

GOVERNMENT OF INDIA
KRISHNA WATER DISPUTES TRIBUNAL

THE REPORT
OF
THE KRISHNA WATER DISPUTES TRIBUNAL
WITH THE DECISION
IN THE MATTER OF WATER DISPUTES REGARDING
THE INTER-STATE RIVER KRISHNA AND THE RIVER VALLEY THERE OF
BETWEEN

1. The State of Maharashtra
2. The State of Karnataka
3. The State of Andhra Pradesh
4. The State of Madhya Pradesh
5. The State of Orissa

}

Parties to the dispute
until 19th April, 1971.

VOLUME I

NEW DELHI
1973

COMPOSITION OF THE KRISHNA WATER DISPUTES TRIBUNAL

CHAIRMAN

Shri R. S. Bachawat,

(Judge of the Supreme Court of India until
31-7-1969).

MEMBERS

Shri Shamsher Bahadur,

(Judge of the Punjab & Haryana High Court
until 14-11-1969).

Shri D. M. Bhandari,

(Chief Justice of the Rajasthan High Court
until 15-12-1969).

SECRETARY

Shri M. Prasad

CONTENTS

VOLUME I

	PAGE
Letter of transmittal	(v)
Representatives of the State Governments	(vii)
CHAPTER-I Genesis of the dispute transmittal	1
CHAPTER-II Reference and subsequent proceedings	3
CHAPTER-III The Krishna river and river basin	8
CHAPTER-IV Inter-State Conference and disputed agreement of July 1951	28
CHAPTER-V Disputes concerning the Tungabhadra	44
CHAPTER-VI Claims arising out of the States Reorganisation Act, 1956	55
CHAPTER-VII Diversion of the Godavari Waters to the Krishna	66
CHAPTER-VIII Ground Water	71
CHAPTER-IX Determination of dependable flow	73
CHAPTER-X Return flow	82
CHAPTER-XI Inter-State Water Disputes Act, 1956, and law relating to equitable apportionment of the benefits of an inter-State river	90
CHAPTER-XII Protection of existing uses	98

Government of India
Krishna Water Disputes Tribunal
D-27, New Delhi South Extension, Part-II

No. 18(5)/73-KWDT.

Dated the 24th December, 1973

To

The Secretary to the Government of India,
Ministry of Irrigation & Power,
NEW DELHI.

Government of India, Ministry of Irrigation & Power referred to the Tribunal certain matters connected with and relevant to the said water dispute *vide* Reference Nos. 4/2/70-WD dated the 18th July, 1970, 4/2/70-WD(i) dated the 2nd September, 1970, 4/2/70-WD(ii) dated the 2nd September, 1970 and 4/2/70-WD, dated the 20th February, 1971.

Sir,

The Tribunal has investigated the matters referred to it, and has prepared its report setting out the facts as found by it and giving its decision on the matters referred to it.

On the 10th April, 1969, the Government of India constituted the Krishna Water Disputes Tribunal *vide* Notification No. S.O. 1419 dated the 10th April, 1969 issued by the Government of India, Ministry of Irrigation and Power. Vacancies in the offices of Members of the Tribunal were filled by fresh appointments made by the Government of India *vide* Notification Nos. S.O. 1738 dated the 3rd May, 1969 and S.O. 4858 dated the 4th December, 1969 issued by the Government of India, Ministry of Irrigation & Power.

The unanimous report of the Tribunal is forwarded herewith.

Yours faithfully,

(R. S. Bachawat)
Chairman

(Shamsher Bahadur)
Member

(D. M. Bhandari)
Member

On the 10th April, 1969, the Government of India, Ministry of Irrigation & Power, referred to the Tribunal for adjudication the water dispute regarding the inter-State river Krishna and the river valley thereof *vide* Reference No. DW II. 32(19)/68 dated the 10th April, 1969. On the 18th July, 1970, the 2nd September, 1970 and the 20th February, 1971. the

Enclosure : Report (Volumes I-IV).

Representatives of the State Governments before the Krishna Water Disputes Tribunal.

I. For the State of Maharashtra.

Advocates

1. Shri H. M. Seervai, Advocate General.
and
2. Shri T. R. Andhyarujina, Advocate.
Instructed by
3. Shri K. J. Choksi, Solicitor.

Other representatives

1. Shri K. K. Framji, Technical Consultant.
2. Shri N. S. Pardasani, Secretary to Government, (up to 15-11-1969).
3. Shri B. A. Kulkarni, Secretary to Government. (from 16-11-1969).
4. Shri E. C. Saldanha, Joint Secretary.
5. Shri K. S. Shankar Rao, Deputy Secretary.
6. Shri V. B. Mulye, Under Secretary.
7. Shri N. M. Jog, Under Secretary.

II. For the State of Karnataka.

Advocates

1. Shri T. Krishna Rao, Ex-Advocate, General.
2. Shri A. G. Holla, Advocate.
3. Shri S. S. Javali, Advocate, Supreme Court.

The following Advocates also appeared in the initial stages :—

1. Shri M. K. Nambyar, Senior Advocate, Supreme Court.
2. Shri V. S. Malimath, Advocate General.

Other representatives

1. Shri B. C. Angadi, Director, Water Resources Development Organisation, (up to 31-8-1972).

2. Shri S. G. Balekundry, Chief Engineer, (from 1-9-1972).
3. Shri B. Subramanyam, Superintending Engineer.
4. Shri M. V. Aswathnarayana Setty, Adviser.

III. For the State of Andhra Pradesh.

Advocates

1. Shri P. Ramachandra Reddi, Advocate General.
2. Shri Anwarulla Pasha, Advocate.
3. Shri D. V. Sastri, Advocate.

The following Advocates also appeared in the initial stages :—

1. Shri A. K. Sen, Senior Advocate, Supreme Court.
2. Shri D. Narasa Raju, Advocate.
3. Shri P. Rami Reddi, Standing Counsel for the Government of Andhra Pradesh at Delhi.

Other representatives

1. Shri M. Sitarama Sastry, Special Officer (Chief Engineer).
2. Shri G. K. S. Iyengar, Superintending Engineer.
3. Shri B. Gopalakrishna Murty, Superintending Engineer.
4. Shri K. Ramachandran, Research Officer.

The following representatives also appeared in the initial stages :—

1. Shri A. R. Venkataraman, Adviser.
2. Shri Mod Ram, Adviser.
3. Shri Mir Jafar Ali, Adviser.

IV. *For the State of Madhya Pradesh. (up to 19-4-1971)*

Advocates

1. Shri K. A. Chitale, Advocate General,
2. Shri U. N. Bhachawat, Advocate.
3. M/s. J. B. Dadachanji & Co., Advocates.
4. Shri V. K. Sanghi, Advocate.

Other representatives

1. Shri S. B. Lal, Secretary to Government.
2. Shri M. S. Chaudhary, Additional Chief Secretary to Government.
3. Shri T. N. Bahel, Special Commissioner.
4. Shri K. L. Handa, Irrigation Adviser and Chief Engineer.
5. Shri R. L. Gupta, Deputy Chief Engineer.

V. *For the State of Orissa. (up to 19-4-1971).*

Advocates

1. Shri Asok Das, Advocate General.

2. Dr. L. M. Singhvi, Senior Advocate, Supreme Court.

3. Shri Santosh Chatterjee, Advocate, Supreme Court.

4. Shri Bimal Krushna Pal, Advocate. 5.

Shri Madhabananda Das, Advocate.

6. Shri Goyind Das, Advocate, Supreme Court.

Other representatives

1. Shri U. C. Agarwal Secretary to Government.
2. Shri Janardhan Tripathy, Chief Engineer

Shri K. C. Gantavat, Additional Chief Engineer.

4. Shri Nilakantha Mishra, Superintending Engineer.

CHAPTER I

Genesis of the dispute

Before the middle of the nineteenth century, there was little development of the water resources of the Krishna basin. Numerous tanks and small diversion works were in operation, but no major work had been constructed. The rivers of the Krishna river system rising in the Western Ghats had plentiful supplies during the monsoon months but most of the water was wasted to the sea. From about 1855 onwards, major irrigation works were undertaken. Since 1855 up to 1928, the Krishna Delta, canal system, the Kurnool Cuddapah Canal, the Mutha canals, the Nira Left Canal, the Vanivilas Sagar and the Nira Right Canal were constructed. During the period 1918 to 1930, the Tatas constructed the Tata Hydrel Works for generating hydro power by westward diversion of water. Until the conclusion of the Second World War, the engineering works for development of water resources were few in number, the water supply was ample in relation to the demand upon it and no use of water seriously affected other uses. There was, therefore little scope for disputes regarding the use, control and distribution of the Krishna waters. British India was subject to the unitary control of the Government of India and even the Princely States were under its paramountcy control. There were minor disputes relating to the Tungabhadra waters but they were amicably settled in 1892 and 1933.

Under the Government of India Act, 1935, water became an exclusive provincial subject and specific provision was made for settlement of water disputes. Before Independence, the Provinces of Madras and Bombay, the States of Hyderabad and Mysore and a few other Princely States had riparian interests in the Krishna basin. The agreements of June and July 1944 provisionally settled disputes concerning the sharing of the Tungabhadra waters, and enabled the States concerned to undertake the construction of the Tungabhadra Project, the Rajolibunda Diversion Scheme, the Bhadra Reservoir Project and the Tunga Anicut. The Radhanagari Project and Ghataprabha Left Bank Canal were also undertaken before 1950.

In 1950, when the Constitution came into force, the entire Krishna basin fell within the territories of the States of Bombay, Mysore, Hyderabad and Madras. There was planning at the State and National levels for intensive development of water resources. The States of Bombay, Hyderabad and Madras pro-

posed important schemes for utilisation of the Krishna waters, like the Koyna, Upper Krishna, Lower Krishna, Krishna Pennar and other projects. At an inter-State conference held in July, 1951 at New Delhi, a memorandum of agreement was drawn up apportioning the available supply of the Krishna river system among the four riparian States.

Apparently, the memorandum of agreement drawn up at the inter-State conference in July 1951 had settled the conflicting claims of the riparian States with regard to the supplies of the Krishna river system for a period of 25 years. But the settlement was more apparent than real. As the State of Mysore refused to ratify the agreement, it was inevitable that disputes regarding the validity of the agreement would arise sooner or later. In the meantime, the Planning Commission continued to clear projects on the assumption that the memorandum of agreement of 1951 was binding upon the States.

Extensive territorial changes were made in the Krishna basin by the Andhra State Act, 1953 as from the 1st October, 1953 and the States Reorganisation Act, 1956 as from the 1st November, 1956. The new States of Bombay, Mysore and Andhra Pradesh became the riparian States in place of the old States of Bombay, Hyderabad, Mysore and Madras. In view of the extensive territorial changes, the Central Water and Power Commission drew up a scheme for re-allocation of the Krishna waters, but the scheme was not accepted by the States. An inter-State conference was held on the 26th and 27th September, 1960, but no settlement could be reached. The legal existence and validity of the agreement of 1951 were now vigorously challenged. The State Governments began to raise objections to the clearance of new projects on the basis of the 1951 allocations.

After 1951 and before September 1960, the States concerned undertook the construction of several important major projects such as the Nagarjunasagar, the Musi, the Tungabhadra High Level Canal Stage I, the Koyna Hydrel Stage I, the Khadakwasla Stage I, the Ghataprabha Stage II, the Ghod and the Vir Dam.

More schemes were put forward by the State Governments and their aggregate demand was in excess of the available supplies. As the pressure on the available supplies increased, the disputes became more bitter and

vociferous. Objections were raised concerning Nagarjunasagar, Srisaïlam and Koyna projects.

In January 1962, the Mysore Government applied to the Central Government for a reference of the disputes to the Tribunal. In May 1961, the Central Government appointed the Krishna Godavari Commission and in August 1962, the Commission submitted their report. The Commission found that without further data it was not possible to determine the dependable flow accurately. They also found that the supplies available in the Krishna basin were inadequate to meet the demands of all the projects of the State Governments. In view of the shortage in the river supplies, they indicated the procedure that should be adopted with regard to the projects under construction and the new projects which the State Governments were anxious to undertake immediately. They put forward proposals for diversion of the Godavari waters into the Krishna and recommended further investigation. They also recommended that regular gauging should be carried out at key sites on the river system.

On the 23rd March, 1963, the Union Minister for Irrigation and Power stated that according to legal opinion at the highest level, the agreement of 1951 had become void, if it was not initially void, at least partially. He stated that new projects should not be held up pending final allocation of the Krishna supplies and should be cleared on the footing that the withdrawals of supplies by Maharashtra, Mysore and Andhra Pradesh should not exceed 400, 600 and 800 T.M.C. respectively. However, the States concerned were not agreeable to this interim allocation. In June 1963, the Maharashtra Government asked for reference of the disputes to the Tribunal.

Since September 1960, the Central Government has given clearance to several important major projects such as the Srisaïlam, the Tungabhadra High Level Canal Stage II, the Upper Krishna, the Malaprabha, the Bhima, the Kukadi, the Krishna, the Warna and the Koyna Hydel Stages II and III.

Action was also taken on the recommendations of the Krishna Godavari Commission. Investigations concerning suitable Godavari diversion links were made at the technical level, but no agreed formula was arrived at. Model experiments were conducted at research stations with a view to re-Construct the yearly flow data at Vijayawada, but the reliability of the model experiments and the accuracy of the reconstructed flow - data were disputed, and the problem of quantitative assessment of the dependable supply remained unsolved.

The Central Government tried their best to settle the dispute by negotiations. Several inter-State conferences were held, but the dispute could not be settled. Fresh applications for reference of the dispute were made by the State Governments in 1968 and 1969. Eventually in April 1969, the Central Government referred the disputes to this Tribunal.

In view of the re-organisation of States and the re-distribution of the Tungabhadra Valley between the States of Mysore and Andhra Pradesh, disputes arose concerning the continuing validity of the earlier Tungabhadra agreements, the use control and distribution of the Tungabhadra waters and the management of certain existing works on the Tungabhadra. These disputes were also referred to the Tribunal.

CHAPTER II

Reference and subsequent proceedings

Reference of the dispute • On the 10th April, 1969, the Government of India constituted the Krishna Water Disputes Tribunal. On the 3rd May, 1969 and the 4th December, 1969, vacancies in the offices of Members of the Tribunal were filled by fresh appointments.

On the 10th April, 1969, the Government of India referred to the Tribunal for adjudication the water dispute regarding the inter-State river Krishna and the river valley thereof emerging from the letters of the Mysore Government dated the 29th January, 1962 and the 8th July, 1968, the letters of the Maharashtra Government dated the 11th June, 1963 and the 26th August, 1968 and the letters of the Andhra Pradesh Government dated the 21st April, 1968 and the 21st January, 1969. The complaints of the State Governments were set out in the afore-said letters. In the letter of reference, the Government of India requested the Tribunal to consider the representations of some of the States concerning the possibility of diversion of waters of the river Godavari to the river Krishna and the opposition of some of the other States to such diversion.

Summary of complaint of the Mysore Government: The memorandum of agreement drawn up by the Planning Commission regarding the distribution of the waters of the river Krishna between the States of Bombay, Madras, Hyderabad and Mysore as a result of the inter-State Conference held on the 27th and 28th July, 1951 is not binding as no agreement matured as a result of the Conference. The proposal of the Central Water & Power Commission regarding the re-allocation of the Krishna waters in consequence of the reorganisation of States and the statement of the Union Minister for Irrigation and Power in the Lok Sabha on March 23, 1963 regarding the interim allocation of the Krishna waters are not acceptable to Mysore. The proposed Srisailem and Nagarjunasagar Stage II projects, the erection of crest gates on the Nagarjunasagar dam and the proposed westward diversion of the Krishna waters in excess of 67.5 T.M.C. are objectionable. Mysore claims an equitable distribution of the waters of the Krishna and a stay of implementation of the projects of Andhra Pradesh and of Maharashtra's westward diversion of the Krishna waters in excess of 67.5 T.M.C.

Summary of complaint of the Maharashtra Government: The agreement of 1951 regarding the allocation of the Krishna waters is void and not binding. The interim allocation of the Krishna waters by the Union Minister on March 23, 1963 cannot be accepted. The implementation of Srisailem project, the erection of the Nagarjunasagar crest gates and the clearance of projects of the lower States without Maharashtra's prior consent are objectionable. Maharashtra claims an assessment of the dependable flow of the Krishna, an equitable apportionment of the Krishna waters and in case it is found that any State is utilising more than its legitimate share of the Krishna waters, an order directing it to release the excess waters and, if such release is impossible, an order directing it to make good the shortfall by diverting its share of the Godavari waters to the Krishna Valley.

Summary of complaint of Andhra Pradesh Government: The 1951 Agreement regarding allocation of the Krishna waters is valid and binding. Maharashtra and Mysore are committing breaches of the 1951 agreement. Moreover, Mysore is committing breaches of the 1944 agreement between Madras and Mysore concerning the Tungabhadra waters. Andhra Pradesh claims an injunction restraining Maharashtra and Mysore from undertaking works involving utilisation of more than their respective shares under the 1951 agreement, an injunction restraining "Maharashtra from diverting westwards more than 67.5 T.M.C. of water for the Koyna project, an order directing Maharashtra to reduce the storage capacity of Koyna dam to 36 T.M.C., and an injunction restraining Maharashtra and Mysore from intercepting flows to the Delta and other irrigation works of Andhra Pradesh.

Parties to the dispute: The States of Andhra Pradesh, Maharashtra, Mysore, Madhya Pradesh and Orissa were the original parties to the water dispute. The States of Madhya Pradesh and Orissa were made parties as they were interested in the diversion of the Godavari waters to the Krishna. On the 19th April, 1971, all the parties jointly stated that none of the States would ask for a mandatory order for such diversion. Thereafter, Madhya Pradesh and Orissa were not interested in the Krishna case and they were discharged from the records of the case.

Subsequent references.—On the 18th July, 1970, the Government of India at the request of the Andhra Pradesh Government referred to the Krishna Water Disputes Tribunal matters concerning the release of waters by Mysore for the benefit of Andhra Pradesh from (i) the Upper Krishna Project; (ii) the Tungabhadra Left Bank Canal and (iii) the Bhima Project. On the 2nd September, 1970, matters concerning the release of waters by Maharashtra for the benefit of Mysore from (i) a storage dam at Ajra and (ii) the Koyna Project were referred to the Tribunal at the request of the Mysore Government. On the same day, matters concerning the agreements of 1892 and 1933 were referred to the Tribunal at the request of the Andhra Pradesh Government. On the 20th February, 1971, the Government of India at the request of the Andhra Pradesh Government referred to the Tribunal matters concerning the release of water from the Tungabhadra Reservoir to meet the requirements of the Kurnool-Cuddapah Canal and Rajolibunda Canal and as contribution to the Krishna and concerning the vesting in the Tungabhadra Board of the control of the Tungabhadra dam and reservoir and the main canal on the left side, the Munirabad Power House, the Rajolibunda Headworks and the length of the common canal of the Rajolibunda Project in the Mysore State limits.

Pleadings: The parties filed their statements of case and rejoinders (APK Volumes I to X, MRK Volumes I to VIII, MYK Volumes I to VIII, MPK Volumes I to III and ORK Volumes I and II) and also additional statements (S P. Volumes I to IV). The pleadings clarify the disputes raised in the complaints made by the States concerned, and specify the reliefs claimed by them.

Maharashtra⁽¹⁾ prayed for (a) a declaration that the agreement of 1951 was invalid and/or had ceased to be operative, (b) allocation of the equitable share of the Stages in the dependable flow of the Krishna basin, (c) suitable provision for the sharing of the excess or deficiency of supplies when they would be more or less than the dependable flow, (d) direction for diversion of the waters of the river Godavari to the Krishna and (e) suitable machinery for implementing the order of the Tribunal.

Mysore (2) prayed for (a) allocation to the parties of the available waters in the Krishna river system

determined at 75 per cent dependability ignoring the alleged agreement of 1951, (b) sharing of waters in years when the available supply would be more or less than the yield determined on the basis of 75 per cent dependability, (c) direction for diversion of surplus waters of the Godavari to the Krishna basin, (d) injunction restraining diversion of the waters of the Krishna beyond the Krishna basin, (e) stay of further implementation of Srisaïlam and Nagarjunasagar projects and (f) suitable machinery for implementation of the decision of the Tribunal.

Andhra Pradesh⁽³⁾ prayed for a declaration that the agreement of 1951 was valid and binding and for suitable directions for implementation of the agreement. In case the agreement of 1951 was held to be not valid and binding, Andhra Pradesh prayed for (a) a declaration that the dependable yield of the river Krishna was 1745 T.M.C. of water, (b) direction for ensuring full supply in all years for projects committed before 1951 on a daily basis and for projects committed up to 1960 on a weekly basis, (c) allocation of the balance dependable yield without taking into consideration the diversion of water from the Godavari to the Krishna, (d) sharing of the excess flows over and above the dependable yield, (e) injunction restraining further westward diversion of the Krishna waters, (f) directions for the working of the Tungabhadra Left Bank Canal and other schemes in Mysore so that areas in Andhra Pradesh might not be deprived of the benefits and use of waters from those schemes, (g) implementation of the agreement of 1944 and (h) other reliefs.

In the supplemental pleadings⁽⁴⁾ Andhra Pradesh prayed for (a) release of water from the Tungabhadra dam for the benefit of certain downstream projects and by way of contribution to the Krishna (b) vesting of the control and administration of certain works in the Tungabhadra Board and (c) directions for ensuring the share of Andhra Pradesh in the power generated at the Munirabad Power House.

Claims of Maharashtra, Mysore and Andhra Pradesh on the waters of the Krishna river system: In their statements of case, ⁽⁵⁾ Maharashtra, Mysore and Andhra Pradesh asserted the following claims to the utilisations of the waters of the Krishna river system for their existing and future projects:—

(1) MMR I pp. 223–226.

(2) M Y K I pp. 64–65.

(3) APK I pp. 133–137.

(4) SP III pp. 12–23.

(5) MRK I p. 38; MRK II pp. 50–60; MYK I pp. 52–53; APK I pp. 123–125,

State	Gross utilisation in T.M.C.
Maharashtra	828.70
Mysore	1430.00
Andhra Pradesh	1888.10
	4146.80

In addition to the above demands, Maharashtra claimed 32.5 T.M.C. from regenerated flows and 70 to 80 T.M.C. for industrial use and domestic water supply, Andhra Pradesh claimed 120 T.M.C. for water supply and industrial use and Mysore stated that its demand for 1430 T.M.C. did not include its needs of water for domestic and industrial use.

Admittedly, there is not enough water in the Krishna river system to satisfy all the claims asserted against it by the three States.

Points of dispute: The preliminary point of dispute between the parties is whether any agreement regarding allocation of the Krishna waters was concluded as a result of the deliberations at the inter-State conference held in New Delhi on the 27th and 28th July, 1951 and, if so, whether the agreement is valid and subsisting. If there is a valid and subsisting agreement, it must be implemented. If not, the parties want an equitable apportionment of the Krishna waters for their beneficial uses, so that they may know the limits within which each can operate and may plan their water resources development accordingly. For the purpose of equitable allocation, it is necessary to determine the dependable flow of the Krishna, regarding which there is a dispute between the parties and to consider whether return flows from irrigation and the possibility of diversion of the waters of the river Godavari to the Krishna should be taken into account.

The next main point of dispute is how and on what basis the equitable apportionment should be made. This dispute requires consideration of the following matters; first, what are the relevant laws and guidelines on the subject; secondly, whether and to what extent the projects in operation or under construction should be protected and their utilisations preferred to contemplated uses; thirdly, whether any preference or priority should be given to irrigation over production of power; fourthly, whether more diversion of the Krishna waters outside the Krishna basin should be permitted; fifthly, how and on what basis the allocations for existing and future development of the concerned States should be made; sixthly, whether any direction for the release of water or for extension of irrigation facilities from any project in any State should be made for the benefit of another State under section 108(2) of the States Reorganisation Act; seventhly, whether any restrictions should be imposed on the uses of any State; eighthly, whether the allocations

should be subject to review or modification; and ninthly, what machinery, if any, should be set up to make available and regulate the allocation of water to the States or otherwise to implement the decision of the Tribunal.

With regard to the Tungabhadra, a tributary of the Krishna, there are a number of specific points of dispute; first, whether the agreements of 1892, 1933, June 1944 and July 1944 are valid or subsisting; secondly, whether any directions should be given regarding the release of waters from the Tungabhadra dam; thirdly, whether any directions should be given regarding the control and administration of the Tungabhadra dam and reservoir and other works; and fourthly, whether Andhra Pradesh is entitled to any share in the power generated in the power house at Munirabad.

Finally, it is necessary to determine what reliefs should be given to the parties.

Issues.—Issues were raised on the 8th January, 1970. They were amended from time to time and were finally settled on the 14th April, 1971. The issues as finally settled are as follows:—

I. Was there any concluded agreement regarding allocation of the waters of the river Krishna as alleged? Was the agreement valid and enforceable? Is it still subsisting and operative and binding upon the States concerned in the present reference? If so, with what effect? Is there any breach of the agreement as alleged?

Sub-Issues

- (1) Was there a concluded agreement as alleged? Was the agreement ratified, acted upon and treated as binding by the States concerned?
- (2) Was the agreement in conformity with Article 299 of the Constitution? Was it within the purview of the article?
- (3) Was the agreement inequitable or arbitrary or based on inadequate data? If so, with what effect?
- (4) Did the agreement on its true construction allocate waters for specific projects? Have some of the projects been abandoned? If so, has the agreement become void?
- (5) Has the agreement ceased to be operative on the reorganisation of the States?
- (6) If the agreement is binding, what reallocation of waters, if any, should be made, in view of the reorganisation of States?
- (7) Is there any breach of the agreement as alleged by Andhra?

- (8) Is the validity of the agreement dependent upon the validity of the Godavari agreement.

II What directions, if any, should be given for the equitable apportionment of the beneficial use of the Waters of the Krishna river and the river valley ?

Sub-Issues

- (1) On what basis should the available waters be determined ?
- (2) How and on what basis should the equitable apportionment be made ?
- (3) What projects and works in operation or under construction, if any, should be protected and/or permitted ? if so, to what extent ?
- (4) Should diversion or further diversion of the waters outside the Krishna drainage basin be protected and/or permitted ? If so, to what extent and with what safe guards ? How is the drainage basin to be defined ?
- (5) Should any preference or priority be given to irrigation over production of power ?
- (6) Has any State any alternative means of satisfying its needs? If so, with what effect ?
- (7) Is the legitimate interest of any State affected or likely to be affected prejudicially by the aggregate utilisation and requirements of any other State ?
- (8) What machinery, if any, should be set up to make available and regulate the allocations of waters, if any, to the States concerned otherwise to implement the decision of the Tribunal.

III Is the Agreement of July, 1944 valid and subsisting and, if so, with what effect ? Was it invalid as Bombay, Sangh and Hyderabad were not parties to it? Was it rendered ineffective by the Supplemental Agreement of 1945? Did it survive on the merger of the Princely State of Mysore in the Republic of India? Had it ceased to be operative on the reorganisation of States ?

IV Are the Agreements of 1892 and 1933 so far as they relate to river Krishna and its tributaries subsisting and, if so with what effect? Did they survive On the merger of the Princely State of Mysore in the Republic of India? Have they ceased to be operative on the reorganisation of States?

IV (A). Did the agreement of June, 1944 survive on the —

- (i) coming into force of the Indian Independence Act;
- (ii) coming into force of the Constitution of India ; and
- (iii) merger of the princely State of Hyderabad in the Republic of India ?

Has the agreement ceased to be operative on the reorganisation of States ?

IV(B). (a) Should any directions be given for the release of waters from the Tungabhadra Dam —

- (i) for the benefit of the Kurnool Cuddapah canal;
- (ii) for the benefit of the Rajolibunda Diversion Scheme ; and
- (iii) by way of contribution to the Krishna river ?

(b) Should any directions be given for the vesting of the control and administration in the Tungabhadra Board of —

- (i) the Tungabhadra Dam and the Reservoir and the main canal on the left side ;
- (ii) the Rajolibunda Headworks and the common canals within Mysore State limits ; and
- (iii) the Power House at Munirabad ? Has

the Tribunal any power to give such directions?

(c) Is Andhra Pradesh entitled to a share in the power generated at the Power House at Munirabad ?

(d) Is the claim of Andhra Pradesh for a share in the benefits of the power generated at Munirabad Power House and/or for the vesting of the control and administration of the said Power House in the Tungabhadra Board a water dispute within the meaning of the Inter-State Water Disputes Act ?

V. Should any directions be given for release of waters —

- (a) by Maharashtra for the benefit of Mysore from (i) storage dam at Ajra and

(ii) Koyna Valley Irrigation-cum-Hydro-Electric Project;

(b) by Mysore for the benefit of Andhra Pradesh from (i) Upper Krishna Project; (ii) Tungabhadra Left Bank Canal Project and (iii) Bhima Project.

VI. Is it possible to divert waters from the river Godavari to the river Krishna ? Should such diversion be made and, if so, when by whom, in what manner and at whose cost ? Is the Tribunal competent to adjudicate on these questions ?

VII. To what relief are the parties entitled ?

Exhibits and Documents.—The parties filed numerous exhibits. Most of the exhibits may be found in bound volumes (APDK volumes I to XII, MRDK Volumes I to XIV, MYDK Volumes I to XXII, CWPC(K) Volumes I to XXXIV, MIP(K) Volumes I and II, PC(K) Volume I, APPK Volumes I to XXXVI, MRPK Volumes I to XXXIII and MYPK Volumes I to XIV.

Witnesses.—The State of Maharashtra called K. K. Framji, Consulting Engineer, as an expert witness on the subjects of model experiments, sub-basin yields, return flows and carryover studies generally and with particular reference to Srisaïlam and Nagarjunasagar storage reservoirs. The State of Mysore called B. C. Angadi, Chief Engineer, P.W.D., as an expert witness regarding carryover studies in the Krishna Valley. The State of Andhra Pradesh called U. V. Srinivasa Rao, a photographer, to prove certain photographs of the Vijayawada anicut, M. Sivaramaiah, Executive Engineer, to prove the custody of a file and drawing and the conditions of river flow at Vijayawada, M. V. R. Prasad, an assistant, to prove the proper custody of certain documents and drawings relating to the Vijayawada anicut, Y. Jagannadha Rao, retired Assistant Engineer, to prove a photograph and the physical features of the anicut, M. Jaffer Ali, retired Chief Engineer, on the subject of carryover studies particularly with reference to Nagarjunasagar and Srisaïlam reservoirs and Professor J. V. Rao as an expert witness on the subject of model experiments.

Tour.—The Tribunal visited various places in the Krishna basin to study the local conditions and needs and to see irrigation and power projects, the sites of projects under construction or under contemplation and also certain research stations. Particulars of the tour are given in Appendix "T" to this Report.

Assessors.—When the hearing of the case started, Counsel for all the States jointly requested us not to appoint any assessors. On the 15th September, 1969 ; Counsel for all the States stated that they "desire that the Tribunal need not appoint any assessor or assessors". Again, on the 7th August, 1970, all the States jointly stated that "The States of Andhra Pradesh, Maharashtra, Mysore, Madhya Pradesh and Orissa adhere to their submission that no assessors should be appointed by the Hon'ble Tribunal." Counsel for all the States assured us that their engineers and technical representatives would jointly give us the fullest assistance with regard to all scientific and technical matters. In these circumstances, we refrained from exercising our powers of appointing assessors under subsection (3) of section 4 of the Inter-State Water Disputes Act, 1956.

Units of Measurement.—The old records used the British system of units, the new records have mostly used the metric system of units and the data supplied by the parties have used both system of units. As we have to refer to the old as also the new records and the data supplied by the parties, both the systems have to be necessarily used in this judgment. The parties have supplied an agreed conversion table which is included as Appendix "A" to this Report.

Alteration of name of the State of Mysore.—The Mysore State (Alteration of name) Act, 1973 provides for alteration of name of the State of Mysore. Under Section 2 of the Act, with effect from the 1st November, 1973, the State of Mysore shall be known as the State of Karnataka. Section 8 of the Act provides that, in pending legal proceedings, the State of Karnataka shall be deemed to be substituted for the State of Mysore.

CHAPTER III ⁽¹⁾

The Krishna River and River Basin

Part—I—The Krishna River System

THE KRISHNA.—The Krishna is the second largest river in Peninsular India. It rises in the Mahadev range of the Western Ghats near Mahabaleshwar at an altitude of 4,385 ft. above sea level. Rising in the Ghats near the Arabian sea, the Krishna flows through Maharashtra, Mysore and Andhra Pradesh gathering water on its way from innumerable rivers, streams or tributaries and drops into the Bay of Bengal. From its source, the Krishna speeds southwards skirting the eastern spurs of the hills through the districts of Satara, Sangli and Kolhapur in Maharashtra. After passing the dam sites for the Krishna Project at Dhoni and Borkhal, the Krishna receives the waters of the Venna on the right bank, 42 miles from its source at Mahuli near Satara city. Lower down, the river is joined by the Urmodi and the Tarali on the right bank. Flowing past the Khodshi weir from which the Krishna canal takes off, the Krishna is joined on the right bank by the Koyna of which the Wang is a tributary, at mile 85 at an elevation of 2,505 ft. Lower down, the Krishna receives the waters of the Yerla from the left. About 135 miles from its source near Sangli, the Krishna receives on the right bank the waters of the Warna of which the Kadvi is a tributary. Near Kurundvad, at about mile 156, the Krishna receives on its right bank the united waters of the Panchaganga, that is, the Kasari, the Kumbhi, the Bhogavathi, the Tulshi and the Dhamni. At about mile 190, the Krishna is joined on the right bank by the Dudhganga of which the Vedganga is a tributary. About 190 miles from its source and at an altitude of about 1,750 ft., the Krishna enters Mysore State. The river now has left the heavy rainfall zone and turns east. In the run of 186 miles within Maharashtra, the bed fall is 14.06 ft. per mile, the fall up to mile 85 being steeper at the rate of 22.1 ft. per mile.

After flowing for some distance in Mysore, the Krishna is joined by the Agrani on the left bank, the Ghataprabha on the right bank at mile 315 and the Malaprabha on the right bank at mile 337. The

junction of the Malaprabha is between Almatti and Narayanpur, the dam sites of the Upper Krishna Project. At Jaldurga falls below Narayanpur, the Krishna drops about 400 ft. in about 3 miles from the table land of the Deccan proper to the alluvial lands of Raichur District. Lower down, the Krishna receives the waters of the Don on the left bank and at about mile 490 the waters of the Bhima on the left bank at an altitude of 1,125 ft. In the run of 300 miles within Mysore, the bed fall is 2.12 ft. per mile.

After the confluence of the Bhima, the Krishna forms the common boundary of Mysore and Andhra Pradesh for 26 miles and then flows through Andhra Pradesh.

About 545 miles from its source, the Krishna receives the waters of the Peddavagu on its left bank, and at about mile 570 near Kurnool the waters of the Tungabhadra on the right bank. A short distance below its junction with the Tungabhadra, the Krishna enters a deep gorge 180 miles long and flows in a north easterly direction in deep rocky channels, with a rapid fall through the spurs of the Nallamalai range and other hills past Srisailem dam site and Nagarjunasagar reservoir before emerging into the plains of the Coromandal coast at Pulichintala, 750 miles from its source at an elevation of 120 ft. Between Kurnool and Pulichintala, the Krishna is joined by the Dindi on its left bank at mile 681, Peddavagu II on its left bank at mile 696, the Hallia at mile 704 and the Musi on its left bank at mile 726. Lower down, the Krishna is joined by the Palleru on the left bank at mile 762 and the Muneru on the left bank at mile 789 before reaching Vijayawada at about mile 815. At Vijayawada the river flows through a gap, three quarters of a mile wide, between two hills. Beyond this point stretching away on both sides of the river lies a wide alluvial plain known as the Krishna Delta. The Delta is irrigated by canals taking off from the Prakasham Barrage at Vijayawada. After Vijayawada, the river continues in a single channel of great width for another 40 miles when it secondly off to the left a branch known as the Puligadda which forms

(1) Important data with regard to the rivers of the Krishna river system and the Krishna basin were agreed to by the technical representatives and counsel of the States of Maharashtra, Mysore and Andhra Pradesh. The agreed data were incorporated in separate sheets which were exhibited by consent of the parties see MRDK XI, XII, XIII, XIV.

the island of Divi. Thereafter, the main stream continues for another 15 miles and after a total run of 870 miles it breaks up into three mouths separated from one another by two islands and joins the Bay of Bengal. In a run of 358 miles within Andhra Pradesh, the bed fall is 3 feet per mile.

During the monsoon season, the Krishna occasionally swells into floods. In the highest known flood on the 7th October, 1903, the recorded discharge at Vijayawada was 10,60,880 cusecs,⁽²⁾ a quantity more than twice the maximum discharge of the Nil. During the dry weather, the minimum discharge has fallen as low as 100 cusecs. The distinctive features of the greater part of the river are low water level during dry weather, narrow and rocky bed and great flood lift sometimes as much as 100 ft. Increasing upstream utilisation will delay the floods and reduce their intensity. The major tributaries fall into the river in the upper two-thirds of its length.

The rivers Bhima and Tungabhadra, tributaries of the Krishna, are themselves major inter-State rivers.

THE BHIMA.—The Bhima rises in the Western Ghats at Bhimashanker in Poona District of Maharashtra at an altitude of about 3,100 ft. The river flows for a total length of 535 miles through Maharashtra, Mysore and Andhra Pradesh and falls into the Krishna 3 miles above Krishna Railway Station at an altitude of about 1,125 ft.

During its passage through Maharashtra, the Bhima is joined by the Indrayani of which the Kudali is a tributary on the right bank, and the Vel on the left bank. The Bhima receives the waters of the Mulamutha on the right bank near Poona about 85 miles from its source, at an elevation of 1,700 ft. In 85 miles, the bed fall is 16.4 ft. per mile. Lower down, the Bhima is joined by the Ghod of which the Mina, the Kukadi and the Hanga are tributaries, at about mile 103 on the left bank at an elevation of about 1,685 ft. The fall between miles 85 and 103 is 0.82 ft. per mile. The Bhima passes the Ujjani dam site at mile 200 at an elevation of 1,503 ft. The fall between miles 103 and 200 is 1.88 ft. per mile. The river is joined at mile 223 on the right bank by the Nira of which the Karha is a tributary and then by the Man on the right bank. At mile 303, the elevation of the river is about 1,400 ft. For a stretch

of 46 miles between miles 303 to 349 the Bhima forms the boundary between Maharashtra and Mysore. Within this stretch, the Bhima receives the waters of the Sina on the left bank. The fall between miles 200 and 303 is 1 ft. per mile.

After mile 349, the river Bhima flows through Mysore for 186 miles. In Mysore, the river is joined by the Dodahalla (Nargel), the Bor, the Bori, the Amarja and the Kagna of which the Bennithora and Mullamari are tributaries. In the last 6 miles, the Bhima forms the common boundary between Andhra Pradesh and Mysore. The river joins the Krishna after a run of 535 miles. The fall between miles 303 and 535 is 1.19 ft. per mile.

THE TUNGABHADRA.—The river Tungabhadra is formed by the confluence of two powerful streams—the Tunga on the left and the Bhadra on the right. The two streams rise in the Western Ghats on the hill known as Varaha Parbata at Gangamula within Mysore State at an elevation of about 3,930 ft. to the north of the ridge separating the Krishna and the Cauvery basins. The Malnad region, through which the Tunga and the Bhadra flow, has rich and well developed forest resources. The Tunga runs north-east beyond Sringeri, takes a sharp turn north-west to Tirthahalli and then flows north-east past Ganjnoon, the site of the Tunga anicut near Shimoga town. The Bhadra runs east to the western base of the Baba Budan Range near Mugundi and then north past Lakkavalli and Bhadravathi. The Tunga, after a run of 92 miles, and the Bhadra, after a run of 111 miles, unite at Kudali at an elevation of 2,000 ft. The bed falls of the Tunga and the Bhadra from their sources up to Kudali are 21 ft. and 17.38 ft. per mile respectively.

Below the junction of the Tunga and the Bhadra, the river takes the name Tungabhadra, the fabled Pampa of the Ancients. The river Tungabhadra flows north for some distance, is joined by the Kumudwathi on the left and the Haridra on the right and at mile 100 by the Varada swollen by the waters of the Dharma at an elevation of 1,670 ft. The Tungabhadra then runs north-east, is joined by the Chikka Hagari, and cuts through the Sandur range of hills at Mallapuram where the landscape is dominated by the Tungabhadra dam. The dam site at mile 165 is at an elevation of 1,483.5 ft. The fall between Kudali

(2) The Lower Krishna Project Report 1952 p. 35 (APPK X p. 35); The Nandikonda Project Report 1954 p. 14 APPK I p. 14). On the basis of the Poondi Model experiment, the recorded discharge at Vijayawada on 7-10-1903 was stated to be 11,3,901 cusecs in Kistna Pennar Project Report (1951 Scheme) Vol. I pp. 2, 17 (APPK II pp. 2, 17) and in the Khosla Committee Report, p. 13. The discrepancy in the data of the maximum discharge at Vijayawada is discussed in the Report of the COPP Irrigation and Power Team on Nagarjunasagar Project, 1960, pp. 139-145, 155-157.

and mile 165 is 3.13 ft. per mile. From Mallapuram, the river flows swiftly past Hampi through the ruins of the capital city of the mighty Vijayanagar Empire, and is joined by the Vedavathi at mile 225. The Tungabhadra forms the border between Mysore and Andhra Pradesh between miles 237 and 273 where it receives the waters of the Maskinala and flows past Rajolibunda anicut. The elevation of the river at mile 237 is 1,120 ft. and at mile 273 is 995 ft. Between miles 165 and 237 the fall is 5.04 ft. per mile and between miles 237 and 273 the fall is 3.47 ft. per mile. In Andhra Pradesh the river is joined by the Hindri and after passing Sunkesala anicut, it flows into the Krishna beyond Kurnool at an elevation of 865 ft. after a run of 330 miles from the confluence of the Tunga and the Bhadra. The fall between miles 273 and 330 is 2.28 ft. per mile. The river receives copious supply from the highly wooded and hilly catchment of the Western Ghats. Though it is classed as a perennial river, the monsoon -flows are large, while the summer flows dwindle to 100 or even 50 cusecs.

The Varada drains a large area of the Western Ghats and its chief tributary is the Dharma.

THE GHATAPRABHA.—The Ghataprabha rises from the Western Ghats in Maharashtra at an altitude of 2,900ft., flows eastwards for 37 miles through Ratnagiri and Kolhapur Districts of Maharashtra, forms the border between Maharashtra and Mysore for 5 miles and then enters Mysore. Not far from the Mysore border are Hidkal dam site and the Gokak falls about 200 ft. high. In Mysore, the river flows for 134 miles through Belgaum District past Bagalkot. After a run of 176 miles, the river joins the Krishna on the right bank at Kudli Sangam at an elevation of 1,640 ft., about 10 miles from Almatti. Its principal tributaries are the Tamraparni, the Hiranyakeshi and the Markandeya.

The Tamraparni rising in Maharashtra flows in Maharashtra for 16 miles and after a run of another 16 miles in Mysore joins the Ghataprabha. The Hirayankeshi rising at Amboli village in Ratnagiri District of Maharashtra flows in Maharashtra for 39 miles, forms the boundary between Maharashtra and Mysore for 4 miles and after a run of 12 miles in Mysore joins the Ghataprabha on the left bank. The Markandeya rising in Maharashtra flows in Maharashtra for 5 miles and after a run of 41 miles in Mysore joins the Ghataprabha on the right bank.

THE MALAPRABHA.—The Malaprabha has its source near the Chorla Ghats, a section of the Western Ghats at an elevation of 2,600 ft. about 22 miles

south-west of Belgaum in Mysore. The river flows east and then north-east and joins the Krishna at Kapilasangam in Bijapur District at an elevation of 1,600 ft. about 190 miles from its source. Near Manoli, the river passes through the famous Peacock Gorge, the site of the Malaprabha dam now under construction. The principal source of supply of the river is about 20 miles length of the Western Ghats and a small area east of it. Its principal tributaries are the Bennihala, and the Hirehalla.

VEDAVATHI.—The Vedavathi, also called the Hagari, is formed by the union of the streams—the Veda and the Avati originating in the Bababudanagiri range of hills of the Western Ghats in Mysore State. The river flows in Mysore, enters Andhra Pradesh near Bhairavanithippa, re-enters Mysore and after a short run forms the boundary between Andhra Pradesh and Mysore. For the remainder of its course, the river flows in Mysore until it joins the Tungabhadra on the right bank after a run of 243 miles. The river runs for 182 miles in Mysore, 45 miles in Andhra Pradesh and forms the common boundary between Mysore and Andhra Pradesh for 16 miles. Its principal tributaries are the Suvarnamukhi; the Chinna Hagari and the Peddavanka.

THE MUSI.—The Musi rises at an altitude of 2,168 ft. in Medak District of Andhra Pradesh. It flows east, passes through Hyderabad city, is joined by the Chinnamusi Nadi and by the Aleru, turns south, is joined by the Paler and drops into the Krishna near Wazirabad at an elevation of about 200 ft. after a run of 166 miles.

THE PALLERU.—The Palleru, also known as the Palair, rises in Warangal District, flows south, and after a run of 95 miles joins the Krishna.

THE MUNERU.—The Muneru rises in Warangal District, flows south, is joined by the Akeru and the Wyra and drops into the Krishna after a run of 122 miles.

THE KOYNA.—The Koyna in Satara District of Maharashtra is an important right bank tributary of the Krishna river. Rising on the west side of the Mahabaleshwar plateau the river runs in a north to south direction for the first 40 miles and after Helwak village turns east for the remaining 34 miles. The Koyna dam is located up stream of Helwak village at mile 36 of the Koyna river. The Koyna joins the Krishna lower down near Karad town after a run of 74 miles. In the hot weather season, the stream often dries up but the water stands in deep pools through the driest year. During the rains, the river fills up from bank to bank.

Generally.—The heavy rainfall of the Western Ghats is the main source of supply of the Krishna river system. The Krishna basin drains a length of about 428 miles of the Western Ghats, comprising 140 miles in Upper Krishna, 40 miles in Ghataprabha, 20 miles in Malaprabha, 100 miles in Upper Bhima and 128 miles in Tungabhadra sub-basins. The waters of the river system find their outlet in the Bay of Bengal, though they have their main source in the Ghats not far from the Arabian sea.

The Western Ghats run almost parallel to the sea coast at a distance of 50 to 100 miles (80.47 to 160.93 km) from the sea. Precipitous on the western side, they fall away more gradually to the east. The heaviest rainfall occurs on the peak of the ridge, the intensity of the rainfall rapidly decreasing as we go eastwards. The rivers rise in the valleys close to the Ghats which like the ridge of a roof divides the flow into two parts, the smaller portion falling westwards into the Arabian sea and the other flowing through rivers eastwards to the Bay of Bengal.

All the rivers are under the influence of the south-west monsoon. They are entirely rain fed. There is no perennial snow in the mountains to sustain them. Many of the rivers having their source in the Western Ghats begin to rise with the first good rains in June 2nd during high floods occasionally swell into raging torrents. From the middle of October, the flow decreases rapidly. During the dry weather, the discharges are very very low, but as the rivers are fed by underground springs, they are not completely dry.

In the non-Ghat areas, the rivers generally have flat shallow valleys and run in deep channels which have generally approached the base level of erosion. The river courses are stable and well defined.

Inter-State rivers—The inter-State rivers' of the Krishna river system and their successive and common lengths in the States of Maharashtra, Mysore and Andhra Pradesh are given below:—

Sl. No.	Name of River	LENGTH IN MILES				
		Maharash- tra	Mysore	Andhra Pradesh	Common length	Total length
1	2	3	4	5	6	7
1.	Krishna	186	300	358	26	870
2.	Ghataprabha	37	134	..	5	176
3.	Bhima	303	180	..	52	535
4.	Tungabhadra		237	57	36	330
5.	Vedavathi (Hagari)		182	45	16	243
6.	Vedaganga	41	12	..	2	55
7.	Dudhganga	43	12	..	8	63
8.	Panchaganga	44		..	2	46
9.	Agrani	34	26	..	..	60
10.	Don	8	122	..	..	130
11.	Hirehalla (Krishna)	2	22	..	..	24
12.	Markandeya (Ghataprabha)	5	41	..	..	46
13.	Tamraparni (Ghataprabha)	16	16	..	..	32
14.	Hiranyakeshi (Ghataprabha)	39	12	..	4	55
15.	Doddahalla (Bhima)	30	6	..	..	36
16.	Bor Nala (Bhima)	24	18	..	..	42
17.	Bori Nadi (Bhima)	66	14	..	..	76
18.	Amarja (Bhima)	6	39	..	..	45
19.	Kagna (Bhima)		44	43	..	87
20.	Bennithora (Kagna)	30	55		6	91
21.	Suvarnamukhi		45	6	2	54
22.	Chinna Hagari		80	18	..	98
23.	Peddavanka (Vedavathi)		15	14	..	29
24.	Peddavanka (Tungabhadra)		5	12	..	17

1	2	3	4	5	6	7
25. Garchi Vanka (Tungabhadra)		..	15	20	..	35
26. Gonde Halla (Chinna Hagan)		..	21	3	..	24
27. Dona Halla (Bor Nala)		12	6	..	..	18
28. Katra (Bhima)		5	7	..	..	12
29. Sar Nala (Kagna)			23	5	..	28

List of Stream : A table giving the names of the streams in the Krishna river system and their lengths is given in the enclosed map."

Part II—The Krishna River Basin

Locations.—The Krishna basin lies between latitudes 13° 7'/N to 19° 20'/N and longitudes 73° 22'/E to 81° 10'/E. It is roughly triangular in shape with its base along the Western Ghats, and apex at Vijayawada. The basin extends over an area of 99,980 square miles which is nearly 8 per cent of the total geographical area of India.

Boundaries.—The Western Ghats, 7,000 to 2,000 ft. high running parallel to the coast, form a continuous watershed on the west.

On the north, the Balaghat and the Mahadeo ranges stretching forth from the eastern flank of the Western Ghats and the Anantagiri and other ranges of hills and ridges separate the Krishna basin from the Godavari.

On the eastern side, the broken ranges of the Eastern Ghats dissect the country and proceeding south-west leave broad flat tracts of land between the hills and the sea.

On the south, the Uravakonda and the Mitta-kondala ridges and the Erramalai hills separate the Krishna basin from the Pennar basin and the Nallamalai and the Veligondla hills separate the Krishna basin from other minor basins. Other ridges on the south separate the Krishna basin from the Cauvery basin.

A map of the Krishna basin is appended to this report.

Sub-basins.—The Krishna Basin may be divided⁽³⁾ into the following sub-basins :—

K. 1. Upper Krishna.—The river Krishna from source to the confluence with it of the Dudhganga ; the sub-basin includes the catchment area of the river Krishna and of all its tributaries which fall into the Krishna in this reach up to and including the Dudhganga.

K. 2. Middle Krishna.—The river Krishna, from its confluence with the Dudhganga to its confluence with the Bhima; the sub-basin includes the direct catchment of the Krishna in this reach as well as of all its tributaries outfalling in this reach, except that of the Ghataprabha and of the Malaprabha (K. 3 and K. 4 below).

K. 3. Ghataprabha.—The entire catchment of the Ghataprabha from source to its confluence with the Krishna, including the Catchment area of the Hiranyakeshi, the Markandeya and other tributaries of the Ghataprabha.

K. 4. Malaprabha.—The river Malaprabha, from source to its confluence with the Krishna; the sub-basin includes the entire catchment of the Malaprabha and of all its tributaries.

K. 5. Upper Bhima.—The river Bhima, from source to the confluence with it of the Sina; the sub-basin includes the catchment area of the Bhima in this reach as well as of all its tributaries which fall into it in this reach including the Sina.

K. 6. Lower Bhima.—The lower part of the river Bhima from its confluence with the Sina to the point where the Bhima falls into the Krishna; the sub-basin includes the direct catchment of the lower part of the Bhima as well as of all its tributaries which fall into it in this reach.

K. 7. Lower Krishna.—The lower part of the river Krishna from its confluence with the Bhima to the sea; the sub-basin includes the direct catchment of the Krishna in this reach and of all its tributaries which fall into it in this reach, except the area covered by sub-basins K. 8 to K.12 described below.

K. 8. Tungabhadra.—This sub-basin includes the entire catchment of the Tungabhadra of all its tributaries, except that of the Vedavathi (K. 9 below)

K. 9. Vedavathi.—The river Vedavathi, from source to its out-fall into the Tungabhadra; the sub-basin includes the catchment area of the Vedavathi (also called Hagari in its upper reach) and of all its tributaries.

*See Volume IV of the Report.

(3) Report of the Krishna Godavari Commission, pp. 22-23.

K. 10. *Musi*.—This sub-basin includes the entire catchment of the Musi and of all its tributaries.

K. 11. *Palleru*.—This sub-basin includes the entire catchment of the Palleru and of all its tributaries.

K. 12. *Muneru*.—This sub-basin includes the entire catchment of the Muneru as well as of its tributaries.

Elevation.—A broad view of the elevation of the sub-basins is presented in the following table:—

	Sub-basin	Elevation in feet
K-1	Upper Krishna	
	Ghat area	4500 to 3000.
	Rest	3000 to 2000.
K-2	Middle Krishna	2000 to 1000.
K-3	Ghataprabha	
	Ghat area	4500 to 3000.
	Rest	3000 to 2000
K-4	Malaprabha	
	Ghat area	3000 to 2000.
	Rest	2000 to 1600.
K-5	Upper Bhima	
	Ghat area	4500 to 2000.
	Rest	2000 to 1000.
K-6	Lower Bhima	2000 to 1000.
K-7	Lower Krishna	
	Western Part	2000 to 1000.
	Eastern Ghats	3000 to 50.
	Delta	50 to 0.
K-8	Tungabhadra	
	Ghat area	3900 to 2000.
	Rest	2000 to 900.
K-9	Vedavathi	3000 to 1000.
K-10	Musi	2000 to 200.
K-11	Palleru	1000 to 150
K-12	Muneru	1500 to 100.

Topography.—The interior of the basin is a plateau divided into a series of valleys sloping generally

towards the east. Belts of country adjoining the Western Ghats in the Upper Krishna, the Upper Bhima, the Ghataprabha, the Malaprabha and the Tungabhadra sub-basins are hilly and highly undulating and covered with dense and evergreen forests; the rest of these sub-basins are flatter and less undulating. The central zone comprising the Middle Krishna, the Lower Bhima and parts of the Malaprabha and the Tungabhadra sub-basins consists of undulating plains and broad flat valleys interspersed with isolated ridges and quaint rocky outcrops of hills. On the eastern side lie the Lower Krishna, the Musi, the Palleru and the Muneru sub-basins comprising the coastal plains, the Eastern Ghats and a series of valleys partly covered with hills and dense forests.

Political divisions, effect of reorganisation of States : Since Independence, there were important political changes affecting the Krishna basin. During 1947-48 the Kolhapur, Deccan and Mysore Agency States having riparian interests in the Krishna basin were merged in the Provinces of Bombay and Madras. Before 1951, the four riparian States of Bombay, Mysore, Hyderabad and Madras had 40,487, 11,636 34,758 and 13,099 sq. miles of territories respectively in the Krishna basin. As from October 1, 1953, the Andhra State was constituted with the territories specified in section 3 of the Andhra State Act, 1953 and thereupon Madras ceased to be a riparian State. As from November 1, 1956 there was a general reorganisation of States and the new States of Andhra Pradesh, Mysore and Bombay were formed with the territories specified in section 3, 7 and 8 of the States Reorganisation Act, 1956 while Hyderabad ceased to be a separate State. As a result of the reorganisation, the three States of Bombay, Mysore and Andhra Pradesh came to possess respectively 26,805, 43,734 and 29,441 sq. miles of territories in the Krishna basin. In 1960, the State of Bombay bifurcated into the States of Maharashtra and Gujarat and all the Krishna basin areas of the old Bombay State fell within the new State of Maharashtra.

Before the reorganisation of States, the Krishna ran for 343 miles in Bombay, formed the common boundary between Bombay and Hyderabad for 5 miles, ran for 222 miles in Hyderabad, formed the boundary between Hyderabad and Madras for 180 miles and ran for another 120 miles in Madras. Now, the Krishna runs for 186 miles in Maharashtra, forms the boundary between Maharashtra and Mysore for 4 miles, runs for 300 miles in Mysore, forms the boundary between Mysore and Andhra Pradesh for 22 miles and then runs for 358 miles in Andhra Pradesh.

As a result of the reorganisation, the Ghataprabha valley which formerly lay within Bombay State exclusively now lies within the States of Maharashtra and Mysore. The Malaprabha Valley which lay within Bombay State now lies within Mysore State. The Bhima Valley which formerly lay in the States of

Bombay and Hyderabad now lies in the States of Maharashtra, Mysore and Andhra Pradesh. The Tungabhadra valley which lay within Mysore, Bombay, Hyderabad and Madras now lies within the States of Mysore and Andhra Pradesh.

State-wise distribution of sub-basin areas.—The distribution of the sub-basin areas in the three States is given below:—

Sub-basin		Area in square miles				Percentage of Krishna basin
		Maharashtra	Mysore	Andhra Pradesh	Total	
1		2	3	4	5	6
K-1	Upper Krishna	6,613	326	..	6,939	6.97
K-2	Middle Krishna	536	6,243	..	6,779	6.81
K-3	Ghataprabha	776	2,633	..	3,409	3.43
K-4	Malaprabha	..	4,459	..	4,459	4.48
K-5	Upper Bhima	17,504	282	..	17,786	17.85
K-6	Lower Bhima	1,376	7,130	972	9,478	9.54
K-7	Lower Krishna	..	650	13,298	13,948	13.53
K-8	Tungabhadra	..	14,977	3,489	18,466	18.57
K-9	Vedavathi	..	7,034	2,074	9,108	9.16
K-10	Musi	..	..	4,329	4,329	4.35
K-11	Palleru	..	..	1,260	1,260	1.27
K-12	Muneru	..	..	4,019	4,019	4.04
		26,805	43,734	29,441	99,980	100

District-wise Distribution of sub-basin areas.—The District-wise distribution of the sub-basin areas is given below:—

MAHARASHTRA

District	Region	Area within Krishna Basin			Normal - Weighted annual rainfall, of District in inches
		Sq. miles	Percentage of total area of District	Sub-basin	
1	2	3	4	5	6
Poona	Western Maharashtra	5,978	99.1	K ₅	51.2
Sholapur	—do.—	5,765	99.2	K ₅ K ₆	23.6
Satara	—do.—	4,041	100	K ₁ K ₅	49.2
Sangli (South Satara)	—do.—	3,297	100	K ₁ K ₂ K ₅	29.5
Kolhapur	—do.—	2,929	91.4	K ₁ K ₃	78.7
Ahmednagar	—do.—	2,386	36.2	K ₅	25.6
Ratnagiri	—do.—	45	0.9	K ₃	118.1
Osmanabad	Marathawada	1,759	31.8	K ₅ K ₆	33.5
Bhir	—do.—	605	14.2	K ₅	27.6
		26,805			

MYSORE

Chitradurga	Old Mysore	4,185	100	K ₈ K ₉	21.7
Shimoga	—do.—	3,025	74.4	K ₈	78.7
Chikmagalur	—do.—	2,397	86	K ₈ K ₉	88.6

1	2	3	4	5	6
Tumkar	Old Mysore	1,520	37.1	K ⁹	27.6
Hassan	— do—	509	19.3	K ⁹	39.4
Bellary	Rayalaseema	3,825	100	K ₈ K ⁹	22.6
Bijapur	Bombay Karnataka	6,590	100	K ₂ K ₃ K ₄ K ₅ K ₆	23.6
Belgaum	—do—	4,623	90.8	K ₁ K ₂ K ₃ K ₄	39.4
Dharwar	— do —	4,587	86.5	K ₄ K ₈	27.6
Kanara	—do—	246	6.2	K ₈	108.3
Gulbarga	Hyderabad Karnataka	6,348	100	K ₂ K ₆ K ₇	26.6
Raichur	— do.—	5,508	100	K ₇ K ₈ K ₂ K ₄	23.6
Bidar	— do.—	371	17.9	K ₆	35.4

43,734

ANDHRA PRADESH

Mahboobnagar	Telangana	6,833	100	K ₆ K ₇ K ₈ K ₁₀	27.6
Nalgonda	—do.—	5,351	100	K ₇ K ₁₀ K ₁₁	28.5
Hyderabad	— do. —	2,860	98.5	K ₆ K ₇ K ₁₀	27.6
Warangal	—do.—	2,530	47.5	K ₁₀ K ₁₁ K ₁₁	41.3
Khammam	—do.—	2,001	43.5	K ₁₁ K ₁₂ K ₇	41.3
Medak	—do.—	578	15.2	K ₆ K ₁₀	33.5
Karimnagar	— do.—	14	0.3	K ₁₂	38.4
Kurnool	Andhra Rayalaseema	3,933	42.4	K ₇ K ₈ K ₉	26.6
Guntur	Andhra	2,110	36.4	K ₇	32.5
Krishna	Andhra	1,488	42.5	K ₁₁ K ₁₂ K ₇	37.4
Anantpur	Andhra Rayalseema	1,743	23.6	K ₉	21.7

29,441

Andhra and Telangana regions of Andhra Pradesh.—The distribution of Krishna Basin area in the Andhra and Telangana regions of Andhra Pradesh is given below:—

v Name of District	Krishna Drainage Basin Area (In sq. Miles)	
	Andhra Region	Telangana Region
1	2	3
Anantapur	1,743	
Guntur (including areas of present Prakasam District)	2,110	
Hyderabad		2,860
Karimnagar		14
Khammam		2,001
Krishna	1,488	
Kurnool (including areas of present Prakasam District)	3,933	
Mahboobnagar		6,833
Medak		578
Nalgonda		5,351
Warangal		2,530
TOTAL	9,274	20,167

29,441 sq. miles.

Basin population.— On the basis of the 1971 census and the percentages of the area of each district within the basin to the district as a whole, the total population in the basin is about 38.71 million. The State-wise distribution is shown in the Table below: —

Population in the Krishna Basin—Statewise:

Sl. No.	State	Population
1.	Andhra Pradesh	12.06 Million
2.	Maharashtra	12.15 Million
3.	Mysore	14.05 Million
		38.71 Million

There are sixteen main cities in the basin which have a population of more than one lakh each. They are Hyderabad, Vijayawada and Kurnool in Andhra Pradesh; Ahmednagar, Poona, Sholapur, Sangli and Kolhapur in Maharashtra and Hubli-Dharwar, Davangere, Bijapur, Shimoga, Bhadravathi, Bellary, Gulbarga and Belgaum in Mysore. The average density of population in the basin is 149 persons per sq. km. The density varies from region to region within the basin. The coastal plain is generally densely populated while the hilly areas have a relatively low density.

In 1971, the most densely populated district of Hyderabad had 362 persons per sq. km. while the district of North Kanara with 83 persons per sq. km. stood at the other extreme.

75.8 per cent of the population in the basin live in rural areas and the balance of 24.2 per cent in cities and towns. The working force constitutes about 36.7 per cent of the population. Nearly 37.6 per cent of the working force is engaged as cultivators, 30.5 per cent as agricultural labourers and the balance 31.9 per cent are employed in mining, manufacturing and tertiary activities. Forests and agriculture are the mainstay of the people.

Hydrologic cycle.—The constant circulation of water from ocean to air and back again to the ocean with temporary storages in life forms, fresh water bodies and ground water is called the hydrologic cycle or the water cycle. The water cycle is an intricate combination of evaporation, transpiration, air mass movement, condensation, rainfall, percolation, ground water storage and movement, and run-off. The cycle has no beginning or end.

Rainfall.—Rainfall is the source of all water within the Krishna basin. The dominant natural factor that affects basically the life and economy of the people in the Krishna basin is the rainfall and its regional and seasonal distribution, amount and variability. The major part of the rainfall is received during the south-west monsoon season.

South-west monsoon season.—At the end of May, when the weather is at its hottest in India, the trade winds from the south of the equator blow northwards into the Bay of Bengal and the Arabian Sea; and are deflected inland as south-westerly winds which give rise to the cool and humid south-west monsoon. This humid current called the south-west monsoon is frequently ushered in by cyclonic storms either in the Bay of Bengal or the Arabian Sea with the associated heavy rainfall.

The south-west monsoon bursts on the Kerala coast at the beginning of June, gradually extends northwards and spreads over most of India by the end of June.

The Arabian Sea current strikes the west coast of India where it is obstructed by the continuous barrier of the Western Ghats 2,000 to 7,000 ft. high. The

mountain barrier, by forcing ascent and consequent expansion and cooling of the moisture-bearing winds, causes heavy precipitation in the coastal districts, on the Ghats and within a belt of a maximum width of 30 to 40 miles on their leeward side. From this region of heavy rainfall and evergreen and semi-evergreen forests, the monsoon current bereft of most of its moisture advances eastwards over an extensive rainshadow region of sparse rainfall.

The south-west monsoon season during June to September contributes about 73 per cent of the annual rainfall of the Krishna basin. Agriculture depends mainly on the amount and distribution of rainfall during this season. The months of June and July are crucial for Kharif crops. The normal date of onset of the south-west monsoon in the Krishna basin is between the 1st and the 10th of June. The arrival of the monsoon is a gradual process with a period of transition spread over a week or more and is marked by a sudden increase in rainfall. During the monsoon season, heavy to moderate rains alternate with breaks when there is little or no rain. The strength of the monsoon current increases from June to July, remains more or less steady in August, and begins to weaken in the month of September. The normal date of withdrawal of south-west monsoon in the Krishna basin is between the 1st October and 15th November.

The character of the monsoon season is determined by the dates of onset and cessation of the monsoon, the monthly and seasonal rainfall, the intensity of the rain, the number of rainy days and the frequency and duration of dry spells.

Other rainy seasons.—The other rainy seasons are not as well defined and as well spread as the south-west monsoon season.

By the middle of October, the retreating south-east monsoon curves round under the influence of the belt of low pressure in the centre of the Bay of Bengal and is deflected towards the Peninsula from the north-east. This current which is usually called the north-east monsoon causes occasional showers, the amount of rainfall decreasing from the coast towards the interior. During October and November, cyclonic storms from the Bay of Bengal bring heavy rain to the Coromandal coast. The season October to December contributes about 17 per cent of the normal annual rainfall of the Krishna basin.

There is little rain during the winter season in January and February. During the hot weather season from March to May, particularly during April and May, local thundersstorms bring welcome showers in some regions. The winter and hot weather seasons contribute about 1 per cent and 9 per cent respectively of the normal annual rainfall of the Krishna basin.

Water year.—A water year is a continuous twelve month period during which a complete annual stream

flow cycle occurs and which is selected for water accounts and data of steam flow⁽⁴⁾. Water year usually starts when ground and surface storage are both reduced to the minimum⁽⁵⁾. The parties agree that in the Krishna basin, for all purposes, the water year commences from the 1st of June and ends on the 31st of May of every year.

Sub-basin-wise rainfall.—The seasonal and annual weighted rainfall in different sub-basins are shown in the following table:—

SEASONAL AND ANNUAL WEIGHTED AVERAGE RAINFALL

Sub-basin	Rainfall (millimetres)					Regional variation of annual rainfall (millimetres)
	Jan. — Feb.	Mar. — May.	June — Sept.	Oct. — Dec.	Annual	
1	2	3	4	5	6	7
Upper Krishna K.1	5	65	1,286	152	1,508	In large part 3000 to 1000, in Western end more than 3000 and on the east of the line joining Kolhapur and Satara 1000 to 600.
Middle Krishna K.2	7	62	366	130	565	600 and less.
Ghataprabha K.3	5	92	671	153	921	Ghat area 3500 to 1000 non-Ghat area less than 600.
Malaprabha K.4	4	93	431	147	675	Ghat area 1000 or more; Rest less than 700 with some area less than 600.
Upper Bhima K.5	8	36	527	105	676	Western zone Ghat area 3000 to 1000 Middle Zone 400 to 600 Eastern zone 600 to 800.
Lower Bhima K.6	12	51	499	99	661	600 to 800, with some area less than 600.
Lower Krishna K.7	12	60	508	141	721	Western end 600 Eastern end 1000.
Tungabhadra K.8	8	95	622	159	884	4000 to 500.
Vedavathi K.9	9	103	288	168	568	700 to 500 and less.
Musi K.10	14	65	546	124	749	700 to 830
Palleru K.11	14	55	605	136	810	770 to 880
Muneru K.12	19	78	723	134	954	800 to 1050
Krishna basin	9	69	570	136	784	

(4) See Multi-lingual Dictionary on Irrigation and Drainage published by the International Commission on Irrigation and Drainage 1967, p. 70. Serial No. 1137; MRG VI, pp. 14, 42.

(5) Ven Te Chow, Hand book of Applied Hydrology (1967), pp. 8-12, 15-41.

Rainfall distribution.—Rainfall distribution in the basin is mainly influenced by the physical features of the terrain. The Western Ghats and a small belt of adjoining country of varying width receive the highest amount of rainfall. A large area to the east of the Western Ghats is a rainshadow region having rainfall below 600 mm. East of the rainshadow zone, the rainfall gradually rises and increases to about 1,050 mm.

Variability of rainfall.—The monthly seasonal and annual rainfall of the Krishna basin varies from year to year. The co-efficient of variability (that is, standard deviation x 100 arithmetic mean) is an

important statistical measure of variation. The available material⁽⁶⁾ indicates that the co-efficient of variability of the annual rainfall ranges from 20 to 35 per cent. For season June to September the range is between 20 to over 40 per cent, for season October to December between 50 to about 100 per cent, and for season March to May between 50 to 100 per cent. In the eastern third of the basin, the co-efficient of variability is between 20 to 30 per cent during June to September.

The following table shows the areas (in square miles) of the three States in the Krishna basin for different ranges of co-efficient of variability of rainfall:—

		Mysore	Maharashtra	Andhra Pradesh
1	2	3	4	5
Annual	More than 20%	40,045	25,777	29,441
	More than 25%	33,504	20,986	12,171
	More than 30%	12,903	11,309	947
June-Sept.	More than 20%	43,057	26,012	29,441
	More than 30%	29,635	20,383	12,367
	More than 40%	5,565	1,606	1,340
Oct.-Dec	More than 50%	41,528	26,800	29,441
	More than 60%	30,696	26,007	27,851
	More than 80%	1,248	5,708	Nil
	More than 100%	Nil	723	Nil

The monthly rainfall variation is generally higher than the seasonal variation. Low total rainfall and high variability go hand in hand.

Variability of rainfall creates the greatest drought hazards. Except in areas of abundant rainfall or assured irrigation, large deficiencies in the normal rainfall are likely to cause partial or complete failure of crops. Within the Krishna basin, there are exceptionally insecure regions of low rainfall and large variability of precipitation, where, at frequent intervals, drought causing partial or complete failure of crops and scarcity conditions prevail.

Climate.—The Krishna basin has a monsoon tropical climate.

Temperature.—The mean annual temperature of the basin varies from 24°C (75°F) in the Western Ghats to 29.4°C (85°F) on the east-coast. The range of mean daily temperature during representative winter, summer, monsoon and post-monsoon months is shown in the following table .—

	Minimum	Maximum
January	15°C (59 °F) to 18°C(64°F)	30°C (86°F)

	Minimum	Maximum
April	22°C (72°F) to 26°C (79°F)	35°C (95°F) to 40°C(104°F)
July	20°C (68°F) to 26°C (79°F)	27°C(81°F)to 33°C(91°F)
October	20°C (68°F) to 23 °C (74°F)	30°C (86°F)

The Ghat areas, because of their high altitude, have a comparatively lower temperature. The non-Ghat areas are mostly regions of hot summers and warm winters. The range of daily maximum and minimum temperature is less near the coastal regions because of their proximity to the sea. During summer months, the central regions have the highest maximum daily temperature.

Humidity.—Except during the rainy season, humidity is low in most parts of the basin.

Evaporation.—In most parts of the Krishna basin, because of the high temperature and low humidity, evaporation from a free water surface, such as, river channels, canals and reservoirs is very high. Some idea of the mean potential evaporation, that is, evaporation if a free water surface were available, may

(6) Rainfall variability of Krishna and Godavari Basins issued by the Indian Meteorological Department, March, 1970.

be gathered from the following figures given in the Krishna Godavari Commission Report:—

Name of Sub-basin	Mean Annual potential evaporation in millimetres		
	Maximum	Minimum	Mean
1	2	3	4
K1 Upper Krishna . .	2,540	1,088	1,814
K2 Middle Krishna . .	3,493	2,223	2,858
K3 Ghataprabha . .	3,015	1,088	2,052
K4 Malaprabha . . .	3,175	1,088	2,540
K5 Upper Bhima . .	3,810	2,223	3,017
K6 Lower Bhima . .	..	..	3,810
K7 Lower Krishna . .	..	..	2,540
K8 Tungabhadra . .	..	..	2,540
K9 Vedavathi . . .	..	..	2,540
K10 Musi	..	..	2,800
K11 Palleru	..	..	2,540
K12 Muneru	..	..	2,235

Except during the monsoon season, June to September, the normal potential evaporation is in excess of the normal rainfall and for some stations, such as, Sholapur, Gulbarga, Raichur and Kurnool this excess persists during the monsoon season.

Evapo-transpiration.—Equally high is the evapo-transpiration, that is, the quantity of water transpired by plants and evaporated from soils ⁽⁷⁾. The annual potential evapo-transpiration, that is, the annual evapo-transpiration from an extensive vegetative cover if an unlimited supply of water were available, ranges from 1,600 to 1,800 millimetres in the Krishna basin. In some parts of the basin, it is even more than 1,800 millimetres. These figures give a fair idea of the water need of plants. In most parts of the basin, except during the monsoon season, the monthly precipitation is less than the monthly potential evapo-transpiration and there is moisture deficiency. As and when the soil moisture within the root zone of plants is depleted, there is need for irrigation to sustain plant life.

Adequacy of rainfall for meeting the water needs of plants is judged by comparing the rainfall received with the potential evapo-transpiration, taking also into consideration the soil characteristics of the area, particularly its water holding capacity.

Arid and semi-arid regions.—Arid and semi-arid regions are areas where rainfall cannot satisfy a large portion of the evapo-transpiration needs. East of the Western Ghats, there are extensive semi-arid regions and regions where conditions close to aridity prevail. All arid and semi-arid regions are susceptible to drought ⁽⁸⁾.

The Irrigation Commission ⁽⁹⁾ 1972 observed that arid regions are areas where rainfall meets one-third or less of evapo-transpiration needs and semi-arid regions are areas where rainfall meets one-third to two-third of evapo-transpiration needs.

Scarcity areas.—The State Governments suggest different tests for defining scarcity areas. Maharashtra considers that scarcity areas are areas having (i) annual rainfall of less than 19.7 inches (500 mm), (ii) 75 per cent dependable rainfall of less than 5 to 6 inches during September-October, (iii) co-efficient of variability of annual rainfall of more than 30 per cent, (iv) co-efficient of variability of September-October rainfall of more than 45 per cent ⁽¹⁰⁾.

Mysore suggests that scarcity areas are areas which (i) receive less than 15.8 inches (400mm) normal rainfall during June-September, (ii) less than 5.9 inches (150mm) normal rainfall during October-December, (iii) have co-efficient of variability of June-September, rainfall of more than 3 per cent, (iv) are arid and semi-arid areas according to a map prepared by the Central Arid Zone Research Institute Jodhpur, (v) have less than 20 or 30 rainy days in June-September and/or (vi) have high suspensions of land revenue ⁽¹¹⁾.

Andhra Pradesh suggests that scarcity areas are areas, which have less than 30 inches of average annual rainfall with high frequency of deficiency of annual rainfall from average annual rainfall ⁽¹²⁾.

(7) The rate of evapo-transpiration is controlled by meteorological and radiation factors. See Henry Olivier, Water Resources Engineering, 1972, pp. 25-31.

(8) Report of the Indian Irrigation Commission 1972 Vol. I, pp. 163-165 and Fig. 8.2; Map prepared by the Central Arid Zone Research Institute Jodhpur showing aridity index and moisture index in the Krishna basin and an Article in the Journal of the Indian Society of Agricultural Statistics Vol. XIX June 1967; MYDK XX, pp. 13-25; An Article by R.D. Dhir published in Reviews of Research on Arid Zone Hydrology. UNESCO 1953, p. 96 MY DK XVIII pp. 64-65.

(9) Report of the Irrigation Commission 1972 Vol. I p. 164, Fig. 8.2.

(10) MRK I pp. 156-160; MRK III p. 184; MRK IV pp. 7, 26.

(11) MYK I pp. 23-28 MYK III p. MYK IV p. 37.

(12) APK I p. 113

All the States rely on the history of the occurrence of scarcity and famines in areas within their respective territories.

The underlying assumption of all these tests is that scarcity areas are areas of low and uncertain rainfall, which frequently suffer from droughts causing partial or complete failure of crops and where consequently distress and scarcity conditions prevail at frequent intervals. We may observe that drought or scarcity areas are areas where large deficiencies of annual rainfall occur frequently.

The materials on the record⁽¹³⁾ indicate that drought and scarcity conditions have frequently occurred in extensive areas within the Krishna basin

and particularly in several Taluks in the following districts:—

In Maharashtra	Poona, Sholapur, Satara, Sangli, Ahmednagar, Osmanabad and Bhir districts.
In Mysore	Bijapur, Bellary, Raichur, Dharwar, Gulbarga, Chitradurga and Tum-kur districts.
In Andhra Pradesh	Mahboobnagar, Nalgonda, Hyderabad, Kurnool and Anantpur districts.

The Indian Irrigation Commission⁽¹⁴⁾ 1901 said that a rainfall deficiency of 25 per cent would be likely to cause some injury and a deficiency of 40 per cent would generally cause severe injury, and that the former may be called a dry year and the later a year of severe drought.

-
- (13) Report of the Indian Irrigation Commission 1901—1903, Part I p. 17; Report of the Krishna Godavari Commission, pp. 33, 101—108; Report of the Fact-Finding Committee for survey of scarcity areas in Bombay State 1960, Vol. I pp. 13-14; APDK X pp. 1-3; Report of the Committee to go into the availability of Krishna basin for utilisation in Mysore State; MYDK II pp. 420—457.

Report of the Central Team visiting drought affected areas of Mysore 1968 Planning Commission, MYDK XVIII pp. 35-51.

Report of Central Team visiting drought affected areas of Andhra Pradesh 1968 Planning Commission, APDK II pp. 30—44.

Report of a tour of scarcity areas in Mysore by a team of officers led by S.V. Ramamurthy, Adviser, Planning Commission, MYDK XVIII pp. 2—3.

Scheme for development of backward areas in Mysore State 1964, MYDK XVIII p. 1.

Mysore State Gazetteer, Gulbarga district 1966 p. 136, MYDK IV p. 39.

Mysore State Gazetteer, Chitradurga district 1967 p. 151, MYDK IV p. 40.

Bombay State Gazetteer Dharwar District 1955 pp. 356—359, MYDK IV pp. 41—46.

Mysore State Gazetteer Tumkur District 1969 pp. 167—168, MYDK IV p. 47.

Mysore State Gazetteer, Bijapur District p. 164, MYDK XVIII pp. 58—61.

Statistical atlas of Bombay State (Provincial Part) 1950 pp. 131—133, 145—147 published by the Bureau of Economics and Statistics, Bombay Government, MYDK IV pp. 19—29.

Census of India 1951, Vol. I Parts IA and IB pp. 267—270 MYDK XVIII pp. 4—9.

Imperial Gazetteer of India—Provincial series Hyderabad State 1909 pp. 48—49, 246—275, MYDK IV pp. 17—18 MYDK III pp. 2—4.

Gazetteer of Bellary district pp. 121—148, MYDK IV. pp. 48—50.

Gazetteer of Bombay Presidency (Vol. XXIIB) Bijapur and Jath Table XIII Famines, MYK I pp. 75 —76 Famine Manual MYK I pp. 72-74.

H.F. Beale, Investigation report on protective irrigation works 1910 pp. 297, 315, MYDK IV pp. 64—65.

H.F. Beale Report on the surveys for protective irrigation works in the Deccan 1910 pp. 36, 37, MYDK IV pp. 66—69.

Journal of Indian Society of Agricultural Statistics Vol. XIX June 1967 No. 1 Growth and Inability in Indian Agriculture by

S.R. Sen pp. 7—8, 12, 22, 23, 27, MYDK XX pp. 15—26.

Kanitkar, Sirur and Gokhale, Dry Farming in India pp. 8, 17, MYDK IV p. 51, MYDK XVIII p. 55.

- (14) Report of the Indian Irrigation Commission 1901—1903 Part I p.4.

The Irrigation Commission⁽¹⁵⁾ 1972 observed:—

"We had also requested the India Meteorological Department to assist us in laying down criteria for the identification of drought areas. The Department has defined drought as a situation occurring in any area when the annual rainfall is less than 75 per cent of the normal. It has defined 'moderate drought' as obtaining where the rainfall deficit is between 25 to 50 per cent and 'severe drought' where the deficiency is above 50 per cent. Areas where drought has occurred, as defined above, in 20 per cent of the years examined, are considered 'drought areas', and where it has occurred in more than 40 per cent of years, as 'chronic drought areas'."

Accepting the definition of drought given by the India Meteorological Department, the Irrigation Commission concluded that the drought areas were areas having 20 per cent probability of rainfall departures of more than (—) 25 per cent from the normal and chronically drought affected areas were areas having 40 per cent probability of rainfall departure of more than (—) 25 per cent from the normal. On this basis, the Irrigation Commission identified extensive areas in Maharashtra, Mysore and Andhra Pradesh as drought areas and some areas as chronically drought affected areas. Most of the areas susceptible to drought fall within the arid and semi-arid zones.

Irrigation, to the extent it can be provided, will afford protection to the scarcity areas. Schemes for irrigation of such areas should receive special attention⁽¹⁶⁾. One of the objectives of the Fourth Plan in regard to new irrigation projects is the choice, wherever practicable, of those areas which are relatively deficient in assured rainfall as well as irrigation⁽¹⁷⁾.

Water demands in the Krishna basin.—A demand for beneficial use of water arises out of almost every phase of human activity. Some demands de-

pending on flow uses do not involve removing the water from its natural location. These include such activities as conservation of fish and wildlife, swimming and recreational activities, navigation on rivers and lakes and the disposal of waste. These are non-withdrawal uses. Under certain conditions, hydro-power developments are in this category. There are some demands for non-withdrawal uses in the Krishna basin.

Withdrawal uses of water, which involve continual removal of water from its natural location either permanently or temporarily, include irrigation, hydro-power involving diversion of water to a different watershed, navigation on canals, industrial use, public water supplies, domestic and stockwatering use. There are demands for all these categories of withdrawal uses in the Krishna basin. The largest demands are for irrigation and for hydro-power involving diversion out of the basin.

We have provided in our final order that beneficial use shall include any use made by any State of the waters of the river Krishna for domestic, municipal, irrigation, industrial, production of power, navigation, pisciculture, wild life protection and recreation purposes.

Technique of development of river resources in the Krishna basin.—All the rivers of the Krishna river system have one common feature. During the monsoon, they pass enormous volumes of water part of which runs waste of the sea. After the monsoon, their flow is too meagre for planned agriculture. Such being the pattern of inflows, provision of regulating storages to even out the wide seasonal fluctuation becomes the key techniques of development of river resources. The water stored during the rains is let out from time to time according to the requirements of irrigation and other beneficial uses. However, evaporation losses from the free water surface of storage reservoirs are very high, particularly if the water spread is large. Some of the earlier irrigation works derive their supplies from diversion of river water into canals.

(15) Report of the Irrigation Commission 1972, Vol. I pp. 160, 164-166 Fig. 8.2.

(16) See Circular letter No. N.R.4 (17) (58) dated 2-12-1958 from the Planning Commission to all State Governments; Indian Irrigation Commission 1972, Vol. I, pp. 259.

(17) Fourth Five Year Plan, p. 248.

Irrigation Development.—The source-wise irrigation in the Krishna basin in the three States during the

year 1969-70 is given in the following table:—

Sl. No.	Source of Irrigation	Area irrigated in '000 hectares			Total area irrigated
		Maharashtra	Mysore	Andhra Pradesh	
1.	2	3	4	5	6
1.	Canals	134.8	252.6	352.6	740.0
2.	Tanks	6.5	169.6	196.1	372.2
3.	Tube wells	..	..	6.3	6.3
4.	Wells	295.7	135.7	107.3	539.7
5.	Other sources	54.0	36.1	20.9	111.0
Total		491.0	595.0	683.2	1769.2

Classification of irrigation projects.—For purposes of planning and administration it is usual to classify projects costing more than Rs. 50 million each as major, irrigation schemes costing between Rs. 2.5 million and Rs. 50 million as medium and works costing up to Rs. 2.5 million in the plains and Rs. 3 million in the hilly regions as minor.

For purposes of this case, it is convenient to classify projects utilising more than 3 T.M.C. of water annually as major, projects utilising 1 to 3 T.M.C. of

water annually as medium, works and projects (including small tanks and diversions but excluding wells) utilising less than 1 T.M.C. annually of water as minor.

Major Irrigation Projects using more than 10 T.M.C. of water annually.—Major Irrigation Projects in the Krishna basin in operation and under construction using more than 10 T.M.C. of water annually, are given below:—

Name of Project	Year of commencement of operation	Type	Sub-basin	State benefited
1. Nira System Ex Vir	1892	Storage cum diversion	K5	Maharashtra
(i) Left Bank Canal				
(ii) Right Bank Canal	1928	"	"	"
2. Vir Dam Project	1962	Storage	"	"
3. Bhima Project	Under construction	"	"	"
4. Kukadi Project	Under construction	"	K-5	"
5. Khadakwasla Project Stage I	1970	"	"	"
6. Ghod Project	1958	"	"	"
7. Krishna Project	Under construction	"	K-1	"
8. Warna Project	Under construction	"	"	"
9. Radhanagari Project	1952	"	"	"
10. Upper Krishna Project Stage I	Under construction	"	K-2	Mysore
11. Ghataprabha Stage I	1951	Diversion	K-3	"
Stage II	Under construction	Storage	"	"

Sl. No	Name of Project	Year of commencement of operation	Type	Sub-basin	State benefited
12.	Malaprabha Project	1972	Storage	K-4	Mysore
13.	Bhadra Project	1957	"	K-8	"
14.	Tungabhadra Project		"	"	Mysore and Andhra Pradesh
	Low Level Canal				
	Right Side	1953			
	Left Side	1953			Mysore
15.	Tungabhadra Right Bank High Level Canal Stages I & II	1967	"	"	Mysore and Andhra Pradesh
16.	Rajolibunda Diversion Scheme	—	Diversion	"	"
17.	Kurnool Cuddapah Canal	1866	"	"	Andhra Pradesh
	Improvements	1962			
18.	Nagarjunasagar Project	1967	Storage	K-7	"
19.	Krishna Delta System	1855	Diversion	"	"
20.	Tunga Anicut	1955	"	K-8	Mysore

Lining of canals.—In Maharashtra, all the canals in the Krishna basin (except the first 12 miles of Khadakwasla Project) are unlined.

In Mysore, it is proposed to line the main canal, branches and distributaries (up to 10 cusecs capacity) of the Upper Krishna Project and the main canal and branches of the Malaprabha Project. The main canals of the Tungabhadra Project Left Bank Low Level Canal, the Tungabhadra Project High Level Canal, the Tungabhadra Project Right Bank Low Level Canal up to mile 14/0 (Power canal portion) and the Rajolibunda Diversion Scheme have been lined. All other canals in the Krishna basin are unlined. It is stated on behalf of Mysore that the main canal and branches of most of the proposed major projects will be lined.

In Andhra Pradesh, the main canals of the Kurnool Cuddapah Canal up to mile 76, the Rajolibunda Diversion Scheme and the Tungabhadra Project Right Bank High Level Canal from Mysore-Andhra Pradesh border up to mile 116/0 in Andhra Pradesh are lined. The Nagarjunasagar Project Left Canal up to mile 85 is to be lined as per sanctioned estimate. All other canals in the basin are unlined.

Major irrigation projects using 3 to 10 T.M.C. of water annually.—Major irrigation projects in the Krishna basin using 3 to 10 T.M.C. of water annually are Mutha System Ex-Khadakwasla in K5, Koilsagar, Dindi and Guntur channel in K7, Bhadra Anicut in K8, Bhairavanitippa and Vanivilas Sagar in K9, Musi in K10, Palair in K11, Muniyeru and Wyra in K12.

1Mofl&P/73—5.

Medium irrigation projects.—Medium irrigation projects in the Krishna basin using 1 to 3 T.M.C. of water annually are Krishna Canal and Tulshi Project in K1, Mhaswad, Mangi tank, Ekruk tank and Khasapur tank in K5, Kurnoor, Chandramapalli and Kotepallivaga in K6, Okachettivaga and Vaikunthapuram Pumping Scheme in K7, Ambiligola, Anjanpur Reservoir, Dharma Canal System and Dharma Project, Hagari Bommanhalli and Gajuladinne in K8, Pakhal Lake and Lankasagar in K12.

Small diversions.—Where topographical conditions are favourable, anicuts are built across streams and small canals are taken for a short distance. Some diversion schemes were constructed centuries ago. The Vijayanagar channels previously known as pre-Mughal channels in Bellary and Raichur districts of Mysore and Kurnool District of Andhra Pradesh were constructed by the powerful Vijayanagar Kings during 1500 A. D. to 1560 A.D.

Tanks.—In Andhra Pradesh and Mysore, irrigation from storage tanks has been practised from the earliest times down to this day. The storage tanks are constructed by forming earthen bunds across valleys and small streams. The tanks have shallow depth and comparatively large waterspread and there is considerable loss of water from evaporation. On some streams there are groups of tanks where the surplus water of an upper tank and the drainage of its wet cultivation are caught and used in a lower tank. There are thousands of tanks in Andhra Pradesh and Mysore. There are tanks in Maharashtra also.

Irrigation from wells.—From the information supplied by the parties, it appears the areas irrigated from wells in the Krishna basin within Maharashtra, Mysore and Andhra Pradesh were as follows:—

Year	Name of State	Net area irrigated by wells in hectares
1969-70	Maharashtra	2,95,920

1969-70	Mysore	Andhra	1,36,670
1969-70	Pradesh		1,07,300

Flood Control.—There is no separate scheme for flood control in operation.

Power Development.—The following hydro-electric power projects based on westward diversion of water are in operation :—

Sl. No.	Name of Project	Installed capacity M.W.	Sub-basin	State benefited
1	2	3	4	5
1.	Koyna Hydro-Electric Project Stages I & II.	540	K1	Maharashtra
2.	Tata Hydro-Power Supply Scheme (Khopoli Power House)	70.0	K5	"
3.	Andhra Valley Power Supply Scheme (Bhivpuri Power House)	72.0	K5	"
4.	Tata Power Scheme Mulshi Dam (Bhira Power House)	132.0	K5	"

The following hydro-electric projects involving use of tail race waters of existing westward diversion schemes are under construction :—

Sl. No.	Name of Project	Installed capacity M.W.	Sub-basin	State benefited
1	2	3	4	5
1.	Koyna Hydro Stage	320	K1	Maharashtra
2.	Bhira tail race development	80	K5	"

Other hydro-electric power projects in operation are as follows :—

Sl. No.	Name of Project	Installed capacity M.W.	Sub-basin	State benefited
1	2	3	4	5
1.	Tungabhadra Project Dam Power House on right side	36	K8	Andhra Pradesh and Mysore in the ratio of 4:1
2.	Tungabhadra Project Power House on right canal at Hampi	36	K8	Andhra Pradesh and Mysore in the ratio of 4:1
*3.	Tungabhadra Project Dam Power House on left side at Munirabad.	27	"	Mysore
4.	Bhadra Hydro-electric Project	33.2	"	Mysore
5.	Gokak Mills Power House	2.6	K3	Mysore
6.	Radhanagari Hydro Scheme	4.8	K1	Maharashtra

*Note: In item 3 Andhra Pradesh claims a share. This claim is disputed by Mysore and will be dealt with separately.

Other hydro-electric power projects under construction are as follows :—

Sl. No.	Name of Project	Installed capacity M. W.	Sub-basin	State benefited
1	2	3	4	5
1.	Bhatgar & Vir Hydro-electric Project			
	(i) Bhatgar Dam Power House	16	K5	Maharashtra
	(ii) Vir Dam Power House	9	K5	Maharashtra
2.	Srisaillam Hydro-electric Project	440	K7	Andhra Pradesh
3.	Nagarjunasagar Pumped Storage Hydro-electric Scheme	100	K7	Andhra Pradesh

Municipal and domestic water supply.—Open wells and bore wells are the main sources of water supply in villages. Since independence, rural water supply has received special attention by its inclusion under various programmes in the Five Year Plans. Most of the major cities and towns have some provision of water supply. The more important municipal water supply schemes in operation in the Krishna basin are—

Name of scheme	Sub-basin	State benefited
Sholapur city water supply scheme	K5	Maharashtra
Water supply to twin cities of Hyderabad and Secunderabad	K10	Aadhra Pradesh
Mutha system Ex-Khadakwasla	K5	Maharashtra

The Mutha system Ex-Khadakwasla supplies water to Poona city, Poona and Kirkee Cantonment areas.

Navigation.—The Krishna river is navigable from sea to 22 miles upstream of Prakasham barrage throughout the year and up to about 60 miles upstream of the barrage during the monsoon months. On account of their rocky and shallow beds and their rapid course during the monsoon months, the other rivers and the upper reaches of the Krishna are not navigable.

There are navigation facilities in the delta canals below Vijayawada. The canals are open to navigation for nine to ten months in the year.

A network of canals connects the Krishna and Godavari Rivers to the sea ports of Kakinada and Machilipatnam.

The Krishna Delta Elluru Canal takes off from Vijayawada and runs North to Elluru where it joins the Godavari West Canal which takes off from the anicut across the Godavari at Dowlaishwaram. From Dowlaishwaram, the Godavari Eastern Canal takes off and goes up to Kakinda port. From Vijayawada, another canal called the Bandar Canal takes off and connects Vijiyiwada With Machiripatnam port.

The Krishna Western Main Canal takes off from the Vijayawada anicut on the Sithanagaram side, is continued under the name of Kommamur Canal and joins the Buckingham Canal which in its turn stretches to the south of Madras city.

Except parts of the Kurnool Cuddapah Canal, the other canals in the Krishna basin are not navigable.

Some features of Krishna basin ⁽¹⁸⁾.

The culturable area, the net and gross sown area and the net and gross irrigated area in the Krishna

(18) Statistical Abstract of Mysore 1970-71, pp. 17-19, 23, 39, 42; Season and Crop Report of Maharashtra State 1969-70, pp. 40—43, 46; Season and Crop Report of Andhra Pradesh for the agricultural year 1969-70, pp. 105; Statistical Abstract of Andhra Pradesh 1971, pp. 54-55.

basin in the three States during 1969-70 are given in the following table:

Item	Mysore	Maharashtra	Andhra Pradesh	Total of Krishna Basin
1	2	3	4	5
(Area in 1000 hectares)				
(i) Cultivable area (1969-70)	9,270	5,749	5,429	20,448
(ii) Net area sown (1969-70)	7,247	4,857	3,706	15,810
(iii) Gross sown area (1969-70)	7,498	5,101	4,230	16,829
(iv) Net area irrigated (1969-70)	595	491	683	1,769
(v) Gross area irrigated (1969-70)	698	571	960	2,229

Soils.—The four major soil groups in India are (1) alluvial soils, (2) black soils (regur), (3) red soils and (4) laterite and lateritic soils. In the Krishna basin, deep, medium and shallow black soils, red loamy and red sandy soils and mixed red and black soils predominate. There are also some laterites and lateritic soils, alluvial soils and saline and alkaline soils in the basin.

The principal soils in the several sub-basins are shown in the following table :—

Sub-basin	Soils
K1 Upper Krishna	Generally medium black. In the valleys, medium and deep black, lateritic in western parts.
K2 Middle Krishna	Principally medium and deep black.
K3 Ghataprabha	Medium and deep black; also lateritic.
K4 Malaprabha	Lateritic, deep to medium black, mixed red and black.
K5 Upper Bhima	Generally medium black. Deep black in the valleys along river courses.
K6 Lower Bhima	Shallow and medium black, deep black along river courses, lateritic.
K7 Lower Krishna	Predominantly red sandy loam. Some red and black. Deep black in the valley along river course. Alluvial in Delta.
K8 Tungabhadra	Red Sandy to loamy in the upper reaches. Red, sandy red, and sandy black in the lower parts. Deep black in the valley along river courses.
K9 Vedavathi	Predominantly red loamy and red-sandy, In the upper reaches of rivers, deep black. Mixed red and black soils.
K10 Musi	predominantly red sandy, red loamy soil
K11 Palleru	Predominantly red loamy soil.
K12 Muneru	Red loamy.

The capability of the soil and the use to which it may be put are determined largely by the depth, texture, structure, permeability, moisture holding capacity, nutrient elements, organic matter, degree of acidity or alkalinity, surface drainage, slope, susceptibility to erosion and other characteristics of the soil.

Crop seasons.—The crop seasons in the Krishna basin are not as well defined as in northern India. The sowing of crops and other agricultural operations are determined largely by the timing and incidence of rainfall. In Maharashtra and Bombay-Karnataka areas of Mysore in the Krishna basin, broadly the crop seasons are June to October (Kharif). October to February (Rabi) and February to June (Hot weather). In Andhra Pradesh and the rest of Mysore, the crop season for irrigated paddy in June-July to November-December (Abi) and January to April (Tabi).

Crops.—The main crops of the Krishna basin are jowar, bajra, cotton, oilseeds, pulses, tobacco, wheat, gram, ragi, paddy and sugarcane. There are patches of vegetable and fruit cultivation including mangoes, sweet limes, grapes, bananas, chillies and lemons. Water melons are grown in the river bed Paddy and sugarcane are mostly irrigated crops. The other crops are grown under both rainfall and irrigated conditions.

In all the three States, jowar and bajra are the staple food crops and are extensively cultivated. Bajra is grown on the poorer soils. Pulses are sown mostly as winter crops. Cotton is grown in rich black soils. Groundnut and oilseeds are extensively grown.

In Maharashtra, the jowar-bajra-wheat-oilseeds-sugarcane zone of the Bhima valley and the jowar-bajra-wheat-sugarcane belt of the Krishna valley are important agricultural regions. Sugarcane has increasing acreage under cultivation. Paddy, Cotton and tobacco are other important crops.

In Mysore, jowar is an important food crop. Wheat is grown mostly in Belgaum, Bijapur, Gulbarga, Bidar and Dharwar Districts. In irrigated areas, rice is a favourite crop. Bijapur, Dharwar, Bellary, Chitradurga, Raichur and Gulbarga Districts are important cotton areas. Sugarcane and tobacco are also grown. Spices and arecanut are important subsidiary crops.

In Andhra Pradesh, rice production finds pride of place throughout the State. Tobacco cultivation is a speciality in the dry tracts of Guntur, Prakasham and Krishna Districts. Sugarcane is also grown.

Land use of Krishna basin area in the three States during 1967-68.

Andhra Pradesh: Of the gross irrigated area of 8,70,000 hectares, about 82.4% is under paddy, 0.9% under sugarcane and the balance under other crops. The other irrigated crops are jowar, bajra, maize, wheat, ragi, millets, condiments, spices, groundnut, sesamum, cotton, tobacco and fodder crops. Food and non-food crops respectively cover about 92.1% and 7.9% of the irrigated cropped area.

Maharashtra : Of the gross irrigated area of 5,53,700 hectares nearly 32.8% is under jowar, 16.8% under sugarcane, 10.6% under wheat, 5.2% under bajra, 4.8% under paddy and the balance under other crops. The other irrigated crops are maize, ragi, cotton, barley, gram, pulses, condiments, spices, groundnut, sesamum, tobacco and fodder crops. Food

and non-food crops cover about 90.5% and 9.5% of the irrigated cropped area respectively.

Mysore : Of the gross irrigated area of 6,80,500 hectares, 47.7% is under paddy, 12.9% under jowar, 7.6% under sugarcane, 3.3% under maize, 1.9% under wheat and the balance under other crops. The other irrigated crops are ragi, barley, millets, gram, pulses and cotton. The food and non-food crops represent about 84.0% and 16.0% of the irrigated cropped area respectively.

Of the total irrigated area in the basin, 50.7% is under paddy, 13.2% under jowar, 7.2% under sugarcane, 3.5% under wheat, 1.5% under bajra, 2.0% under maize and the balance under other miscellaneous crops.

Out of a total area of 26 million hectares, nearly 3 million hectares are under forests. The area annually cropped in the Krishna basin is about 16.4 million hectares. Agriculture is generally rain-fed relatively low yields except in about 2.1 million hectares of irrigated area, of which about 1.07 million hectares grow paddy.

Other data regarding Krishna basin: An agreed statement giving the catchment areas at different points in the Krishna basin as also agreed data regarding forests, minerals, industries and communications in the Krishna basin and a brief description of the population, topography etc. of the States of Maharashtra, Mysore and Andhra Pradesh are included in the volume containing appendices.

CHAPTER IV

Inter-State conference and disputed agreement of July, 1951 Issue-I

Inter-State conference on the 21th and 28th July, 1951 :

A conference was held in the Planning Commission, New Delhi, with the representatives of Bombay, Madras, Hyderabad, Mysore and Madhya Pradesh Governments to discuss the utilisation of supplies in the Krishna and Godavari river basins so that an assessment could be made of the relative merits of the projects for inclusion in the First Five Year Plan. The Governments of Mysore, Bombay, Madras and Hyderabad only were interested in the supplies of the Krishna river basin.

Disputes : In the present proceedings, the dispute is whether as a result of the deliberations at the conference, a concluded agreement was reached between the States of Bombay, Madras, Mysore and Hyderabad regarding allocation of the waters of the Krishna basin and, if so, whether it is valid and subsisting.

Pleadings : Andhra Pradesh pleaded that a concluded agreement was reached amongst all the four States regarding the Krishna waters. Maharashtra and Mysore pleaded that there was no concluded agreement. They alleged that the agreement, if any, was invalid because (i) it did not conform to the provisions of article 299 of the Constitution and (ii) it was inequitable, arbitrary and based on inadequate data. They also alleged that (i) the agreement, if any, had become void because it allocated water for specific projects and some of the projects had been abandoned and (ii) it ceased to be operative on the reorganisation of States.

Issue : Accordingly the following issue was raised on the 29th January, 1970.—

Issue I: Was there any concluded agreement regarding allocation of the waters of the river Krishna as alleged ? Was the agreement valid and enforceable ? Is it still subsisting and operative and binding upon the States con-

cerned in the present reference ? If so, with what effect ? Is there any breach of the agreement as alleged ?

Sub-issues

- (1) Was there a concluded agreement as alleged ? Was the agreement ratified, acted upon and treated as binding by the States concerned ?
- (2) Was the agreement in conformity with article 299 of the Constitution ? Was it within the purview of the article ?
- (3) Was the agreement inequitable or arbitrary or based on inadequate data? If so, with what effect?
- (4) Did the agreement on its true construction allocate waters for specific projects ? Have some of the projects been abandoned ? If so, has the agreement become void ?
- (5) Has the agreement ceased to be operative on the reorganisation of the States ?
- (6) If the agreement is binding, what re-allocation of waters, if any, should be made, in view of the reorganisation of States ?
- (7) Is there any breach of the agreement as alleged by Andhra ?
- (8) Is the validity of the agreement dependent upon the validity of the Godavari agreement ?

Supplementary Pleadings : On the 29th January, 1971, the Tribunal directed Andhra Pradesh to furnish particulars of the alleged agreement. Andhra Pradesh supplied the particulars, and all parties filed supplementary pleadings.

Divergent case of the parties on the question whether there was a concluded agreement :

The case of Andhra Pradesh is that (1) the agreement regarding the allocation of the Krishna water was

oral and was entered into on the 27th July, 1951 at the conference among Shri Jivraj Mehta, Minister, P.W.D., Bombay, Shri M. K. Vellodi, Chief Minister, Hyderabad, Shri M. Bhakatavatsalam, Minister, P.W.D., Madras and Shri K. C. Reddy, Chief Minister, Mysore, on behalf of their respective States, (2) there was a separate oral agreement on the 28th July, 1951 among Bombay, Hyderabad and Madras modifying their respective shares of the Krishna waters and Mysore was, in no way, affected by this modification and (3) Mysore ratified, acted upon and treated the agreement as binding and is precluded from denying it.

Andhra Pradesh relied upon the alleged oral agreement of the 27th July, 1951. It is not the case of Andhra Pradesh that the agreement was made in writing or that there was an oral agreement on the 28th July to which Mysore was a party.

Mysore and Maharashtra denied that there was any oral agreement on the 27th July or that a separate and distinct oral agreement concerning the Krishna waters was reached on the 28th July.

It is common case that a memorandum of agreement was drawn up and was subsequently ratified by Bombay, Hyderabad and Madras. It is the case of Andhra Pradesh that the three States, having ratified the memorandum of agreement, were bound by it. On the other hand, it is the case of Mysore and Maharashtra that the three States ratified the memorandum of agreement upon the condition that Mysore also would ratify it, and that as Mysore refused to ratify, there was no operative and concluded agreement by which the ratifying States were bound.

Points for decision :

The points arising for decision are : (1) whether there was a concluded oral agreement on the 27th July, 1951 between the concerned States including Mysore regarding the Krishna waters, (2) whether Mysore ratified the agreement, (3) whether Mysore acted upon and treated the agreement as binding and is precluded from denying it and (4) whether, in the absence of ratification by Mysore, there was any operative and concluded agreement.

Evidence.—The parties did not call any oral evidence on Issue No. 1. They relied entirely on the documentary evidence on the record.

Preparations for the conference.—The Governments of Bombay, Hyderabad and Madras had important schemes for irrigation and electrification based on the Krishna river and its tributaries, such as the Koyna Project (Bombay), the Lower Krishna (Hyderabad) and the Krishna Pennar Project (Madras). On the 7th May, 1951, the Planning Commission wrote to the Governments of Bombay, Hyderabad, Madras and Mysore suggesting that a conference might be convened to discuss the schemes so that early decisions might be taken on what schemes might be included in the First Five Year Plan and requesting them to send particulars of the schemes under contemplation, the quantum of proposed withdrawals, the supplies available at the proposed sites of withdrawals, the quantum of withdrawals by works already under construction or in operation, the financial aspect of the projects and other details. All the State Governments supplied the required particulars. The information supplied by each Government was communicated to the other Governments. Eventually, the Planning Commission invited all the four States to attend a conference at New Delhi on the 27th and 28th July, 1951, and they all agreed to attend. Mysore was brought into the picture as it was interested in the supplies of the Krishna basin, The Government of Madhya Pradesh was invited as it was interested in the supplies of the Godavari basin and the conference was convened to discuss the schemes on the Godavari river system also.

Persons present at the conference :

The conference was duly held on the 27th and 28th July, 1951 at New Delhi. The Planning Commission was represented by Shri V. T. Krishnamachari, Member, G. R. Garg, Chief of Natural Resources Division and others. Shri N. V. Gadgil, Minister for Works, Production and Supply, attended by invitation. The Central Water and Power Commission was represented by its Chairman Shri A. N. Khosla and others. Bombay was represented by Dr. Jivraj Mehta, Minister, P.W.D., Shri Naik Nimabalkar, Development Minister, the Secretary, P.W.D. and two engineers. Madras was represented by Shri M. Bhakatavatsalam, Minister, P.W.D., the Secretary, P.W.D. and three engineers. Hyderabad was represented by Shri M. K. Vellodi, Chief Minister, Nawab Zain Yar Jung, Minister, P.W.D. and two engineers.

Mysore was represented by Shri K.C. Reddy, Chief Minister. Shri Reddy was not accompanied by any engineer or other officer. He attended the conference on the 27th July, 1951 only.

Andhra Pradesh's pleading ⁽¹⁾ suggests that he was present in the forenoon on the 27th July, 1951 for a few hours only at the inaugural session of the conference. However, the summary record of discussion stated that he attended on the 27th July and we shall assume that he was present at the conference in the afternoon also on that day.

Shri Aghnibhoj, Minister, P.W.D., Madhya Pradesh, also attended, but he was interested in the Godavari basin only.

Summary record of discussions, memorandum of agreement and C.W.P.C. technical note :

The Central Water & Power Commission prepared a technical note on the utilisation of supplies in the Krishna valley on the basis of the information supplied by the State Governments. The Planning Commission kept a summary record of the discussions at the conference. A memorandum of agreement allocating the flows of the river basins amongst the concerned States was drawn up and annexed to the summary record of discussions. Copies of the three documents are given at the end of this Chapter.

Main provisions of memorandum of agreement :

The memorandum of agreement was divided into three parts. Part I related to the Krishna. The dependable annual flow of the Krishna basin was accepted as 1715 T.M.C. The allocations for the existing utilisations and for projects under construction were as follows :—

	T.M.C.
Bombay	176
Hyderabad	180
Mysore	98.5
Madras	290
	744.5

It was stated that if there were any omissions in respect of the existing utilisations, the necessary adjustments would be made in the figures of dependable flow and existing utilisations. The balance flow after meeting the above allocations was taken to be 1000 T.M.C. and was allotted as follows :—

	Per cent	T.M.C
Bombay	24	240
Hyderabad	28	280

	Per cent	T.M.C.
Mysore	1 (provisional)	10
Madras	47	470

The balance flow in excess of 1000 T.M.C. was allotted as follows :—

Bombay	30 per cent
Hyderabad	30 per cent
Mysore	1 per cent (provisional)
Madras	39 per cent

It was stated that, as a result of further engineering scrutiny, the allocation to Mysore might be increased by 1%, such increase to come out of the share of Madras.

Part II related to the Godavari. Part III contained general provisions. It was provided that the allocations would be reviewed after 25 years.

The summary record of discussions shows that there was no concluded oral agreement on the 27th July:

The summary record of discussions shows that in the forenoon of the 27th July 1951, the conference assembled, Shri V. T. Krishnamachari opened the discussion, Shri G. R. Garg explained the technical note and several participants expressed their views on the available supply and its utilisation. Thereupon the conference adjourned till 4 P.M. to enable the engineers to arrive at an agreement about the Krishna waters. At 4 P.M. the conference re-assembled and the engineers reported a tentative agreement regarding the Krishna waters. No engineer of Mysore was present at the deliberations of the engineers or was a party to the tentative agreement reported by them.

After the conference re-assembled at 4 P.M., Shri N.V. Gadgil suggested that the percentage adopted by the engineers for Bombay should be increased. After discussion it was agreed that a different set of proportions for discharges above 1000 T.M.C. should be adopted in respect of the Krishna waters, but the proportions were not settled and agreed to on the 27th July.

The memorandum of agreement was not prepared on the 27th July and Shri K. C. Reddy could not have agreed to the terms of the memorandum on that day. Clearly, there was no concluded agreement on the 27th July.

(1) APK TV pp. 5-6.

On the 28th July at 10 A.M., the engineers met to discuss the distribution of waters in the Godavari basin and arrived at a tentative set of proportions concerning allocation of the Godavari waters. The conference assembled at 11.30 A.M. and considered the proposal of the engineers regarding the Godavari. The engineers were requested to prepare a memorandum of agreement and the conference adjourned till 3.30 P.M.

Thereafter the engineers drafted a memorandum of agreement. Parts I and II related to the Krishna and the Godavari respectively. The general provisions of Part III applied to both the rivers, and its wording suggests that its terms were discussed and tentatively agreed upon by the engineers after they had arrived at the tentative agreement regarding the Godavari on the 28th July.

After the draft memorandum of agreement was prepared, the conference re-assembled at 3.30 P.M. and proceeded to consider the draft sentence by sentence. In other words, the draft was subjected to close scrutiny and discussion. Clearly, up to this point of time, no final agreement had been concluded.

Shri N. V. Gadgil stated that the proportions for the Krishna waters worked out on the previous day were not equitable. After some discussion the proportions were modified, Bombay getting 4 per cent more and Hyderabad and Madras each getting 2 per cent less.

A final draft of the memorandum of agreement was then drawn up. The summary record of discussions stated that the basis of distribution of the Krishna and Godavari waters was shown in the annexed memorandum of agreement as finally agreed to by the conference.

There is no record of an oral agreement regarding the Krishna waters on the 27th July and a distinct and separate oral agreement on the 28th July modifying an earlier agreement. There were only discussions and negotiations on the 27th July.

Admittedly on the 28th July, Mysore was not represented at the conference and could not have agreed to the memorandum of agreement prepared on that day.

The memorandum of agreement was not the record of a concluded agreement :

Though the summary record of discussions stated that the memorandum of agreement annexed to it was finally agreed to by the conference, the Mysore Government, at the earliest opportunity on the 24th September, 1951, treated the memorandum as a draft agreement ⁽²⁾. The statement was fully justified, as the Mysore Government was not represented at the conference on the 28th July when the draft was prepared. All the States were asked to ratify the agreement presumably because the memorandum of agreement was a draft and not the record of a concluded agreement.

Absence of a signed agreement and necessity of ratification by the concerned States :

The avowed object of the conference was to discuss the utilisation of the supplies of the Krishna river system, so that an assessment might be made of the projects for inclusion in the First Five Year Plan. However, at the conference, a memorandum of agreement was drawn up allocating the supplies among the concerned States for a period of 25 years. But it is the common case that the representatives of the State Governments did not sign and execute any agreement at the conference. Immediately after the conference, the Planning Commission requested all the State Governments to ratify the agreement. The Government of Bombay, Madras and Hyderabad sent their letters of ratification to the Planning Commission. As ratification was considered essential, repeated requests for ratification were made to the Mysore Government. No one suggested that ratification was unnecessary.

From the surrounding circumstances we draw the inference that the representatives of the State Governments did not intend to bind their Governments by an oral agreement. On the contrary, they intended that the State Governments would be bound only if they sent formal signed letters of ratification addressed to the Planning Commission within a reasonable time.

Mysore's demands for water were not properly scrutinised at the conference :

Mysore had set forth its demands for water in its letter to the Planning Commission dated the 23rd

(2) MYDK I, p 20. 1
M of I & P/73—6

June, 1951⁽³⁾. These demands were summarized in the C.W. & P. C. technical note. At the conference on the 27th July, Shri K. C. Reddy handed over to the Chairman, C. W. & P. C. another note setting forth Mysore's revised demands. Shri Reddy's note was kept in the records of the Planning Commission.⁽⁴⁾ But apparently only the C. W. & P. C. note was discussed at the conference. The demands as allowed

by the conference were shown in the memorandum of agreement.

The following table shows Mysore's demands (1) as summarised in the C. W. & P. C. technical note. (2) as made in Shri Reddy's note and (3) as allowed by the memorandum of agreement:—

	Existing utilisation T.M.C.	Projects under construction T.M.C.	New Projects T.M.C.	Evaporation loss T.M.C.	Total T.M.C.
I	2	3	4	5	6
C.W. & P.C. technical note . . .	30	68.50	25.50	—	124
Shri Reddy's note . . .	45.07	70.25	23.75	4.50	143.57
Memorandum of agreement . . .	30	68.50	10		118.50
			(provisional and subject to increase up to 20 T.M.C. on further scrutiny)		-

The evaporation loss was not quantified in Shri Reddy's note but it was later shown as 4.50 T.M.C.

The Mysore Budget estimates of 1951-52⁽⁵⁾ show the Mysore projects then under construction. It is not disputed that these projects involved the use of 70.25 T.M.C. of water annually.

In the absence of Mysore's engineers, its demands of water could not be properly scrutinized at the conference.

The discrepancy between Mysore's earlier demand for 30 T. M. C. and its revised demand for 45.07 T.M.C. for existing utilisation was not checked and the correct figure for existing utilisation was not ascertained. Presumably for this reason, the draft, memorandum of agreement stated that the allocations for existing utilisations might require modification.

The memorandum of agreement erroneously assumed that Mysore's projects under construction would require 68.50 T.M.C. only, though as a matter of fact, They involved the use of 70.25 T.M.C.

Mysore's claim for allotment of 23.75 T.M.C. of water for its new projects could not be properly considered in the absence of its engineers. For this reason, the memorandum of agreement provided that the allotment for the new projects of Mysore was provisional and might have to be increased on further engineering scrutiny.

Mysore refused to ratify the agreement unless its demands for 143.5 T.M.C. of water was allowed in full,

Contention that Mysore wanted to preserve only the right under an earlier Tungabhadra agreement is rejected :

Andhra Pradesh argued that Mysore wanted to preserve only its established rights under an earlier Tungabhadra agreement and that as these rights were preserved by the memorandum of agreement of 1951, Mysore suffered no prejudice. It was argued that the statement of Shri K. C. Reddy at the conference supported the contention. Shri Reddy had stated that "So far as the Krishna River basin was concerned, Mysore had certain agreement with Madras and

(3) MYDK I p. 9; APDK I pp. 27-29.

(4) APDK IX pp. 76—80.

(5) MYDK XVII, pp. 31—32.

Hyderabad and the new agreement, that might be arrived at, should take a note of the existing agreement". Obviously Shri Reddy was referring to the agreement of July, 1944 between Madras and Mysore as modified by the supplemental agreements of December, 1945 and 1946 among Madras, Hyderabad and Mysore.

Shri Reddy wanted to preserve Mysore's established rights under the earlier Tungabhadra agreement, but he did not say that Mysore had no other claims on Tungabhadra waters. As a matter of fact, Mysore's notes had put forward larger claims.

The agreement of July 1944 between Madras and Mysore related to the Tungabhadra waters above Mallapuram only. It did not settle Mysore's share in the waters of the Vedavathi sub-basin.

The agreement of July 1944 fixed the shares of Madras and Mysore only in the Tungabhadra waters above Mallapuram. It did not bind the other riparian States. It contemplated that in a final apportionment of the Tungabhadra waters at the instance of the other States, a different share might be allotted to Mysore.

The agreement of July, 1944 preserved Mysore's existing utilisations above Mallapuram and established Mysore's right to use other quantities of water. It is not shown to our satisfaction that these rights were fully or unconditionally preserved by the memorandum of agreement of 1951.

Ratification of memorandum of agreement by Bombay, Madras and Hyderabad :

On the 31st July, 1951, the Planning Commission wrote to the Governments of Bombay, Madras and Hyderabad enclosing copies of the summary record of discussions and memorandum of agreement and asking them to ratify the agreement. Letters of ratifications were sent to the Planning Commission by the Madras Government on the 17th August, 1951, by the Hyderabad Government on the 23rd August, 1951 and by the Bombay Government on the 30th August, 1951.

Mysore's refusal to ratify.—On the 31st July, 1951, the Planning Commission wrote to the Mysore Government enclosing the documents and asking for early ratification of the agreement. Shri V. T. Krishnamachari wrote a similar letter to Shri K. C. Reddy. On the 3rd August, 1951 the Mysore Government acknowledged receipt of the documents. On the 17th September, 1951, the Personal Assistant to Shri Reddy wrote to the Personal Secretary to Shri Krishnamachari stating that Shri Reddy was unwell and

unable to attend to the matter and that the ratification of the agreement would be sent by the concerned Secretary to the Government soon.

On the 24th September, 1951, the Mysore Government wrote to the Planning Commission stating that the draft agreement should be modified so as to allow Mysore the right to use 143.5 T.M.C. of water as asked for in Shri Reddy's note and that the question of ratification would be considered after the necessary modifications were made. The letter was sent with the approval of Shri Reddy. Had Shri Reddy been a party to a concluded agreement, he could not have treated the memorandum as a draft agreement. On the 4th October, 1951, the Planning Commission wrote to the Mysore Government stating that the discrepancy between 45 T.M.C. claimed in Shri Reddy's note and 30 T.M.C. allowed by the memorandum of agreement on account of existing utilisation could be corrected under paragraph 2 of Part I of the memorandum, but the correction could be done only after careful verification and consultation with the other State Governments and, as this would take a considerable time, Mysore should not withhold ratification of the agreement. Significantly, the letter did not say that Mysore was resiling from a concluded agreement. Nor did the letter explain whether the discrepancy between 70.25 T.M.C. claimed in Shri Reddy's note and 68.50 T.M.C. allowed by the memorandum for projects under construction could be corrected. Clearly, this discrepancy could not be corrected under paragraph 2 of part I of the memorandum. On the 3rd and 19th, November, 1951, the Planning Commission sent reminders. On the 10th December, 1951, Mysore reiterated its previous stand.

On the 30th March, 1952, Shri K. C. Reddy ceased to be the Chief Minister of Mysore and, in his place, Shri Hanumanthiah became the Chief Minister. On the 3rd May, 1952, Shri V. T. Krishnamachari wrote to Shri Hanumanthiah stating that, as Mysore had some doubt about the effect of the memorandum of agreement on Mysore's rights under the earlier Tungabhadra agreement, Mysore might ratify the agreement with the proviso that the ratification would not affect Mysore's rights under the earlier agreement. In his letters dated 31st October, 1952 and the 16th December, 1952 to Shri Hanumanthiah, Shri Krishnamachari repeated the suggestion. But the clause that Mysore would continue to retain its rights under the earlier agreement could not be inserted in the memorandum of agreement without the consent of the other State Governments. A conditional ratification with a proviso preserving those rights would be tantamount to a refusal to ratify and would amount to a new offer. Had the memorandum of agreement been finally agreed

to at the conference, Mysore could not be asked to ratify it after adding a new term. On the 4th January, 1953, Shri Hanumanthiah wrote to Shri Krishnamachari stating that, in view of the recent drought in the areas served by the Tungabhadra waters, the tentative discussions of the July 1951 conference could not be regarded as a proper basis for the finalising of an agreement and that another conference should be called for the purpose. The letter also stated that no engineer from Mysore was present at the conference nor was any Mysore representative present at the deliberations on the 28th July, 1951 though their presence was necessary for fixing the allocation to Mysore. In his reply dated the 4th March, 1953, Shri Krishnamachari stated that Shri K. C. Reddy was present at the conference on the 27th July, 1951 when an agreement was reached on the use of the Krishna waters, that the changes made on the second day did not affect Mysore's share and that Mysore should ratify the memorandum of agreement, as its interests were protected by the memorandum and by the express reservation of its rights under the earlier Tungabhadra agreement to which the Planning Commission had agreed. It was not explained how the Planning Commission could agree to a new term without any authority from the other States.

On the 14th September, 1953, the Andhra State Act, 1953 was passed. Under this Act the Kannada speaking Taluks of Bellary District were added to the State of Mysore as from the 1st October, 1953. On the 19th September, 1953, Shri Hanumanthiah wrote to Shri Krishnamachari claiming more water for Mysore areas including water for the Bellary areas. On the 16th December, 1953, Shri Krishnamachari wrote to Shri Hanumanthiah stating that equitable adjustments on account of the transfer of Bellary areas to Mysore could be made later. On the 15th July, 1954, Shri Hanumanthiah wrote to Shri Krishnamachari stating that corrections on account of irrigation of the Bellary areas were absolutely necessary. In the subsequent correspondence up to the 18th March, 1955, these views were reiterated.

Effect of the correspondence between the Mysore Government and the Planning Commission :

The correspondence mentioned above⁽⁶⁾ taken either singly or collectively did not amount to ratification of the agreement by the Mysore Government. Nor does it show that there was a concluded oral agreement in July, 1951.

Erroneous statements that there was an agreement in 1951 and Mysore had ratified it:

There were numerous official statements that an agreement on the allocation of the Krishna waters was reached at the inter-State conference held on the 27th and 28th July, 1951. The Bombay Government made such statements in various official letters and documents.⁽⁷⁾ Similar statements were made by central authorities.⁽⁸⁾ All these statements erroneously assumed that the Mysore Government was a party to the agreement and had ratified it. The Lower Krishna Project Report 1952 prepared by the Hyderabad State explicitly stated that the agreement had been ratified by Mysore. On a review of the correspondence, we have already shown that Mysore refused to ratify the agreement. Some authorities were not even aware of the refusal of Mysore to ratify. The Central Water and Power Commission in its letter to the State Governments dated the 24th February, 1959⁽⁹⁾ stated that it was not known whether Mysore had ratified the agreement.

Moreover, the Andhra Pradesh Government in its letter to the Central Water and Power Commission dated the 10th July, 1959,⁽¹⁰⁾ and at the inter-State conference on the 26th and 27th September, 1960,⁽¹¹⁾ all the States admitted that the agreement was not ratified by Mysore. Finally, on the 23rd March, 1963, the Union Minister for Irrigation and Power stated in the Lok Sabha⁽¹²⁾ "They (the Planning Commission) convened a conference in New Delhi on 27th and 28th July, 1951, to discuss the utilisation of supplies in the two river basins and make an assessment of the relative merits of the projects proposed for inclusion in the second part of the First Year Plan.***(*)".

(6) MYDK I pp. 11—54; APDK IX pp. 69, 72.

(7) Letter dated 27-12-1951 to the Madras Government; APK II p. 34; Letter dated 30-7-1959 to the Government of India, MRK-II pp. 181—189; Letter dated 30-8-1959 to the Planning Commission, APK-II pp. 83-88; Koyna Hydro Electric Project Reports of January 1952 p. VI, December 1952 p. V, March 1956 p. IV, October 1956 p. IV.

(8) Statement of Prime Minister Shri Jawahar Lal Nehru in the Lok Sabha on 31-8-1951, APDK -IX p. 43; First Five Year Plan 355; Report of the Technical Committee for the Optimum Utilisation of Krishna and Godavari Waters, December 1952, pp. 15, 16, 91—93; Report of the States Reorganisation Commission 1955, p. 24.

(9) MYDK I, pp. 59—61.

(10) APDK I, pp. 72-73.

(11) APDK IV, pp. 2—17.

(12) APK II, pp. 123—125.

After a brief review of the then existing utilisation of supplies in the two river basins and the contemplated utilisation by the States concerned, a memorandum of agreement was drawn up, allocating the flows of the two rivers amongst the participating States. While the other participating States ratified the agreement, Mysore objected to it at the earliest opportunity and declined to ratify it.*** In order to bring about a settlement, an inter-State conference was convened in New Delhi under my chairmanship on September 26 and 27, 1960. Owing, however, to widely divergent views expressed at the conference, no settlement could be reached.**** As grave doubts were expressed at the conference about the validity or otherwise of the 1951 Agreement, my Ministry had the whole matter examined by the Ministry of Law at the highest level. Briefly the advice of the Ministry of Law was that the Agreement was legally wholly ineffective and unenforceable. This view was generally supported by the Attorney General of India, who stated that the Agreement must be treated as having become void, if it was not void at least partially *ab initio*".

Statements that Planning Commission had made an award in July, 1951 :

As no binding agreement concerning the Krishna waters was reached at the conference held on the 27th and 28th July, 1951, it was thought that the memorandum of agreement drawn up in July 1951 was an award made by the Planning Commission and/or the Government of India with regard to the allocation of the Krishna waters for the existing and future projects of the States and statements to that effect were made from time to time.⁽¹³⁾

Statements by the Mysore Government and others that there was an award:

The Government of Mysore and other authorities stated that the Planning Commission had made an award in 1951. Clause 10(i) of the conclusion reached at the conference of Ministers of Andhra Pradesh and Mysore held at the Tungabhadra Dam on the 5th and 6th October 1957,⁽¹⁴⁾ stated: "It is agreed that the waters of the Reservoir be utilised on

both sides in the manner and for the areas specified by the Governments of former Hyderabad and Composite Madras States in conformity with the framework of the Planning Commission award of 1951 irrespective of the territories in which the areas are now situated. The question of utilisation of surplus waters, if any, will be considered after a period of two years."

On an enquiry made by the Andhra Pradesh Government on the 14th August, 1957⁽¹⁵⁾ whether the proposed abstraction of supplies by the Gayathri reservoir, then under construction, would be within the allocations of the Delhi award of 1951, the Government of Mysore stated on the 8th August 1958⁽¹⁶⁾ that the contemplated storage through the reservoir would be well within the provisions of the award. On a further enquiry by the Andhra Pradesh Government, the Mysore Government said that the so-called '1951 award' was legally void and unenforceable. ⁽¹⁷⁾

During the negotiations with the Bombay Government with regard to the sharing of the water stored in the Koyana reservoir, the Government of Mysore in its letter dated the 20th October 1958 ⁽¹⁸⁾ sought to justify its demand for the water on the basis of 'the Planning Commission award of 1951'. The negotiations were inconclusive and no agreement was reached on the subject between the two Governments.

In the correspondence regarding the clearance of Ghataprabha Project, Stage II during 1959⁽¹⁹⁾ the Central Water & Power Commission as also the Mysore Government referred to the 1951 award of the Planning Commission.

During 1959-1960, in course of the correspondence arising out of the proposal of the Central Water and Power Commission for reallocation of the Krishna waters in consequence of the reorganisation of States, reference was made to the allocations in the Planning Commission award of 1951 by the Government of India, ⁽²⁰⁾ the Andhra Pradesh Government ⁽²¹⁾ and the Mysore Government. ⁽²²⁾ Subsequently in 1961 ⁽²³⁾ the Mysore Government stated that the so called memorandum of agreement of 1951 could not be regarded as an award and that the Planning Commission had no authority to make any award.

(13) See letter of the Madras Government to the Bombay Government dated 11-5-1953, APDK-IX pp. 25—27 (Award of July, 1951 made by the Government of India); Report on the Tungabhadra Project High Level Canal Scheme 1954 Government of Andhra APPK III, p. 7 (allocation of the Planning Commission); Report of the COPP Irrigation and Power Team on Nagarjunasagar Project 1960, pp. 4-5 (1951 award and allocations as fixed by the Planning Commission at the 1951 Conference).

(14) APK II, pp. 58-59 *

(15) APDKIX, p. 171.

(16) APDK IX, pp. 172—174.

(17) MYDK XVII, pp. 23—29.

(18) MRDK VI, pp. 56—60.

(19) MYDK XII, pp. 80—115.

(20) MYDK I, p. 87.

(21) APDK I, pp. 72—81.

(22) APK IV, pp. 95—101; MYDK-I, pp. 91—92.

(23) MYDK I, pp. 95—102.

The Planning Commission did not make and had no power to make an award:

In the present proceedings, none of the parties relied on any award made by the Planning Commission or the Government of India concerning the Krishna waters and consequently no issue was raised as to the existence and validity of the supposed award. It is plain beyond doubt that in July 1951 the Government of India or the Planning Commission had no power of superintendence or paramountcy control over the States and had no authority to make an award apportioning the Krishna waters, nor had they, as a matter of fact, made such an award. The minutes of the Tribunal's proceedings, dated the 17th February, 1971 recorded the following admission of the parties:—

"Learned Advocate General of Andhra Pradesh, Learned Advocate General of Maharashtra and Mr. T. Krishna Rao on behalf of their respective States stated before us that the Planning Commission did not make any award in respect of Krishna Waters in 1951 nor had the Planning Commission any authority to make the award. Be it recorded that this was conceded on behalf of the aforesaid States at the time when the Issues were framed and accordingly no Issue was raised on the question whether the Planning Commission made an award in 1951 regarding Krishna waters and whether the Planning Commission had any authority to make the award."

Mysore is not estopped from denying the existence and validity of the agreement:

Andhra Pradesh contended that the statements of Mysore in the above mentioned documents show that the Mysore Government acted upon and treated the agreement of 1951 as binding and was, therefore, estopped from denying it. We are unable to accept this contention. It is to be observed that none of the documents contained any representation by the Mysore Government that there was a concluded and binding agreement in 1951 concerning the allocation of the Krishna waters, nor did any party act upon such a representation. Instead of stating that there was such an agreement, all the documents referred to an award made by the Planning Commission in July 1951. It was because there was no concluded agreement in 1951, that the idea had gained ground that the Planning Commission had made an award

in 1951 concerning the Krishna waters. Moreover, all these documents were written after 1956. In the meantime, extensive territorial changes in the Krishna basin had been made by the Andhra State Act, 1953 as from the 1st October, 1953 and by the States Reorganisation Act, 1956 as from the 1st November, 1956 and Mysore had acquired large territories in the Krishna basin. In this changed situation, Mysore could not have intended to affirm the memorandum of agreement prepared on the basis of conditions prevailing in July 1951.

Andhra Pradesh relied on the following passage in the judgment of Viscount Maugham in *Lady Naas v. Westminster Bank Ltd.*, 1940 A.C. 366, at 373:—

"It is clear beyond doubt that a party who knowingly takes the benefit of a deed is bound by it although he has not executed it." But Andhra Pradesh does not show that Mysore took any benefit under the agreement of 1951. At the earliest opportunity, Mysore repudiated the agreement and refused to abide by it. Dehors the agreement, Mysore was entitled to utilise the waters of the Krishna river system, -and it continued to utilise them. The argument that Mysore is bound by the agreement of 1951 although it had not ratified the agreement must fail.

Conclusion that Mysore is not bound by the alleged agreement of July 1951 :

We are satisfied on the evidence that there was no concluded oral agreement on the 27th July, 1951 regarding the allocation of the Krishna waters as alleged. Mysore was not a party to any agreement reached at the conference, nor did Mysore subsequently ratify the agreement. Mysore did not act upon and treat the agreement as binding and is not precluded or estopped from denying the agreement. Mysore is not in any way bound by the alleged agreement.

The other State Governments ratified the agreement, but the question is whether they are bound by the agreement in the absence of any ratification by the Mysore Government. It is not the case of Andhra Pradesh that the other State Governments entered into any agreement other than the agreement set forth in the memorandum of agreement.

Memorandum of agreement could not take effect according to its tenor unless Mysore ratified it:

The memorandum of agreement apportioned the dependable flow of the Krishna river system and allocated specific quantities of water to four States. The allocation implied that each State would utilise the quantity of water allotted to it and no more. The memorandum as drafted could not take effect according to its terms unless Mysore accepted the allotment and bound itself to utilise the quantity of water allocated to it and no more. The rights and obligations of the other States were inextricably mixed up with those of Mysore and could not be separately enforced.

The other States ratified the agreement on the understanding that Mysore also would ratify it :

All the four States were invited to the conference and participated in its deliberations. A memorandum of agreement was drawn up and all the four States were requested to ratify it. The States of Bombay, Hyderabad and Madras ratified the agreement. As ratification by Mysore was necessary, repeated requests for ratification were sent by the Planning Commission to Mysore.⁽²⁴⁾ Mysore was a necessary party to the agreement as drafted. The other States could not have intended to affirm or ratify an agreement to which Mysore was not a party. The inference is irresistible that they ratified the agreement on the understanding that Mysore also would ratify it. The consideration for which they ratified the agreement and promised to abide by it was that all the States including Mysore also would ratify the agreement and be bound by it.

Law.—The law on the subject is well settled. In *Jainarian Ram Lundia v. Surajmall Sugarmul* 1949

F.C.R. 379, at p. 392, B. K. Mukherjee J., observed: "When parties enter into an agreement on the clear understanding that some other persons should be a party to it, obviously no perfected contract is possible so long as this other person does not join the agreement. This would be the position in law apart from any rule of equity." After referring to *Lady Naas v. Westminster Bank Limited* 1940 A. C. 366, in which case the House of Lords discussed the broad principles upon which equity would relieve a party from his obligations under an unconditional deed which took effect at law, he observed "and in order that a relief might be claimed in equity, it is necessary to prove that substantial injustice would result if the deed is enforced unconditionally against the executing parties. Relief, therefore, could be given in those cases where the strict enforcement of law would lead to the executing parties being saddled with heavier liability than they otherwise would incur or would make the transaction substantially different from what it would have been if all the parties had joined it".

CONCLUSION.—As already stated, the States of Bombay, Hyderabad and Madras ratified the agreement on the clear understanding that the State of Mysore would also join the agreement and would ratify it. As Mysore did not ratify the agreement, there was no operative and concluded agreement and the ratification by the three States were wholly ineffective. This is the position in law apart from any rule of equity. The ratifying States or their successor States are not bound at law by any agreement and they need not seek any equitable relief.

Answer to Issue I.—In view of the above conclusions, no other question under Issue I need be decided. We hold that there was no concluded and binding agreement regarding the allocation of the waters of the river Krishna as alleged. Issue I is answered accordingly.

24 See office notes in Planning Commission file APDD IX, pp. 45, 46, 48, 50, 52.

Annexures to Chapter IV.

NOTES BY THE CENTRAL WATER AND POWER COMMISSION ON THE UTILISATION OF SUPPLIES IN THE KRISHNA VALLEY

Average annual runoff and dependable yield.

Discharge observations of the river Krishna are available for Bezwada site in Madras for the year 1895 to 1945 i.e., for 51 years. Actual yearly runoff are given in statement 'A'. The mean annual runoff comes to 1957 T. M. Cft. This, however, is available in 21 years only out of 54 and hence cannot be taken as dependable supply. Runoff of 1800, 1700 and 1450 are available in 30 years, 37 years and 44 years respectively. Hence dependable supplies at Bezwada excluding present utilisation above may be taken as 1450 T. M. Cft. This tallies with the figure worked out by Hyderabad. The Madras figure of 2000 is too high.

The existing utilisation of supplies above Bezwada is 120 in Bombay, 90 in Hyderabad, 30 in Mysore and 10 in Madras taking a total of 250. Hence total dependable supply in the river basin may be taken as 1700 T. M. Cft.

Minor Works		8
	TOTAL	90
	Mysore	
Bhadra reservoir		57
Tunga Anicut		11.5
	TOTAL	69.5
	Madras	
Tungabhadra		65.0
	GRAND TOTAL	279.5
	or say (B)	280

Water available for future Projects

Total of A and B above=450+280=730 T.M.cft
This leaves 1700—730=970 T.M.Cft. only for future schemes.

	Existing Utilisation	T.M. Cft.
	Bombay	
All minor works		120
	Hyderabad	
Minor Works		90
	Mysore	
Vanivilas Sagar		30
	Madras	
K.C. Canal		10
Bezwada Anicut		200
	TOTAL (A)	450
Projects under construction		

	Bombay	
Ghataprabha Left Bank Canal		15
Mulehir Weir		8
Radha Nagri		11.3
Other minor works		21.7
	TOTAL	56.0
	Hyderabad	
Tungabhadra		65
Rajolibunda		17

	Projects under investigation or contemplation	
	Bombay	T.M.Cft.
Koyna Irrigation and Hydro-Electric (I Stage)		127
Koyna Irrigation and Hydro-Electric (II Stage)		46
Ghataprabha Valley		70
New Khadakvasla dam		33
Kukadi Irrigation project		28
Asoga Reservoir		25
Vir dam		14
Bhima storage		12
Other projects		25
	TOTAL	380
	Hyderabad	
Upper Krishna		165
Bhimana		80
Lower Krishna		240
Medium and minor projects		65
Extension of irrigation on Tungabhadra		35
	TOTAL	585

Mysore				
	T.M.Cft.	1903-04	2952	67.89
Bhadra anicut	5	1904-05	1456	33.53
Vedavathi	1	1905-06	1131	26.01
Other works	19.5	1906-07	1643	37.78
TOTAL	25.5	1907-08	1911	43.95
Madras		1908-09	2293	52.73
		1909-10	1746	40.05
Krishna Pennar Project	825	1910-11	2171	49.93
Pulichintala Project	100	1911-12	1135	26.10
Tungabhadra High Level Canal.	25	1912-13	1907	43.86
TOTAL	950	1913-14	1445	33.23
GRAND TOTAL	1940	1914-15	2750	63.25
		1915-16	2250	51.75
		1916-17	3487	80.20
		1917-18	-2569	60.08
		1918-19	808	19.84
		1919-20	1857	42.71
		1920-21	1372	31.55
		1921-22	1784	41.03
		1922-23	1730	39.79
		1923-24	2043	46.98
		1924-25	1936	44.52
		1925-26	1819	41.83
		1926-27	1953	44.91
		1927-28	2054	47.24
		1928-29	1901	43.73
		1929-30	1627	37.42
		1930-31	1927	44.22
		1931-32	2508	57.68
		1932-33	2472	56.85
		1933-34	2524	58.05
		1934-35	1794	41.26
		1935-36	1600	36.80
		1936-37	1652	37.92
		1937-38	3336	76.58
		1938-39	2169	49.76
		1939-40	1713	39.32
		1940-41	1903	43.69
		1941-42	1310	30.13
		1942-43	1610	37.03
		1943-44	1700	39.10
		1944-45	2000	46.00

Hence the total demand on the waters of the Krishna considering projects proposed or under contemplation is 1940. 5 T.M.Cft., as against 970 T.M.Cft., the water potential remaining after catering to the demands by works already under operation and construction. The future demand is thus twice the availability of water in the basin.

A statement 'B' showing quantum of proposed utilisation, power installed and proposed irrigation with capital costs etc. is attached.

STATEMENT 'A'				
Statement showing annual run off of Krishna at Bezwada anicut excluding existing utilisation.				
Year	T.M. Cft.	M. Acre ft		
1894-95	1809	41.60	1934-35	1794 41.26
1895-96	2085	47.95	1935-36	1600 36.80
1896-97	2320	53.36	1936-37	1652 37.92
1897-98	2481	57.06	1937-38	3336 76.58
1898-99	2271	52.22	1938-39	2169 49.76
1899-1900	854	19.64	1939-40	1713 39.32
1900-01	2577	59.24	1940-41	1903 43.69
1901-02	1822	49.90	1941-42	1310 30.13
1902-03	1732	39.83	1942-43	1610 37.03
1902-03	1732	39.83	1943-44	1700 39.10
			1944-45	2000 46.00
			51 years average 1957 Average 45.01	

Statement 'B'
Krishna Basin Projects
Statement showing quantum of proposed utilisation, power installed, proposed irrigation and cost.

Name of Project	Total demand T.M. Cft.	Proposed irriga- tion (acres)	Proposed power to be installed	Cost in lakhs of rupees	Return (%)
1	2	3	4	5	6
<i>Bombay</i>					
Koyna H.E. and Irrigation Project		4,40,000	6,00,000	9278	
Other Project	173				
Ghataprabha Valley	70	6,00,000		2455	1.5
New Khadakvasla Dam	33	1,40,000		750	4.5
Kukadi Irrigation Project	28	1,30,000		600	4.2
Asoga Reservoir	25	74,200		472	5.0
Other Projects	42	2,34,350		1322	
Other I Class works	9				
	207	11,78,550	6,00,000	5599	

1	2	3	4	5	6
	Hyderabad				
Upper Krishna	165	7,34,000	80,000	3,800	6.08
Bhima	80	2,74,000		1,200	4.50
Lower Krishna	240	9,00,000	80,000	4,800	5.90
Medium and minor project	65	2,50,000	..	..	..
	550	21,58,000	1,60,000	9,800	
	Mysore				
Bhadra Anicut	5		..	..	..
Vedavathi	1	Figures not given			
Other works	19.5				
	25.5				
	Madras				
Krishna-Pennar Project	825	30,00,000	2,50,000	15,750	4.5
		(I crop)			
		12,00,000			
		(II crop)			
		Other Projects			
Pulichintala	100	6,00,000			
Tungabhadra High Level Canal	25				
	125				

Summary record of discussions at the Inter-State Conference on the utilisation of Krishna and Godavari Waters held in the Committee Room of the Planning Commission, New Delhi, on 27th and 28th July, 1951.

Planning Commission

Shri V. T. Krishnamachari, Member-Chairman.

Shri G. R. Garg, Chief of Natural Resources Division.

Shri K. S. S. Murthy, Asstt. Executive Engineer, Natural Resources Division.

Hon'ble Shri N. V. Gadgil, Minister for works, Production and Supply attended by invitation.

BOMBAY

Hon'ble Dr. Jivraj Mehta, Minister, P.W.D.

Hon'ble Shri Naik Nimbalkar, Development Minister.

Shri G. V. Bedekar, I.C.S., Secretary, P.W.D. Shri Mirchandani, Chief Engineer, Electricity. Shri Champhekar, I.S.E., Chief Engineer, Irrigation,

MADRAS

Hon'ble Shri M. Bhakthavatsalam, Minister, P.W.D.

Shri T. M. S. Mani, I.C.S., Secretary, P.W.D.

Shri A. R. Venkatacharya, I.S.E., Chief Engineer, Irrigation.

Shri N. Padmanabha Iyer, I.S.E., Superintending Engineer.

Shri M. D. Narasimhachari, Deputy Chief Engineer.

HYDERABAD

Hon'ble Shri M. K. Vellodi, Chief Minister.

Hon'ble Nawab Zain Yar Jung, Minister, P.W.D.

Shri Papaiah, Chief Engineer.

Mr. Jaffar AH, Superintending Engineer.

MADHYA PRADESH

Hon'ble Shri R. Agnibhoj, Minister, P.W.D.

MYSORE

Hon'ble K. C. Reddy, Chief Minister (attended on 27th only).

CENTRAL WATER AND POWER COMMISSION

Shri A. N. Khosla, Chairman.

Shri Gadkary, Member.

Shri Dr. K. L. Rao, Director.

Shri C. S. Parthasarthy, Asstt. Engineer.

Opening the discussion Shri V. T. Krishnamachari stated the broad principles on which schemes for irrigation and power development should be selected for inclusion in the Plan. He mentioned that only projects, which had been thoroughly investigated and found technically, economically and financially justifiable, should be included in our Five Year Plan.

The object of the conference was to discuss the utilisation of supplies in the Krishna and Godavari river basins so that an assessment could be made of the relative merits of projects proposed for inclusion in the second part of the Five Year Plan. He referred to the technical paper already circulated showing the supplies available in these rivers. In considering the issues placed before the meeting, two points of view should be reconciled. The first was the need from an all India point of view for increasing available food supplies within the shortest possible time and on the most economic basis. The Irrigation Commission reporting over 50 years ago emphasised the need regarding irrigation development as a national-all-India question. This was even more important now than it was in the past. India's food problem can be solved only on such a basis. The shortage of power in the Bombay City and surrounding areas should also be regarded as an urgent problem. On the other hand, regional development was important, especially the development of backward regions, and could not be ignored. He was confident that an agreement could be reached reconciling these two considerations in a practical manner which would be equitable to all areas concerned.

2. Shri G. R. Garg, Chief of Natural Resources Division, then gave a brief review of the existing utilisation of supplies in these river basins and the contemplated utilisation based on the technical note circulated by the Planning Commission.

Shri Venkatacharya, Chief Engineer, Madras, stated that the discharge figures of Krishna River, which had been worked out in the note, were under-estimated by about 8%. Shri Champhekar, Chief Engineer, Bombay, stated that the regeneration supplies in the river basin had not been taken into account. He

thought that nearly 25 per cent to 40 per cent of the waters would perhaps be available as regeneration supplies. These points were noted.

3. Hon'ble Shri N. V. Gadgil drew attention to the extremely backward condition of certain districts of Bombay State, Poona, Sholapur, Bijapur, etc. He specially stressed the needs of the Karnatic areas. The development of these regions depended on the availability of power and irrigation and should have high priority. Their needs should be provided for

Shri M. K. Vellodi, Chief Minister of Hyderabad, desired that certain broad principles of priority should be laid down by the conference, so that details could be worked out later on.

4. Shri V. T. Krishnamachari mentioned that apart from power supply projects in the Plan to meet existing deficits, irrigation had been given priority over power projects. The Planning Commission in their draft Five Year Plan has suggested a Committee for selecting projects for inclusion in the second part of the Plan, and set out the principles which should regulate the inclusion of projects in the Plan. No doubt certain States had some initial advantages—trained staffs and long experience of irrigation works—but the interests of other regions could not be neglected.

Hon'ble Shri K. C. Reddy, Chief Minister of Mysore, stated that so far as the Krishna River basin was concerned, Mysore had certain agreement with Madras and Hyderabad and the new agreement, that might be arrived at, should take note of the existing agreement.

5. Shri Rameswar Agnibhoj referred to the Wainganga Project of Madhya Pradesh. It was suggested to him that his Government should request the Central Water and Power Commission to complete the investigations so that negotiations might be undertaken with the adjoining States for utilising the power proposed to be generated.

6. Shri T. M. S. Mani of Madras suggested that the waters of the river basins should be distributed to the various States on a percentage basis so that every one would be affected equally in good or bad year.

7. Thereupon the Conference adjourned to enable the engineers to arrive at an agreement about the water of Krishna.

8. The Conference reassembled at 4 P.M. The engineers reported a tentative agreement regarding the

waters of the Krishna Hon'ble Shri N. V. Gadgil suggested that the percentage adopted by the engineers for Bombay should be increased. After discussion it was agreed that in the case of the Krishna waters, a different set of proportions should be assumed for discharges above 1,000 T M Cft.

Saturday the 28th July, 1951.

9. The engineers met at 10 am. to discuss the distribution of waters in the Godavari Basin and arrived at a tentative set of proportions.

10 The Conference assembled at 11.30 am. It considered proposals made by the engineers regarding the Godavari The engineers were requested to prepare a memorandum of agreement and the Conference adjourned till 3 30 p m

11. The Conference reassembled at 3.30 p.m. and proceeded to consider the draft memorandum sentence by sentence As regards Section I, Hon'ble Shri N. V. Gadgil stated that the proportions for the Krishna waters worked out on the previous day were not equitable as they would prejudice the development of the economically backward areas he mentioned and these areas were entitled to a larger share. After some discussion in which the representatives of Madras, Hyderabad and Bombay took part, the conference agreed to a modification of the proportions of distribution for the Krishna waters—Bombay's share being increased by 4 per cent, 2 per cent being surrendered by Hyderabad and 2 per cent by Madras.

12 The basis of distribution for the Krishna and the Godavari waters agreed to at the conference is shown in the annexed memorandum of agreement as finally agreed to by the conference.

MEMORANDUM OF AGREEMENT

I.—THE KRISHNA

The dependable annual flow in the Krishna basin based on the recorded gaugings at Vijayawada is accepted as 1715 T.M.Cft. This figure may have to be increased to allow for any omissions in respect of existing utilisations in any State.

Shri Venkatachari's statement that the actual flow will be in excess of the recorded gauged flow by 8 per cent is noted.

2 The existing utilisations (subject to corrections mentioned in para I) plus flows required for projects under construction in the concerned States, as

stated below, are hereby allocated to the respective States :—

	T M Cft
Bombay	176
Hyderabad	180
Mysore	98.5
Madras	290
	744.5

3. The balance of flow for new projects, after meeting the above allocations works out to 970 5 T.M.Cft. For purposes of allocation, this has been taken as 1,000 T M Cft. For this balance upto 1,000 T M Cft. the allocations are made as hereunder:—

	Per cent	T. M. Cft
Bombay	24	240
Hyderabad	28	280
	Per cent	T M Cft
Mysore	1	10
	(Provisional)	
	47	470

For balance flow in excess of 1,000 T M Cft mentioned above, the allocations will be as follows —

	Per cent
Bombay	30
Hyderabad	30
Mysore	1 (Provisional)
Madras	39

The allocation to Mysore may have to be slightly adjusted to the extent of additional 1 per cent as a result of further engineering scrutiny. This addition will come out of the share of Madras.

4. The above allocations are subject to the condition that the diversion of supplies across the western ghats for the Koyna Project will be limited to 67.5 T.M.Cft.

II—THE GODAVARI

The dependable annual flow in the Godavari basin based on the recorded gaugings at Dowlaishwaram is taken as 2,500 T.M.Cft

2 The existing utilisations plus supplies required for projects under, construction in the concerned States

as stated below are hereby allocated to the respective States:—

	Percent	T.M. Cft.
Bombay		57
Hyderabad		208
Madhya Pradesh		30
Madras		300
TOTAL		<u>595</u>

3. Of the balance flow of 1,905 T.M.Cft. (say 1,900) which remains available after meeting the allocations in para 2, the allocations to the various States will be as below:—

	Per cent	T.M.Cft.
Bombay	3	57
Hyderabad	26	494
Madhya Pradesh	24	456
Madras	47	893
		<u>1900</u>

These percentages will apply whether the supplies are in excess or short of the dependable flow assumed above.

III.—GENERAL

The allocations in the case of the Krishna and the Godavari have been made on an annual basis. The new utilisations have to be so adjusted as not to interfere with the existing daily utilisation for existing works and agreed utilisation for new works.

2. The use of water passed by one State for her use downstream, out of the share allocated to her and passing through the reservoir of another State may be used by the latter State, solely for power purposes, provided that such quantities are not impounded in their passage through the reservoir for more than the period agreed upon between the Governments concerned, which agreement shall not be unreasonably withheld.

3. The allocations made under parts I and II shall be reviewed after 25 years.

4. No major project shall be undertaken for construction by any State unless it has been fully investigated and necessary detailed estimates have been prepared, and duly examined.

CHAPTER V

Disputes concerning the Tungabhadra

The Tungabhadra river and river valley :—Prior to 1947, the river Tungabhadra had its catchment area in the States of Mysore and Hyderabad and the Provinces of Madras and Bombay. Small portions of its catchment area lay within the States of Sangli, Sandur, Savanur, Miraj (Senior), Miraj (Junior) and Banaganapalle.

Before Independence, about 11,636 square miles of the Tungabhadra catchment fell within the old Mysore State. Now, 22,011 square miles of the catchment lie within Mysore and 5,563 square miles lie within Andhra Pradesh.

Formerly, the united Tungabhadra after the junction of the Tunga and the Bhadra ran in Mysore for a length of 40 miles, formed the boundary between Mysore and Bombay for a length of 35 miles, the boundary between Madras and Bombay for 62 miles, and the boundary between Madras and Hyderabad for the next 192 miles. The Tungabhadra now runs for 237 miles in Mysore, forms the boundary between Mysore and Andhra Pradesh for 36 miles and runs for the next 57 miles in Andhra Pradesh.

Agreements concerning Tungabhadra waters :

From time to time there were the following agreements concerning the Tungabhadra waters:—

- (a) agreement of 1892 between Madras and Mysore ⁽¹⁾;
- (b) agreement of 1933 between Madras and Mysore ⁽²⁾;
- (c) agreement of June 1944 between Madras and Hyderabad ⁽³⁾;
- (d) agreement of July 1944 between Madras and Mysore ⁽⁴⁾;

- (e) supplemental agreement of December 1945 among Madras, Mysore and Hyderabad ⁽⁵⁾; and
- (f) supplemental agreement of 1946 among Madras, Mysore and Hyderabad ⁽⁶⁾.

Copies of the agreements are appended to this Report.

Agreements of 1892 and 1933, Issue IV :—The agreements of 1892 and 1933 between the Governments of Madras and Mysore imposed restrictions concerning irrigation works on the Tungabhadra, the Tunga, the Bhadra, the Vedavathi and their tributaries and several rivers outside the Krishna basin. The agreements so far as they related to the rivers outside the Krishna basin are not the subject-matter of these proceedings.

The effect of clauses 10 and 11 of the agreement of July 1944 between Madras and Mysore was that the agreements of 1892 and 1933 were abrogated so far as they related to the Tungabhadra, the Tunga and the Bhadra and they continued to subsist so far as they related to the Vedavathi only. This is conceded by all the concerned parties.

Mysore contended that in the events which happened after July 1944, the two agreements had wholly ceased to be operative. Andhra Pradesh disputed this contention. Accordingly, the following issue was raised:—

Issue IV: "Are the Agreements of 1892 and 1933 so far as they relate to the river Krishna and its tributaries subsisting and, if so, with what effect? Did they survive on the merger of the princely State of Mysore in the Republic of India? Have they ceased to be operative on the reorganisation of States?" Maharashtra is not interested in this issue.

(1) APK II pp. 144—159
(2) APK II pp. 160—163
(3) APK II pp. 164—167
(4) APK II pp. 168—174
(5) MYDK II pp. 401—402
(6) APDK V pp. 31-35.

On the 2nd September, 1971, the States of Mysore and Andhra Pradesh filed the following agreed statement regarding Issue IV and protection to irrigation works in their respective territories in the Vedavathi sub-basin:—

"It is agreed between the State of Mysore and the State of Andhra Pradesh that the State of Mysore will not put up any new work on the streams mentioned in Schedule (1) within the limits shown in the said Schedule and marked in the map* appended herewith, without the previous consent of Andhra Pradesh to protect the irrigation interests under the existing irrigation works in Andhra Pradesh and similarly it is agreed that the State of Andhra Pradesh will not put up any new work on the streams mentioned in Schedule (2) within the limits

shown in the said Schedule and marked in the map* appended herewith, without the previous consent of Mysore State to protect the irrigation interests under the existing irrigation works in Mysore State.

It is further agreed between the State of Mysore and the State of Andhra Pradesh that the State of Mysore will not put up any new construction on Suvarnamukhi river so as to affect the supply of Agali tank in Andhra Pradesh for the irrigation of an ayacut of 884 acres, the supplies for which are drawn from the Agali Anicut in Mysore State.

Having regard to this concession the parties are agreed that the Tribunal need not decide issue No. IV."

SCHEDULE-1

List of streams on which no new constructions should be undertaken by the State of Mysore without the previous consent of Andhra Pradesh

Sl. No	Name of the Stream or Catchment	Location In the Map	Limits within which no new construction should be undertaken by Mysore without the previous consent of Andhra Pradesh
1.	Hagari (Vedavathi)	A	From Vanivilas Sagar in Mysore upto Bhairavanithippa Dam in Andhra Pradesh.
2.	Dodderi tank halla (Garanihalla)	B	4½ miles up-stream of confluence with Hagari.
3.	Talak tank halla (Garanihalla)	C	From the Salem-Bellary road bridge over this stream upto confluence with Hagari.
4.	Chinnahagari	D	Upto 16 miles upstream from Mysore — Andhra Pradesh boundary.
5.	Amarapuram tank catchment	E	Catchment of Amarapuram tank in Mysore State.
6.	Virapasamudram tank catchment	F	Catchment of Virapasamudram tank in Mysore State.
7.	Yeradkere tank catchment	G	Catchment of Yeradkere tank in Mysore State.
8.	Rangasamudram tank catchment	H	Catchment of Rangasamudram tank in Mysore State.
9.	Nagalapuram tank catchment	I	Catchment of Nagalapuram tank in Mysore State.

SCHEDULE-2

List of Streams on which no New constructions should be undertaken by the State of Andhra Pradesh, without the previous consent of Mysore

Sl. No	Name of the Stream	Location in the Map	Limits within which no new construction should be undertaken by Andhra Pradesh without the previous consent of Mysore State
1	2	3	4
1.	Madalur Doddakere nala	J	Entire catchment of the nala in Andhra Pradesh.
2.	Madalur Gidagana halli Katte nala	K	Entire catchment of the nala in Andhra Pradesh.
3.	Doddabanagere Doddakere nala	L	Entire catchment of the nala in Andhra Pradesh.
4.	Dharmapur tank nala	M	Entire catchment of the nala in Andhra Pradesh.
5.	Parasurampur Doddakere nala	N	Entire catchment of the nala in Andhra Pradesh.

*See Map II in Volume IV of the Report.

1	2	3	4
6. Kadehoda Achuvali kere nala	O	Entire catchment of the nala in Andhra Pradesh.	
7. Parasurampura tank nala	P	Entire catchment of the nala in Andhra Pradesh.	
8. Gowripura Palyadakere nala	Q	Entire catchment of the nala in Andhra Pradesh.	
9. Jajur tank nala	R	Entire catchment of the nala in Andhra Pradesh.	
10. Thippareddihally Kyatanakere nala	S	Entire catchment of the nala in Andhra Pradesh.	
11. Oblapur tank nala	T	Entire catchment of the nala in Andhra Pradesh.	
12. Hagari (Vedavathi)	U	Below Bhairavanithippa Dam upto Andhra Pradesh-Mysore border.	
13. Chinnahagari	V	From Mysore-Andhra Pradesh border upto its confluence Vedavathi (Hagari).	

On the 23rd October, 1972, the States of Mysore and Andhra Pradesh filed the following supplemental agreed statement concerning issue IV:—

"The State of Andhra Pradesh and the State of Mysore submit that in the agreement of 2nd September, 1971, filed before this Hon'ble Tribunal it is specifically stated that the parties agreed that this Hon'ble Tribunal need not decide Issue No. IV. In view of this the validity or the effect of the agreements of 1892 and 1933 need not be decided in these proceedings. The State of Andhra Pradesh and the State of Mysore do not rely on the agreements of 1892 and 1933 for any relief in these proceedings or any other proceedings relating to the allocation of the Krishna waters."

Having regard to the above concessions we do not decide Issue IV. The States of Mysore and Andhra Pradesh jointly pray that the Tribunal should give suitable directions regarding protection to irrigation works in the Vedavathi sub-basin in accordance with the agreed statement of September 2, 1971. The State of Maharashtra does not oppose this prayer.

On a consideration of all relevant materials before us we propose to direct that the regulations set forth in Annexure 'A' to our final Order regarding protection to the irrigation works in the respective territories of the States of Mysore (now known as Karnataka) and Andhra Pradesh in the Vedavathi sub-basin be observed and carried out.

Agreements of June 1944 and July 1944 and Supplemental agreements of December 1945 and 1946 [Issue III and IV (A)] :

In June 1944, the Governments of Madras and Hyderabad entered into an agreement for the partial

utilisation of the Tungabhadra waters. The immediate object of the agreement was to enable the two Governments to start the construction of the Tungabhadra Project at Mallapuram. The necessity of a storage project on the Tungabhadra for purposes of irrigation was felt for a long time⁽⁷⁾.

In July 1944, the Governments of Madras and Mysore entered into an agreement in regard to sharing of the waters of the Tungabhadra river. The immediate object of the agreement of July, 1944 was to enable the Mysore Government to construct the multi-purpose project at Lakkavali on the Bhadra river.

The project was under investigation for a long time and took its final shape in 1939⁽⁸⁾. Part I of the agreement related to the sharing of the waters of Tungabhadra. Part II of the agreement related to the royalty payable to the Government of Madras for use of the waters of the Cauvery at Sivasamudram. The agreement so far as it related to Sivasamudram royalty is not the subject matter of these proceedings.

In December 1945 and 1946, the Governments of Hyderabad, Mysore and Madras entered into supplemental agreements modifying the agreements of June 1944 and July 1944 in certain respects.

On the 6th January, 1970, Counsel for Andhra Pradesh stated: "Andhra is not claiming any relief for past breaches of 1944 agreement." Accordingly, no issue was raised on the question of breaches of the July 1944 agreement.

Andhra Pradesh claimed that it was entitled to enforce the agreements of June 1944 and July 1944 against Mysore. Mysore contended that the agreements were not enforceable. Accordingly, the following issues were raised:—

Issue III : Is the agreement of July 1944 valid and subsisting and, if so, with what effect?

(7) Report of the Tungabhadra Project Low Level Canal Scheme APPK XVIII pp. 1—13.

(8) Bhadra Reservoir Project Report MYPKVI p. 11.

Was it invalid as Bombay, Sangli and Hyderabad were not parties to it ? Was it rendered ineffective by the Supplemental agreement of 1945 ? Did it survive on the merger of the Princely State of Mysore in the Republic of India ? Has it ceased to be operative on the reorganisation of States ?

Issue IV(A) : Did the agreement of June 1944 survive on the :

- (i) coming into force of the Indian Independence Act;
- (ii) coming into force of the Constitution of India ; and
- (iii) merger of the Princely State of Hyderabad in the Republic of India ?

Has the agreement ceased to be operative on the reorganisation of States ?

On October 23, 1972, the State of Mysore and Andhra Pradesh filed the following agreed statement concerning Issues III and IV(A):

"Issues III and IV(A) have been raised relating to the waters of the Tungabhadra river. The States of Andhra Pradesh and Mysore are agreed that in the events that have happened it is not necessary to decide these issues as this Hon'ble Tribunal has general jurisdiction in the matter of equitable distribution of waters of the river Krishna (including the waters of the Tungabhadra river) between the States of Andhra Pradesh, Maharashtra and Mysore. The States of Andhra Pradesh and Mysore accordingly pray that this Hon'ble Tribunal may be pleased not to answer the said Issues III and IV(A)".

The State of Maharashtra does not oppose this prayer.

Accordingly, we have to make equitable distribution of the waters of the river Krishna including the waters of the Tungabhadra in the exercise of our general jurisdiction and we are not called upon to decide Issues III and IV(A).

Supersession of older agreements concerning the Tungabhadra waters

The State of Mysore contended that the agreements of 1892, 1933, June 1944 and July 1944 were invalid and/or had ceased to be operative, while the state of Andhra Pradesh argued that they were valid and still

I M of I & p 73—8

operative. Even assuming that these agreements were valid and still subsisting, they as also the supplemental agreements of December 1945 and 1946 have now lost all vitality and should be superseded in view of the equitable allocation of the Krishna waters including the Tungabhadra waters and the agreed statements filed by the parties before, us from time to time.

Accordingly, our final order will contain the following directions:—

"This order will supersede:

- (i) the agreement of 1892 between Madras and Mysore so far as it related to the Krishna river system;
- (ii) the agreement of 1933 between Madras and Mysore so far as it related to the Krishna river system;
- (iii) the agreement of June 1944 between Madras and Hyderabad;
- (iv) the agreement of July 1944 between Madras and Mysore in so far as it related to the Krishna river system;
- (v) the supplemental agreement of December 1945 among Madras, Mysore and Hyderabad;
- (vi) the supplemental agreement of 1946 among Madras, Mysore and Hyderabad."

On the 17th August, 1973, the States of Andhra Pradesh and Mysore through their respective counsel stated that, without prejudice to their respective contentions, they agreed to the above order. Learned Counsel for the State of Maharashtra stated that the State of Maharashtra did not object to the incorporation of the above clause in our final Order.

Tungabhadra Project

The Tungabhadra Project consists of the following components:—

- (a) masonry dam across the Tungabhadra river near Mallapuram for impounding 133 T.M.C. of water (gross);
- (b) Left Bank Low Level Main Canal 127 miles long with 14 miles branch canal at tail and Left Bank High Level Canal 9.5 miles long, all in the district of Raichur;

- (c) Right Bank Low Level Main Canal 217 miles in length in Bellary and Kurnool Districts ;
- (d) Right Bank High Level Canal 116 miles in length running through Bellary and Anantpur Districts in the first stage and extending to the Cuddapah District in the second stage ;
- (e) net work of distributaries emanating from the canals ;
- (f) power house on right side of the dam ;
- (g) power house on Right Bank Low Level Canal at Hampi; and
- (h) power house on left side of the dam at Munirabad.

The agreement of June 1944 enabled the Madras and Hyderabad Governments to start construction of the Tungabhadra Project after the conclusion of the Second World War. The Project came under the purview of three successive Five Year Plans.

The Project was intended to irrigate areas on the left and right banks of the river Tungabhadra. In 1944, the left side fell within the dominion of the Nizam of Hyderabad. The right side fell within the Province of Madras in British India.

Upon the Constitution coming into force in 1950, the States of Hyderabad and Madras respectively continued to be in charge of the left and right sides of the Project.

On the passing of the Andhra State Act, 1953, as from the 1st October 1953, the Madras part of the project was divided between the States of Mysore and Andhra. Half of the dam, the right side headworks and the Right Bank Canal up to the 96th mile fell within the limits of Mysore State and the remainder of the canal fell within Andhra State. The main canal after it entered Andhra fed branches which re-entered Mysore. The left side of the project continued to be in charge of the State of Hyderabad.

Upon the coming into force of the States Reorganisation Act, 1956, as from the 1st November, 1956, the control of the left side of the project became vested in the State of Mysore..

Section 66 of the Andhra State Act

Section 66 of the Andhra State Act, 1953 made special provisions with regard to the devolution of the rights and liabilities of the State of Madras in relation to the Tungabhadra Project and the administration thereof. Sub-section (4) of section 66 authorised the President to give directions with regard to the matters specified in the section and, in particular, for the completion of the project and its operation and maintenance thereafter. Only the President can issue directions under sub-section (4) of section 66.

Tungabhadra Board

By a notification issued on the 29th September, 1953,⁽⁹⁾ in pursuance of sub-section (4) of section 66 of the Andhra State Act, the President of India established the Tungabhadra Board consisting of a Chairman appointed by the Central Government and Chief Engineers, Irrigation and Electricity of Andhra, Mysore and Hyderabad, as members. Paragraph 5(1) of the notification provided :

"The Board shall take charge of and deal with, all matters relating to works on or connected with the Tungabhadra Project which are common to both the States of Andhra and Mysore, but nothing in this sub-paragraph shall be deemed to authorise the Board to deal with any matter in respect of works which relate to only one of the States or in which only one State is interested."

The Board was given certain powers of a Chief Engineer of Madras, but the powers of Government were to be exercised by the Central Government. This arrangement did not prove satisfactory. On the 10th of March, 1955⁽¹⁰⁾ the Board was reconstituted with effect from the 15th March, 1955. The reconstituted Board, which consisted of a whole-time Chairman and four members each representing the Government of India and the Governments of Andhra Pradesh, Mysore and Hyderabad, was given certain powers of a State Government.

The Tungabhadra Board was reconstituted in 1956. The reconstituted Board consists of a Chairman and three members each representing the Government of India, Andhra Pradesh and Mysore.

(9) Government of India, Ministry of Irrigation and Power, Notification No. DW II-22 (129) dated the 29th September, 1953.

(10) Government of India, Ministry of Irrigation and Power, Notification No. DWVI-4(9) dated the 10th March, 1955.

The Tungabhadra Board administers and controls the right half of the dam, common portions of the Right Bank Low Level and High Level Canals and the two power houses on the right side. The Mysore Government administers and controls the left half of the dam, the Left Bank Low Level and High Level Canals and the Munirabad Power House on the left side.

In consequence of the States Reorganisation Act, 1956, the Hyderabad portion of the Tungabhadra Project on the left side vested in Mysore. The existing arrangement on the right side continued.

Tungabhadra dam⁽¹¹⁾

The construction of the dam was inaugurated by the Governments of Hyderabad and Madras on the 28th February, 1945. It was decided that the work relating to the dam would be divided into two halves, the right half to be executed by Madras and the left half by Hyderabad, each side undertaking the canal work within its territories.

The dam was formally opened in 1953 and completed in 1956.

The Tungabhadra reservoir has a number of outlets for low level canal irrigation and power sluices, high level canal sluices, water supply sluices and river outfall sluices on both left and right banks, river sluices and sluices for existing irrigation (Raya and Basavanna channels) on the right bank.⁽¹²⁾

The water drawn through the penstocks on the right bank is used for generation of power in the dam power house. The tail-race water is discharged into the power canal which runs for about 14 miles and empties into a forebay at Hampi. The water drawn through the penstocks at the dam power house which is in excess of the requirements of the power canal is discharged into the river through river outfall sluices.

The water from the forebay at Hampi is drawn through penstocks for generation of power in the Hampi power house. The tail-race water then joins a small tail-race pond formed across the natural stream known as Gundalkeri Vanka. Most of the tail-race water is discharged into the Right Bank Low Level

Canal through head sluices of the canal and a small portion is discharged into the Vanka through river outfall sluices. The Vanka joins the Tungabhadra river about 2 miles below the regulator.

Similarly, on the left side, the water required for irrigation is primarily drawn through penstocks and let into the left bank main canal, the excess being surplused to the river through river outfall sluices. It is possible to draw the water through irrigation sluices also as a stand-by, when power house is shut down partly or wholly. However these are not required generally to be operated, in view of the fact that, most of the time, withdrawals from penstocks are sufficient for irrigation requirements.

*Left Bank Canals⁽¹³⁾.—*The left bank canals are :

- (1) Left Bank Low Level Main Canal 127 miles long with 14 miles long branch canal at tail.
- (2) Left Bank High Level Canal 9.5 miles in length.

Both the canals serve Raichur District of Mysore and are under the exclusive control of the Mysore Government.

*Right Bank Canals.—*The Right Bank Low Level Canal is 217 miles long and is intended to irrigate areas in Bellary and Kurnool Districts. The jurisdiction of the Tungabhadra Board extends upto 155 miles of the Right Bank Low Level Canal. The rest of the Canal is in charge of Andhra Pradesh. The construction of the Canal commenced in February 1945 and was completed in 1957. The Canal started operation in 1953.

The Right Bank High Level Canal is 116 miles long, the first 68 miles 6 furlongs running in Mysore and the rest in Andhra Pradesh. Mysore and Andhra agreed to entrust execution of the common works to the Tungabhadra Board at a conference held on the 18th June, 1956. The joint scheme of Mysore and Andhra Pradesh was approved by the Planning Commission on the 3rd November, 1958. The Board is in charge of the construction, maintenance and operation of about 68 miles 6 furlongs of the main Canal up to Mysore State limits. The rest of the main Canal is in charge of Andhra Pradesh. Construction of the Canal started in 1957-58. The Canal commenced

(11) See also discussion under issue IV (B) (a) IV(B) (b) (i).

(12) KGCR Ann. IX p. 17, MY Note No. 35.

(13) Disputes concerning the Left Bank canals are dealt with under issues 11(3), IV (B) (b) (i) and V(b) (ii).

operation in 1967. Construction work of the distributaries is still under progress and is in charge of the respective State Governments.

On the 22nd January, 1971, the States of Mysore and Andhra Pradesh made the following joint statement⁽¹⁴⁾ before the Tribunal:—

"The States of Andhra Pradesh and Mysore state that the benefits of the following projects are shared between the two States as mentioned hereinbelow :—

(a) Tungabhadra Project Right Bank Low Level Canal.

Andhra Pradesh	.	.	2 4	T.M.C.
Mysore	.	.	19	T.M.C.

(b) Tungabhadra Project Right Bank High Level Canal.

Andhra Pradesh	.	.	3 2 . 5	T.M.C.
Mysore	.	.	1 7 . 5	T.M.C.

Reservoir losses in respect of the above canals on the right side are shared as mentioned below :—

Andhra Pradesh	5.5 T.M.C.
Mysore	3.5 T.M.C."

On the 7th May, 1971, all the States filed an agreed statement that the following projects and the quantum of their utilisation and evaporation losses as mentioned below should be protected :—

Name of Project	Name of State benefited	Quantum of utilisation T.M.C.	Evaporation losses T.M.C.	Total T.M.C.
1	2	3	4	5
Tungabhadra Right Bank Low Level Canal	Mysore	19.00	3.50	22.50
—do-----	Andhra Pradesh	24.00	5.50	29.50

1	2	3	4	5
Tungabhadra Right Bank High Level Canal Stages I & II.	Mysore	17.50	-nil.	17.50
—do—	Andhra Pradesh	32.50	nil.	32.50

Reservoir loss.—The annual reservoir loss of the Tungabhadra reservoir was estimated to be 18 T.M.C.⁽¹⁵⁾. Originally in 1942⁽¹⁶⁾ it was contemplated that the reservoir loss would be allocated to Madras and Hyderabad in respect of their works on the left and right sides of the reservoir in proportion to their respective draw-offs. The Tungabhadra Project scheme finally formulated for execution as a joint scheme of Hyderabad and Madras contemplated that the total annual reservoir loss estimated to be 18 T.M.C. would be equally shared by the left and right sides and, out of 9 T.M.C. to be shared by the right side, the shares of Andhra Pradesh and Mysore would be 5.5 to 3.5 T.M.C. respectively⁽¹⁷⁾. Accordingly, on the 22nd January, 1971, the parties agreed that the reservoir loss of 9 T.M.C. in respect of the Right Bank Low Level and High Level Canals would be shared as follows : Andhra Pradesh 5.5 T.M.C., Mysore 3.5 T.M.C. It was also common case before us in the list of projects filed on the 7th May 1971⁽¹⁸⁾ that the evaporation loss of 9 T.M.C. under the Tungabhadra Left Bank Low Level Canal should be protected and such protection has been given by us accordingly.

Counsel for the State of Mysore while closing his argument on the 23rd August, 1973 urged that the evaporation loss of the reservoir could be debited equally to the left and right sides provided the utilisations were also ensured to be equal on either side. He argued that the sharing of 9 T.M.C. of evaporation losses by the Tungabhadra Left Bank Low Level Canal was conditional upon equal utilisation by the left and right sides. We are unable to accept this argument. We find no trace of this condition either in the agreed statement of the 22nd January, 1971, or in the list of projects filed on the 7th May, 1971.

(14) This statement is in accordance with earlier statements and agreements, see supplement to the Report of the Tungabhadra Low Level Canal Scheme 1942, APPK XIX, pp. 2-3; Summary record of the conclusions reached at the inter-State conference on the 5th and 6th October, 1957, APDK IX pp. 2-11 at p. 7; Project report on the Tungabhadra Project High Level Canal distribution system, Mysore portion, MYPK VI p. 3.

(15) See KGCR Ann. IX p. 16, see also Report of the Tungabhadra Project 1942, Low Level Canal Scheme (Government of Madras) Vol. I, pp. 45, 47, APPK XVIII pp. 45, 47.

(16) Report of the Tungabhadra Project 1942, Low Level Canal Scheme (Government of Madras) Vol. I, p. 47, APPK-XVIII, p. 47.

(17) Supplement to the Report of the Tungabhadra Low Level Canal Scheme (Government of Andhra Pradesh), pp. 1,3, APPK XIX pp. 1,3.

(18) MRDK VIII p. 65.

We are informed by the State of Mysore now known as the State of Karnataka that the annual reservoir loss of Tungabhadra reservoir though estimated to be 18 T.M.C. actually varies from year to year.

On a consideration of all relevant factors, we propose to give the following directions :—

"The reservoir loss of Tungabhadra reservoir shall be shared equally by the works of the State of Karnataka on the left side and the works on the right side of the reservoir. The half share of the right side in the reservoir loss shall be shared by the States of Andhra Pradesh and Karnataka in the ratio of 5.5 to 3.5."

We think that the above direction is just and equitable under the current conditions of utilisation of the waters of the Tungabhadra reservoir. If the conditions materially change in the future, this direction may be altered when our decision is reviewed.

Powers Houses on right side.—The dam power house on the right side has four generating units of 9,000 kW each. The power house on Right Bank Canal at Hampi has four generating units of 9,000 kW each. The two power houses are in charge of the Tungabhadra Board. The States of Andhra Pradesh and Mysore agreed to share their benefits in the ratio of 4 to 1.⁽¹⁹⁾

Munirabad Power House⁽²⁰⁾.—The Munirabad Power House on the left side is in charge of the Mysore Government.

Release of waters from Tungabhadra Dam, Issue IV(B) (a).—Andhra Pradesh contended that the following quantities of water should be released by way of regulated supplies from the Tungabhadra reservoir :—

- (1) 58 T.M.C for the requirements of Kurnool Cuddapah Canal.

- (2) 8.5 T.M.C. by way of assistance to Rajolibunda Diversion Scheme.

- (3) 26 T.M.C. as contribution to the Krishna for the benefit of irrigation lower down the Krishna river.

Mysore disputed the claim.⁽²¹⁾

Accordingly, the following issue was raised : —

Issue IV(B)(a).—"Should any directions be given for the release of waters from the Tungabhadra Dam—

- (i) for the benefit of the Kurnool Cuddapah Canal;
- (ii) for the benefit of the Rajolibunda Diversion Scheme; and
- (iii) by way of contribution to the Krishna river ?"

The Madras-Hyderabad agreement of June 1944 contemplated release of supplies from the Tungabhadra reservoir for meeting the needs of new and pre-Moghul irrigation, giving assistance to the Kurnool Cuddapah Canal and Rajolibunda Canal and by way of contribution to the Krishna for the requirements of Krishna irrigation.⁽²²⁾

The Rajolibunda Diversion Scheme is based on river flow and assistance from Tungabhadra Dam.⁽²³⁾

Sir Arthur Cotton considered Kurnool Cuddapah Canal to be a part of the complete Tungabhadra Project.⁽²⁴⁾ The Khosla Committee Report⁽²⁵⁾ considered that the K.C. Canal had a prior claim on the Tungabhadra waters and that until the Siddheswaram dam was built, the Tungabhadra reservoir should provide 4.35 T.M.C. of water for the requirements of the K.C. Canal of the order of 58 to 60 T.M.C. as proposed by the Committee.

At an inter-State conference in 1959, the Chief Engineers of Mysore and Andhra Pradesh agreed that 26 T.M.C. should be released from the Tungabhadra

(19) Summary record of the conclusions reached at the inter-State conference of Ministers of Andhra Pradesh and Mysore at the Tungabhadra Dam on the 5th and 6th October, 1957 APDK IX p. 10 ; MRDK XII Sheet XIII (3),

(20) Disputes concerning the Munirabad Power House are dealt with under Issue IV(B) (b) (iii) IV (B) (c) and IV (B) (d).

(21) SP III pp. 6-9, 12.

(22) APK II pp. 164-167.

(23) KGCR Ann. IX p. 27 : Report of Rajolibunda Diversion Scheme (Hyderabad) APPK XVI p. 2.

(24) Note of T. Highham on the Tungabhadra and Krishna Projects APDK I p. 21.

(25) Report of the Technical Committee on the optimum utilisation of the Krishna and the Godavari Waters pp. 99-100.

reservoir by way of contribution to the Krishna. They accepted the principle that some assistance to the pre-Moghal channels and the Rajolibunda and K.C. Canals should be given from the Tungabhadra reservoir. While the Andhra Pradesh Chief Engineer was of the view that assistance to the extent of 18 T.M.C. and 8.5 T.M.C. should be given to the K.C. Canal and the Rajolibunda Canal respectively, the Mysore Chief Engineer said that assistance to a limited extent only could be given. The two Chief Engineers also accepted the principle that the following priorities should be adopted for sharing the waters of the Tungabhadra reservoir (1) Pre-Moghal channels, (2) Krishna contribution, (3) assistance to the K.C. Canal, (4) assistance to the Rajolibunda Left Bank Canal. However, no final agreement was reached between the Secretaries and Ministers of the two States.⁽²⁶⁾

On October 23, 1972, the parties jointly made the following statement :—

"As regards issue IV(B) (a) the States of Andhra Pradesh and Mysore are agreed that the question of giving directions in respect of matters referred to in sub-clauses (i), (ii) and (iii) of Clause IV(B) (a) be decided by this Hon'ble Tribunal in the exercise of its general jurisdiction relating to the equitable distribution of the waters of the River Krishna between the States concerned."

The matters referred to in issue IV(B) (a) will be dealt with accordingly.

Vesting of control and administration of the Tungabhadra dam and reservoir and the main canal on the left side in the Tungabhadra Board, Issue IV(B) (b) (0) :

Andhra Pradesh contends that the control and administration of the Tungabhadra dam and reservoir and the main canal on the left side should be vested in the Tungabhadra Board. Mysore disputes the claim. Accordingly, the following issue was raised :—

Issue IV(B)(b)(i) "Should any directions be given for the vesting of the control and administration in the Tungabhadra Board of the Tungabhadra Dam and the Reservoir and the main canal on the left side ? Has the Tribunal any power to give such directions ?"

The Tungabhadra Board was established by the President of India under section 66(4) of the Andhra State Act, 1953. No directions have been issued by the President of India under section 66(4) vesting the control of the left side of the Tungabhadra dam and reservoir and the Left Bank Canals in the Tungabhadra Board.

In 1955-56 there was a proposal to vest in the Tungabhadra Board unitary control over the maintenance and operation of the Tungabhadra dam and reservoir and operation of sluices and spillway gates but the proposal was eventually dropped.⁽²⁷⁾

On the 22nd August, 1973, the learned Advocate General of Andhra Pradesh conceded that this Tribunal has no power to direct the vesting of the control and administration of the Tungabhadra dam and reservoir and the main canal on the left side in the Tungabhadra Board. But he prayed that we should make suitable recommendations for vesting the control and administration of the entire Tungabhadra reservoir and dam including the spillway, river sluices and penstocks, as also the headworks on both sides and works common to the States of Andhra Pradesh and Mysore in a Joint control body.

In our opinion, there is no ground for taking away the administration and control of the Tungabhadra Left Bank Canals and their headworks from the Mysore Government and vesting them in the Tungabhadra Board or any other joint control body.

At present, the Tungabhadra dam and reservoir are subject to the control and administration of the Mysore Government on the left side and the Tungabhadra Board on the right side. We consider that control over the maintenance and operation of the entire Tungabhadra dam and reservoir and spillway gates on the left and right sides should be vested in a single control body, but this may be done by suitable legislation. Until another control body is established, such control may be vested in the Tungabhadra Board. The control body may be empowered to carry out contour surveys of the entire reservoir from time to time with a view to ascertain whether its storage capacity has been reduced due to silting and prepare revised capacity tables, if necessary.

At present, common working tables of the Tungabhadra reservoir are being prepared from time to time by the Tungabhadra Board and discharges from the reservoir are regulated in accordance with such

(26) SP III pp. 64-65, 105-111, 129.

(27) SP III p. 138-151.

working tables. The existing practice started in 1967-68. The Tungabhadra Board had prepared the working table of the Tungabhadra reservoir from 15-11-1967 to 15-7-1968 in consultation with the Chief Engineers of the States of Mysore and Andhra Pradesh. The Board asked for a direction in this regard from the Central Government. By its letter dated the 13th June, 1968⁽²⁸⁾ the Government of India, Ministry of Irrigation and Power, conveyed to the Chairman, Tungabhadra Board, its approval to the operation of the reservoir for the period up to the 15th July, 1968 on the basis of the aforesaid working table. The letter stated that "The arrangement suggested in this working table is purely *ad hoc* and without prejudice to the rights, claims and apportionment of Tungabhadra waters or of the regulation of the Tungabhadra Reservoir in future years". An identical statement is added at the foot of all working tables prepared subsequently by the Tungabhadra Board. We considered that the existing practice with regard to the preparation of the working tables of the Tungabhadra reservoir by the Tungabhadra Board and regulation of discharges from the reservoir in accordance with such working tables should be continued until another control body is established.

The State of Mysore has represented that the Tungabhadra Board should be abolished. The State of Andhra Pradesh wants that the Board should be continued. In our opinion, it is desirable that the Tungabhadra Board should continue to retain charge of works on or connected with the Tungabhadra Project which are common to the two States until another control body, as mentioned above, is established. The State of Mysore has made charges of partiality against the Tungabhadra Board. It will be open to the State of Mysore to make such representation as it thinks fit on this subject to the Government of India.

If a control body for the entire Krishna valley is established, the Tungabhadra Board may be abolished and all the powers of the Tungabhadra Board may be vested in such control body.

Issue IV(B) (b) (i) is answered accordingly.

Vesting of Control of the Rajolibunda headworks and common portion of the canal within Mysore State limits in the Tungabhadra Board. Issue IV(B) (b) (ii) :

Andhra Pradesh contends that the control of the Rajolibunda headworks and the length of the common

portion of the canal within Mysore State limits should be vested in the Tungabhadra Board with a view to ensure supply to the irrigation lower down in Andhra Pradesh and to prevent unauthorised abstraction of water in the Mysore reaches of the canal. Mysore disputes the claim and contends that the Tribunal has no power to give such directions.⁽²⁹⁾ Accordingly, the following issue was raised :—

Issue IV(B)(b)(ii) :—Should any directions be given for the vesting of the control and administration in the Tungabhadra Board of the Rajolibunda headworks and the common canals within Mysore State limits ?

Has the Tribunal any power to give such directions ?

Upon the reorganisation of States in 1956, the headworks and the initial 26-27 miles of the canal with an ayacut of 5,900 acres fell within Mysore State and the remaining portion of the canal with an ayacut of 87,000 acres fell within Andhra Pradesh.⁽³⁰⁾

At an inter-State conference of Ministers of the States of Andhra Pradesh and Mysore on the 5th and 6th June, 1959, at Bangalore, it was agreed that the existing arrangement for the maintenance of the headworks and the common portions of the Rajolibunda canal and regulation of water by Mysore be continued for a period of one year from the 1st July, 1959, subject to the condition that the regulation of water at the head reach might be done by the Officer concerned in close consultation with the Executive Engineer concerned of Andhra Pradesh or his representative who would be contacting the Mysore Officer at the headworks either on telephone or otherwise. This procedure has been followed ever since.

In October 1959, the Chief Engineers of the two States agreed that there would be a full supply discharge of 850 cusecs at the canal head out of which 770 cusecs would be available at the Mysore-Andhra Pradesh border.⁽³¹⁾

In November 1959, the States of Andhra Pradesh and Mysore agreed that the liabilities on account of the headworks of the Rajolibunda Diversion Scheme would be shared in the ratio of the quantities of the water allocated for use by the two States under the Scheme and that the principles applicable to the allo-

(28) SP III pp. 191-192 (Ex. MYK 383).

(29) SP HI pp. 10, 164, 182-183.

(30) SP III p. 132, KGCR Ann. IX p. 27.

(31) SP III p. 103.

cation of liabilities under the Tungabhadra Right Bank Low Level Canal (common portion) should be made applicable to the liabilities under the Rajolibunda Canal.⁽³²⁾

On the 25th January, 1971, the States of Mysore and Andhra Pradesh made the following joint statement :—

"The States of Mysore and Andhra Pradesh state that the benefits of utilisations under the existing Rajolibunda Diversion Scheme are shared between the two States, as mentioned herein below :

Mysore	1.2 T.M.C.
Andhra Pradesh	15.9 T.M.C."

The actual withdrawals and deliveries at the canal head and at Mysore-Andhra Pradesh border were as follows :—

Year	Withdrawals in T.M.C.	
	At canal head(33)	At Mysore Andhra Pradesh border(34)
1	2	3
1961-62	5.70	4.29
1962-63	8.98	6.89
1963-64	10.73	9.61
1964-65	13.98	12.45
1965-66	13.27	11.96
1966-67	17.02	15.08
1967-68	18.18	14.95
1968-69	19.33	15.98

The deliveries at Mysore-Andhra Pradesh border were somewhat irregular and not in conformity with the agreements, mentioned above.⁽³⁵⁾ However, it appears that the ayacut was not fully developed and having regard to the areas irrigated in Andhra Pradesh and their water requirements, Andhra Pradesh did not suffer any real prejudice.⁽³⁶⁾

Mysore has installed two minor lift irrigation schemes for which water is pumped from the Rajolibunda canal.⁽³⁷⁾ The area irrigated under the two

schemes is 384 acres. Mysore is at liberty to use its share of the water withdrawn at the canal head for lift irrigation but it has no right to use water in excess of its share.

In September 1968, the Andhra Pradesh Government requested the Central Government to take over the management of the Rajolibunda Diversion headworks and common portion of the canal.⁽³⁸⁾ The Central Government did not accede to the request.

On the 22nd August 1973, the learned Advocate General of Andhra Pradesh conceded that this Tribunal has no power to direct the vesting of the control and administration of the Rajolibunda headworks and the common canals within Mysore State limits in the Tungabhadra Board. However, he prayed that we should make suitable recommendations for vesting the control and administration of the aforesaid works in a joint control body.

We are of the opinion that, at present, there is no sufficient ground for taking away the administration and control of the Rajolibunda headworks and the common portion of the canal within Mysore State limits and vesting such administration and control in the Tungabhadra Board or any other joint control body.

However, we find it necessary to give directions for the proper sharing of the benefits of utilisations under the Rajolibunda Diversion Scheme between the States of Mysore (now known as Karnataka) and Andhra Pradesh. Accordingly, we propose to give the following direction :—

The benefits of utilisations under the Rajolibunda Diversion Scheme be shared between the States of Karnataka and Andhra Pradesh as mentioned herein below :—

Karnataka	1.2 T.M.C.	T.M.C.
Andhra Pradesh	15.9	

Issue IV(B) (b) (ii) is answered accordingly.

Other disputes concerning Tungabhadra water :

Other disputes concerning the Rajolibunda Diversion Scheme, the Kurnool Cuddapah Canal and the Bhadra Reservoir Project are considered under Issue II(3).

(32) SP III p. 130.

(33) MYDK XV pp. 11-14.

(34) APDK VI pp. 13-14.

(35) SP III pp. 132-136.

(36) SP IV pp. 35-37; APDK VII p. 20; MRDK VIII, pp., 19-20.

(37) SP IV pp. 4, 36, 49.

(38) SP III pp. 132-137.

CHAPTER VI

Claims arising out of the States Reorganisation Act, 1956

Reorganisation of States : Under Articles 3 and 4 of the Constitution, a law made by Parliament for reorganisation of States may contain such supplemental, incidental and consequential provisions as Parliament may deem necessary. Consequent upon the reorganisation of States from time to time, Parliament considered it necessary to make special provisions with a view to minimise the unsettling effects of a reorganisation on certain irrigation and power projects and inter-State arrangements and agreements. For purposes of the present proceedings, the special provisions contained in section 66 of the Andhra State Act, 1953 and sections 107 and 108 of the States Reorganisation Act, 1956 are relevant. We have considered elsewhere the provisions of section 66 of the Andhra State Act.

Section 107 of the States Reorganisation Act, 1956 :

The section provides :—

***"Section 107.** If it appears to the Central Government that the arrangement in regard to the generation or supply of electric power or the supply of water for any area or in regard to the development of any project for such generation or supply has been or is likely to be modified to the disadvantage of that area by reason of the fact that it has been transferred by the provisions of Part II from the State in which the power stations and other installations for the generation and supply of such power, or the catchment area, reservoirs and other works for the supply of water, as the case may be, are located, the Central Government may give such directions as it deems proper to the State Government or other authority concerned for the maintenance, so far as practicable, of the previous arrangement."

Similar provisions are to be found in section 69 of the Bombay Reorganisation Act, 1960 and section 68

of the Punjab Reorganisation Act, 1960, Articles 309 and 310 of the Treaty of St. Germain of October 10, 1919 and other Peace Treaties contained analogous provisions⁽¹⁾

Andhra Pradesh claims relief under section 107 in respect of Munirabad Power House on the ground that an arrangement for supply of power to Hyderabad city has been modified by reason of the fact that Hyderabad city was transferred to Andhra Pradesh. We have held that there was no arrangement as alleged and, consequently, no relief under section 107 can be granted. The question whether, assuming there was such an arrangement, the Tribunal can give any relief under section 107 does not, therefore, arise.

Section 108 of the States Reorganisation Act, 1956 :

The section provides :—

****"108. (1)** Any agreement or arrangement entered into between the Central Government and one or more existing States or between two or more existing States relating to—

- (a) the administration, maintenance and operation of any project executed before the appointed day, or
- (b) the distribution of benefits, such as, the right to receive and utilise water or electric power, to be derived as a result of the execution of such project, which was subsisting immediately before the appointed day shall continue in force, subject to such adaptations and modifications, if any (being of a character not effecting the general operation of the agreement or arrangement) as may be agreed upon between the Central Government and the successor State concerned or between the successor States concerned, as the case

(1) See F.J. Berber, *Rivers in International Law* 1959 Ed. pp. 59-60.

*Continuance of arrangements in regard to generation and supply of electric power and supply of water.

**Continuance of agreements and arrangements relating to certain irrigation, power or multipurpose projects.

may be, by the 1st day of November, 1957, or, if no agreement is reached by the said date, as may be made therein by order of the Central Government.

(2) Where a project concerning one or more of the existing States affected by the provisions of Part II has been taken in hand, but not completed, or has been accepted by the Government of India for inclusion in the Second Five Year Plan before the appointed day, neither the scope of the project nor the provisions relating to its administration, maintenance or operation or to the distribution of benefits to be derived from it shall be varied :—

- (a) in the case where a single successor State is concerned with the project after the appointed day, except with the previous approval of the Central Government, and
- (b) in the case where two or more successor States are concerned with the project after that day, except by agreement between those successor States, or if no agreement is reached, except in such manner as the Central Government may by order direct,

and the Central Government may from time to time give such directions as may appear to it to be necessary for the due completion of the project and for its administration, maintenance and operation thereafter.

- (3) In this section, the expression 'project' means a project for the promotion of irrigation, water supply or drainage or for the development of electric power or for the regulation or development of any inter-State river or river valley."

The expression "appointed day" means the 1st day of November, 1956, see section 2(a) of the Act.

The object of section 108 is to minimize the unsettling effect of reorganisation of States on inter-State projects and agreements. ⁽²⁾

In the present reference, there is no dispute about the scope or interpretation of section 108(1).

The first part of section 108(2) shows that section 108(2) applies to a project concerning one or more of the existing States affected by the reorganisation

of States which was taken in hand, but not completed or was accepted by the Government of India for inclusion in the Second Five Year Plan before the appointed day. If there is such a project, neither its scope nor the provisions relating to its administration, maintenance and operation or to the distribution of benefits to be derived from it shall be varied except as provided in the sub-section.

The second part of section 108(2) authorises the Central Government to give necessary directions for the due completion of such a project and for its administration, maintenance and operation thereafter.

Relief under section 108(2) has been claimed in respect of—

- (1) release, of water from the Koyna Project, Issue V(a)(ii) ;
- (2) release of water from a storage dam at Ajra, Issue V(a) (i) ;
- (3) extension of the Tungabhadra Left Bank Low Level Canal to Andhra Pradesh, Issue V(b)(ii) ;
- (4) extension of a project on the Bhima in Mysore to Andhra Pradesh, Issue V(b)(iii) ;
- (5) extension of the Upper Krishna Project to Andhra Pradesh, Issue V(b) (i) ; and
- (6) sharing of power generated at the Munirabad Power House, Issue IV(B).

For reasons to be given hereafter, we have held that no grounds for relief under section 108(2) have been made out in respect of any of the projects. Accordingly, the question what relief could be granted by the Tribunal if such grounds were established does not arise. The second part of section 108(2) authorises only the Central Government to issue the directions mentioned therein.

We now proceed to discuss the projects in respect of which relief is claimed under section 107 and/or section 108 of the States Reorganisation Act, 1956.

(2) Report of the States Reorganisation Commission 1955, pp. 54-56, 224, 254.

*(1) Release of water from the Koyna Project,
Issue V(a) (ii) :*

Koyna Hydro-electric Project Stages I and II :
Stage I of the Koyna Hydro-electric Project as envisaged in the project report of December 1952⁽³⁾ and sanctioned by the Bombay Government on the 20th February, 1953⁽⁴⁾ provided for power generation only and a storage of 36 T.M.C. of water. The Project was inaugurated in January 1954. Some details of Stage I were modified by the project reports of March, 1956 and October, 1956. Stage I as envisaged in the report of October 1956 was approved by the Bombay Government on the 17th January, 1957⁽⁵⁾ and was cleared by the Planning Commission. ⁽⁶⁾

The construction of Stage I was planned so as to facilitate the work of Stage II. Consequently, the estimate of Stage I provided for construction of a spillway of full width in foundation and superstructure required for Stage II to store 98.7 T.M.C., irrigation sluices, penstock pipes and other works needed for Stage II.⁽⁷⁾

Stage II of the Project as envisaged in the project report of July 1960 provided for the construction of works relevant to the storage of 73 T.M.C. of water upto the crest level of the spillway and use of 67.5 T.M.C. for power generation and 16 T.M.C. for irrigation in South Stara District.⁽⁸⁾ Stage II of the Project was cleared by the Planning Commission in April 1961 subject to the condition that westward diversion of water would be limited to 67.5 T.M.C. of water per annum and consumptive use of the water let down eastwards from the reservoir would not be made without the approval of the Government of India. ⁽⁹⁾ In January 1962, the Planning Commission sanctioned the thickening of the Koyna dam relevant to a storage of 98 T.M.C. and raising of the height of the dam for full reservoir level 2158.5 on condition that the proposal did not involve any change in the scope of the project in regard to the maximum westward diversion of water or the consumptive use for irrigation. ⁽¹⁰⁾ In July 1962, the Maharashtra Government gave administrative sanction to the estimate of Stage II.

*Offer of storage of water in the Koyna Dam for
irrigation in Bijapur District :*

In May 1958, the Bombay Government offered to provide storage of 25.53 T.M.C. of water in the Koyna dam for lift irrigation in Bijapur District of Mysore on condition that the Mysore Government would pay the cost of the extra storage⁽¹¹⁾

However, lift irrigation in Bijapur was not economically feasible without the supply of cheap power from the Koyna Project. As the Bombay Government declined to supply the power, the Mysore Government was unwilling to pay the cost of the extra storage and they intimated that, while they reserved their right to utilise Koyna waters to the extent of 46 T.M.C., they did not presently ask for any storage in the Koyna dam.⁽¹²⁾

In 1958, the Bombay Government had stated that the storage of 25.53 T.M.C. of water in the Koyna dam for lift irrigation in Bijapur could be provided at a later date on payment of extra cost by the Mysore Government. In 1962, the Mysore Government requested the Maharashtra Government to provide storage for their Upper Krishna Project to irrigate Bijapur District. The Maharashtra Government declined to comply with the request. An appeal to the Government of India to provide the storage was unsuccessful. ⁽¹³⁾

Issue : Mysore contends that the Koyna Hydro-Electric Project which was taken in hand by the Bombay Government but not completed before the 1st November, 1956 contemplated lift irrigation in Bijapur District. ⁽¹⁴⁾ Upon the reorganisation of States, Koyna remained within the State of Bombay and Bijapur District became part of the reorganised Mysore State. In view of section 108(2) of the States Reorganisation Act, 1956, the scope of the Project and distribution of its benefits cannot be varied and consequently Maharashtra as the successor of Bombay State is bound to release water from the

(3) December, 1952 Report, pp. vi, vii, 6, 45.

(4) MYDK II pp. 365-379.

(5) MRDK VI pp. 96-104.

(6) MR. Note No. 16; First Five Year Plan p. 351, Second Five Year Plan, pp. 333, 366.

(7) December, 1952 Project Report, pp. 33, 34; Report of the COPP Irrigation and Power Team on Koyna Project, p. 29,

(8) July, 1960 Project Report, p. 4.

(9) MRDK VI pp. 107-108.

(10) APK II p. 118; MRDK I pp. 161-163.

(11) MYDK II pp. 386-388.

(12) MYDK II pp. 389-392; MRDK VI pp. 47-60, 63-64, 94.

(13) MYDK I pp. 175-195; MYDK XIX pp. 63-70.

(14) MYK I, pp. 46-48 MRK IV, pp. 35-39; MYK IV, pp. 23-24; MYDK I p. 181-SP I pp. 133-154.

Koyna storage for irrigating lands in Bijapur District. Maharashtra disputes the contention." The following issue was raised :—

Issue V(a) (ii) : Should any direction be given for release of waters by Maharashtra for the benefit of Mysore from Koyna Valley Irrigation-cum-Hydro-electric Project ?

Claim for relief under section 108(2) of the States Reorganisation Act is not established : Stage I of the Koyna Hydel Project which was taken in hand but not completed before the 1st November, 1956 envisaged power production only. Irrigation in Bijapur District was not within the scope of Stage I as alleged.

Some works relevant for Stage II were undertaken in Stage I, but before the 1st November, 1956, the construction of the additional storage or the excavation of canals required for irrigation was not taken in hand.

Stage II of the Project was not taken in hand nor included in the Second Five Year Plan before the 1st November, 1956. Stage II which was taken in hand subsequently did not provide for irrigation in Mysore territory.

The Bombay Government was under no legal obligation to provide storage in the Koyna dam for the irrigation of Bijapur District. Nevertheless, the Bombay Government offered to reserve 25.53 T.M.C. of the storage for Mysore provided Mysore was willing to pay the cost, but the Mysore Government did not accept the offer.

The Mysore Government is not entitled to any relief under section 108(2) of the States Reorganisation Act.

The Mysore Government claimed relief under section 107 of the States Reorganisation Act also. However, Counsel for the Mysore Government does not press this claim.

Conclusion : Issue V(a) (ii) is answered in the negative.

(2) *Release of water from a storage dam at Ajra Issue V(a) (i)* :

The Bombay Government proposed the construction of a storage reservoir at Ajra on the Hiranyakeshi

river and the Ghataprabha Right Bank Canal under the Ghataprabha Valley Development Scheme Stage III. Upon the reorganisation of States in 1956, Ajra remained within Bombay State and the area to be irrigated under Stage III of the scheme fell within the reorganised Mysore State. ⁽¹⁵⁾

Mysore contended that in view of section 108(2) of the States Reorganisation Act, the scope of the proposed scheme could not be varied and Maharashtra, as the successor of Bombay State, was bound to supply water from a storage at Ajra for the benefit of the Mysore areas. Maharashtra denied the contention. The following issue was raised :—

Issue V(a) (i) : Should any directions be given for release of waters by Maharashtra for the benefit of Mysore from a storage dam at Ajra ?

We find that Ghataprabha Scheme Stage III including the storage dam at Ajra was not taken in hand nor included in the Second Five Year Plan before the 1st November, 1956. Section 108(2) of the States Reorganisation Act does not *apply* to the Project. Mysore is not entitled to any relief under section 108(2) as claimed.

On the 22nd January, 1971, Mr. Krishna Rao, Counsel for the State of Mysore, stated that he did not press Issue V(a) (i) and that Mysore would not ask for a mandatory order on Maharashtra for release of waters from any storage dam at Ajra.

Issue V(a) (i) is answered in the negative.

(3) *Extension of the Tungabhadra Left Bank Low Level Canal to Andhra Pradesh, Issue V(b) (ii)* :

Tungabhadra Left Bank Low Level Canal Scheme and dispute concerning its extension to Andhra Pradesh : The Tungabhadra Project Scheme finally formulated for execution as a joint scheme of Hyderabad and Madras Governments envisaged construction of the Left Bank Low Level Canal on the Hyderabad side 127 miles in length taking off from the Tungabhadra dam at Mallapuram and running in the district of Raichur. The scheme was taken up for execution by the Hyderabad Government in 1945.⁽¹⁶⁾ Construction of the Left Bank Low Level Canal started in February 1945.

(15) MYPK IV pp. 8-9 MYDK II p. 381 ; MYK IV p. 34.

(16) Supplement to the Report of Tungabhadra Project Low Level Canal Scheme (1942), APPK XIX, p.1.

In his arguments before us, Counsel for Andhra Pradesh claimed relief under section 108(2) only. He did not argue that Andhra Pradesh was entitled to any relief under sections 107 and 108(1) of the Act or under any other provision of law.

The extension of the Tungabhadra Left Bank Canal and other projects in Mysore to areas in Andhra Pradesh can fructify only by close co-operation and mutual adjustments between the States concerned,⁽²¹⁾ but instead of co-operative approach and mutual agreement, there is vigorous opposition to all such extension schemes by the State of Mysore.

Issue V(b)(ii) is answered in the negative.

(4) *Extension of a project on the Bhima in Mysore to Andhra Pradesh; Issue V(b)(iii) :*

The Hyderabad Government contemplated construction of the Bhima Reservoir Project at Tangadgi in Gulbarga District for irrigating 4,00,000 acres in Gulbarga and Mahboobnagar Districts.⁽²²⁾

Upon the reorganisation of States in 1956 most of Gulbarga District including Tangadgi fell within Mysore, and Mahboobnagar District became part of Andhra Pradesh.

After 1956, Mysore proposed the Bhima Lift Irrigation Scheme at Sonna and the Bhima Irrigation Project at Sonthi to irrigate Gulbarga District of Mysore.⁽²³⁾

Andhra Pradesh now proposes the Bhima Project with headworks at Tangadgi in Mysore with extension to Mahboobnagar District of Andhra Pradesh to irrigate 3,80,000 acres with an annual utilisation of 100 7 T.M.C. of water.⁽²⁴⁾

Andhra Pradesh contends that in view of section 108(2) of the States Reorganisation Act, 1956, the scope of the earlier projects cannot be varied and Mysore is bound to supply water from those projects for the benefit of Andhra Pradesh areas. Mysore denies the contention. The following issue was raised:—

Issue V(b)(iii) : Should any directions be given for release of waters by Mysore for the

benefit of Andhra Pradesh from Bhima Project ?

We find that the Bhima Reservoir Project at Tangadgi was not sanctioned by the Hyderabad Government. Even the Bhima Irrigation Project and the Bhima Lift Irrigation scheme proposed by Mysore since 1956 have not yet been sanctioned by the Mysore Government. None of the Projects was taken in hand or included in the Second Five Year Plan before the 1st November 1956. Section 108(2) of the States Reorganisation Act, 1956 does not apply to the Projects. Andhra Pradesh is not entitled to any relief under section 108(2) for extension of irrigation facilities to Mahboobnagar District from any Project at Tangadgi in Mysore.

Issue V(b) (iii) is answered in the negative.

(5) *Extension of Upper Krishna Project to Andhra Pradesh, Issue V(b)(i) :*

The Hyderabad Government proposed construction of the Upper Krishna Project at Kamaladinne for irrigating Gadwal and Alampur Taluks and other areas in Hyderabad State. At the inter-State conference of 1951, the Hyderabad Government put forth a demand of 165 T.M.C. for the project. In view of the allocation of the Krishna waters in 1951, the Hyderabad Government earmarked 100 T.M.C. for the project. The project was included in the draft Hyderabad Second Five Year Plan.⁽²⁵⁾ Upon the reorganisation of States, Kamaladinne fell within Mysore while Gadwal and Alampur Taluks became part of Andhra Pradesh.

After 1956, the Mysore Government proposed the Upper Krishna project with headworks at Narayanpur for irrigating Gulbarga and Raichur Districts in Mysore. The project was sanctioned by the Planning Commission in 1963.⁽²⁶⁾

The Andhra Pradesh Government now proposes extension of the Upper Krishna Project to irrigate 1,50,000 acres in Gadwal and Alampur Taluks with an annual utilisation of 54.40 T.M.C. of water.⁽²⁷⁾ Andhra Pradesh contends that, in view of section 108(2) of the States Reorganisation Act, 1956, the

(21) Report of the Krishna Godavari Commission, p. 220.

(22) APPK XIV pp. 1-3.

(23) MYPK VIII pp. 63, 76.

(24) \PPKXXVIII pp. 3-5; APK I p. 44; SP III pp. 118-124; MYK III pp. 31-32.

(25) APPK XXVII, pp. 1-3.

(26) MYPK I, p. 20, MYDK XII, p. 1.

(27) APPK XXVII pp. 5-7; APK I. p. 44; MYK II pp. 31-32; SP III pp. 118-124

scope of the earlier Projects cannot be varied and Mysore is bound to supply water from those projects for the benefit of Andhra Pradesh areas. Mysore disputes the contention. The following issue was raised :—

Issue V(b) (i) : Should any directions be given for release of waters by Mysore for the benefit of Andhra Pradesh from Upper Krishna Project ?

We find that the Upper Krishna Project of Hyderabad was not sanctioned or taken up for execution by the Hyderabad Government. The Mysore Government started construction of its Upper Krishna Project after 1963. None of the Projects was taken in hand or included in the Second Five Year Plan before the 1st November, 1956. Section 108(2) of the States Reorganisation Act, 1956 does not apply to the Projects. Andhra Pradesh is not entitled to any relief under section 108(2) for extension of irrigation facilities to Gadwal and Alampur Taluks from the Upper Krishna Project.

Issue V(b) (i) is answered in the negative.

(6) *Munirabad Power House, Issue IV(B) (b) (iii), IV(B)(c), IV(B)(d) :*

Munirabad Power House and disputes relating thereto :

The Munirabad Power House has 3 generating sets of 9,000 kW each. It is situated on the left side of the Tungabhadra dam.

Construction of the Power House was started by the Hyderabad Government. ⁽²⁸⁾ Before the 1st November, 1956, the Tungabhadra dam and reservoir on the left side including the Munirabad Power House were vested in the State of Hyderabad.

Under the States Reorganisation Act, 1956, with effect from the 1st November, 1956, Hyderabad District, Mahboobnagar District including the Taluks of Maktal and Narayanpeth, Alampur and Gadwal Taluks of Raichur District and Kodangal and Tandur Taluks of Gulbarga District of the erstwhile Hyderabad State were added to the State of Andhra Pradesh. The rest of Raichur and Gulbarga Districts including the site of Munirabad Power House became a part of the State of Mysore. In consequence of the reorganisation of States, the Munirabad Power House with all its

assets and liabilities devolved on the State of Mysore⁽²⁹⁾ and the administration and control of the Power House vested in that State.

Andhra Pradesh claims a share of the power generated at the Munirabad Power House under sections 107 and 108(2) of the States Reorganisation Act, 1956, and, to ensure the supply of the power, an order for the vesting of the control of the Power House in the Tungabhadra Board. Mysore denies the claim and contends that the dispute is not a water dispute.

Accordingly, the following issue was raised :—

Issue IV(B) (b) (iii) : Should any direction be given for the vesting of the control and administration in the Tungabhadra Board of the Power House at Munirabad ?

Has the Tribunal any power to give such directions ?

(c) Is Andhra Pradesh entitled to a share in the power generated at the Power House at Munirabad ?

(d) is the claim of Andhra Pradesh for a share in the benefits of the power generated at Munirabad Power House and/or for the vesting of the control and administration of the said Power House in the Tungabhadra Board a water dispute within the meaning of the Inter-State Water Disputes Act ?

Tungabhadra Hydro-electric Project Stages I and II

The Tungabhadra Hydro-electric Project of Hyderabad envisaged the construction of the Munirabad Power House in two stages. The project came under the purview of the First and Second Five Year Plans.

Work on Stage I of the project was in progress during April 1951 to March 1952.⁽³⁰⁾

The revised estimate of Stage I of the Project was prepared in October 1954. Stage I of the project was sanctioned at the end of the First Five Year Plan and was included in the Plan before the 1st November, 1956.⁽³¹⁾

Stage I contemplated the installation of two generating sets of 9,000 kW each at the main station at Munirabad, the construction of 8 sub-stations including Narayanpeth sub-station, 132 kV transmission line from Munirabad to Raichur, 66 kV line from Raichur to Yadgir, 33 kV feeder line from Yadgir to Narayanpeth and other lines.

(28) SP III pp. 240-241.

(29) See Second Five Year Plan of Mysore State (1956-57 to 1960-1961) p. 175.

(30) Hyderabad Administrative Report, April 1951-March 1952, SP III pp. 240-241.

(31) SP III pp. 242-264, 267.

On the 24th August, 1957, the Planning Commission approved of Stage II of the Project for implementation in the Second Five Year Plan.⁽³²⁾ Stage II envisaged the installation of one additional generating set of 9,000 kW. The Project Report⁽³³⁾ stated —

"The maximum load demand by the end of 1961 is expected to reach 16085 kW, the details of which are given below —

(1) Maximum demands as per Appendix I	6785	kW
(2) Maximum demands for Cement & Sugar Factories expected in the Raichur and Gulbarga Districts	3000	kW
(1) Maximum demands for lift irrigation	5000	kW
(4) Additional demands expected and agri-cultural processing due to increased irrigation facilities in the	1000	kW
(5) Maximum demands under community project area	300	kW
	16085	kW "

The Report gave the estimated load demand of 30 towns and villages. The demands of 5 Telengana towns were shown as follows —

Name of locality	Power demand	
	Day KW	Night KW
1	2	3
District Gulbarga		
Tandur	300	100
Kodangal	60	20
Kosgi	100	30
District Mahboobnagar		
Narayanpeth	475	75
Maktal	40	10
	975	235

The Report also stated that (1) by 1963-64, at least 20 per cent increase in the loan might be ex-

pected and (2) as electrification of 20 more villages would be taken up, there would be additional load of nearly 1,700 kW.

Agreement of September 1956 for adoption of 110 kV transmission line.—

The original proposal for 132 kV transmission lines from Munirabad power station was meant for the southern districts of Hyderabad without any reference to the Mysore grid. In view of the proposed reorganisation of States, it became advisable to consider the station as part of an integrated grid consisting of Mysore system and Tungabhadra system. The Chief Electrical Engineer, Mysore, therefore, proposed to the Chief Engineer (Electrical), Hyderabad that 110 kV transmission line system should be adopted for the Tungabhadra Electrical Scheme in place of 132 kV line. On the 13th September, 1956, the Chief Engineer (Electrical), Hyderabad agreed to the proposal. ⁽³⁴⁾

On the 19th September, 1956, the Hyderabad Government sanctioned the acceptance of the joint recommendations of the two Chief Engineers. ⁽³⁵⁾

On the 3rd October, 1956, the Chief Engineer (Electrical), Hyderabad State, advised the Karnataka Chamber of Commerce, Hubli, that the power available from the Munirabad power station in the first stage could be made available for industries in the Munirabad/Raichur area and that further correspondence should be addressed to the Chief Electrical Engineer, Mysore. ⁽³⁶⁾

The change-over from 132 kV to 110 kV was done with a view to keep the Munirabad Power Station linked with the rest of the Mysore power system so that the power produced at Munirabad could be utilised fully in Mysore.

After this change, on the 24th August, 1957, the Planning Commission described Stage II of the Project as "the project relating to the second stage development of Tungabhadra Electric Project in the Karnatak region of the erstwhile Hyderabad State". ⁽³⁷⁾

(32) SP III 215

(33) Report of the Tungabhadra Hydro-electric Project Stage II, SP III pp 265-287 (Ex APK 425)

(34) SP III pp 102-306 Ex MYK 292.

(35) SPIII p 285 Ex APK 426.

(36) SP II p 227 Ex MYK 291

(37) Letter of sanction of Stage II of the Project by the Planning Commission, SP III p. 215 (Ex. MYK 289).

Claim of Andhra Pradesh for 3376 kW of power under section 108(2) of the States Reorganisation Act.—

Andhra Pradesh contends ⁽³⁸⁾ that the sanctioned Tungabhadra Hydro-Electric Project envisaged the supply of 3376 kW of power to Telengana towns and areas as mentioned below :—

(1) 5 towns	1068 kW
Tandur	300 kW.
Kodangal	60 kW.
Kosgi	100 kW.
Narayanpeth	475 kW.
Maktal	40 kW.
	975 kW

Assuming 1.15 per cent line losses and 1.05 diversity factor, the equivalent demand on power station

was $(9.75 \times 1.15) / 1.05 = 1068 \text{ kW}$.

(2) Sugar and cement factories for 3 Taluks of Raichur and Gulbarga districts transferred to Andhra Pradesh out of 25 taluks comprised in the two districts before the re-organisation of States. The demand for 3 Taluks was

$3/25 \times 3000 = 360 \text{ kW}$. . . 360 kW.

(3) Lift irrigation and agricultural process- in3. The demand in the ratio of 6 taluks transferred to Andhra Pradesh and 22 taluks transferred to Mysore was $6/28 \times (5000 + 1000) = 1285 \text{ kW}$.

Total	1285 kW.
	2713 kW

(4) 20% increase in demand of 2713 kW. in Stage II . . . 543 kW.

(5) Estimated additional load in the towns of Maktal, Narayanpur, Nashirabad, Kodangal and Kosgi out of total additional load of 1,700 kW. in Stage II

Stage II	120 kW.
Grand Total	3376 kW

Upon the reorganisation of States, Alampur and Gadwal Taluks of Raichur District, Kodangal and Tandur Taluks of Gulbarga District and Maktal and Narayanpeth Taluks of Mahboobnagar District of

the erstwhile Hyderabad State, as also the five towns mentioned above, were transferred to the State of Andhra Pradesh.

Andhra Pradesh contends that the load forecast in the Project reports established a scheme of distribution of power to Telangana areas and towns, that in view of the States Reorganisation Act, 1956 neither the scope of the Project nor the distribution of its benefits can be varied, and that consequently it is entitled to the supply of 3,376 kW of power for the benefit of the towns and areas mentioned above.

Claim for relief under section 108(2) is not established.—

It is not shown that the Tungabhadra Hydro Electric Project established a scheme of distribution of power benefits. The load forecast in the project reports cannot be regarded as a scheme of distribution of benefits.

The object of the load forecast was to assess the probable future demand for the power generated at the Power Station. The load forecast did not bind the power station to supply power to any area. There was no certainty that the anticipated load demand would materialise or that they would arise in Telengana areas and towns.

Before the 1st November, 1956, the Hyderabad Government sanctioned the adoption of the transmission voltage of 110 kV. with a view to enable the Mysore Government to utilise the power in Mysore areas only. Accordingly the voltage of Munirabad Raichur line was fixed at 110 kV., the line between Yadgir to Raichur was retained at 66 kV. and no provision was made for Yadgir-Narayanpeth line or for Narayanpeth sub-station. On the 3rd October, 1956, the Chief Engineer (Electrical), Hyderabad, stated that the entire power from the power station in the first stage could be made available in the Munirabad Raichur region. Thus the Hyderabad Government clearly indicated that upon the reorganisation of States as from the 1st November, 1956, the Mysore Government would be at liberty to utilise the entire power produced by the Munirabad power station in Mysore areas.

Stage I of the project was taken in hand but not completed before the 1st November, 1956, but it is not shown that the scope of Stage I of the project or the distribution of the benefits to be derived from it has been varied after the 1st November, 1956

(38) SP III pp. 10-11, 13, 16-22.
IMofI&P/73—10

Stage II of the project was taken in hand after the 1st November, 1956 and the provisions of section 108(2) are not attracted to it. Moreover, Stage II of the Project was for development of the Karnataka areas only.

Upon the reorganisation of States, the Munirabad power station with all its assets and liabilities devolved on Mysore. There is no basis for the claim that Andhra Pradesh is entitled to a share of the power generated at the power station without paying for it.

Andhra Pradesh is not entitled to any relief under section 108 (2).

Claim of Andhra Pradesh for 10,000 kW. of power under section 107 of the States Reorganisation Act.—

Andhra Pradesh contends that before the 1st November, 1956 there was an arrangement in regard to supply of 10,000 kW of power to Hyderabad city from Munirabad Power Station, that such arrangement has been modified by Mysore by reason of the fact that Hyderabad city was transferred by the States Reorganisation Act, 1956, from Hyderabad State in which the power station was located and that consequently suitable direction for the continuance of the arrangement should be given under section 107 of the States Reorganisation Act.⁽³⁹⁾

The State of Hyderabad originally contemplated that 10,000 kW of surplus power would be supplied from Munirabad power station to Hyderabad city.⁽⁴⁰⁾

However, in 1953, a Power Team consisting of Shri S. A. Gadkari and Shri S. K. Menon, Members Central Water and Power Commission, disapproved of the proposal and in their report to the Planning Commission observed that the surplus power of Munirabad Power House could be utilised in the south and south-western areas of the State and that Ramagundam Thermal Station could supply power to the Hyderabad area immediately.⁽⁴¹⁾ Accordingly, the proposal for the supply of surplus power to Hyderabad city was abandoned and the reports of Stages I and II of the project did not envisage the supply of power to Hyderabad city.

Claim for relief under section 107 is not established.—

The sanctioned Project Stages I and II did not envisage supply of power to Hyderabad city. It is not established that there was any arrangement before the 1st November, 1956, for the supply of 10,000 kW of power from Munirabad Power House to Hyderabad city. The argument that such an arrangement is established by the provision for 132 kV transmission line from Munirabad to Raichur in Stage I of the Project cannot be accepted. Had there been such a transmission line, it could be more easily connected with the 132 kV line to Hyderabad. But the provision for such a line does not indicate an arrangement for supply of power from Munirabad Power House to Hyderabad city. Even the provision for 132 kV line from Munirabad to Raichur was replaced by a provision for 110 kV line before the 1st November, 1956. The Hyderabad Government sanctioned the change with a view to facilitate the utilisation of the power produced at Munirabad in Karnataka areas.

Section 107 of the States Reorganisation Act is not attracted, and the claim based on it must fail. *Mysore Second Five Year Plan.—*

The Second Five Year Plan of Mysore (1956-57 to 1960-61) stated⁽⁴²⁾ :—

"Due to the annexing of the northern regions of Mysore, following the States Reorganisation, the Munirabad Power Station, viz., Tungabhadra Dam Left Bank Station is transferred to the State with an amount of Rs. 424 lakhs for the Station and the Transmission Lines and sub-stations connected with it. 18,000 kW will be available from this station during the plan period. All the power under this scheme will be distributed in the integrated region except 200 kW which will be supplied to Andhra Territory."

This statement does not advance Andhra Pradesh's claim for a share of power based on sections 107 and 108(2) of the States Reorganisation Act.

Andhra Pradesh does not claim any relief for the supply of 200 kW of power on the basis of the above statement.

(39) SP III pp. 23-32.

(40) Report of Hydro-electric Survey prepared in 1938, SP III p. 24; Plan of Power Scheme prepared in 1946, SP III pp. 42, 52; Note of Jaffer Ali prepared in 1949, SP III p. 43; Memorandum on electrical development in Hyderabad State dated 20-11-1951 submitted by Hyderabad Government to Planning Commission, SP III p. 24; Letter of Zafir Ahmed dated 1-7-1952 to the Planning Commission SP III pp. 47-48; Sketch accompanying tender notice issued by the Government of Hyderabad in 1952, SP III p. 49.

(41) Letter dated 17-2-1953 from Shri Gadkari and Shri Menon to the Secretary, P.W.D. Hyderabad; SP III pp. 217-222.

(42) SP II p. 301 Ex. APK 428.

The basis of the supply of 200 kW of power is not disclosed nor is it known for what period and on what terms the supply would be made.

Andhra Pradesh does not allege that there was any agreement for supply of 200 kW of power to it, nor does it seek or make out any, case for relief on the basis of an agreement.

Answer to issues IV(B)(b) (iii), IV(B)(c) and IV (B) (d).—

Andhra Pradesh is not entitled to any share in the power generated in the Power House at Munirabad. Issue IV(B)(C) is answered in the negative.

In view of this conclusion, there is no occasion for vesting the control and administration of the Power House in the Tungabhadra Board. Issue IV(B)(b) (in) is answered in the negative.

Consequently, the question whether the dispute is a water dispute within the meaning of the Inter-State Water Disputes Act, 1956, does not arise. Issue IV(B) (d) is disposed off accordingly.

Gotur and Kocheri weirs and Karlahatti Bhandara.—

At one stage, Mr. Krishna Rao, learned Counsel for the State of Mysore, argued that we should impose restrictions on the State of Maharashtra with regard to Gotur and Kocheri weirs and Karlahatti Bhandara. On the 17th August, 1973, Mr. Krishna Rao stated that he did not press his contentions regarding Gotur and Kocheri weirs and Karlahatti Bhandara before this Tribunal. He added that, if necessary, resort would be made by the State of Mysore to the Government of India for giving appropriate relief regarding them.

CHAPTER VII

Diversion of the Godavari waters to the Krishna (Issue VI)

Pleadings.—In their statements of case both Maharashtra⁽¹⁾ and Mysore⁽²⁾ prayed for a direction that the waters of the river Godavari be diverted to the Krishna. Maharashtra contended that this diversion would help to meet, partly or fully, the shortage of waters in the Krishna. Since this water shortage had been created by over-appropriations by Andhra Pradesh with evident assistance of the Centre, it was the responsibility of the Andhra Pradesh Government to take up this work of diversion at its own cost and meet its water requirement from its share of the Godavari waters which would come to Andhra Pradesh on equitable apportionment by the Tribunal. Mysore contended that if Andhra Pradesh should require waters in excess of its legitimate share to irrigate vast areas for raising a second or even a third crop, it was open to that State to divert waters from the Godavari, since the Godavari had plentiful waters for such diversion. The necessity for the diversion would appear from the report of the Krishna Godavari Commission and the statement of the Union Minister for Irrigation and Power in the Lok Sabha on the 23rd March, 1963.

Andhra Pradesh opposed the diversion and contended⁽³⁾ that the dispute was not a "water dispute" within the purview of the Inter-State Water Disputes Act. Andhra Pradesh contended that it was for Andhra Pradesh to consider whether it should augment its supplies in the Krishna by diversion of its share of the Godavari waters if its share of the Krishna waters fell short of its commitments and that this matter did not concern the other two States.

Issue.—The following issue (Issue VI) was raised.—

"Is it possible to divert waters from the river Godavari to the river Krishna ? Should such diversion be made and, if so, when, by whom, in what manner and at whose cost ? Is the Tribunal competent to adjudicate on these questions ?"

Order of the Tribunal.—On April 19, 1971, the Tribunal passed an Order in terms of the following agreed minutes filed by Counsel for the States of Andhra Pradesh, Maharashtra, Mysore, Madhya Pradesh and Orissa :—

- "(1) Parties have agreed that each of the States concerned will be at liberty to divert any part of the share of the Godavari waters allocated to it by the Godavari Tribunal from the Godavari basin to any other basin.
- (2) In view of the pleadings and the statements of the States concerned, none of the States asks for a mandatory order for diversion of the Godavari waters into the Krishna basin.
- (3) All the other contentions of the parties are reserved and will be decided in the Krishna case.
- (4) The Krishna case will be decided separately from the Godavari case.
- (5) The States of Madhya Pradesh and Orissa are ordered to be discharged from the record of this case and will no longer be parties to this case.
- (6) The States of Madhya Pradesh and Orissa will bear and pay their own costs."

Clause 1 of the above order was amended by an order passed in terms of agreed minutes filed by the parties on the 27th July, 1971. The amended clause 1 is as follows :—

"Parties have agreed that each of the States concerned will be at liberty to divert any part of the share of the Godavari waters which may be allocated to it by the Godavari Tribunal from the Godavari basin to any other basin."

(1) MRK I pp. 204,213-222, 225

(2) MYK I pp. 55-57, 65.

(3) APK VII pp. 8-9.

Similar orders were passed in the Godavari case.

Effect of Orders of the Tribunal.—In view of the above orders, the State of Andhra Pradesh is free to divert its share of the Godavari waters to the Krishna river, but it can not be compelled to do so.

It is still necessary to consider whether the possibility of the diversion of the Godavari waters to the Krishna or the absence of such diversion affects the equitable share of the parties in the Krishna waters.

Topo-sheet study.—The upper reaches of the Godavari Valley are lower than the corresponding reaches of the Krishna Valley. It is, therefore, not possible to divert, by flow, any waters from the upper reaches of the Godavari into the upper reaches of the Krishna.

The highest suitable point on the Godavari is near Pochampad from where its waters can be dropped into the Nagarjunasagar reservoir on the Krishna. In the lower reaches, there are possibilities of diverting the Godavari waters by a link canal from the Godavari near Albaka to Pulichintala on the Krishna and a link canal from the Godavari at Polavaram to Vijayawada.

Earlier Proposal.—The Ramapadasagar Project of 1951 contemplated diversion of the Godavari waters by the Polavaram-Vijayawada link canal.⁽⁴⁾ The Khosla Committee⁽⁵⁾ discussed the possibility of the diversion.

Krishna Godavari Commission.—In 1961, the Krishna Godavari Commission was asked to report on the feasibility of diverting any surplus supplies in the Godavari to the Krishna indicating the quantity to be diverted and the cost involved. After examining this question, the Commission recommended that the shortage in the Krishna basin could be made up partly by the transfer of such surplus supplies from the lower Godavari area as could be utilised in the Krishna basin by the following two link canals :—

- (a) A link canal from the Godavari at Polavaram to Vijayawada at a cost of about Rs. 40 crores. This link canal would transfer about 211 T. M. Cft. of water to the Krishna.
- (b) A link canal from the Godavari near Albaka or Singaraddy to Pulichintala on the Krishna

at a cost of about Rs. 40 crores. This link canal would transfer about 95 T. M. Cft. of water to the Krishna.

The Commission considered that it should be possible, on the basis of the information contained in their report as well as field reconnaissance and some preliminary surveys to be carried out, to prepare a preliminary project report in about 6 months and establish the feasibility or otherwise and the scope of the proposed diversions from the Godavari to the Krishna.⁽⁶⁾

Later investigations.—As a result of the recommendations of the Krishna Godavari Commission, the work of investigating the diversion of the Godavari waters to the Krishna was entrusted to the Central Water and Power Commission and two Circles were opened, one for investigating the diversion links and the other for measuring discharges at some key stations on the Krishna and Godavari rivers. The Government of India set up the Godavari Krishna Technical Committee to review the progress of work in the two Circles and give suitable guidance to them. The feasibility of the link canals was discussed in four meetings of the Godavari Krishna Technical Committee between 1963 and 1966 and in inter-State meetings held in August and October 1967. No agreement on the subject was reached between the concerned States.

Godavari-Pulichintala link canal.—The Krishna Godavari Commission considered that it might be possible to divert 95 T. M. C. of the Godavari waters annually from this link canal. However, it is no longer contended by Maharashtra and Mysore that this link canal is technically feasible. Accordingly, we are not called upon to consider the possibility of diversion by this link canal.

Polavaram-Vijayawada link canal.—This link canal formed part of the Ramapadasagar Project which was later abandoned. The Polavaram Barrage scheme proposed by Andhra Pradesh consists of a barrage at Polavaram on the Godavari and two canals. The right bank canal of this scheme would run up to Vijayawada. At the first meeting of the Godavari Krishna Technical Committee, all members agreed that Polavaram would be the best site for the link canal and that since the Polavaram barrage as well as

(4) Ramapadasagar Project Report 1951 Vol. I, pp. 14, 17, 20, Vol II, Index Map. 4

(5) Report of the Technical Committee for optimum utilization of the Krishna and Godavari Waters 1953, pp. 73-76, 101-103

(6) Krishna Godavari Commission Report, pp. 2, 290-294, 320-321.

the Vijayawada barrage would have no storage of their own, it would be necessary to have a storage site on the Godavari river upstream of Polavaram to provide the necessary storage for meeting the requirements of both the Godavari and Krishna Delta canals.⁽⁷⁾ At the second meeting of the Committee⁽⁸⁾ it was decided that the base study for the link canal would be made on the basis that the link canal would take off by a diversion structure from near about Polavaram and would get regulated supplies from a storage higher up or releases from a number of projects high up. At the second, third and fourth meetings of the Committee⁽⁹⁾, and at inter-State meetings held in August and October 1967 several storage sites on the Godavari were discussed, but no agreement was reached. Maharashtra has stated that storages at Inchampalli and Ippur at the requisite level are not permissible in view of the extensive submergence of areas in Maharashtra and Madhya Pradesh and that except the Bhopalpatnam and Watra Badruk Project no other storage for meeting the reasonable irrigation needs of Andhra Pradesh is feasible.⁽¹⁰⁾ This statement is not disputed by Mysore.

Revised Maharashtra Scheme.—In its final statement⁽¹¹⁾ regarding the Godavari diversion, Maharashtra proposes that for meeting the needs of the Krishna Delta, 146 T. M. C. of the Godavari waters may be diverted by the Polavaram-Vijayawada Link canal from the run of the river supplies and regulated releases of 171 T. M. C. from the Bhopalpatnam storage and 182 T. M. C. from the Watra Badruk storage. The Bhopalpatnam storage on the Indravati river would be a joint project of Madhya Pradesh and Maharashtra and the Watra Badruk storage on the Pranhita river would be a joint project of Andhra Pradesh and Maharashtra. One of the two storages is necessary and sufficient for the diversion scheme. Sufficient surplus supply from Andhra Pradesh's share in the Godavari waters after meeting its reasonable requirements will be available for diversion to the Krishna. The right bank canal of the Polavaram barrage scheme with suitable modifications can serve as the Polavaram-Vijayawada link canal. Mysore general-

ly supports this proposal⁽¹²⁾. Andhra Pradesh opposes the proposal⁽¹³⁾.

Proposal for Bhopalpatnam and Watra Badruk projects.—Before the Godavari Water Disputes Tribunal, Madhya Pradesh proposed Bhopalpatnam Project Stages I and II as a joint project of Madhya Pradesh and Maharashtra⁽¹⁴⁾. The note on the Project stated that the proposal was based on topo-sheets and that field investigations were being undertaken. Maharashtra supported the proposal⁽¹⁵⁾. The Project would submerge large areas in the territories of both Madhya Pradesh and Maharashtra.

Before the Godavari Water Disputes Tribunal, Andhra Pradesh proposed the Watra Badruk (Pranhita) Project and stated that it would be for the mutual benefit of Maharashtra and Andhra States if the project was taken up as a joint venture.⁽¹⁶⁾ Andhra Pradesh stated that detailed investigation of the scheme was in progress. The project would submerge large areas in the territories of both Andhra Pradesh and Maharashtra. Maharashtra supported the proposal.⁽¹⁷⁾

There is no material before the Tribunal to show that the field investigations have been completed. No joint project report of either the Bhopalpatnam Project or the Watra Badruk Project has been filed before the Tribunal. After the project reports are prepared, joint cost-benefit schemes will have to be finalised and it will be then for the States to consider whether any of the joint projects is feasible or advantageous. It is not possible at this stage to say that Maharashtra and Madhya Pradesh will enter into an agreement for the undertaking of the joint Bhopalpatnam Project or that Andhra Pradesh and Maharashtra will enter into an agreement for the undertaking of the joint Watra Badruk Project. In the absence of an agreement, there cannot be a joint project or storage either at Bhopalpatnam or Watra Badruk. One of the two storages is necessary and essential for the diversion scheme proposed by Maharashtra. On the present materials it is not possible to say with certainty that either of the two storages will be available in the near future.

(7) MRK I p. 217; MRDK II pp. 79-83.

(8) MRDK II p. 85.

(9) MRDK II pp. 83-113.

(10) SP II, p. 10.

(11) SP II, pp. 3-39.

(12) SP II, pp. 40-47.

(13) SP II, pp. 48-63.

(14) Notes on Bhopalpatnam Project I and II, MPPG XI. Similar proposal was made before the Krishna Godavari Commission, see KGCR Ann. XV p. 241.

(15) MRPG XXXVIII p. 193, MRG II pp. 78-81; MRK I p. 220.

(16) Note on Pranhita Project APPG XI pp. 23-24. Separate projects on the Pranhita river near Watra Badruk were proposed by Andhra Pradesh and Maharashtra before the Krishna Godavari Commission, see KGCR Ann. XV pp. 139-141, 505-507.

(17) MRG II, pp. 82-85; MRK I, p. 220.

Possibility of Godavari diversion and equitable apportionment of the Krishna waters.—It may be that sooner or later either the Bhopalpatnam Project or the Watra Badruk Project may materialise and in that event the scheme for diversion of the Godavari waters to the Krishna river for meeting a part of the requirements of the Krishna Delta Canals can be carded out. But the remote possibility of diversion of the Godavari waters to the Krishna is not a sufficient ground now for cutting down the allocation of an equitable share of the Krishna waters to Andhra Pradesh for meeting its needs.

Maharashtra argument regarding equities.—Maharashtra argues that in view of the statement of the Union Minister for Irrigation and Power in the Lok Sabha on the 23rd March, 1963 and other statements of the Union Government regarding diversion of the Godavari waters into the Krishna, equities have arisen in favour of Maharashtra and Mysore and that if the diversion of the Godavari waters to the Krishna does not materialise, the allocations for Nagarjunasagar and Srisailem Project of Andhra Pradesh should be suitably cut down and modified. We are unable to accept this contention for the following reasons :—

In his Lok Sabha speech on the 23rd March, 63,⁽¹⁸⁾ the Union Minister for Irrigation & Power said that Nagarjunasagar Stage it could be cleared only after investigations on Godavari supplies would be completed. He did not say that in the absence of the Godavari diversion the sanctioned Nagarjunasagar Project (Stage I) would be modified. Nagarjunasagar Project was undertaken in 1955 and its sanction was not dependent on the availability of supplies from the Godavari.

The Union Minister stated that Srisailem Project should be suitably modified after taking into account the requirement of 264 T. M. C. for Nagarjunasagar Project, the possibility of diversion of the Godavari waters and inflows between Srisailem and Nagarjunasagar. Suitable action was taken on this statement. On March 26, 1964, Srisailem Project was sanctioned by the Planning Commission. ⁽¹⁹⁾ The sanction was on the basis of ultimate water release of 180 T. M. C. from Srisailem. The preliminary sanction letter of June 7, 1963 and the letter and note of Planning Commission dated July 5, 1963 ⁽²⁰⁾ pointed out that even on the assumption that the Godavari diversion would materialise, it could be safely assumed that the

minimum release for power generation from Srisailem would be 180 T. M. C. annually. If there is no diversion of the Godavari waters into the Krishna, it will be necessary to release more than 180 T. M. C. annually from Srisailem to meet the requirements of Nagarjunasagar Project and Krishna Delta Canals. The sanctioned Srisailem Project is not dependent or conditioned on the availability of additional supplies in the Krishna from the Godavari diversion.

On March 23, 1963, the Union Minister also stated that pending final allocation of waters, Maharashtra, Mysore and Andhra Pradesh should withdraw respectively 400 T. M. C., 600 T. M. C. and 800 T. M. C. of supplies from the Krishna. At a meeting between the representatives of Maharashtra and Union Governments on April 22, 1963⁽²¹⁾, Shri S. B. Chavan, Minister of Irrigation & Power, Government of Maharashtra said that it was not clear on what basis the withdrawals had been allowed. Shri Hafiz Mohammad Ibrahim, Union Minister for Irrigation and Power stated that the withdrawals indicated by him were only estimates and were not in any way final allocations. Shri M. R. Sachdev, Secretary to the Government of India, Ministry of Irrigation and Power stated that sizeable surplus would be available for further allocation to Maharashtra and Mysore as a result of diversion of the surplus waters of the Godavari to the Krishna but the quantum would be known after the investigations would be completed. Shri C. L. Handa, Member, Central Water and Power Commission stated that additional supplies would be available as a result of diversion of the surplus waters of the Godavari estimated at 300 T. M. C. by the Gulhati Commission, and from regeneration or salvage of irrigation flows ; but he could not say how much of the additional supply would be available to Maharashtra. Shri O. V. Alagesan, Minister of State, Irrigation & Power said that 300 T. M. C. as a result of the Godavari diversion and 300 T. M. C. as a result of regeneration or salvage *i.e.* in all 600 T.M.C. would be available and the allocation had been made on that basis. Shri Handa stated that the surpluses on account of regeneration and salvage could not be quantified. Shri B. Y. Barve, Minister of Finance, Government of Maharashtra stated that, according to Maharashtra, hardly any further supplies in addition to the withdrawals of 400, 600 and 800 T. M. C. indicated in the Union Minister's statement would be available for allocation from the Krishna. No definite assurance was given to Maharashtra by the Union Government that investigations regarding the Godavari diversion had

(18) MYDK I pp. 156-171.

(19) MRK II, p. 310.

(20) APDK VIII, pp. 1-5; MYDK II, p. 320.

(21) MRK II, pp. 205-218.

been completed and such diversion was technically feasible, or that any portion of the additional supplies in the Krishna from the diversion would be available to Maharashtra, nor did Maharashtra act upon such an assurance. No representative of Andhra Pradesh was present at the meeting. Our attention was not drawn to any other statement of the Union Government in this connection. Andhra Pradesh made no representations concerning Godavari diversion for which it can be saddled with any equities in favour of Maharashtra and Mysore.

The States of Maharashtra and Mysore submitted that in the event of diversion of the waters of the river Godavari to the river Krishna, there should be a self-executing order providing for equitable distribution of such waters. Alternatively, they submitted that in the event of augmentation of the water? of the river Krishna by the diversion of the waters of the Godavari, the Ganga or any other river, liberty should be reserved to them to claim the benefits of the diverted waters. The State of Andhra Pradesh strongly disputed

these claims. The question whether the States of Maharashtra and Mysore should be given any share in the" diverted waters will require examination if and when the waters of the river Godavari or any other river are diverted into the river Krishna. We are providing for review of our final order after the 31st May, 2000. We are inclined to think that all the States should be at liberty to urge their respective contentions before the reviewing authority after the 31st May, 2000 and not earlier. Accordingly, we propose to pass the following order :—

"In the event of the augmentation of the waters of the river Krishna by the diversion of the waters of any other river, no State shall be debarred from claiming before the aforesaid reviewing authority or tribunal that it is entitled to greater share in the waters of the river Krishna on account of such augmentation nor shall any State be debarred from disputing such claim".

Issue VI is answered accordingly.

CHAPTER VIII

Ground Water

Ground Water.—The fresh water resources of a basin include both surface and ground water. Both surface and ground water are replenished by rainfall and form part of the circulatory pattern of the hydrologic cycle. If the water table at the top of the zone of saturation is above in level of the water surface in a stream, ground water seeps into the stream; but when the water table is below this level, there is seepage from the stream into the porous layers of rocks. Thus, ground water supplies the relatively stable and uniform base flow of the stream and is, in its turn, replenished by the stream flow. Depletion of ground water by pumping or otherwise may reduce the stream flow somewhere else in the river basin ⁽¹⁾.

For equitable apportionment of waters of an interstate river system, the underground water resources of a State is a relevant factor. Ground water may furnish alternative means for satisfying the State's irrigation needs. Moreover there may be such a close connection between the surface and ground water resources of a river basin that it may be necessary to limit the use of ground water to prevent diminution of the water supply downstream⁽²⁾.

Under the Indian law, every owner of land has the right to collect and dispose off within his own limits all water under the land which does not pass in a defined channel⁽³⁾. The Indian law is based on the common law of England. The common law doctrine⁽⁴⁾ has been considerably modified in England by the Water Resources Act 1963, Chapter 38, sections 23 to 32, but the general Indian law continues to be the same as before.

However, ground water flow is not fully calculable from the technical point of view and, therefore, not fully cognisable as yet from the legal point of view⁽⁵⁾. Being invisible, ground water resources baffle quantitative measurement ⁽⁶⁾.

In the Krishna basin, systematic ground water surveys have not been carried out, and sufficient data of ground water resources are not available⁽⁷⁾. In view of this lack of data, the Tribunal passed an order on the 1st April, 1971, in terms of the following agreed minutes (Annexure 'A' to the order) filed by the States of Andhra Pradesh, Maharashtra and Mysore.

"Having regard to the fact that there is no available data relating to underground water which the parties can place before this Honourable Tribunal for the purpose of deciding the present dispute, the parties state, for the purpose of this dispute, as follows: —

1. The underground water resources of the States concerned will not be regarded as alternative means of satisfying their needs and will not be taken into account for purposes of the equitable apportionment of the waters of the river Krishna and the physical basin (river-valley) thereof.
2. The States do not ask the Tribunal to put any restrictions on the use of underground water by the States."

-
- (1) The Year Book of Agriculture 1955, Water, (The U.S. Dept. of Agriculture) pp. 48, 49, 73; O.E. Meinzer, Hydrology pp. 399; 432; E. Kuiper, Water Resources Development, Planning, Engineering and Economics (1965) p. 8; Ground Water Studies—Edited by R.H. Brown and others, UNESCO 1972, para 1.1.2.
 - (2) Arizona v. California 376 U.S. 340. (Clause IV of the decree); Masters Report in the same case cited in A.H. Garretson and others, The Law of International Drainage Basins 1967 pp. 525-526, see also *ibid* pp. 585-586.
 - (3) The Indian Easements Act, 1882, Illustration (g) Report of the Indus (Rau) Commission Vol. I, pp. 54-55.
 - (4) See Chasemore v. Richards (1859) L.R. 7 H.L.C. 349.
 - (5) A.H. Garretson and others, The Law of International Drainage Basins (1967) p. 312; L.A. Teclaff, The River Basin in History and Law, p. 10.
 - (6) The Nation's Water Resources, United States Water Resources Council 1968, pp. 3-2-1, 3-2-7.
 - (7) Report of the Krishna Godavari Commission, p. 145; Report of the Irrigation Commission 1972 Vol. III Part II, p. 194.

On the 25th September, 1972, the parties filed the following agreed statement:—

"With reference to Annexure 'A' to the order of the 1st April, 1971, the States of Andhra Pradesh, Maharashtra and Mysore are agreed that for clause 2 of the said Annexure 'A' the following clauses 2 and 3 be substituted :—

2. The States will be free to make use of underground water within their respective State territories.
3. This agreement will not be taken in any way to alter the rights, if any, under the law for the time being in force, of private individuals, bodies or authorities."

On a consideration of all relevant materials, we propose to pass the following order: —

"The Tribunal hereby declares that the States of Maharashtra, Karanataka and Andhra Pradesh will be free to make use of underground water within their respective State territories in the Krhhna river basin.

This declaration shall not be taken to alter in any way the rights, if any, under the law for the time being in force of private individuals, bodies or authorities.

Use of underground water by any State shall not be reckoned as use of the water of the river Krishna."

CHAPTER IX

Determination of Dependable Flow

This chapter would cover discussions on the first sub-issue of Issue No. II. The main Issue II is to this effect :—

"What directions, if any, should be given for the equitable apportionment of the beneficial use of the waters of the Krishna river and the river valley?"

The sub-issue (1) under discussion in this chapter is:—

"On what basis should the available waters be determined?"

This sub-issue broadly speaking is concerned with the determination of the quantum of water which is available for allocation between the different States. As observed in the Krishna Godavari Commission Report in Chapter XI relating to 'Hydrologic Characteristics', the source of all water in the Krishna and the Godavari basins, whether in stream flow or under the surface, is the rain which falls within the area. There is no evidence of any sub-soil flow from outside getting into the basin. So far as underground water is concerned, all the three States would be free to use the underground water within their respective State areas as they wish.

The subject relating to the availability of the surface water has engaged much attention and time of this Tribunal and has been the subject matter of acute controversy between the parties. The oral evidence regarding dependable flow commenced on the 6th September, 1971 with the testimony of Mr. Framji (MRW-I), the expert witness of the State of Maharashtra. The principal witness Prof. Rao (APW-5), who appeared on behalf of the State of Andhra Pradesh was also examined at great length and his evidence concluded on the 30th March, 1972. The arguments on the sub-issue started on the 3rd July, 1972 with a lengthy address by the learned Advocate General of the State of Andhra Pradesh. He was followed by the Advocate General of Maharashtra, whose argument in the main has been adopted by Mr. Krishna

Rao, appearing on behalf of the State of Mysore. It is a tribute to the learning and ability, of the learned counsel and the engineers of the three States as also to their mutual appreciation of the points of each other which have prompted them to conclude a settlement on this controversial point and therefore it is now necessary only to refer to the barest facets of this crucial question.

It is generally agreed that the volume of water which passes over and through the Vijayawada Weir would give us a fair idea of the volume of flow in the river after the upstream utilisations are added to it. From Vijayawada Weir onwards the river Krishna forms into a delta and flows eventually into the sea.

In the notes submitted by the Central Water and Power Commission on the utilisation of supplies in the Krishna river for consideration of the Conference held on the 27-28th July, 1951 which is mentioned in the discussion of Issue I, it was observed thus (MRDK Vol. I, page 117) :—

"Discharge observations of the river Krishna are available for Bezwada (Vijayawada) site in Madras for the year 1895 to 1945 i.e. for 51 years. Actual yearly run off are given in Statement 'A'. The mean annual run off comes to 1957 T.M. Cft. This, however, is available in 21 years only out of 54 and hence cannot be taken as dependable supply. Runoff of 1800, 1700 and 1450 are available in 30 years, 37 years and 44 years respectively. Hence dependable supplies at Bezwada excluding present utilisation above may be taken as 1450 T.M.Cft. This tallies with the figure worked out by Hyderabad. The Madras figure of 2000 is too high".

It was on this basis that the allocation was made between the different States in the Conference of 1951. For reasons which have already been stated, we are unable to attach any importance to the agreement reached on the 28th July, 1951.

Broadly speaking, the position of Maharashtra and Mysore is that for the purpose of irrigation the volume of available water of the river Krishna should be computed at 75 per cent dependability. It would be a safe basis as the flow at 75 per cent dependability would be available in 3 out of 4 years. The contention of the State of Andhra Pradesh is that the figure of 1745 recorded in 1951 should be stuck to and that 86 per cent dependability is a reliable criterion.

Dependable flow is the magnitude of river flow which may be assuredly expected at a given point on the river on some scientific or rational basis inspiring confidence. We may mention here a simple statistical method for determining the percentage dependability of the flow of a river at a particular point. For ascertaining the percentage dependability of the flow at a given point of a stream where a continuous record of flow for a number of N years is available, the flow discharge data is arrayed in descending order. Each year's flow so arrayed is assigned the serial number from the top and if M be the serial number of the flow in any year, the percentage dependability for the flow of that year is calculated by applying the formula

$M / (N \times 100)$ Some authorities say that the percentage dependability should be arrived at by applying the formula $\frac{M}{N+1} \times 100$ but all the parties in

this case have adopted the formula $(M/N) \times 100$

If flow at a particular dependability is to be computed and is not directly available from the flow series as mentioned hereinbefore then the flow data for the two consecutive years—one just above the required dependability and the other just below the required dependability is taken into consideration and proportionate adjustment is made to arrive at the flow at that particular dependability.

For example, take a series of flow discharge data of the river Krishna at Vijayawada for 78 years. If, in this series, the flow of a certain year having the serial number 58 is 2063 T.M.C., the percentage dependability of the flow of 2063 T.M.C. is $(58/78) \times 100 = 74.36$ per cent and if the flow of the next year having the serial number 59 is 2057 T.M.C., the percentage dependability of the flow of 2057 T.M.C. is $(59/78) \times 100 = 75.64$ per cent. Therefore, in this flow series of 78 years the flow of $(2063 + 2057) / 2$ or 2060

T.M.C. has the percentage dependability of

$(74.36 + 75.64) / 2 = 75$ per cent. In other words, the flow of 2060 T.M.C. is expected to appear in the river at Vijayawada in 75 out of 100 years and is called the 75 per cent dependable flow of the river Krishna at Vijayawada.

The Committee on Plan Projects of 1960 set up by the National Development Council examined both the Koyna (Maharashtra) and Nagarjunasagar (Andhra Pradesh) projects in some detail and at page 5, paragraph 2.23 of AP-27, made the following observations :—

"It is, therefore, for consideration whether the scope of projects for assured irrigation should be extended beyond the dependable yield adopted in the 1951 award. This question has been discussed with Central Water and Power Commission and it has been suggested by them that many of the current projects under sanction are planned on seventy-five per cent to eighty per cent dependability and this should be adopted for the Krishna basin. The Project Authorities have expressed similar views during discussions. This question has also been discussed with the Consultative Committee and they have expressed that for the assured irrigation projects on Krishna river, a dependability of 75 per cent may be adopted, and that the same percentage be adopted in respect of projects of all States on the Krishna river."

In the statement regarding the Krishna and the Godavari waters laid by the Union Minister for Irrigation and Power on the Table of the Lok Sabha on the 23rd March, 1963 reproduced at page 156 of MYDK Vol. I, it was stated as follows at page 164:—

"In the matter of availability of supplies, from overall considerations, a criterion based on 75 per cent dependability has been considered to be the most suitable and for the purposes of our projects that have to go forward, this criterion of dependability may be adopted".

We shall deal with this subject further in connection with our decision on the question of apportionment of water of the river Krishna between the three States.

It would be recalled that in the minutes of the proceedings of the Conference of July, 1951, it was

stated by Shri Venkatacharya, Chief Engineer of Madras that the discharge figures of the Krishna river which had been worked out in the note were underestimated by about 8 per cent. This observation was merely "noted" and the allocations were made at 86 per cent dependability.

The first term of reference of the Krishna Godavari Commission appointed by the Government of India on the 1st May, 1961 was —

"(1) To report on the availability of supplies in the Krishna on the basis of annual flow at Vijayawada and other points taking into account upstream utilisation and allowing for regeneration :—

- (i) for 86 per cent dependability as assumed in 1951 ;
- (ii) for 75 per cent dependability ; and
- (iii) for such other criterion of dependability as may be considered appropriate".

The Commission, while submitting its report on the 21st August, 1962, did not record any definite answer to the question covered by the first term of reference and it was stated that because of the uneven distribution of discharge sites there are many sub-basins in which no river flow data exists. The Commission strongly recommended as a matter of first urgency, vide paragraph 18—34 of its Report, the establishment on a permanent basis and on scientific lines of daily discharge observations at 38 sites on the Krishna River System. The Commission observed that this data is essential for the individual projects, for the preparation of an integrated basin-wide plan, for the subsequent operation of such a plan and the regulation to the best advantage of the available river waters in any year. The Central Government was charged with the responsibility of this important work and also to set up a special organisation for this purpose under the Ministry of Irrigation and Power. Further, it was stated in paragraph 18—37 of this Report : —

"It is unfortunate that no attempt has so far been made to undertake regular discharge observations at the sites of proposed projects. Even for the projects under construction, little attention has been paid to the observation and compilation of accurate flow data."

It will be relevant at this stage to mention some of the predominant factors which influence the runoff. These factors have been enumerated in the article

'Flood Hydrographs' by Gail A. Hathaway and A. L. Cochran in the book "Engineering for Dams" by the Late William P. Greager and others at pages 140 and 141 Vol. I (Fourth Printing, March, 1950).

They are as follows :—

"Rainfall.

- a. Intensity, duration, sequence.
- b. Areal distribution during successive time intervals.

Infiltration.

- a. Initial loss, or loss before appreciable runoff begins.
- b. Minimum average capacity, or in some cases, the relation of capacity to field-moisture conditions.

Regimen of Runoff.

- a. Effects of basin configuration and arrangement of tributaries.

b. Effects of natural storage:

- 1. In tributaries, lakes, swamps, etc.
- 2. In principal stream channels and valleys.

c. Effects of artificial structures :

- 1. Reservoirs.
- 2. Channel improvements.
- 3. Land-use practices.

d. Effects of slopes :

- 1. In principal stream channels and flood plains.
- 2. In drainage areas tributary to principal runoff channels.

e. Effects of land coverage :

- 1. Forested areas.
- 2. Cultivated areas.
- 3. Pasture lands and barren areas.

f. Ability of subsurface soil to transmit infiltrated water to surface channels within the period required for direct runoff to pass through the channel storage phase of runoff."

Each of these factors has its own effect on the runoff. The cumulative effect of all these factors has to be taken into consideration in determining the total quantity of water available for utilisation in any region. There are obvious difficulties in computing runoff of

a mighty river like the Krishna which has its origin in high mountainous region covered with forests having heavy intensity of rainfall and which in its course towards the sea descends at various degrees of slopes and crosses through forested areas, cultivated areas, pasture lands and barren areas gathering water on its way from innumerable nullahs, streams and tributaries some of which are as mighty as the river Krishna itself. Measuring water accurately in the Krishna basin by establishing rainfall runoff relationship is a difficult problem.

But the other method of determining water available in a basin is to measure water flowing in a stream. Stream flow though dependent on so many factors of diverse character and varying degree of intensity, represents the residual water available in a drainage basin. Stream flow represents the integrated results of all meteorological and hydrological factors operative in the drainage basin and it is the only phase of the hydrologic cycle for which reasonably accurate measurements can be made of the volumes involved ⁽¹⁾.

This method of measuring the water available in the Krishna basin has been followed since a long time.

At Vijayawada the construction of an anicut across the river Krishna was sanctioned by the Court of Directors of the East India Company. It was built in 1852—55. The primary purpose of the construction of the weir was for irrigating parts of Guntur and Masaulipattam Districts. The Anicut was also utilised for measuring the water of the river flowing over it by applying the formula known as M.D.S.S. formula. The importance of the measurement of discharge at Vijayawada is that after the river had passed the Vijayawada Anicut, it receives practically no contribution of water from surface runoff due to rainfall. Thus, after taking into account the utilisations, discharge over the Anicut reflects the amount of water available due to run off in the entire Krishna basin. The plan and section of the Anicut are found in G.T. Walch's The Engineering Works of the Kistna Delta, Vol. II (APK-582). The changes brought in the Anicut after its construction are described by Walch in the note in the Plan as follows :—

"The crest of the Anicut was raised above what is here shown by 1 foot in 1891-92 and by another 2, feet in 1894. This 2 feet was removed in 1897 and for it falling shutters substituted in 1898. The solid portion of the crest in front of the shutters is now 1-3"

higher than the crest as shown on this plan; it is taken as + 47.50 and the top of the shutters when up + 50.25."

The dimensions of the Anicut which were taken in consideration for calculating discharges are shown in Fig. 1 in the Kistna Reservoir Project Vol. II Ex-APK-403 at page 1 and the cross-section of Vijayawada Anicut is shown as Fig. HI at the same page. In the description of the Anicut as given at pages 1 and 2 of these Kistna Reservoir Project—Vol. II reference is made to the falling shutters fixed on the Anicut :—

"The length (3,076.75 ft.) of the horizontal crest of the work is fitted with falling shutters which are 10 ft. long each and when raised have an effective height of 2.75 ft.

When down, these shutters lie prone behind the masonry crest and offer no obstruction to the passage of water. The flanks of the anicut are sloped at 1 in 23.21 on the left and at 1 in 23 on the right side. For purposes of calculation the slope on both sides is taken as 1 in 23."

In 1925 three feet falling shutters were removed and six feet falling shutters of Zifta weir type were installed. This change is noted in "College of Engineering Manual, Irrigation" by Ellis (Ex. APK-640) at page 424, paragraph 579-A. It is stated in that Manual that :—

"Due to increased demand for water in the expanding delta, the three feet falling shutters of the type shown in Fig. 131, were removed and 6 feet falling shutters of Zifta weir type installed on the Kistna anicut at Bezawada in 1925. They are made up of 29 sets of 11 shutters each, a single shutter being 10 feet long.

The total length comes to 3193'4-1/4" including the spaces between the shutters. These spaces are closed up with canvass staunching frames during seasons of scarcity. These shutters are intended to maintain water over the crest of the anicut upto 6 feet. They are tripped set after set as water rises above 6 feet until all the sets are down. The tripping of these sets is effected by hydraulic pressure maintained and worked from Seetana-

(1) Introduction to Hydrometeorology by Bruce and Clark—page 80 (First edition, 1966 and reprinted in 1969).

garam and Bezwada side valve houses, for each of the two valves of the anicut by means of separate pipe connections taken to the first shutter (master shutter) of each set. As soon as the master shutter is tripped by the application of pressure from the valve house, the other ten shutters connected to this with axles and clutches will also fall down one after the other.

When the water level begins to go down below 6 feet raising of the shutters set after set is done by means of travelling machine otherwise called 'plough' which is worked by steam power.

In the off-position the shutters lie flat on the masonry crest of the body wall the plough moving forward on its track on the anicut catches up the roller in the middle of the free end of the shutters. This roller moves along over an inclined track in the plough so that as the plough goes forward, the shutter rises to its vertical position".

Formulae as given in the Kistna Reservoir Project, Vol IT at pages 2 to 9, paragraphs 5 to 13(1) were being applied for calculating the discharge at Vijayawada Weir. These formulae made certain assumptions regarding the velocity of approach which are given in paragraph 6 at pages 2-3 of the said report. The formula for Anicut discharge with clear overfall is given in paragraph 7. The Krishna Anicut was taken as submerged when the flow was 6 feet above the crest and the formula for discharge calculations on submerged Anicut as given in paragraphs 8 and 9 at pages 5 to 7 of the said report was being applied. Methods for calculating discharges of under-sluices and canals are mentioned in paragraph 12 and 13 at page 8 of the said Report. According to Annexure II of the Report of the Krishna Godavari Commission, there were some minor changes in these formulae from time to time

Annexure II to the Krishna Godavari Commission Report at pages xiv and xv in paragraph 8 gives the details of the manner in which the discharges over the Anicut were computed after 6' shutters were installed in 1925. The Krishna Anicut was divided into the following five parts :—

- (a) The central portion of the Anicut 3,193.35 feet long is in the form of a weir with a crest width of 6.0 feet with a 20 feet extension upstream at a slightly lower level. It

had six feet high automatic shutters on top of the crest. The top level of the shutters was R.L. 53.05 and the effective crest level, when the shutters were down, was R.L. 47.22.

- (b) The Vijayawada side level flank, 174.33 feet long with crest at R. L. 53.05
- (c) The Vijayawada side sloping flank, 108.92 feet long with crest rising from R.L. 53.05 to R.L. 57.40, at a slope of 1 in 25.04.
- (d) The Seethanagram side level flank, 156 feet long, with crest at R.L. 53.05.
- (e) The Seethanagaram side sloping flank, 126 feet long, with crest rising from R.L. 53.05 to R.L. 58.30, at a slope of 1 in 24.

The discharge Q over the Anicut was calculated when the down stream water level was below the crest level by applying the formula —

$$Q = 3.1 L [(H + h_a)^{3/2} - h_a^{3/2}] \quad \dots \quad (1)$$

When the downstream level was above the crest level of the Anicut, the discharge Q was calculated by applying the formula —

$$Q = 3.1 L [(h + h_a)^{3/2} - h^{3/2}] + CLD \sqrt{2g(h + h_a)} \quad \dots \quad (2)$$

The values of L, H, h, h_a, and d are as mentioned in paragraph 8 of Annexure II. Thus it will be seen that whenever downstream water level was above the crest level the second formula was applied. This method of calculating the discharges is the main point of controversy between the parties.

There was a breach in the Krishna Anicut in the year 1952 and in its place construction of the Krishna (Prakasam) Barrage was sanctioned. The construction of the Krishna (Prakasam) Barrage started in the year 1953 and was completed in the year 1962.

There is a serious controversy between the parties with respect to the dimensions of the Krishna Anicut which is no more in existence, the formulae employed in calculating the discharges of the water flow over the Anicut and the gauge or gauges with reference to which calculations were made. We proceed to refer to the nature of controversy between the parties on these points.

The case of the State of Maharashtra regarding the assessment of discharge of the Krishna river at Vijayawada Weir is set out at pages 9-18, paragraphs 2.2.1 to 2.2.5 of MRK-Vol. I. It has been stated in paragraph 2.2.5 that Shri Venkatacharya, Chief Engineer of Madras had stated in the 1951 Conference that discharge figures of the Krishna river which had been worked out in the Central Water and Power Commission note were under-estimated by about 8 per cent. This together with the correction for inclusion of the higher yield for years 1945 to 1950, showed that the estimated 86 per cent dependable yield would have been 1977 T.M.C. (rounded to say, 2000 T.M.C.) instead of 1715 T.M.C. (rounded to 1745 T.M.C.) as adopted by the Planning Commission for the supplies at 86 per cent dependability only. The 75 per cent dependable yield would be much more approximately 2200 T.M.C. It is stated that this figure has been confirmed since then by the three dimensional model experiments carried out at the Central Water and Power Research Station, Poona in 1967-68. on the basis of which the Central Water and Power Commission has reconstructed the flow data at Vijayawada. According to that study the 75 per cent dependable flow at the river Krishna at Vijayawada comes to 2176 T.M.C.

It is further stated that the Krishna Godavari Commission has also given the run off figures for the subsequent years 1951-52 to 1959-60 and that if these 10 years are added to the previous 50 years, the 75 per cent dependable yield would increase to 2188 T.M.C. which may be rounded off to approximately 2200 T.M.C., as the 75 per cent dependable flow at Vijayawada including the existing utilisations. The concluding part of paragraph 2.4.5 is as follows :—

"Thus, in the view of the Maharashtra State, the best estimate (as of date) of the available total flows at Vijayawada on the basis of 75 per cent dependability would be 2200 T.M.C."

The State of Mysore has also adopted this estimate as the correct estimate of the flow of the river Krishna at Vijayawada. Reference in this connection may be made to pages 57—59, paragraph 3 in MYK-Vol. III.

The case of the State of Andhra Pradesh is set out in the rejoinder of the State of Andhra Pradesh to the statement of the case of the State of Maharashtra (APK-III) pages 42 to 62, paragraphs 4.2.1 to 4.7.4. Paragraphs 4.2.3, 4.2.4, 4.5.21, 4.6.1, 4.6.2 and 4.6.3 reproduced below give the gist of the case of the State of Andhra Pradesh :

4.2.3. Gauge readings were being observed meticulously thrice a day, i.e., at 6.00 AM, 12.00 Noon and 6.00 PM on the upstream and downstream of the anicut both on Vijayawada side and Seethanagaram side of the river. The position of the shutters and number of shutters lowered were also recorded every time the gauges were read. Laborious calculations were being made to get the averages of Vijayawada and Seethanagaram gauges at all times and to get from those the weighted average gauge readings for the day and night and the weighted average lengths of shutters down.

4.2.4. Daily discharges were being calculated from the above using the free overfall and submerged weir-flow formulae then in vogue. The coefficients in the formulae were fixed taking into consideration the How condition, upstream bed condition, the velocity of approach etc. by responsible engineers. Change in the section of anicut along its length at its ends, such as sloping lengths etc., were also taken into consideration in fixing the values of coefficients and arriving at the correct discharges. Systematic tables were prepared for calculating the discharges for every 0.01 foot of the weighted gauge readings for mechanical application, to save time, and to avoid the possibility of personal errors in calculations. The formulae adopted were clearly described in Krishna Reservoir Project Report Vol. IT, printed in the year 1911. Attempts were also made once in 1913 and again in 1936 to give necessary corrections to the coefficients in the formulae, to take into account the change, in the upstream bed conditions and the velocity of approach in the river. From the above it can be seen that discharges observed at Vijayawada were done very carefully, accurately and scientifically.

4.5.21. Discharges of rivers are being measured all over the world and in India, by continuous current meter gaugings. Therefore the only method of estimating the dependable flow of a river of this magnitude is by continuous current meter gaugings for a sufficiently long period, and it was precisely that, that was recommended by the Krishna Godavari Commission. Unless and until it is done, it is not prudent to discard the valuable data observed over a very long period and preserved for the posterity.

4.6.1. The Maharashtra stated that, if the flow data were reconstructed for the years from 1951-52 to 1959-60, the 75 per cent dependable flow will be increased to 2,183 Thousand Million Cubic Feet, or approximately 2,200 Thousand Million Cubic Feet, which is the best estimate of the available total flows at Vijayawada in their view.

4.6.2. In this context it is to be stated that the Krishna Anicut breached in 1951 and the construction of the barrage was undertaken soon and therefore the observations of the discharges at the anicut site were vitiated for this period. In spite of that, the readings at Vijayawada anicut were being recorded regularly as before the breaching of the Anicut, and the discharges were also calculated in the field as per the old method without taking into account the disturbed flow conditions. These calculations are only very rough and cannot be relied upon.

4.6.3. It is also to be mentioned that we have to establish first the correctness of the dependable flow upto 1951 only, because it has been questioned and the subsequent data will not be of any use for this."

The State of Andhra Pradesh has also challenged the model experiments performed in 1967 at Poona on several grounds, as set out in paragraph 4.5 of APK-III, pages 54 to 61.

As the case progressed the State of Maharashtra set up an alternative case, the details of which are given in Chart No. C-66 which is on record.

The alternative case of the State of Maharashtra is that in the event of the Tribunal holding on the facts and circumstances of the case that the results of the model experiments performed at Poona in 1967-68 duly corrected for the changes in the weir cannot be made to give a reasonably accurate estimate of the dependable flow of the Vijayawada Weir the M.D.S.S. formula should be suitably modified as the submerged flow formula was wrongly applied to the heads of water over the weir from 6' to 22' (or above), except for the days on which the submerged flow actually occurred. It was further submitted that for calculating the discharge over the standing shutters the coefficient of discharge must be taken to be 3.33 and not 3.1. The State of Mysore also adopted the alternative case of the State of Maharashtra.

The rejoinder of the State of Andhra Pradesh to this alternative case is set out in Chart No. C-47 which IM of & P/73—12

is on record. The contention of the State of Andhra Pradesh is that the use of the constant value of 3.1 as coefficient in the formula is not correct. The State of Andhra Pradesh has submitted at page 2 of this Chart the varying values -for C in the formula $Q=CL [(H+ha)^{3/2} - ha^{3/2}]$ which according to it may be adopted in modifying the formula.

It is stated that :—

"Considering all the above, the State of Andhra Pradesh submits that the following varying values may reasonably be adopted for C for different heads in the formulae for discharge over weirs for any reconstruction of discharges to be made using the available gauge data".

The varying values of C mentioned by the State of Andhra Pradesh are given below :—

Range of Head	Value of C Pre-1925 in the formula $Q=CL[(H+ha)^{3/2} - ha^{3/2}]$	Value of C Post-1925 in the formula $Q=CL[cH+ha)^{3/2} - ha^{3/2}]$
0'-3'	2.65	2.60
3'-6'	2.80	2.75
6'-9'	2.90	2.85
9'-11'	3.08	3.03
11'-14'	3.17	3.12
above 14'	3.20	3.15

It is to be noted that the State of Andhra Pradesh has made a distinction between pre-1925 and post-1925 period, as its case is that the cross-section of the Anicut in the post-1925 condition had got more kinks and also had an upstream vertical retaining wall.

On the 5th October, 1972, during the course of arguments, the Advocate General of Maharashtra and the counsel for the State of Mysore submitted a signed statement which runs as follows :—

"1967, 3 D Model Experiments of C. W. & P. R. S. Poona.

The principal objections urged by Andhra Pradesh to using the results of 3 D model Experiments to reconstruct the recorded gauge data are :

- I. (a) The 3 D model was not geometrically similar to the prototype.
- (b) Consequently kinematic and dynamic similarity is not secured.
- (c) The model is not proved
- (i) Because it is not geometrically similar and

- (ii) Because there was no prototype data available for the year 1932 at the time of 1967 experiments for the Sitanagaram u/s gauge and therefore the reading of the Sitanagaram u/s gauge in the model was based on a statistical study for the years 1933 to 1950. The actual gauge data of the year 1932 which became subsequently available after 21st March, 1969 show that there is a wide disparity between the statistically determined gauge readings and the actual gauge readings of the Sitanagaram u/s gauge 06 the prototype. Consequently the model is not proved.
- (d) The u/s approach should have been reproduced upto 2 miles. In any event, the reproduction of 1 mile u/s approach was not adequate as it did not correctly simulate the flow pattern in the model.
- (e) The method of independent variables cannot be applied so as to correct the geometrical dissimilarity between the model and the prototype; at any rate the method cannot be applied to all the features in the geometry of the Vijayawada Weir.

II. The States of Maharashtra and Mysore have carefully considered these objections and the evidence on record. Having regard to the undisputed fact that before the results of 3 D model experiments can be acted upon, the model must be proved, the States of Maharashtra and Mysore are not able to maintain that the model can be said to have been proved in view of the very great disparity between the readings of the u/s Sitanagaram gauge on the prototype as disclosed by the recorded data made available after the 21st March, 1969 and the readings of the u/s Sitanagaram gauge on the model having been based on a statistical study of data for the years 1933-50. Under the circumstances the States of Maharashtra and Mysore do not rely on the 3 D model experiments for reconstructing the Vijayawada recorded discharge data."

There may be other reasons also for not relying on the 3 D model experiments. But whatever the reasons may be, in view of the statement made by the learned Advocate General of Maharashtra and the learned counsel of Mysore, the case of the States of Maharashtra and Mysore that on the basis of the results obtained from the aforesaid experiments the flow at Vijayawada should be estimated at 2176 T.M.C. does not stand and need not be considered.

The only case that we have now to examine is the alternative case set up by the State of Maharashtra. On a careful examination of the alternative case and the rejoinder of the State of Andhra Pradesh it is clear that so far as the matter of calculating the discharge over the standing shutters is concerned, all the parties are agreed that the coefficient of discharge C may be taken as 3.33 in the formula — $Q = CL [(H+h^a)^{3/2} - ha^{3/2}]$. We may also mention that initially there was some controversy about the value of the velocity of approach, but at the final stage of the arguments the parties agreed that in calculating the discharges after 1925, the velocity of approach may be taken to be as mentioned in Annexure II to the Krishna Godavari Commission Report page xvi. Parties are also agreed that for non-modular flow, the discharge may be calculated according to the formula mentioned at page xvi, paragraph 8 (iii) B of Annexure II to the Krishna Godavari Commission Report. Parties are also broadly in agreement regarding the utilisations made by each State every year from 1901-02 to 1968-69.

For the period 1929 to 1951, complete gauge data for calculating the discharge over Vijayawada Anicut are available on the record of the Tribunal. If the modular limit and the value of the coefficient of discharge are determined, the annual discharge of the river Krishna over the Krishna Anicut for the period 1929-30 to 1950-51 can be calculated from that data. But this will furnish annual discharge data only for 22 years. The engineers of the States of Maharashtra, Mysore and Andhra Pradesh were requested to calculate the annual discharge for the period 1929-30 to 1950-51 (a) taking the flow to be non-modular on days when the afflux was less than 1' as given in C.W.P.C. (K)-5 at pages 170 to 173 (b) applying to the formula for modular flow $Q = CL[(H+ha)^{3/2} - ha^{3/2}]$ the following values of C :—

0'-3'		2.60
3'-6'		3.75
6'-9'		3.00
9'-11'		3.10
Above 11'		3.20

(c) adopting the formula for non-modular flow as mentioned in the Krishna Godavari Commission Report, Annexure II and (d) taking the agreed value of the velocity approach and agreed value of the coefficient for flow over the standing shutters. They submitted a document containing these calculations from which the 75 per cent dependable yield works out to 2065 T.M.C.

Realising that it will be better if from the material on record, the annual discharge for a longer period may be determined, the parties made certain submissions which are incorporated in the notes submitted by them.

The States of Maharashtra and Mysore submitted that for the four years 1925-26 to 1928-29, as the record of individual readings of both upstream gauges are not available, the available record containing averages of the two upstream gauges may be utilised not only for computing the discharge over the central portion, but also discharge over the flanks taking the average of the two gauges as representing the individual readings of the two upstream gauges. This method of computing discharge will give results with sufficient accuracy for all practical purposes. This contention is contained in paragraph 3 of MR Note No. 1 filed on the 26th March, 1973.

The States of Maharashtra and Mysore further submitted that the recorded data over the Krishna Anicut from the years 1951-52 to 1960-61 and the discharge data gauged by the State of Andhra Pradesh on the Krishna (Prakasam) Barrage (which came into operation in 1961) for the years 1961-62 to 1970-71 may be taken into account without making any modifications. The case of the States of Maharashtra and Mysore on this point is summed up in paragraphs 5, 6 and 7 of MR Note No. 10 filed on the 5th April, 1973. The State of Andhra Pradesh has, however, raised objection to the inclusion of the recorded data for these years. It has, however, submitted that discharge data for the years 1901-02 to 1924-25 may be calculated by applying the modified formula taking the gauge readings given in the printed register Ex. APK-616 for the period 1901-02 to 1924-25 which according to it represented the average of the readings of the two upstream gauges. Alternatively the State of Andhra Pradesh submitted that annual discharge data so arrived may be increased by 2.29 per cent. Ultimately it submitted in AP Note No. 10 filed on the 3rd May, 1973 that in view of the factors mentioned in that note, Andhra Pradesh had no objection for making an overall positive correction of +5 per cent for the annual flows over the Anicut for the period 1901-02 to 1924-25 as given in Column 3 of Annexure II of AP Note No. 2, dated the 30th March, 1973.

It was also for our consideration whether the discharge data mentioned in the Krishna Reservoir Project Volume II for the years 1894-95 to 1900-1901 should be taken into consideration or not.

With the able assistance of the parties and after thorough examination of all the material on record and after a careful consideration of the matter, the Tribunal directed that the series of discharge data from 1894-95 to 1971-72 be prepared on the lines indicated by the Tribunal which represented the views of the Tribunal on all matters in controversy between the parties. The States of Maharashtra, Mysore and Andhra Pradesh submitted on the 4th May, 1973 separate documents marked X (Ex. MRK-342), Y (Ex. MYK-303) and Z (Ex. APK-696) ⁽¹⁾ containing the annual flow series at Vijayawada for the years 1894-95 to 1971-72. The 75 per cent dependable flow from each of these series works out to 2,060 T.M.C.

After scrutinising the documents the parties submitted an agreed statement stating that the 75 per cent dependable flow of the Krishna river at Vijayawada for the purpose of the case may be adopted as 2060 T.M.C. This statement which is Ex. MRK-343 is set out at the end of this Chapter. It is a matter of great satisfaction that the dispute on a very crucial matter in the case which had been the subject matter of serious controversy between the parties and which was mainly responsible for the prolongation of the trial in this case has been thus satisfactorily resolved. We place on record our appreciation of this attitude adopted by the parties.

Conclusion.—The Tribunal hereby determines that for the purpose of this case the 75 per cent dependable flow of the river Krishna upto Vijayawada is 2060 T.M.C.

Sub-issue No. 1 of Issue II is partly decided as aforesaid. The other aspects of this issue are discussed separately.

Exhibit MRK—343

In view of the documents marked X, Y and Z containing the 78 years' flow series, filed by the three States, the parties are agreed that the 75 per cent dependable flow be adopted as 2060 T.M.Cft. for the purpose of this case.

Sd/-

P. Ramachandra Reddi, for Andhra Pradesh.

4-5-73

Sd/-

T. Krishna Rao, for the state of Mysore.

4-5-73

Sd/-

H. M. Seervai for the State of Maharashtra.

4-5-73

(1) These documents are reproduced as Appendices O, P and Q, respectively.

CHAPTER X

Return flow

Return flow.—Return flow or regeneration from river water diverted for beneficial uses is that portion of diverted water which eventually finds its way to the river from which it is diverted. Return flow is a relevant factor to be considered in making an equitable apportionment of river water. Most of the return flow in the Krishna river comes from water diverted for irrigation.

Return flow from irrigation.—Return flow from irrigation includes drainage from excess percolation during irrigation, surface run off during irrigation as well as drainage from canal seepage, leakage at canal structures, wasteway discharges during conveyance and discharges at the lower ends of canals.⁽¹⁾

When water is applied to a field, a part of the water is rapidly absorbed by the soil. After the sub-soil is saturated and wetted to field capacity, additional water seeps underground by the force of gravity. If sufficient percolation occurs, the water table rises and water in increasing quantities flows back to the stream as invisible return flow.

Contentions regarding return flow from irrigation water.—It is the common case of the parties that a part of the water withdrawn from the stream for irrigation is consumptively used and a part returns to the stream.

It is Maharashtra's case⁽²⁾ that return flow from new irrigation projects in the Krishna basin will be of the order of 30 to 40% of the diversions and will appear within a short time and that this return flow

should be taken into account in determining the dependable flow of the river Krishna.

It is Mysore's case⁽³⁾ that it is difficult to determine the exact extent and time of appearance of return flow. In view of the uncertain character of return flow, it is desirable to evolve a method by which its effect may be automatically accounted for and each State may get its due share of the return flow.

It is Andhra Pradesh's case⁽⁴⁾ that regeneration is an uncertain factor and should not be taken into consideration in allocating the river flow.

Return flow varies from region to region and from time to time.—The magnitude of return flow from irrigation depends upon a number of variable factors such as method and efficiency of irrigation and conveyance, soil type, underlying geological formations, topography, climate, temperature, evaporation and use of groundwater and varies widely from region to region and from time to time.

Studies of return flow in U.S.A.—In U.S.A., systematic measurements of return flow in several river valleys have been made since 1885.⁽⁵⁾ Studies of return flow in U.S.A. show that 16 to 70% of the water diverted for irrigation returned to the stream after use for irrigation.⁽⁶⁾ The latest estimate made in 1968 shows that about 40% of the water withdrawn for irrigation returns to the stream.⁽⁷⁾

(1) Ivan E. Houk, *Irrigation Engineering* (1951) Vol. I, p. 411.

(2) MRK I pp. 21-25; MRK II pp. 40-41, 50-59.

(3) MYK IV p. 7

(4) APK III pp. 62-69.

(5) Ivan E. Houk, *Irrigation Engineering* (1951) Vol. I, p. 412.

(6) E. Kuiper, *Water, Resources, Development, Planning Engineering and Economics* (1965), pp. 14, 349.

Robert W. Abbett, *American Civil Engineering Practice* (1956) Vol. II, p. 17.

Ivan E. Houk, *Irrigation Engineering* (1951) Vol. I, p. 415.

R.K. Linsley, M.A. Kohler, J.L. H. Paulhus, *Applied Hydrology* (1949), p. 217.

(7) L.J. Erie—Management, A Key to Irrigation Efficiency, *Journal of the Irrigation and Drainage Division, Proceedings of the American Society of Civil Engineers* Vol. 94 No. I.R. 3 September, 1968, p. 285. In Canada also irrigation consumes only 60% of delivered water, J.G. Nelson and M.J. Chambers, *Water—Process and Method in Canadian Geography*, p. 15

Quality of return water—Increased concentration of dissolved minerals and salts in the return flow from irrigation, particularly in arid and semi-arid regions may cause salinity problems downstream. Extreme water quality deterioration below tolerance level is injurious to crop growth⁽⁸⁾. However, the salinity has little effect, when the saline water is diluted by relatively large river flows⁽⁹⁾ or by mixture with fresh water in large reservoirs.

Return flow in USA inter-State Water controversies—In the earlier cases⁽¹⁰⁾ due to lack of definite data on the subject, the USA Supreme Court was unable to determine how much of the water used for irrigation returned to the stream. However, in one of these cases,⁽¹¹⁾ the Court was satisfied on the evidence that as respects irrigation is a part of the river valley the return water would more than counterbalance the loss through evaporation and otherwise when the period of storage was not more than from one year to the next.

In later decisions, the Court recorded definite findings with regard to the rate of return flow. In the litigation concerning North Platte river,⁽¹²⁾ the Court found that in Jackson County, Colorado, the diversions were about 4-1/2 acre feet per acre, but the average consumptive use rate was 74 acre foot only. The consumptive use represented the difference between the water diverted and water which returned to the stream after use for irrigation. The Court determined the consumptive use rate in other sections of the river valley also. In the section Pathfinder to Whalen, the consumptive use rate was 1.1 acre feet per acre, while the diversion rate was 2.5 acre feet per acre and, out of the total seasonal headgate diversion of 35,000 acre feet, 18,200 acre feet was returned to the river.

The decree in a case decided in 1963⁽¹³⁾ contained a comprehensive scheme for allocation of water in terms of acre feet of annual consumptive use which was defined as diversions from the stream less such return flow thereto as was available for consumptive use in the United States or in satisfaction of the Mexican Treaty obligation.

USA researches on time of appearance of return flow—Observations in U S A indicate that return flow from a new irrigation project may begin within a few years after initiation of the project, but may not reach its full magnitude until after 10, 20 or even 30 years following the beginning of irrigation⁽¹⁴⁾.

India - -The Indian Irrigation Commission observed⁽¹⁵⁾ that the percentage of irrigation water returning to the river was probably very much less in India than was indicated by observations made in America.

Indus Valley—The Indus Commission⁽¹⁶⁾ held that regeneration was an uncertain factor and could not be depended upon to reduce the shortages in river supplies required for certain projects. The Indus Treaty took into account the average historic gains between Ferozepur and Islam on the Sutlej⁽¹⁷⁾. Henry Olivier⁽¹⁸⁾ has observed

"In territories such as India and Pakistan where perennial irrigation is practised on a vast scale, combined losses of the order of 40% from deep percolation and regeneration seepage constitute major factors not merely as regards the relatively short-term economics of water/land use, but in the progressive qualitative change of water and soils. Preliminary estimates put the annual recharge

(8) Yen Te Chow, Handbook of Applied Hydrology (1964) pp 19-25, 19-31, O W Israelson and V E Hansen, Irrigation Principle and Practices, 3rd Ed., pp 223-229, International Association for Water Law, Annales Juris Aquarum (1968), p 16, A H Garretson and others The Law of International Drainage Basins (1967) pp 579-581, The Nations Water Resources, U S Water Resources Council (1968), p 3-3-5

(9) Lloyd v Wilcox, Effect of irrigation on stream water quality (U S Department of Agriculture), pp 169-173

(10) Kansas v Colorado 206 U S 45 107 (1937) (Arkansas litigation), Wyoming v, Colorado 259 US 419, 483, (1922), 298 U S 573, 581-582 (1932) (Laramie river litigation)

(11) Wyoming v Colorado 259 U S 419, 481

(12) Nebraska v Wyoming 325 U S 589, 600, 603 (1945)

(13) Arizona v California 373 U S 546 (1963) 376 US 340 (1964) (Colorado river litigation)

(14) Edward Kurpet Water Resources Development (1955) p 349, Ivan E Houk Irrigation Engineering (1951) Vol I, pp 412-416 C V Davis Handbook of Applied Hydraulics 2nd Ed (1952) p 785, Transactions of American Society of Civil Engineering Vol 94 (1930) p 138 Paper No 1730

(15) Report of the Indian Irrigation Commission (1901-1903), Vol I, p 13

(16) Report of the Indus (Rau) Commission, Vol I, pp 54-55, 82-91,

(17) See para 23 and 34 of Annexure 'H' to the Indus Waters Treaty N D Gulhati, Development of Inter-State Rivers (1972), p 90

(18) Henry Oliver Irrigation and Water Resources Engineering (1972) p 14,
See also N D Gulhati Indus Waters Treaty (1973), pp 29-237

of groundwater in the northern zone of West Pakistan at approximately $25 \times 10^9 \text{ m}^3$ to $47 \times 10^9 \text{ m}^3$ (20-38 million acre-feet) and in the southern zone it is estimated to be about half this amount."

Special considerations affecting return flow in the Krishna basin.—(1) The Krishna valley lies in a latitude of $13^\circ 7'$ to $19^\circ 20' \text{ N}$ and has a tropical climate. The mean annual temperature is 24°C (75°F) to 29.4°C (85°F), the average annual potential evaporation 71 to 150 inches and the weighted average rainfall 30.9" (784 mm) in a catchment of 99,980 square miles.

(2) Most of the canals in the Krishna basin are unlined. There is heavy percolation loss from unlined canals.

(3) A part of the water of the Krishna river system is diverted outside the Krishna basin for purposes of irrigation and power production. There is no return flow in the Krishna river from water diverted outside the Krishna basin.

(4) All the parties have stated that they will be free to use the underground water within their respective territories. Extensive withdrawal of groundwater from wells may lower the water table and reduce the return flow.

Assessment of return flow from irrigation in the Krishna valley :

(1) *Nira Valley.*—Studies of return flow in the Nira Valley ⁽¹⁹⁾ in rabi and hot weather seasons during 1941-42, 1943, 1944-45, 1945-46 showed that 18.1 to 51.4% of the water diverted for irrigation returned to the stream in water-logged areas and under conditions of lavish and excessive application of water. Another study during hot weather season of 1953-54 revealed that the return flow was of the order of 3 to 4% only. The year 1953 was preceded by a year of extreme scarcity of rainfall.

About 5,400 acres of sugarcane and 15,500 acres of seasonal crops are being irrigated on the banks of the Nira river below Vir Dam and up to confluence of the Nira with the Bhima by lifting water from the available river flow and regeneration flows in the Nira river. No water is let down from Vir storage during the non-monsoon season.⁽²⁰⁾

(2) *Project reports.*—Several project reports give estimates of return flow in the Krishna basin varying from 4 to 10% of the water diverted for irrigation⁽²¹⁾

(3) *Krishna Godavari Commission Report.*—The Krishna Godavari Commission observed that although little statistical data were available, it could be stated from general considerations that the contribution to groundwater from irrigation channels and irrigated fields might be as large as and sometimes even much more than the quantity actually utilised by crops. Considerable theory and many precedents could be cited in support of the fact of such regeneration. However the quantum of regeneration varied widely from one set of conditions on one river to a different set of conditions on another. No practical benefit could be derived from regeneration in the optimum development of the waters of any rivers system unless data of daily flows at number of sites along the river were available and were analysed to determine the actual quantum of regeneration. The Commission concluded that until regular gaugings were established at key sites on the river system and results of each gaugings were available for a number of years (in no case less than ten), they could not give any quantitative assessment of regeneration.⁽²²⁾

(4) *No assessment of return flow in the Krishna basin on a regional basis by following normal method.*—A common method of assessing return flow on a regional basis is to ascertain the daily flows at key points on the river system for a number of years and to analyse the data in the light of the areas irrigated, depths of irrigation, rainfall, sub-soil water levels and other geological, hydrological and meteorological data.⁽²³⁾

(19) Reports on Irrigation and Allied Research, PWD, Bombay, 1941-42, 1943, 1946, 1953-54. (Framji's evidence pp. 356-437).

(20) MRPK XXXI, p. 6.

(21) Report of Rajolibaidda Diversion Scheme (erstwhile Hyderabad State) APPK Vol. 46, pp. 1-2.

Mysore Note on Upper Tunga Project MVTK Vol. VIII p. 97, Mysore Note on Tungabhadra Reservoir Foreshore Lift Irrigation MYPK Vol. VIII p. 115. Kistna Pennar Project Report, (1951 Scheme) Madras State Vol. I. Page 10; APPK-Vol. II p. X; Report of the Lower Krishna Project Nandikonda site of the erstwhile Hyderabad State p. 16, APPK-Vol. X, p. 16; Report of the Bhima Irrigation Project, Govt. of Maharashtra Vol. I p. 18. Vol. IV p. 9; MRPK-Vol. 21 p. 18; MRPK-Vol. 23 p. 9

(22) Report of the Krishna Godavari Commission, pp. 129, 138*139, 158.

(23) See Annual Report (Technical) of the Central Board of Irrigation and Power, India 1945, p. 134; Report of the Krishna Godavari Commission, pp. 129, 138-139; see also Groundwater Studies Edited by R.H. Brown and others UNESCO 1972 p. 5.4; D.V. Jog-Ickir Irrigation Research in India, pp. 142-145, Publication No. 78, Central Board of Irrigation and Power.

So far, the return flow in the Krishna basin has not been assessed on a regional basis by adopting this method.

(5) *Oral evidence*.—Mr. Framji, an expert witness, has made an estimate of return flow from new irrigation projects in the Krishna basin.

Mr. Framji's evidence.—On the subject of return flow, the State of Maharashtra called Kavasji K. Framji as an expert witness. In connection with the Sind Punjab dispute before the Indus Commission and the preparation of the Lower Sind Barrage Project, Mr. Framji made an intensive study of the projected return flows between Sukkur and Kotri, the off-take of canals for the Lower Sind Project and the return flows which could be used in the Lower Sind Barrage Canals. Recently, in connection with the Indo-Pakistan negotiations over the waters of the Ganga and the eastern rivers, studies of return flows between Farakka and Hardinge Bridge were made under his direction and supervision. He has also made an intensive study of the literature concerning return flows in U.S.A. and India. In his opinion ⁽²⁴⁾ through return flow may take 10 to 30 years after the beginning of irrigation to reach its full magnitude, on making a safe and conservative estimate, 10% of the annual diversions by new irrigation projects is likely to appear as return flow within 5 years of the coming into operation of the new projects. The return flow will appear somewhere downstream and will be trapped in one of the large storage reservoirs in the Krishna basin. An equitable apportionment of river water should take into account a reasonable minimum allowance for regeneration from new projects. His opinion is based on (1) his own knowledge and experience, (2) published reports on return flow in U.S.A., (3) observations regarding return flow in the Indus basin, (4) reports on measurements of return flow in the Nira Valley, (5) data given in the Krishna Godavari Commission Report and (6) estimates of return flow in project reports. Counsel for the State of Mysore did not cross-examine the witness. Counsel for the State of Andhra Pradesh cross-examined Mr. Framji, but no expert witness was called to rebut his evidence.

According to Mr. Framji, assuming an annual dependable flow of 2,200 T.M.C. up to 1951 and an annual diversion of 1,215 T.M.C. for projects coming into operation after 1951 and contributing return flows, 120 T.M.C. of return water will be added to the dependable supply of the Krishna river.

Measurement of use of water for irrigation and effect of return flow.—It is common case before us that the use of water for irrigation should be measured by the quantity of water diverted from the river without deducting the water that may return after such use to the river, because on such diversion there is immediate depletion of the river supply to the extent of the water diverted. Accordingly, we propose to direct in our final order that save as provided therein, a use shall be measured by the extent of depletion of the waters of the river Krishna without deducting in the case of use for irrigation the quantity of water that may return after such use to the river.

As and when return water from irrigation use appears in the river, the river supply is augmented and the additional water becomes available for subsequent use. Our task is to ascertain, if possible, the quantity of water that will be added to the 75 per cent dependable flow of the river Krishna up to Vijaywada on account of return flows in the near future and to make an equitable apportionment of the additional river supply between the three States.

Estimate of Return Flow and equitable apportionment.—We have determined that the 75% dependable flow of the river Krishna up to Vijayawada is 2,060 T.M.C. This dependable flow was ascertained after taking into account 78 years' flow series from 1894-95 to 1971-72. In this flow series, the upstream utilisations for the years 1969-70 to 1971-72 have been assumed to be the same as in 1968-69, disregarding the extra utilisations, if any, after 1968-69 as further details were not on the record. ⁽²⁵⁾

After 1968-69, there is and will be gradually increasing utilisations by the States of Maharashtra, Mysore and Andhra Pradesh for irrigation within the Krishna basin. The excess utilisations after 1968-69 will yield substantial return flow. No part of this return flow is reflected in the dependable flow of 2,060 T.M.C.

There were elaborate discussions with Counsel and technical representatives of the parties concerning return flow and the method of its ascertainment and allocation. The summary of the discussions is embodied in the minutes of the proceedings of the Tribunal on the 12th October, 1973 and is set forth below :—

(1) The parties agree that a percentage of the excess utilisations for irrigation in the Krishna basin

(24) Framji's evidence pp. 1-5, 317-475, 1127-1135, 1141, 1148-1185, 1200-1204, 1234-1235, 1294-1302, 1305-1313, 1649-1650 (25) EX. MRK-343, 342, MYK—303, APR—696.

from projects using 3 T.M.C. or more will appear as return flow and will augment the 75 per cent dependable flow of 2,060 T.M.C. up to Vijayawada.

According to Maharashtra, the percentage should not be less than 10 per cent ; according to Mysore, the percentage should not be less than 20 per cent; and according to Andhra Pradesh, it should be 4 per cent.

(2) According to Andhra Pradesh, the excess utilisation should be taken to be the excess of the utilisation after 1968-69 over the utilisation in 1968-69.

According to Maharashtra, the excess utilisation should be taken to be the excess of the utilisation after 1968-69 over the utilisation in 1964-65.

According to Mysore, the excess utilisation should be taken to be the excess of the utilisation after 1968-69 over the average of all the utilisations from 1894-95 to 1968-69.

(3) All parties agree that in 1964-65 the utilisation for irrigation in the Krishna drainage basin from projects using 3 T.M.C. or more was as follows :—

In Maharashtra	47.77 T.M.C.
In Mysore	80.70 T.M.C.
In Andhra Pradesh	35.36 T.M.C.

(4) All parties agree that in 1968-69 the utilisation for irrigation in the Krishna drainage basin from projects using 3 T.M.C. or more was as follows :—

In Maharashtra	61.45 T.M.C.
In Mysore	176.05 T.M.C.
In Andhra Pradesh	170.00 T.M.C.

(5) The Tribunal will decide what percentage of the excess utilisation will appear as return flow.

(6) The Tribunal will decide how the augmentation of the 75 per cent dependable flow on account of the return flow will be shared by the parties.

(7) The Tribunal will decide when the distribution of the additional 75 per cent dependable flow will take place between the parties and whether it should take place once or more than once during the next period of 25 years.

(8) The parties agree that they will prepare, keep and maintain complete detailed and accurate records of annual uses for irrigation in the Krishna basin from their respective projects using 3 T.M.C. or more.

(9) The parties agree that the excess utilisation for irrigation in the Krishna basin from their respective projects using 3 T.M.C. or more shall be determined on the basis of the records to be so prepared and maintained by them.

The parties agree that the year 1968-69 referred to in paragraph⁽⁴⁾ above is the water year commencing on from 1st June 1968 and ending on 31st May 1969.

We may add that the parties also made the following submissions :—

(1) According to Maharashtra, the entire return flow in the Krishna basin should be shared equally by Maharashtra and Mysore.

According to Mysore, each State should get the entire return flow coming from the utilisation for irrigation from its own projects.

According to Andhra Pradesh, the entire return flow in the Krishna basin should be shared equally by all the three States.

(2) Maharashtra and Mysore say that the distribution should take place firstly as from the 1st of June, 1974 and then on the expiry of each succeeding period of five years.

According to Andhra Pradesh, the distribution should take place only once, that is to say, on the 1st of June, 1979.

For the limited purposes of ascertaining return flows and distributing the additional 75% dependable flow on account of return flows until our order is reviewed by a competent authority or Tribunal, we decide as follows :—

On a consideration of all relevant materials including the evidence of Mr. Framji and the special features affecting return flow in the Krishna basin and making a safe and conservative estimate, we hold that 7½% of the excess of the utilisations for irrigation in the Krishna basin after 1968-69 from projects using 3 T.M.C. or more annually over the utilisations for such irrigation in 1968-69 from such projects will appear as return flow in the Krishna basin and will augment the 75% dependable flow of 2,060 T.M.C. of the river Krishna up to Vijayawada.

We hold that in the water year 1968-69 the utilisations for irrigation in the Krishna basin from projects using 3 T.M.C. or more were as follows :—

In Maharashtra	61.45 T.M.C.
In Mysore (now known as Karnataka)	176.05 T.M.C.
In Andhra Pradesh	170.00 T.M.C.

In our opinion, the additional 75 per cent dependable flow on account of the return flow from the excess utilisations should be distributed between the parties, firstly as from the water year 1983-84, again as from the water year 1990-91 and again as from the water year 1998-99.

We hold that the additional 75% dependable flow on account of return flows available for distribution as from the water year 1983-84 should be computed on the basis of the excess of the average of the annual utilisations during the water years 1975-76, 1976-77 and 1977-78 over the utilisations in the water year 1968-69.

We hold that the additional 75 per cent dependable flow on account of return flows available for distribution as from the water year 1990-91 should be computed on the basis of the excess of the average of the annual utilisations during the water years 1982-83, 1983-84 and 1984-85 over the utilisations in the water year 1968-69.

We hold that the additional 75 per cent dependable flow on account of return flows available for distribution as from the water year 1998-99 should be computed on the basis of the excess of the average of the annual utilisations during the water years 1990-91, 1991-92 and 1992-93 over the utilisations in the water year 1968-69.

In our opinion, it is just and equitable that, in the present scheme of allocation, each State should get the benefit of the additional 75 per cent dependable flow on account of the return flow from the excess utilisations for irrigation from its own projects using 3 T.M.C. or more annually.

We propose to direct that the three States shall prepare, and maintain complete, detailed and accurate records of annual uses for irrigation in the Krishna basin from projects using 3 T.M.C. or more annually.

We hold that all future utilisations for irrigation in the Krishna basin in each water year from the projects of any State using 3 T.M.C. or more annually shall be computed on the basis of the records to be so prepared and maintained by that State.

Our views regarding the 75 per cent dependable flow of the river Krishna up to the Vijayawada and the augmentation of the dependable flow by return flows and their equitable allocation between the three States are reflected in clauses III and V of our final order which are as follows :—

Clause III.

The Tribunal hereby determines that, for the purpose of this case, the 75 per cent dependable flow of the river Krishna up to Vijayawada is 2,060 T.M.C.

The Tribunal considers that the entire 2,060 T.M.C. is available for distribution between the States of Maharashtra, Karnataka and Andhra Pradesh.

The Tribunal further considers that additional quantities of water as mentioned in sub-clauses A(ii), A(iii), A(iv), B(ii), B(iii), B(iv), C(ii), C(iii) and C(iv) of Clause V will be added to the 75 per cent dependable flow of the river Krishna up to Vijayawada on account of return flows and will be available for distribution between the States of Maharashtra, Karnataka and Andhra Pradesh.

Clause V.

(A). The State of Maharashtra shall not use in any water year more than the quantity of water of the river Krishna specified hereunder :—

- (i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the official Gazette up to the water year 1982-83

565 T.M.C.

- (ii) as from the water year 1983-84 up to the water year 1989-90

565 P.M.C. plus a quantity of water equivalent to $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisation for such irrigation in the water year 1968-69 from such projects.

- (iii) as from the water year 1990-91 up to the water year 1997-98

565 T.M.C. plus a quantity of water equivalent to $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iv) as from the water year 1998-99 onwards
565 T.M.C. plus

a quantity of water equivalent to $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(B). The State of Karnataka shall not use in any water year more than the quantity of water of the river Krishna specified hereunder :—

- (i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the official Gazette up to the water year 1982-83.

695 T.M.C.

- (ii) as from the water year 1983-84 up to the water year 1989-90

695 T.M.C. plus
a quantity of water equivalent of $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more, annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iii) as from the water year 1990-91 up to the water year 1997-98

695 T.M.C. plus
a quantity of water equivalent to $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iv) as from the water year 1998-99 onwards
695 T.M.C. plus
a quantity of water equivalent to $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its

own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(C). The State of Andhra Pradesh will be at liberty to use in any water year the remaining water that may be flowing in the river Krishna but thereby it shall not acquire any right whatsoever to use in any water year nor be deemed to have been allocated in any water year water of the river Krishna in excess of the quantity specified hereunder :—

- (i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the official Gazette up to the water year 1982-83

800 T.M.C.

- (ii) as from the water year 1983-84 up to the water year 1989-90

800 T.M.C. plus
a quantity of water equivalent of $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iii) as from the water year 1990-91 up to the water year 1997-98

800 T.M.C. plus
a quantity of water equivalent of $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iv) as from the water year 1998-99 onwards
800 T.M.C. plus
a quantity of water equivalent of $7\frac{1}{2}$ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(D). For the limited purpose of this Clause, it is declared that—

- (i) the utilisations for irrigation in the Krishna river basin in the water year 1968-69 from projects using 3 T.M.C. or more annually were as follows :—

From projects of the State of Maharashtra	61.45 T.M.C.
From projects of the State of Karnataka	176.05 T.M.C.
From projects of the State of the Andhra Pradesh	170.00 T.M.C.

- (ii) annual utilisations for irrigation in the Krishna river basin in each water year after this Order comes into operation from the projects of any State using 3 T.M.C. or more annually shall be computed on the basis of the records prepared and maintained by that State under Clause XIII.

Clause XIII of our final order will provide that each State shall prepare and maintain annually for each water year complete detailed and accurate records of inter alia "annual uses for irrigation within the Krishna river basin from projects using 3 T.M.C. or more annually."

Return flow from municipal water supply and industrial uses.—Studies in U.S.A. and Canada indicate that in those countries municipal water supply consumes 10 per cent of the water diverted and industries consume about 2 per cent. This consumption does not include evaporation losses and loss through discharge into sewage farms or otherwise. If the quality of return water is impaired, the reusability of the water depends on local facilities for purification. ⁽²⁶⁾

So far, only a small fraction of the waters of the Krishna river is consumed for domestic and municipal water supply and industrial uses.

On the 17th August, 1973 the parties jointly made the following statement :—

"The States of Maharashtra, Mysore and Andhra Pradesh agree as follows :—

The uses mentioned in column No. 1 below shall be measured in the manner indicated in column No. 2 :—

Use	Measurement
Domestic and municipal water supply	By 20 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.
Industrial use	By 2.5 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal."

On a consideration of all relevant materials, we are satisfied that we should incorporate the following direction in our final order.

"The uses mentioned in column No. 1 below shall be measured in the manner indicated in column No. 2 :—

Use	Measurement
Domestic and municipal water supply	By 20 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.
Industrial use	By 2.5 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal."

The question of return flow from these uses will not arise, as they will be measured by the quantity of water consumed by them, in terms of the above direction.

(26) I J Erie—Minagem^{nt}—A Key to Irrigation Efficiency, Journal of the Irrigation and Drainage Division, Proceedings of the American-Society of Civil Engineers Vol. 94 I.R. 83 September 1968, p. 285; J.G. Nelson and M.J. Chambers—Water—Process and Method in Canadian Geography p. 15; Van Te Cho—Handbook of Applied Hydrology, pp. 19-24, 19-25.

CHAPTER XI

Inter-State Water Disputes Act, 1956, and law relating to equitable apportionment of the benefits of an inter-state river

Jurisdiction of Tribunal.—All disputes concerning the equitable apportionment of the waters of or in the inter-State Krishna river and river valley have been referred to this Tribunal for adjudication. The entire area drained by the river and its tributaries is called the river basin ⁽¹⁾. The river basin is also called the river drainage basin. All parties admit that this Tribunal has jurisdiction over the entire surface and underground water of and in the entire Krishna basin. This admission was recorded in our order dated the 4th April, 1973.

Krishna river basin.—Andhra Pradesh argues that the river basin includes all territories outside the river drainage basin to which the waters of the river may be diverted and beneficially applied. It relies on Article II(b) of the Colorado River Compact, 1922 which provided that as used in the compact, "the term 'Colorado River Basin' means all of the drainage area of the Colorado River System and all other territory within the United States of America to which the waters of the Colorado River System shall be beneficially applied". It is to be observed that the purpose of this artificial definition was to authorise certain trans-basin diversions from the Colorado River System⁽²⁾. The same definition of the Colorado River Basin was repeated in Article II of the Upper Colorado River Basin Compact, 1948. However, in other compacts the term "river basin" was defined to mean the drainage basin or the area drained by the river and its tributaries⁽³⁾.

The river basin is necessarily completely bounded by the watershed or divide which separates it from other adjacent basins⁽⁴⁾. The waters of the river basin can be diverted and beneficially applied to areas in the adjacent watersheds but those areas cannot be regarded as parts of the river basin.

The expressions "Krishna basin", "Krishna river basin" and "Krishna drainage basin" used in this Report mean the entire area drained by the Krishna river and its tributaries. The Krishna basin is bounded by the watershed or divide which separates it from other adjacent basins.

River basin an indivisible physical unit.—Each river basin is an indivisible physical unit, a more or less self-contained unit of drainage ⁽⁵⁾. Nature's laws treat the river and its tributaries as the arteries of a single circulatory system. The surface streams converge, ever seeking a lower level and unite to form one mainstream. All the waters that find their way towards a common outlet form an interconnected and interdependent system, capable of transmitting within itself any disturbance caused by changes affecting water in any part of the basin. Water is a moving resource which implies that changes in quality or quantity of water in one place may directly affect uses of water somewhere else.

Thus there exists between the manifold uses to which a river may be put a state of interdependence, a very close solidarity⁽⁶⁾. There is competition not only among uses at various points of the river, but also among various uses at the same point. The nature of this competition depends on the extent to which there is withdrawal of water at each point. When, for example, water is diverted outside the basin for generating power at an upstream station, downstream irrigation may suffer and villages and towns may be deprived of their drinking water supply. Engineering works at any point of the river system depend upon and in their turn affect the uses to which a river may be put at other points of the system.

(1) See W.G. Moore, Dictionary of Geography p. 24; L. Dudley Stamp, The World 10th Ed. p. 44; Webster's Third New International Dictionary p. 182; The Oxford English Dictionary Vol. I, p. 691.

(2) A.H. Garretson, R.D. Hayton and C.J. Olmstead, The Law of International Drainage Basins, pp. 505-506; R.L. Olson, The Colorado River Compact, 1st Edition, pp. 20-21.

(3) See Rio Grande Compact 1938 Art. I(c); Republican River Compact 1942 Art. II; Belle Fourche River Compact 1943 Art. II B; Pecos River Compact 1948 Art II(b); Delaware River Basin Compact 1961 Art. 1, Section 1.2(a); Arkansas River Compact 1965 Art. II D.

(4) R.K. Linsley, M.A. Kohler and J.L.R. Paulhus, Applied Hydrology 1st Ed. (1949), p. 244.

(5) See H.A. Smith, The Economic uses of International Rivers (1931), pp. 150-151.

(6) Legal Aspects of the Hydro-Electric Development of Rivers and Lakes of Common Interest U.N. Doc. No. E/ECE/136 E/ECE/EP/98 Rev. 1, p. 26.

Need for allocation of waters of an inter-State river among riparian States.—Division of an inter-State river by the boundaries of several States merely limits the geographic limits of the authority of a given State; but unlike land resources whose distribution among the States is resolved by the very establishment of their boundaries, the water resources of the common river are not subjected to automatic allocation among them by the delineation of their political frontiers. A river is an indivisible physical unit, and the riparian States are in a state of permanent dependence upon each other. The utilisation of the waters of the river within the territory of one State influences the conditions of water utilisation in other States.

There is competition for the common river water among the riparian States, and it is, therefore, necessary to co-ordinate their various uses and needs and to define the limits within which a State can make use of the water to satisfy its own needs. The conflict of interests of the riparian States must be resolved by agreement, judicial decree, legislation or administrative control, so as to secure a fair and just distribution of the water resources among the concerned States.

Constitutional provisions.—India is a Union of States. Under Entry 56 of List I of the Seventh Schedule to the Constitution, Parliament has overriding power of legislation over "regulation of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest".

In exercise of its powers under Entry 56 of List I, Parliament enacted the River Boards Act, 1956. But no river board has been established under the Act. Apart from enacting the River Boards Act, 1956, Parliament has not exercised its powers under Entry 56 of List I.

Under Entry 17 of List II, the Legislature of a State has exclusive power over water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of Entry 56 of List I. Under article 162 of the Constitution, the executive power of a State extends to the matters with respect to which the Legislature of the State has power to make laws.

Thus, subject to competent legislation by Parliament, a State has plenary legislative and executive powers over all water within its jurisdiction. But the

use, control and distribution of the waters of an Inter State river and river valley within the boundaries of one State may prejudicially affect the interest of another State or States and, if so, a water dispute between two or more States may arise. Article 262 of the Constitution authorises Parliament to pass laws providing for adjudication of disputes relating to waters of inter-State rivers or river valleys. It is in these terms:—

"262(1) Parliament may by law provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any inter-State river or river valley.

(2) Notwithstanding anything in this constitution, Parliament may by law provide that neither the Supreme Court nor any other court shall exercise jurisdiction in respect of any such dispute or complaint as is referred to in clause (1)".

In the exercise of the power under article 262(1) Parliament has passed the Inter-State water Disputes Act, 1956.

Inter-State Water Disputes Act, 1956.—Section 2(c) of the Act defines a water dispute thus:—

" 'Water dispute' means any dispute or difference between two or more State Governments with respect to—

(i) the use, distribution or control of the waters of, or in, any inter-State river or river valley; or

(ii) the interpretation of the terms of any agreement relating to the use, distribution or control of such waters or the implementation of such agreement; or

(iii) the levy of any water rate in contravention of the prohibition contained in Section."

Section 3 enables a State Government to make a complaint as to water disputes. It provides—

"If it appears to the Government of any State that a water dispute with the Government of another State has arisen or is likely to arise by reason of the fact that the interests of the State, or of any of the inhabitants thereof, in the waters of an inter-State river

or river valley have been, or are likely to be, affected prejudicially by:—

- (a) any executive action or legislation taken or passed, or proposed to be taken or passed, by the other State; or
- (b) the failure of the other State or any authority therein to exercise any of their powers with respect to the use, distribution or control of such waters; or
- (c) the failure of the other State to implement the terms of any agreement relating to the use, distribution or control of such waters,

the State Government may, in such form and manner as may be prescribed, request the Central Government to refer the water dispute to a Tribunal for adjudication."

Sections 4 and 5(1) require the Central Government, if it is of opinion that the water dispute cannot be settled by negotiations, to constitute a Water Disputes Tribunal and to refer the dispute to it for adjudication.

Section 5(2) provides that "The Tribunal shall Investigate the matters referred to it and forward to the Central Government a report setting out the facts as found by it and giving its decision on the matters referred to it".

Section 6 provides that "The Central Government shall publish the decision of the Tribunal in the Official Gazette and the decision shall be final and binding on the parties to the dispute and shall be given effect to by them".

Section 11 provides that "Notwithstanding anything contained in any other law, neither the Supreme

Court nor any other court shall have or exercise jurisdiction in respect of any water dispute which may be referred to a Tribunal under this Act".

A State represents all its inhabitants and water users within its territory in a complaint filed by or against it under section 3⁽⁷⁾. This proposition is not disputed by any party in the present case.

A State may make a complaint under the Act if the interests of the State or of any of its inhabitants in the waters of an inter-State river or river valley have been or are likely to be affected prejudicially by the action or omission of another State with respect to the use, distribution or control of the water. If the complaint is justified, the Tribunal gives suitable reliefs. The decision of the Tribunal overrides all repugnant State legislation and executive action. In this manner, the plenary powers of a State over the waters of the inter-State river and river valley within its jurisdiction are regulated and controlled by the decision of the Tribunal. It may be observed that the Indus Commission⁽⁸⁾ held that the plenary powers of a Province under the Government of India Act, 1935, over the waters of an inter-Provincial river within its own boundaries were likewise controlled by a decision given under Sections 130 to 132 of that Act. Thus, the equal right of each State over the waters of the inter-State river and river valley must be respected by all, and none is free to do what it likes with the waters within its boundaries without respecting the interests of others.

Law applicable.—If there is competent legislation by Parliament on the subject of the apportionment of the waters of an inter-State river and river valley, that law binds all the States and there is no room for an inconsistent apportionment. The Tribunal has no power to override the paramount Central Legislation.⁽⁹⁾

(7) In an original proceeding brought before the United States Supreme Court by a State against another State for adjudication of their respective rights in the waters of an inter-State river, the States are deemed to represent all their citizens and water claimants within their respective territories and an adjudication of the States' rights in such a proceeding binds the water claimants in the States as well. *Wyoming v. Colorado* 286 U.S. 494, 506, 509 (1932) ; *Wyoming v. Colorado* 298 U.S. 573, 575-576 (1936); *Nebraska v. Wyoming* 295 U.S. 40 (1935); *M.C. Hinderlater v. La Plata River and Cherry Creek Ditch Company* 304 U.S. 92-82 L. Ed. 1202, 1210; *New Jersey v. New York* 345 U.S. 369, 372 (1953). See also Report of the Indus (Rau) Commission Vol. I, pp. 39-40.

(8) Report of the Indus (Rau) Commission Vol. I, pp. 21, 32-33, 63, 107.

(9) In *Arizona v. California* 373 U.S. 546 (1963) at pp. 565, 566, the United States Supreme Court observed "It is true that the court has used the doctrine of equitable apportionment to decide river controversies between States. But in those cases Congress had not made any statutory apportionment. In this case, we have decided that Congress has provided its own method for allocating among the lower Basin States the mainstream water to which they are entitled under the Compact. Where Congress has so exercised its constitutional power over waters, courts have no power to substitute their own notions of an 'equitable apportionment' for the apportionment chosen by Congress."

Sections 2 and 3 of the Inter-State Water Disputes Act, 1956 indicate that, if there is an agreement between the States relating to the use, distribution or control of the waters, that agreement should be implemented. The agreement determines their respective rights and obligations and furnishes the agreed "law" on the subject. ⁽¹⁰⁾

Likewise competent arbitral awards and judicial decrees should be respected.

In the absence of legislation, agreement, award or decree, the Tribunal has to decide the dispute in such a way as will recognize the equal rights of the contending States and at the same time establish justice between them.⁽¹¹⁾ Equal right does not mean an equal division of the water. ⁽¹²⁾ It means an equitable apportionment of the benefits of the river, each unit getting a fair share.⁽¹³⁾

Equitable apportionment.—The decisions of the U.S.A. Supreme Court firmly established the doctrine of equitable apportionment of the benefits of an inter-State river. The principle was earlier recognised by the Swiss Federal Tribunal in 1878⁽¹⁴⁾ and it also contains the essence of international law on the matter. ⁽¹⁵⁾

In India also, the right of States in an inter-State river is determined by applying the rule of equitable apportionment, each unit getting a fair share of the water of the common river. The doctrine of riparian rights governs the rights of private parties, but it does not afford a satisfactory basis for settling inter-State water disputes. ⁽¹⁶⁾

Broad concept.—The concept of equitable apportionment does not lend itself to precise formulations. Its meaning cannot be written into a code that can be

applied to all situations and at all times. The standard of an equitable apportionment requires an adaptation of the formula to the necessities of the particular situation. ⁽¹⁷⁾ The effort always is to secure an equitable apportionment without quibbling over formulas. ⁽¹⁸⁾

There is no mechanical formula of equitable apportionment applicable to all rivers. Each river system has its own peculiarities. In arid regions, the principal need may be for irrigation, while in humid regions there may be more need for power plants, municipal water supply, navigation and preservation of fisheries. One river system may be more fully developed than another; in one there may be scarcity of water, while in another the supply may be abundant. In one river system, the States may place emphasis on co-operative approach for optimum development of water resources; in another they may desire nothing more than an apportionment of the water for their separate uses. In one river the water diverted for developing the best hydro-power potential may be wasted to the sea; in another the tailrace water may be profitably used again for irrigation downstream.

In one river system, storage works may predominate; while in another there may be more diversion works and barrages requiring different schemes for allocation of the river water. In one river, there may be reliable measurement of historical discharges at key sites; in another such data may not be available. In one system, the river flow is perennial; in another the flow lasts during the monsoon months only. The apportionment of water resources must take into account the peculiar physical, hydrological, economic, political and legal characteristics of the river system and the territory drained and served thereby and the solution of the dispute must be shaped accordingly.⁽¹⁹⁾

(10) Report of the Indus (Rau) Commission Vol. I, pp. 10, 31.

(11) *Kansas v. Colorado* 206 U.S. 46, 98.

(12) *Wyoming v. Colorado* 259 U.S. 419, 465.

(13) *Kansas v. Colorado* 206 U.S. 46 118; *Colorado v. Kansas* 320 U.S. 383, 385.

(14) The Zwillikon Dam case. See H.A. Smith, *The Economic uses of International Rivers* (1907) pp. 39, 40; W.L. Griffin, *The Uses of Waters of International Drainage Basins under Customary International Law*, *American Journal of International Law*, Vol. 53 (1959), p. 66.

(15) H.A. Smith, *The Economic uses of International Rivers*, p. 51; J.D. Chapman, *The International River Basin* (1963), p. 23 Helsinki Rules Article IV.

(16) See Report of the Indus (Rau) Commission Vol. I, pp. 10, 13, 33, 36, 41; The Indian Easements Act, 1882, Section 7, Illustrations (h) and (i); *Kansas v. Colorado* 206 U.S. 46, 87, 105; *Connecticut v. Massachusetts* 282 U.S. 660, 670.

(17) *Nebraska v. Wyoming* 325 U.S. 589, 627.

(18) *New Jersey v. New York* 283 U.S. 336, 343.

(19) R.E. Clark *Water and Water Rights* (1967) Vol. II, p. 427; Legal Aspects of the Hydro-Electric Development of Rivers and Lakes of Common Interest U.N. Doc. No. E/ECE/136 E/ECE/EP/98 Rev. I, pp. 40, 41; H.A. Smith, *The Economic Uses of International Rivers* (1931), p. 87.

Guidelines.—Equitable apportionment calls for the exercise of informed judgment on a consideration of many variable yet important factors, such as, the hydrological, climatic and physical characteristics of the river basin, the volume of available supply, diversions and return flow, the Statewise drainage area and contribution to the supply, the respective needs of the States, the population dependent on the water supply and the degree of their dependence, alternative means of satisfying the needs, the extent of lawfully established uses and reasonable requirements for future uses in each State, the relative value of different uses, and the avoidance of unnecessary waste of water. The list of relevant factors is illustrative and not exhaustive.⁽²⁰⁾

The weight to be given to a relevant factor is a matter of judgment on the pertinent facts of the particular case and no hard and fast rule can be laid down.

The relevant factors emphasised in the 1959 Egyptian Sudanese Treaty were the arable areas easily irrigated in each country, the population of the States, the existing uses and in a less degree the financial contribution of each to the development projects. The State's contribution to the available river flow was not the crucial factor in the apportionment of the Nile waters.⁽²¹⁾ In the North Platte river litigation⁽²²⁾ Colorado was allotted about 3 per cent of the river flow, though it contributed 21 per cent of the flow.

No State has a proprietary interest in a particular volume of water of an inter-State river on the basis of its contribution or irrigable area. Rules of law based on the analogy of private proprietary interests

in water do not afford a satisfactory basis for settling inter-State water disputes.⁽²³⁾

The needs of the riparian States include all their economic and social requirements which cause them to be dependent to a greater or lesser degree on the river water. Varying degrees of dependence on water in arid and humid climates create varying degrees of need.⁽²⁴⁾ Existing use of a State is important evidence of its needs. Demands for potential uses are capable of indefinite expansion.⁽²⁵⁾ Equitable apportionment can take into account only such requirements for prospective uses as are reasonable having regard to the available supply and the needs of the other States.⁽²⁶⁾

Scarcity areas are heavily dependent on river water for irrigation and the needs of such areas, should receive special consideration.

If all the uses cannot be reconciled, it becomes necessary to ascertain which uses will prevail⁽²⁷⁾ In regulating the conflicts of different interests, an attempt is made to appraise and rank them in order of value, laying down that in the given situation on interest is to be preferred to another⁽²⁸⁾

An allocation of water may be made so as to maximise economic gains⁽²⁹⁾ but an established use may have to be protected, though the same amount of water may produce more in other sections of the river⁽³⁰⁾

Needless waste of water should be prevented and efficient utilisation encouraged⁽³¹⁾

(20) Some guidelines are given in Helsinki Rules Article V(2); *Nebraska v. Wyoming* 325 U.S. 589, 618; Report of Michael J. Doherty, Special Master in the same case p. 109; W.L. Griffin, *The Uses of Waters of International Drainage Basins under Customary International Law*, *The American Journal of International Law* Vol. 53 (1959) pp. 50, 77-78.

(21) Rolet Chi-Shih Chen, *The Non-Navigational uses of International Rivers* (1965), p. 156.

(22) *Nebraska v. Wyoming* 325 U.S. 589, 592 fm. 621, 665.

(23) Report of the Joint Committee on Indian Constitutional Reforms 1934 Vol. I Part I para 225.

(24) A.H. Garretson and others, *The Law of International Drainage Basins* (1967), pp. 44, 55-56.

(25) J. Hrschleifer, J.C. De Haven J.W. Milliman, *Water Supply (Economics, Technology and Policy)*, pp. 35-36.

(26) W.L. Griffin, *The Uses of Waters of International Drainage Basins under Customary International Law*, *The American Journal of International Law* Vol. 53 (1959) p. 50, 78 (possible future development in the light of what is a reasonable use of the water by each riparian).

(27) A.H. Garretson and others, *The Law of International Drainage Basins* (1967), p. 47.

(28) H. A. Smith, *The Economic Uses of International Rivers* (1931), p. 139.

(29) Administrative Reforms Commission, Report of the Study Team on Centre-State Relationships (1967) Vol. 1, pp. 228-229; Joseph L. Sax, *Water Law Planning and Policy* (1968), p. 86; R.E. Clark, *Water and Water Rights* (1967) Vol. II, p. 347.

(30) *Nebraska v. Wyoming* 325 U.S. 589, 621.

(31) *Wyoming v. Colorado* 259 U.S. 419, 484; Report of the Indus (Rau) Commission Vol. I, pp. 52-54; C.B. Bourne, *The right to utilize Water of International Rivers*, *The Canadian Year Book of International Law*, 1965 Vol. III, pp. 214-218; A.H. Garretson and others, *The Law of International Drainage Basins* (1967), p. 46.

We shall discuss elsewhere more elaborately the principles of equitable apportionment relating to existing uses, preferential uses and diversion of river water to another watershed.

Meanwhile, we must point out certain peculiarities of U.S.A. Supreme Court decisions and of international law and the caution required in applying them for resolving inter-State water controversies in India. We shall also notice the law and practice in British India regarding inter-Provincial water disputes, and the role of planning of water resources development in India after the Constitution came into force.

U.S.A. Supreme Court decisions: The great merit of the U.S.A. Supreme Court decisions is that they enunciate the broad principles of equitable apportionment. However, in the concrete application of the principle, those decisions are guided by the peculiar constitutional framework and domestic water law of U.S.A., which in many respects are different from those of India. A few points of difference may be noted.

The American States were originally independent sovereign units. Upon the Congress consenting, an inter-State compact operates to the same effect as a treaty between sovereign States⁽³²⁾ and becomes a law of the Union.⁽³³⁾ In India, the States were not originally independent sovereign units,⁽³⁴⁾ and an inter-State agreement is not a treaty between sovereign States, nor does it become a law of the Union.

In U.S.A., the territorial boundaries of the States are permanent and sacrosanct. In India, the areas and boundaries of the States can be altered by Parliament. New States have been created and individual States have been extinguished by Parliamentary legislation.

The U.S.A. Supreme Court cannot issue declaratory decrees.⁽³⁵⁾ An international tribunal is not subject to this limitation,⁽³⁶⁾ nor is the power of an Indian Tribunal so fettered by the Inter-State Water Disputes Act. If declaratory relief cannot be granted, an adjudication of an inter-State water dispute is an inadequate tool for purposes of planning.⁽³⁷⁾

Moreover, the local water laws, the financial structure and the national planning in India are in many ways different from those of U.S.A.⁽³⁸⁾

For all these reasons, the U.S.A. Supreme Court decisions cannot be blindly applied to Indian conditions, nor are they binding authorities in India. They furnish guidelines on broad general principles of equity and are useful examples of solutions of conflicting claims of States in inter-State water controversies. The decisions of other foreign federal courts stand on the same footing.

International Law. Historically, sovereign States were primarily concerned with non-consumptive uses of water of international river such as navigation and fishing. Competing claims of riparian States to consumptive uses of water for irrigation and other purposes and rules of international law, if any, regulating such uses are of comparatively recent origin. Opinions of jurists and associations of jurists on international law do not always distinguish the law as it really is from the law as they think it should be.⁽³⁹⁾ Moreover, there is a clear distinction between international law and national law governing States bound by a Federation.⁽⁴⁰⁾

The Swiss Federal Tribunal rightly observed⁽⁴¹⁾ "Within a federal state and subject to its legislation, the situation is different from that between fully sovereign states. Not only is the community between riparian States—recognised in international law—clo-

(32) *Rhode Island, v Massachusetts* 12 Pet, 657, 725; Constitution of the United States of America revised by Prof. Corwin (1952), p. 370.

(33) *Missouri v. Illinois* 200 U.S. 496, 519; Constitution of the United States of America, Article VI.

(34) *State of West Bengal v. Union of India* (1964) 1 S.C.R. 371-396

(35) *Arizona v. California* 283 U.S. 423, 464.

(36) A H. Garretson and others, *The law of International Drainage Basins* (1967), p. 59.

(37) R.E. Clark, *Water and Water Rights* (1967) Vol. II, p. 363.

(38) Administrative Reforms Commission, *Report of the Study Team on Centre-State Relationships* (1967) Vol. I, p. 125.

(39) See F.J. Berberk *Rivers in International Law* (1959), pp. 40, 259; Rolet Chi-Shi Chen, *The non Navigational uses of International Rivers* (1965) pp. 183, 210.

(40) See Judgement of the German Federal Tribunal in *Donauversinkung* case cited in F. J. Berber, *Rivers in International Law* (1959), pp. 175-176.

(41) *Fribourg v. Federal Council* 78 T.F.I. p.37 cited in W.J. Rise, *Law among States in Federacy* pp. 3-17, 3-18.

ser between federated states, but above all they have a positive law which binds them all and a law dispenser that stands above them all." Subject to these reservations, decisions of courts and tribunals and opinion of jurists on international law may be consulted if they give sensible suggestions for resolving inter-State water controversies.

Law and Practice in British India : British India was divided into Provinces. Till 1921, irrigation works were subject to the unitary control of the Central P.W.D. Since 1921, under the Government of India Act, 1915, as amended by the Government of India Act, 1919, "Water supplies" became a provincial subject, but even then the Government of India could decide inter-Provincial water disputes. The report of the Joint Committee on Indian Constitutional Reform (1934) ⁽⁴²⁾ observed:

"Water supplies" is now a Provincial Subject for legislation and administration, but the Central Legislature may also legislate upon it "with regard to matters of inter-provincial concern or affecting the relations of a Province with any other territory". Its administration in a Province is reserved to the Governor in Council, and is, therefore, under the ultimate control of the Secretary of State, with whom the final decision rests when claims or disputes arise between one Provincial Government and another, or between a Province and a State."

The Government of India used to decide inter-Provincial water disputes on administrative considerations. In letter No.IR45 dated the 18th March, 1935 from the Secretary to the Government of India, Department of Industries and Labour (Public Works Branch), to the Government of United Provinces, Public Works Department, Irrigation Branch,⁽⁴³⁾ the Government of India stated: "the decisions of the Government of India in inter-Provincial disputes relating to the distribution of water are based upon administrative, and not legal, considerations. Each case must therefore be taken separately and no deci-

sion can operate as a general precedent". Consequently these decisions are not of much help in determining the fair share of the units of a Federation in the waters of an inter-State river.

Before Independence, the Government of India as the paramount power settled water disputes between a Province and an Indian State or between two or more Indian States.⁽⁴⁴⁾ Even under the Government of India Act, 1935, paramountcy control continued with respect to unfederated States. ⁽⁴⁵⁾ Though the Government of India in the exercise of its powers of paramountcy control professed to apply rules of international law and the precept of the greatest good to the greatest number irrespective of political boundaries, the actual settlement of the disputes used to be made on political considerations.

Under the Government of India Act, 1935, as from the 1st April, 1937, water became an exclusive provincial subject and specific provision was made in sections 130 to 134 of the Act for decision of water disputes. The Report of the Indus Commission appointed under section 131 of the Act contains a valuable exposition of the principles of equitable apportionment of the benefits of a common river with particular reference to Indian conditions.

Planning of water resources development in India under the Constitution : As water including irrigation and water power is a State subject (Entry 17, List II), it is the State Governments which investigate and formulate schemes for development of water resources and ultimately accord administrative approval to them. However, as economic and social planning is a Concurrent subject (Entry 20, List III), the Union Government as well as the State Governments prepare five year and annual plans for developing the country's resources. The Union Government has the discretionary power under article 282 of the Constitution to make grants for any public purpose including grants to State Governments for financing the State plans. For obtaining these grants, the State Governments are required to obtain clearance of their projects from the Planning Commission. When a

(42) Report of the Joint Committee on Indian Constitutional Reforms Vol. I Part I page 124 para 224.

(43) File No. I.R. 45(1) of 1935 Serial No. 6 Government of India, Department of Industries and Labour (Public Works Branch) Civil Works—Irrigation, (Subject—Rejection of the claim of the Government of the United Provinces for compensation on account of the impending decrease in the supply of water from the River Jumna to the Agra Canal as a result of the scheme for the improvement of water supply arrangements in Delhi.

(44) White Paper on Indian States pp. 9,151 (Lord Reading's letter to the Nizam of Hyderabad, dated the 27th March, 1926); History of the Dispute regarding the Ruparel river with the Alwar State compiled by the Bharatpur State Council from State Records (1904), pp. 12-13.

(45) Section 285 of the Government of India Act 1935, N. Rajagopala Aiyangar's Commentary on the Government of India Act 1935. p. 169.

scheme has been fully investigated and a project report is prepared, the report is submitted by the State Government to the Central Water and Power Commission. After scrutiny of the technical and economic feasibility of the project, the latter makes a report to the Technical Advisory Committee on Irrigation, Flood Control and Power Projects of the Government of India. This Committee advises the Planning Commission and the Ministry of Irrigation and Power on the suitability of the scheme for inclusion in the Plan. The schemes are included in the Plan by the Planning Commission, keeping in view the country's resources and the best method for their effective and balanced utilisation.

In view of the dependence of the States on Central grants, the Union Government plays a dominant role in planning the development of water resources and may withhold clearance of projects on an inter-State river until a consensus is reached between the concerned States regarding distribution of the waters of

the inter-State river between them. However, the Union Government and the Planning Commission have no statutory authority to allocate the water resources among the States or to fix the order of priorities for their projects. If a water dispute arises and the same cannot be settled by negotiations, a reference has to be made to a Tribunal appointed under the Inter-States Water Disputes Act, 1956, for adjudication of the dispute.

After a water dispute has arisen, the Planning Commission may withhold clearance of new projects on an inter-State river, until the river water is apportioned by the Tribunal between the States and the Planning Commission is satisfied that the State concerned is entitled to appropriate the water required for its new projects. In view of the dependence of the States on Central grants, it becomes absolutely necessary for them to obtain an adjudication of the dispute and a declaration of their respective rights in the available supply, so that they may obtain clearance of their projects from the Planning Commission.

CHAPTER XII

Protection of existing uses

Protection of exiting uses; Issue II (3) Pleadings:

The supplies of the Krishna river system are sufficient to meet the requirements of all the existing uses, but they are not sufficient to meet the requirements of both existing and contemplated uses. The question arises whether, in fixing the equitable shares of the parties, claims for existing uses should be preferred to claims for contemplated uses.

Andhra Pradesh having appropriated a large portion of the supplies of the Krishna waters is vitally interested in the preservation of its existing uses. Andhra Pradesh pleaded that, in case of de novo allocation, the committed utilisations of the Krishna waters should be divided into three categories, (1) committed as in 1951, (2) committed between 1951 and September 1960 and (3) committed after September 1960. Committed utilisation means utilisation by schemes in operation as well, as by schemes in the process of implementation and execution. The case of Andhra Pradesh is that all utilisations committed up to 1951 are sacrosanct and are entitled to the fullest protection, and should get full and timely supply on a daily basis as a first priority. Utilisations committed between 1951 and September, 1960 are also entitled to full protection and should get full and timely supply on a weekly basis with second priority to new schemes.

After allowing the committed utilisations up to September 1960, the balance water only should be considered for de novo allocations. Clearance of projects by the Central Government after 1960 in spite of objection or without knowledge of the concerned States ought not to be taken into account by the Tribunal.

Maharashtra and Mysore disputed the classification of committed utilisations into three categories and the claim of Andhra Pradesh for protection of its projects. ⁽¹⁾

Accordingly, the following issue was raised:—

Issue II(3): What projects and works in operation or under construction, if any, should be protected and/or permitted? If so, to what extent?

Meaning of protection: The term "protection" as used in the issues, agreed statements and this judgment must be understood to mean that, in allocating the water, certain existing uses for which protection is claimed and granted should be preferred to contemplated uses. In fixing the equitable shares of the States, the claims of such existing uses should be allowed before claims for future uses are taken up for consideration. It is not intended that the existing uses must continue or that they should not be changed in future.

All projects whether protected or not will get such supply as will be available to them under the final scheme of allocation. It is not intended that simply because a project is protected it will get full and timely supply on a daily or weekly basis in priority to any other project.

Law on the subject of priority of existing uses over contemplated uses: On the question whether existing uses occupy a preferred position over contemplated uses in equitable apportionment, we shall briefly notice (1) Indian law and practice, (2) law in U.S.A. and (3) international law.

Indus (Rau) Commission: The Indus (Rau) Commission laid down the following general principles for equitable distribution of the waters of inter-Provincial rivers⁽²⁾:—

"In the general interests of the entire community inhabiting dry, arid territories, priority may usually have to be given for an earlier irrigation project over a later one: 'priority of appropriation gives superiority of right' (Wyoming v. Colorado 259 U.S. 419, 459, 470).

For purposes of priority, the date of the project is not the date when survey is first commenced, but the date when the project reaches finality and there is a fixed and definite purpose to take it up and carry it

(1) APK I pp 49,55, 123-125, 129-132, 134-135; MRK III pp. 65-72; MYK III pp. 34-40

(2) Report of the Indus (Rau) Commission Vol. I, p. 11.

through, (Wyoming v. Colorado 259 U.S. 419, 494, 495 Connecticut v. Massachusetts 282 U.S. 660, 667, 673)".

Earlier Indian Practice.—In the matter of the dispute regarding the Ruparel River in 1843, the Government of India pronounced that rights of possession regarding existing appropriations should be respected and preserved.⁽³⁾

In the dispute over the waters of the Sutlej in 1918, the concerned States and Provinces agreed that established rights should be fully Safeguarded or compensated for.⁽⁴⁾

Law in U.S.A.—For the settlers in the dry and arid tracts of the Western States, priority of appropriations in time assumed a greater significance than in humid areas and the law of prior appropriation prevailed in those States. Under that law, the one who first appropriated water and put it to beneficial use thereby acquired a vested right to continue to divert and use that quantity of water against all claimants junior to him in point of time. "First in time first in right" is the short-hand expression of this legal principle.⁽⁵⁾

In Wyoming v Colorado, ⁽⁶⁾ the U.S.A. Supreme Court applied the doctrine of priority of appropriation in equitable allocation of waters of inter-State streams. As the available supply of the Laramie river was not sufficient to satisfy Wyoming's prior appropriations dependent thereon and the proposed Colorado appropriations, the Court determined Wyoming's share of the water on lumping up the reasonable requirements of Wyoming's prior appropriations and allocated the remaining water to Colorado. The Court held that a project was entitled to priority from the date when the actual work of construction was begun, and not from a date anterior to the time when there was a fixed and definite purpose to take it up and carry it through.

While priority of appropriation is the guiding rule, it is not conclusive in equitable allocation. In Nebraska v. Wyoming⁽⁷⁾ the junior uses of Colorado

were allowed to prevail over the senior uses of Nebraska having regard to Colorado's countervailing equities and established economy based on existing uses of the water.

The American doctrine of prior appropriation is not applicable in India as between individual riparian owners even in a part of the country where the soil is dry, rocky and parched. ⁽⁸⁾ However, the domestic water law is not necessarily of controlling weight in an inter-state water controversy. The Indus (Rau) Commission has held that in equitable allocation of the waters of inter-Provincial rivers in India, priority of appropriation might give superiority of right.

International Law.—Existing use is one of the factors which should be taken, into account in determining what is a just and equitable, sharing of the benefits of an international river basin. ⁽⁹⁾

In determining what is equitable utilisation where existing and contemplated uses are in conflict, while other factors must be considered and weighed, the most important single factor is the preferred position of the existing use; thus, an existing use which is beneficial and not wasteful will ordinarily prevail over a contemplated use. But a contemplated conflicting use will nevertheless prevail over an existing use if the former offers benefits of such magnitude as is sufficient to outweigh the injury to the existing use.⁽¹⁰⁾

Article VIII of the Helsinki Rules of the International Law Association on the uses of international streams offers the following guidelines.

1. An existing reasonable use may continue in operation unless the factors justifying its continuance are outweighed by other factors leading to the conclusion that it be modified or terminated so as to accommodate a competing incompatible use.
2. (a) A use that is in fact operational is deemed to have been an existing use from the time of the initiation of construction directly

(3) History of the Dispute regarding Ruparel river with the Alwar State compiled by the Bharatpur State Council from State records 1904, p. 12.

(4) Report of the Indus (Anderson) Committee Vol. II, p. 60.

(5) Arizona v. California 373 U.S. 543, 555 (1963).

(6) 259 U.S. 419, 469-471, 489-496.

(7) 325 U.S. 585, 618, 621-622.

(8) Bel Bhadar Pershad Singh v. Sheik, Barkat Ali, 11, CWN, 85.

(9) J. D. Chapman, The International River 1963, pp. 22-23.

(10) A. H. Garretson and others. The Law of International Drainage Basins (1967), pp. 57-58.

related to the use or, where such construction is not required, the undertaking of comparable acts of actual implementation.

(b) Such a use continues to be an existing use until such time as it is discontinued with the intention that it be abandoned.

3. A use will not be deemed an existing use if at the time of becoming operational it is incompatible with an already existing reasonable use.

J. G. Laylin and B. M. Clagett⁽¹¹⁾ observe that in case of competition between new or proposed beneficial uses and old lawfully established beneficial uses they know of no instance in which a State under the principle of equitable apportionment has been required to relinquish, without full replacement from other sources, a lawfully established beneficial use in order to enable a coriparian State to develop a new use or uses of the same kind. To be lawfully established, a beneficial use "must not have been established over the timely protest of a coriparian State which offered to resolve by peaceful means including, if necessary, arbitration or adjudication the question whether the use comes within the equitable share of the State proposing it."⁽¹²⁾

Existing uses on the Krishna River System.—Some uses of the Krishna waters were lawfully established before 1951. Since 1951, a number of projects were cleared by the Planning Commission. No objection was raised by the States to the implementation of the projects sanctioned by the Planning Commission until September, 1960. An inter-State conference was held on the 26th and 27th September, 1960 to discuss the re-allocation of the Krishna waters in view of the reorganisation of States. At the conference, Maharashtra and Mysore insisted on a de novo allocation of the Krishna waters and demanded that until such allocation, the clearance of new projects should be withheld. The protest against clearance of new projects was followed by applications by Mysore in January, 1962 and by Maharashtra in June, 1963 for

reference of the dispute to the Tribunal for adjudication.

We find that all commitments made up to September, 1960 were made without any protest from any coriparian State under the bona facie belief that the committed utilisations will be allowed to continue. At the meeting of September, 1960 Maharashtra was prepared to honour all physical commitments up to September, 1960⁽¹³⁾ Before us, both Maharashtra and Mysore wanted protection for all their projects committed up to September, 1960.

We also find that all commitments made after September, 1960 were set up over the protest of coriparian States.

Maharashtra and Mysore do not want protection for any projects committed after September, 1960 unless the project is protected by agreement or concession of the parties. Even Andhra Pradesh in its pleadings did not claim any protection for such projects. In the agreed statement filed on the 7th May, 1971, all parties conceded that a few projects committed after September, 1960 should be protected.

Priority of existing uses on the Krishna River System.—We are satisfied that prima facie the reasonable requirements of all projects in operation or under construction as on September, 1960 should be preferred to contemplated uses and should be protected.

Any utilisation made after September, 1960 by such projects in excess of the utilisation envisaged in September, 1960 should be regarded as a new appropriation made after September, 1960.

Prima facie except by special agreement or concession of the parties a project committed after September, 1960 is not entitled to any priority over contemplated uses.

Agreed statement dated the 1st May, 1971.—On the 7th May, 1971⁽¹⁴⁾ the parties filed an agreed statement that the following projects and the quan-

(11) J. G. Laylin and B. M. Clagett. The allocation of waters of International streams in Economics and Public policy in Water Resource Development edited by Smith and Castle 1964 Ed. p. 428.

(12) Ibid. pp 428, 445 f. n. (14)

see also Report of the Fifty Second Conference International Law Association. Helsinki 1966 p. 454.

(13) MRK 11 p. 215.

(14) MRDK VIU pp. 61-63.

tum of their utilisations and evaporation losses as mentioned below should be protected. —

Sl. No.	Name of the Project	Name of the State in which	Agreed			Remarks
			Quantum of utilisation T.M.C.	Evaporation losses in T.M.C.	Total T.M.C.	
1	2	3	4	5	6	7
K-1						
1.	Krishna canal ex-Khodshi weir	Maharashtra	2.70	Nil	2.7	
2.	Koyana Hydro Electric Stages I & II	-do-	67.50	7.30	74.8	
3.	Warna	-do-	40.55	7.10	47.7	
4.	Tulshi	-do-	2.31	0.28	2.6	
5.	Radhanagari	-do-	10.00	1.00	11.0	
K-2						
6.	Upper Krishna State I	Mysore	98.50	4.50	103.0	
K-3						
7.	Ghataprabha Stages I & II	-do-	34.8	1.75	36.6	
K-4						
8.	Malaprabha	-do-	31.1	6.10	37.2	
K-5						
9.	(a) Tata Hydrel Power Scheme (b) Andhra Valley Power Scheme (c) Tata Power Scheme (Mulshi)	Maharashtra	42.60	2.40	45.0	
10.	Mutha System Ex-Khadakwasla	-do-	22.4	1.10	23.5	
11.	Ghod Dam	-do-	8.40	2.00	10.4	
12.	Kukadi	-do-	18.00	2.07	20.1	
13.	Visapur Tank	-do-	0.4	0.10	0.5	
14.	Bhima	-do-	70.00	20.20	90.2	
15.	Nira Canal System	-do-	32.30	2.30	34.6	
16.	Vir Dam	-do-	14.40	0.30	14.7	
17.	Mhaswad	-do-	1.60	0.60	2.2	
18.	Ashti Tank	-do-	0.30	0.40	0.7	
19.	Mangi Tank	-do-	0.90	0.20	1.1	
20.	Ekrak Tank	-do-	0.80	1.00	1.8	
21.	Khasapur Tank	-do-	1.00	0.30	1.3	
22.	Sholapur City Water Supply Scheme	-do-	0.30	Nil	0.3	Total withdrawal 1.6 T.M.C. only 20 percent is considered as consumptive use.
K-6						
23.	Kurnool	-do-	1.40	0.10	1.5	
24.	Chandrapalli	Mysore	1.72	0.15	1.9	
25.	Kotepallivagu	Andhra Pradesh	1.70	0.26	2.0	

1	2	3	4	5	6	7
K-7						
26.	Koilsagar	Andhra Pradesh	3.40	0.50	3.9	
27.	Okachettivagu	-do-	1.67	0.25	1.9	
28.	Dindi	do-	3.01	0.70	3.7	Andhra Pradesh reserves the right to claim the difference of 1.6 T.M.C. as water required for the project dehors protected uses.
29	Guntur Channel	-do-	4.00	Nil	4.0	
30	Vaikuntapuram Pumping Scheme	-do-	2.60	Nil	2.6	
K-8						
31	Bhadra Anicut	Mysore	3.10	Nil	3.1	
32	Tunga Anicut	-do-	11.50	Nil	11.5	
33	Ambligola	-do-	1.30	0.10	1.4	
34	Anjanapur Reservoir	-do-	2.20	0.33	2.5	
35.	Dharama Canal System and Dharma Project	-do- \	2.00	0.20	2.2	
36	Tungabhadra Right Bank Low Level Canal	-do-	19.00	3.5	22.5	
37	Tungabhadra Right Bank Low Level Canal	Andhra Pradesh	24.00	5.50	29.5	
38	Tungabhadra Right Bank High Level Canal (Stages I & II)	Mysore	17.50	Nil	17.5	
39	Tungabhadra Right Bank High level Canal (Stages I & II)	Andhra Pradesh	32.50	Nil	32.5	
40	Hagari Bommanahalli	Mysore	1.5	0.5	2.0	
41.	Gajuladinne	Andhra Pradesh	1.8	0.2	2.0	
K-9						
42	Bhairavanitippa	-do-	4.10	0.80	4.9	
43	Vanivilas Sagar	Mysore	5.90	2.30	8.2	
K-10						
44	Musi	Andhra Pradesh	8.41	1.00	9.4	
45	Water Supply to twin city Hyderabad & Secunrabad	-do-	0.82	3.1	3.9	Evaporation =3.1 T.M.C. 20 percent of. water supply use=0.52 T.M.C. Sewage Farm=0.30 T.M.C.
						Total : 3.92 T.M.C

1	2	3	4	5	6	7
K-11						
46.	Palair	Andhra Pradesh	3.27	0.68	4.0	
K-12						
47.	Pakhal Lake	-do-	1.78	0.85	2.6	
48.	Muniyeru	-do-	3.29	Nil	3.3	
49.	Lankasagar	-do-	0.80	0.20	1.0	
50.	Wyra	-do-	2.84	0.88	3.7	

Projects in respect of which there is a dispute whether they should be protected and, if so, to what extent.—On the 7th May, 1971 the parties filed an agreed list of projects in respect of which there was

a dispute as to whether they should be protected and, if so, what quantum of utilisations and evaporation losses should be protected⁽¹⁵⁾

The list is as follows : —

Sl. No	Name of Project	Name of the State in which the project is situated	Quantum of utilisation			Evaporation losses			Total gross (i.e. including evaporation losses)			Protected uses includ- (ing evaporation losses)	Remarks
			a	b	c	a	b	c	Utilisation				
			Maha-rashtra	Mysore	A.P.	Maha-rashtra	Mysore	A.P.	a	b	c		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
K-1													
1.	Krishna	Maha-rashtra	33.6	33.0	33.0	3.3	3.3	(All figures are in T.M.C.) 3.3	36.9	36.3	36.3	*	*Subject to argument on regeneration.
K-3													
2.	Gokak Canal	Mysore	1.40	1.40	Nil	Nil	Nil	Nil	1.4	1.4	Nil		
K-7													
3	Sarisailam	Andhra Pradesh	Nil	Nil	Nil			33.00			33.0		
4	Nagarjuna sagar	-do-	149.5	149.5	264.0	14.0	14.0	17.0	163.5	163.5	281.0		
5.	Krishna Delta	-do-	161.0	161.0	214.0	Nil	Nil	4.0	161.0	161.0	218.0		
K-8													
6	Bhadra Re-servoir	Mysore	56.8	56.8	46.6	4.9	4.9	4.9	61.7	61.7	51.5		
7	Tungabhadra Low Level Left Bank Canal	-do-	92.3	92.3	56.0	9.0	9.0	9.0	101.3	101.3	65.0		
8	Vijayanagar Channels	-do-	Nil	13.7	Nil	Nil	Nil	Nil	Nil	13.7	Nil		
9	Rajolibunda Diversion	-do-	0.80	0.80	1.20	Nil	Nil	Nil	0.8	0.8	1.20*		*Subject to argument on regeneration.
10	-do-	Andhra Pradesh	10.00	10.00	15.90	Nil	Nil	Nil	10.0	10.0	15.90		
11	Kurnool Cuddapah Canal	-do-	20.0	19.0	69.4	Nil	Nil	Nil	20.0	19.0	69.4		

(15) MRDK VIII pp. 64-65. 1 M of I & P/73— 15

We now proceed to discuss the projects mentioned in the last statement as also minor irrigation in respect of which there is a dispute as to the extent of protection.

(1) **Krishna Project.**—The Krishna Project is an irrigation project with storages at Dhom and Borkhal on the Krishna river and at Kanher on the Venna river, and canals for irrigation in Satara and Sangli Districts of Maharashtra. The command area of the project falls within the rain shadow region of the Bombay Deccan. The project is under construction.

On the 25th June, 1973, all the parties made the following statement :—

"All parties are agreed that the annual utilisation of 33.00 T.M.C. and the evaporation loss of 3.3 T.M.C. under the Krishna Project of Maharashtra should be protected."

In allocating the waters of the river Krishna, the annual utilisation of 33.00 T.M.C. and evaporation loss of 3.3 T.M.C. under the Krishna Project of Maharashtra should be preferred to contemplated uses.

(2) **Gokak Canal**—Mysore claims an allowance of 1.4 T.M.C. of water for the Gokak canal. Andhra Pradesh disputes the claim. ⁽¹⁶⁾

The Gokak canal is in operation for over 84 years.⁽¹⁷⁾ Originally, the canal took off from the Dhupdal Weir on the Ghataprabha and there was an average annual diversion of 1.4 T.M.C. of water for its ayacut. The Kokak canal now takes off from the Ghataprabha Left Bank Canal.

According to Mysore, the index map of the Hidkal Dam Project Stage I Report ⁽¹⁸⁾ shows that the area under the Gokak canal is not included in the command of the Ghataprabha Left Bank Canal. But the Krishna Godavari Commission stated ⁽¹⁹⁾ that ayacut under the Gokak canal was merged with the Ghataprabha Left Bank Canal in 1951.

In August 1959, the Chief Engineer, P. W. D. Irrigation Project, Mysore stated : "The irrigable area under the Gokak Canal taken from the Dhupdal Weir is included in the irrigable area of the Left Bank Canal of the Ghataprabha Project first stage 0 to 44 miles and the water requirements for the Ghataprabha Left Bank Canal have been calculated taking this area under the Gokak Canal and also the discharges available in the Dhupdal Weir throughout the year."⁽²⁰⁾

The annual utilisation of 34.8 T.M.C. under Ghataprabha Project Stages I and II has been protected. No separate provision for the Gokak Canal is necessary as its water requirement will be met from the water provided for the Ghataprabha Left Bank Canal.

The list of sanctioned projects prepared by the Govt. of India in June 1967⁽²¹⁾ stated that the sanctioned diversion under the Kokak Canal was 1.4 T.M.C. and mentioned the diversion under the Ghataprabha Project separately. This statement overlooks the fact that the ayacut under the Gokak Canal is now merged in the Ghataprabha Left Bank Canal and that no separate provision for the Gokak Canal is necessary.

(3) **Srisailem Hydro-electric Project :—**

Dispute.—Andhra Pradesh claims protection for the annual evaporation loss of 33 T.M.C. of water under the Srisailem Hydro-electric Project. Maharashtra and Mysore contend that the project is not entitled to any protection.

Project.—The Srisailem Hydro-electric Project comprises a high dam across the Krishna river and a power house at the toe of the dam. The Power house will have 4 generating units of 110 MW each with a provision for adding 3 such units at a later stage. On the basis of the ultimate release of 180 T.M.C. of water annually, the power potential at Srisailem will be of the order of 134 MW at 100 per cent load factor or 224 MW at 60 per cent load factor. The Srisailem Project being a hydro-electric project for generating power without diverting water to another watershed does not involve consumptive use of water except for evaporation loss. ⁽²²⁾ The area of the

(16) MRDK VIII p. 64.

(17) MYPK X p. 3 (constructed in 1883), KGCR Ann. VIII p. 107 (in operation from 1889).

(18) MYPK XII, Index Map.

(19) KGCR Ann. VIII pp. 107, 112, 133.

(20) MYDK XII pp. 94, 96.

(21) MYDK I p. 216; MRDK II p. 119.

(22) MYDK II p. 350.

water spread at full reservoir level 885 will be 6,622 million sq. ft. The annual evaporation loss will be 33 T.M.C. reservoir will provide valuable carryover storage.

In November, 1959, the Andhra Pradesh Government sent the project report to the Central Water and Power Commission for approval. On June 7, 1963, the Planning Commission agreed to the commencement of preliminary works. Soon thereafter, the project was inaugurated. On the 26th March, 1964, the Planning Commission sanctioned the project estimated to cost Rs. 45.75 crores. On the 29th August, 1964, the Andhra Pradesh Government granted administrative sanction to the project. Construction of the Project is in progress. Rupees 34.74 crores were spent on the Project upto January 1971.

Objection.—On the 17th May, 1960, the Mysore Government objected to the clearance of the Srisaillam Project until the question of allocation of the Krishna waters was finally settled. On the 3rd October, 1960, the Maharashtra Government also lodged a similar protest with the Government of India. In January 1962, the Mysore Government requested the Government of India to refer the dispute to a Tribunal for adjudication. In June 1963, the Maharashtra Government made a similar request to the Government of India. In spite of these objections, the project was cleared by the Planning Commission in 1964.

The project was taken in hand by the Andhra Pradesh Government after September 1960 in spite of the timely protests of the coriparian States. On a consideration of all relevant factors, we are unable to give special protection to the project.

Conclusion.—The annual evaporation loss of 33 T.M.C. under the Srisaillam Hydro-electric Project is not entitled to any priority over contemplated uses. Whether any water should be allowed for this project on other grounds will be considered else-, where.

(4) Nagarjunasagar Project:—

Dispute.—Andhra Pradesh claims protection for the annual utilisation of 264 T.M.C. and evaporation

loss of 17 T.M.C. under the Nagarjunasagar Project. Maharashtra and Mysore contend that the protection should be limited to annual utilisation of 149.5 T.M.C. and evaporation loss of 14 T.M.C. only.⁽²³⁾

Project.—The Nagarjunasagar Project comprises a gravity dam in the gorge portion and earth dam on flanks across the Krishna river near Nandikonda village in Andhra Pradesh and two canals on the right and left sides.

Scope of the project.—The project is based on the joint report prepared by Andhra and Hyderabad States in 1954. The joint report⁽²⁴⁾ indicated that the project was capable of being executed in two phases and that the dam would be up to F.R.L. 525 in the first phase.

The irrigation benefits in the first phase shown at page 82 of the Report were :—

	Lakh acres
1	2
Krishna Delta first crop	1.5
Right Bank canal first crop	9.7
Left Bank canal first crop	6.7
Left Bank canal second crop	1.2
TOTAL	19.1

In the working table for the first phase at page 89 of the report, no provision of water was made for second crop irrigation⁽²⁵⁾ The irrigation benefits shown at page 89 were :—

	Lakh acres
1	2
Krishna Delta first crop (now besides existing 10.5 lakh acres)	1.5
Right Bank and Left Bank Canals	18.5
TOTAL	20.0

(23) MRDK VIII p. 64.

(24) APPK 1 pp. 82, 89.

(25) Report of the COPP Irrigation and Power Team on Nagarjunasagar, 1960, p. 2.

The irrigation benefits in the first phase shown in the revised estimate of October 1956 for Rs. 91.12 crores were⁽²⁶⁾ :—

	Lakh acres
1	2
Krishna Delta first crop (extra)	1.50
Krishna Delta second crop	1.50
Right Bank canal first crop	9.70
Left Bank canal first crop	6.70
Left Bank canal second crop	1.20
TOTAL	20.60

The COPP Team on Nagarjunasagar found that only two-thirds of the first crop irrigation on Nagarjunasagar canals envisaged in the first phase could be done with F.R.L. 525. The Team recommended the completion of the masonry dam to the final height of F.R.L. 590, keeping the crest at 546 in the first phase and leaving the installation of the gates in the second phase. They found that with crest at 546, the first crop irrigation of 16.4 lakh acres in the Nagarjunasagar canals and 1.5 lakh acres of first crop and 1.25 lakh acres of second crop in the Delta could be done fully.⁽²⁷⁾

On the 22nd September, 1960, the Government of India approved of the estimate of October 1956 as revised from time to time with a slight modification. ⁽²⁸⁾ The sanctioned project provided for irrigation benefits as shown in the revised estimate of October 1956. The note annexed to the letter of the Planning Commission dated the 13th June, 1969, stated ⁽²⁹⁾:

"The sanctioned project provided for irrigation on 17.90 lakh acres of 1st crop (16.4 lakh acres under Nagarjunasagar Canals and 1.5 lakh acres in Delta) and 2.70 lakh acres of 2nd crop (1.2 lakh acres on L.B.C. and 1.5 lakh acres in Delta)."

The cost of the project increased to Rs. 139.53 crores in the estimate of 1962 and Rs. 163.54 crores

in the estimate of 1969. The estimates incorporated the changes recommended by the COPP Team including the raising of the full reservoir level to R.L. 546. On the 13th June, 1969, the Government of India approved of the revised estimate of cost amounting to Rs. 163.54 crores. The revised project provides for irrigation of 11.74 lakh acres on the Right Bank Canal and 8.80 lakh acres on the Left Bank Canal. ⁽³⁰⁾

Construction with the approval of the Planning Commission and the Government of India.—The joint report of 1954 was prepared in pursuance of the recommendations of the Khosla Committee and the decision taken by the Planning Commission held in December, 1952. In February 1955, the Planning Commission agreed to include the project estimated to cost Rs. 75.08 crores in the First Five Year Plan and decided that a modified project report should be prepared. In June 1955, the Government of India constituted the Nagarjunasagar Control Board consisting of representatives of the Governments of India, Andhra and Hyderabad. In November 1955, the Planning Commission sanctioned the commencement of preliminary works. The project was inaugurated by Pandit Jawaharlal Nehru in December 1955. In January 1956, the Government of India sanctioned loans for the commencement of preliminary works. Work on the project started in February 1956. Consequent on the reorganisation of States in November 1956, the Project vested in Andhra Pradesh exclusively, and the Nagarjunasagar Control Board was reconstituted to consist of representatives of the Government of India and Andhra Pradesh. In March 1957, the Planning Commission sanctioned the construction of cross drainage works for higher discharges. In February 1958, the Central Water and Power Commission prepared detailed specifications, schedules and drawings on Nagarjunasagar dam and appurtenant works. In July, 1960, the COPP Team on Nagarjunasagar Project recommended changes in the design features of the project. In September 1960, the Government of India cleared the project estima-

(26) Report of the COPP Irrigation and Power Team on Nagarjunasagar Project 1960, pp. 3, 7, 118; APPK XVII p. 4, Ann. I p. 3.

(27) Report of the COPP Irrigation and Power Team on Nagarjunasagar Project 1960, pp. 7-8, 17-18, 101-102; APDK VIII p. 85.

(28) MRK II pp. 190-191.

(29) APDK VIII p. 85.

On the 20th December, 1958, the Nagarjunasagar Control Board proposed the redistribution of 1.5 lakh acres of 1st crop with in the accepted ayacut of Nagarjunasagar canals, but that proposal was not incorporated in the sanctioned Nagarjunasagar project of 1960. The estimate of October 1956 as revised from time to time and sanctioned in 1960 made a provision of Rs. 150 lakhs for distributaries for the additional ayacut of 1.5 lakhs acres in Krishna Delta; see Report of the COPP Irrigation and Power Team on Nagarjunasagar Project pp. 6, 129, 173-174, 183, 187; Letter of the Nagarjunasagar Control Board dated the 21st April, 1959, APDK X pp. 147, 154, 162, 167.

(30) APDK VIII pp. 83-110; APPK XVII pp. 6-9, 21-22.

ted to cost Rs. 91.12 crores. The sanctioned Project was included in the Second and Third Five Year Plans. In June 1969, the Planning Commission cleared the revised Nagarjunasagar Project estimated to cost Rs. 163.54 crores. ⁽³¹⁾

Work on the dam has been completed. The right and left canals have been partly completed. The project commenced operation in 1967.

Utilisation of 264 T.M.C. of waters committed since 1956 : Work on the Project commenced in February, 1956. The declared object of the project was to utilise 263.6 T.M.C. of the Krishna waters annually for purposes of irrigation. The design features of the project and the areas proposed to be irrigated were changed during actual execution, but there was no alteration in the quantum of proposed utilisation. The working table at page 89 of the 1954 Report showed an annual withdrawal of 263.615 T.M.C. for Stage I of the project. In 1962, the report of the Krishna Godavari Commission stated that the annual diversion under the project would be 263.60 T.M.C. In March 1963, the Union Minister for Power and Irrigation declared in the Lok Sabha that 264 T.M.C. of the Krishna flows would be required for the sanctioned Nagarjunasagar Project. A note of the Planning Commission dated the 5th July, 1963, stated that the withdrawal under the Project Stage I would be 264 T.M.C. The sanction letter of the Planning Commission dated the 13th June, 1969, declared that the project proposed the withdrawal of 264 T.M.C. of the Krishna waters. Since 1956, the project was taken up and executed with the fixed and definite purpose of utilising 264 T.M.C. of the Krishna waters. The State of Mysore specifically admitted in its rejoinder that the utilisation proposed in Stage I of the project as originally envisaged and sanctioned by the Government of India was 264 T.M.C.⁽³²⁾ We also find that before September 1960, no objection to Stage I of the Project was raised by the other States.

Maharashtra argument that committed utilisation as on September 1960 was 163.5 T.M.C. : The COPP Team found that only two-thirds of the first crop irrigation on Nagarjunasagar canals provided in Stage I of the project could be done with F.R.L. 525 and that the demand for such irrigation would be 147.568 T.M.C. apart from evaporation loss of 15.940 T.M.C. ⁽³³⁾. Maharashtra argued that, in the circumstances, the committed utilisation with F.R.L. 525 sanctioned in 1960 was 163.5 T.M.C. only.

It is to be observed that the 1954 report proposed to utilise 263.6 T.M.C. with F.R.L. 525 in Stage I of the project. The proposal for F.R.L. 525 was based on the unrealistic assumption that no new projects would be undertaken by the upper states. It was because the full irrigation envisaged in Stage I could not be done with F.R.L. 525, the COPP Team recommended the raising of F.R.L. to 546. This change in the internal design feature of the project was necessary for the full utilisation of 263.6 T.M.C.

We are satisfied that since 1956 the committed utilisation under the project is and has continued to be 264 T.M.C.

Raising of full reservoir level to 590 : The project report of 1954 provided for the raising of the full reservoir level to 590 in the final stage. The COPP Team recommended the raising of the full reservoir level to 546 and completion of the dam to the final height (F.R.L. 590) leaving the installation of the crest gates, 44 feet in height, to be done in the final stage. The raising of the F.R.L. to + 590 was the distinctive feature of stage II. In March 1963, the Union Minister for Irrigation and Power declared that Stage II could be cleared after investigations on diversion of Godavari supplies would be completed and the available supplies would be known. In the sanction letter of June 1969, the Planning Commission expressly refused to sanction the installation of crest gates. Nevertheless, the Andhra Pradesh Government installed crest gates 44 feet in height over the spillway crest. Consequently, the F.R.L. of the reservoir is now + 590 and at M.D.D.L. 510, the live storage capacity is 192 T.M.C. Maharashtra and Mysore strongly objected to the installation of crest gates.

However, for reasons to be given hereafter and considering that Andhra Pradesh should have carry-over storage in the Nagarjunasagar dam we are permitting Andhra Pradesh to store water by installing crest gates in the Nagarjunasagar dam.

Evaporation loss : The annual evaporation loss of Nagarjunasagar reservoir at F.R.L. 525 was said to be 12.77 T.M.C. in the 1954 Project Report, 14 T.M.C. in a letter of the Planning Commission dated the 5th July, 1963, and 15.94 T.M.C. in the Report of the COPP Team of 1960. The annual evaporation loss at F.R.L. 590 was said to be 16.795 T.M.C. in

(31) APDK II, pp 63-75, 84-85, APDK I, 140, MRK II p 190; Second Five Year Plan p 362; Third Five Year Plan p 413

(32) APPK I, p 89, Krishna Godavari Commission Report, p 241; KGCR Ann X pp. 11-13; APDK VIII, p 4, MYK III p 36

(33) COPP Report on Nagarjunasagar Project 1960, pp 7-8, 14-15.

the Project Report. ⁽³⁴⁾ In view of the fact that Andhra Pradesh is now permitted to raise the reservoir level to F.R.L. 590 by installing crest gates, we hold that an annual evaporation loss of 17 T.M.C. should be allowed for the Nagarjunasagar Project,

Irrigation of 1.5 lakh acres of first crop in the Delta : The Nagarjunasagar Project sanctioned in 1960 envisaged the development of 1.5 lakh acres of 1st crop in the Delta in addition to 10.5 lakh acres of 1st crop in the Delta existing in 1964. The annual withdrawal of 263.6 T.M.C. under the project included the demand of 23.2 T.M.C. for irrigation of the new 1.5 lakh acres of 1st crop in the Delta. ⁽³⁵⁾ The requirement of the existing 10.5 lakh acres of 1st crop in the Delta had to be met out of the free supplies in the Krishna.

The scope of the Nagarjunasagar Project was changed from time to time. The project as sanctioned by the Planning Commission on the 13th June, 1969, provided for withdrawal of 264 T.M.C. of the Krishna waters and for irrigation of 20.54 lakh acres on Nagarjunasagar canals. The sanction letter dated the 13th June, 1969⁽³⁶⁾ stated that the revised Nagarjunasagar Project was found acceptable "subject to the technical comments and suggestions of the Central Water and Power Commission" and enclosed a copy of the comments of C.W. & P.C. The enclosed note stated that "This Project supplements irrigation of 1.5 lakh acres in the Delta". Thus, even the revised Nagarjunasagar Project as sanctioned on the 13th June, 1969 envisaged that the Project would supplement irrigation of all newly developed 1st crop area in the Delta to the extent of 1.5 lakh acres. It is admitted by Andhra Pradesh that it will implement the project as sanctioned in 1969. Andhra Pradesh argued that any direction for changing the scope of the project regarding use of the water allowed for it in the Krishna Delta would contravene section 108(2) of the States Reorganisation Act, 1956. The question does not arise as we do not propose to give such a direction.

Conclusion :

In allocating the waters of the river Krishna, the annual utilisation of 264 T.M.C. and evaporation loss of 17 T.M.C. under the Nagarjunasagar Project of Andhra Pradesh should be preferred to contemplated uses.

(5) Krishna Delta Canal System :

Dispute : Andhra Pradesh claims protection for the annual utilisation of 214 T.M.C. and evaporation loss of 4 T.M.C. under the Krishna Delta Canals. Maharashtra and Mysore contend that the annual utilisation of 161 T.M.C. only should be protected. ⁽³⁷⁾

Project : The Krishna Delta canal system is in operation since 1855. From time to time there were additions and alterations to the system.⁽³⁸⁾ The headworks are located at Vijayawada where the Krishna river flows through a gap between low hills. Beyond this point, stretching on either side of the river lies a wide alluvial plain known as the Krishna delta. The original weir has been replaced by a barrage. There are two main canals, one on each flank of the barrage. The ⁽³⁹⁾ Krishna Eastern Main Canal on the Vijayawada side, with branch canals commands the eastern Delta. The Krishna Western Main Canal on the Seethanagram side, with branch canals commands the western Delta.

A number of new irrigation schemes in the Krishna Delta were executed or came into operation since 1951-52. ⁽⁴⁰⁾

Andhra Pradesh's claim : Andhra Pradesh claims that the committed annual utilisation in September 1960 under the Krishna Delta system was 214 T.M.C. ⁽⁴¹⁾

In a statement prepared by the Government of India in 1967, the sanctioned annual diversion of the Krishna Delta system was said to be 214 T.M.C. ⁽⁴²⁾ However, the particulars of the sanction were not given.

(34) APPK I pp. 89, 93; APDK-VIII pp. 4, 6; APPK XVII p. 90; COPP Report on Nagarjunasagar Project 1960 p. 15.

(35) Evidence of Jaffer Ali, pp. 174-175.

(36) APDK VIII pp. 83, 84, 91.

(37) MRDK VIII p. 64.

(38) KGCR Ann. VIII, p. 10.

(39) APPK XVII pp. 36-38.

(40) C M.P. 16(75)/71-KWDT.

(41) APK. I p. 213.

(42) MRDK II, pp. 114, 117; MYDK I, p. 215.

Annual diversions of water and areas irrigated: ted by the Krishna Delta system were: ⁽⁴³⁾
 The annual diversions of water and the areas irriga-

Year	Area irrigated by crops (in acres)			Withdrawals in T M C		
	Kharif	Rabi	Total	June to December	January to May	Total
1941-42	9,87,690	3,884	9,91,574	149.37	12.54	161.91
1942-43	9,97,060	9,413	10,06,473	154.56	20.83	174.39
1943-44	10,44,169	15,763	10,59,932	183.13	28.16	211.29
1944-45	10,63,613	87,273	11,50,886	163.74	14.79	178.53
1945-46	10,80,916	21,285	11,02,201	164.86	9.46	174.32
1946-47	10,96,250	31,900	11,28,150	185.82	19.27	205.09
1947-48	11,06,411	28,626	11,35,037	175.09	17.48	192.57
1948-49	11,13,706	29,403	11,43,109	178.70	23.91	202.61
1949-50	11,81,241	46,658	12,27,899	154.96	19.97	174.93
1950-51	12,16,254	37,416	12,53,670	177.71	15.00	192.71
1951-52	11,81,851	45,816	12,27,667	177.01	9.13	186.14
1952-53	10,84,529	30,839	11,15,368	161.33	6.66	167.99
1953-54	11,08,079	45,325	11,53,404	167.11	35.54	202.65
1954-55	11,76,377	81,809	12,58,186	155.54	49.38	204.92
1955-56	11,65,732	1,08,362	12,74,094	160.97	47.47	208.44
1956-57	11,82,748	1,04,430	12,87,178	147.38	56.45	203.83
1957-58	11,39,819	1,03,956	12,43,775	172.89	48.11	221.00
1958-59	11,29,173	92,152	12,21,325	151.17	52.21	203.38
1959-60	10,24,816	1,61,641	11,86,457	177.08	64.90	241.98
1960-61				201.21	55.33	256.54
1961-62	11,28,972	1,33,763	12,62,735	195.39	53.46	248.85
1962-63	11,07,267	1,31,848	12,39,115	162.61	56.80	219.41
1963-64	11,35,817	1,64,368	13,00,185	181.33	43.98	225.31
1964-65	11,61,245	3,17,130	14,78,375	163.68	68.27	231.95
1965-66	11,53,454	1,87,725	13,41,179	173.79	39.09	212.88
1966-67	11,81,098	3,08,726	14,89,824	196.71	63.29	260.00
1967-68	11,83,463	4,83,950	16,67,413	191.73	92.91	284.64
1968-69	11,87,194	4,90,468	16,77,662	209.37	65.36	274.73

NOTE—Upto 1953-54, there were no perennial crops. Since 1954-55 the area irrigated with perennial crops has been included the area irrigated during the Kharif season.

1941-42 to 1950-51 average area irrigated in Kharif 10,88,731, Rabi 31,162, Total 11,19,893 acres

1951-52 to 1959-60 (9 years) average area irrigated in Kharif 11,32,569, Rabi 86,037, Total 12,18,606 acres.

1961-62 to 1968-69 (8 years) average area irrigated in Kharif 11,54,814

Base period for 1st crop paddy is 180 days between June-July to November-December

See KGCR Ann VIII, p 12-13, 16, KGCR Ann IV, p 4-7, APDK VII, pp 1-7 APDK VI, pp 1-5

(43) MRDK XIII, Sheet XXXII. The irrigated area shown above is exclusive of area under green manure which was estimated to be 500,000 acres, see KGCR Ann VIII, p 11.

Increase in second crop area since 1953-54 : The Tungabhadra dam started functioning in July 1953. During 1953-54, the question of utilising the waters stored in the Tungabhadra reservoir until full development of irrigation under the Tungabhadra Project canals was discussed and it was decided that the surplus waters would be utilised for temporary second crop cultivation in the Krishna Delta on the understanding that such cultivation would not give rise to any special claims and different blocks in the Delta would be supplied with water in different years. ⁽⁴⁴⁾ Pursuant to this arrangement and with the concurrence of the Mysore Government, water was released from the Tungabhadra dam since 1953-54 for second crop cultivation in the Delta. The area of second crop cultivation during rabi was 3,884 acres in 1941-42, 30,839 acres in 1952-53, 161,641 acres in 1959-60 and 4,90,468 acres in 1968-69. The increase in second crop area and withdrawal during rabi since 1953-54 was rendered possible by the temporary releases from the Tungabhadra dam. Andhra Pradesh has not acquired any right to the continuance of the temporary release from the Tungabhadra dam, or to special protection for the second crop area brought under cultivation since 1953-54.

During the 10 year period from 1943-44 to 1952-53, before the temporary releases from the Tungabhadra Dam started, the average second crop area irrigated in rabi was 37,498 acres.

Increase in first crop area :

The average first crop area irrigated in Kharif was 10,88,731 acres during the 10 year period 1941-42 to 1950-51, 11,32,569 acres during the 9 year period 1951-52 to 1959-60, 11,54,814 acres during 8 year period 1961-62 to 1968-69.

Increase in withdrawals : The average diversion during the 10 year period 1951-52 to 1960-61 was 209.69 T.M.C. against the average diversion of 186.84 T.M.C. during the 10 year period 1941-42 to 1950-51.

In 1961, Andhra Pradesh Government announced that it proposed to divert 214 T.M.C. annually. ⁽⁴⁵⁾ The average diversion during the 8 year period 1961-62 to 1968-69 was 244.72 T.M.C.

The annual diversions do not furnish a correct indication of the actual utilisations for irrigation under

the Delta canals. It may be mentioned that for irrigation of 11,13,706 acres in kharif and 29,403 acres in rabi during 1948-49 the annual diversion was 202.61 T.M.C., while for irrigation of the larger area of 11,81,241 acres in kharif and 46,658 acres in rabi during 1949-50 the annual diversion was 174.93 T.M.C. only. During 1958-59 the annual diversion was 203.38 T.M.C. for irrigation of 11,29,173 acres in kharif and 92,152 acres in rabi, while for almost the same diversion during 1953-54 the area irrigated was 11,08,079 acres in kharif and 45,325 acres in rabi.

Committed utilisation as on September, 1960 : The project requires water for (a) first crop irrigation (b) second crop irrigation (c) irrigation of green manure and fodder crops (d) navigation (e) water supply to towns (f) washing of salinity from irrigated areas near the coast and tidal drains. ⁽⁴⁶⁾ There is evaporation loss of about 4 T.M.C. from the pondage at the Krishna barrage. ⁽⁴⁷⁾

It is common case before us that the average first crop area of 11,32,569 acres irrigated in kharif during 1951-52 to 1959-60 should be taken to be the first crop area irrigated annually in the Delta by September 1960. Andhra Pradesh is entitled to an allowance of water from the free supplies of the Krishna to meet the requirement of 10.5 lakh acres of first crop in the Delta. The Nandikonda Project report of 1954 shows that the reasonable requirement of 10.5 lakh acres of first crop in the Delta was 161.9 T.M.C. of water.

By September, 1960, an extra 82,569 acres in addition to 10.5 lakh acres of first crop in the Delta existing in 1954 were developed. In 1968-69, the newly developed first crop area in the Delta was 1.37 lakh acres.

We have already pointed out that the annual withdrawal of 263.6 T.M.C. of water under the Nagarjunasagar Project sanctioned in September 1960 included the demand of 23.2 T.M.C. of water for irrigation of new 1.5 lakh acres of 1st crop in the Delta in addition to 10.5 lakh acres of 1st crop existing in 1954. Even the revised Nagarjunasagar Project sanctioned in June 1969 will supplement irrigation of all newly developed area of 1st crop in the Delta to the extent of 1.5 lakh acres. In these circumstances and on a consideration of all relevant factors, we do

(44) SP III 189-190; MYDK XX pp. 4-9.

(45) KGCR Ann. VIII, pp. 12-13.

(46) KGCR Ann. VIII, pp. 14-15.

(47) This is claimed by Andhra Pradesh and assumed by Framji in his evidence pp. 543-544, 1262-63.

not propose to make any separate allowance of water out of the free supplies in the Krishna for the extra 82,659 acres of 1st crop in the Delta developed by September 1960 or for any other 1st crop area in the Delta developed since September 1960.

The average second crop area irrigated in rabi for the decade 1943-44 to 1952-53 was 37,498 acres. It is common case that this area may be taken to be the second crop area irrigated before the commencement of temporary releases from Tungabhadra Dam. Andhra Pradesh is not entitled to any special protection for the second crop area in excess of 37,498 acres brought under cultivation since 1953-54.

The COPP report on Nagarjunasagar Project⁽⁴⁸⁾ shows that the demand 1.5 lakh acres of second crop in the Krishna Delta was 23.3 T.M.C. On this basis, the annual demand for 37,498 acres of second crop was 5.82 T.M.C.

Taken separately, green manure had a delta of 0.4 feet and the requirement of 500,000 acres of green manure was 8.7 T.M.C. of water.⁽⁴⁹⁾ No separate data for the requirement of navigation and water supply to towns etc. are available. It appears that an allowance of 5.82 T.M.C. of water may not be sufficient to meet the requirement of 37,498 acres of second crop, 5,00,000 acres of green manure, navigation, water supply to towns and washing of salinity during the rabi season.

On a rough estimate, an allowance of 15.3 T.M.C. annually may be made for the reasonable requirement of second crop, green manure, navigation, water supply and washing of salinity etc. In addition, an allowance of 161.9 T.M.C. must be made for first crop irrigation.

In all, 177.20 T.M.C. of water on account of the committed utilisation of the Krishna Delta canals as on September 1960 besides annual pond loss of 4 T.M.C. should be allowed out of the free supplies in the Krishna.

Conclusion : In allocating the waters of the river Krishna, the annual utilisation of 177.20 T.M.C. and pond loss of 4 T.M.C. under the Krishna Delta Canal

System of Andhra Pradesh should be preferred to contemplated uses.

(6) Bhadra Reservoir Project :

Dispute : Mysore claims that the annual utilisation of 56.8 T.M.C. under the Bhadra Reservoir Project should be protected. Maharashtra supports the claim. Andhra Pradesh contends that the annual use of 46.6 T.M.C. should be permitted. All the three States agree that annual evaporation loss of 4.9 T.M.C. should be allowed.⁽⁵⁰⁾

Project : The Bhadra Reservoir Project is a multipurpose scheme comprising a storage reservoir across the river Bhadra near Lakkavalli, right bank and left bank canals and power houses.⁽⁵¹⁾

The object of the Madras-Mysore agreement of July 1944 was to enable the Mysore Government to undertake construction of the Project.⁽⁵²⁾ In October/November, 1946 the Mysore Government granted administrative sanction for constructing the works.⁽⁵³⁾ The construction started in April, 1947. The project commenced operation in 1957, but the ayacut was fully developed later.

The ayacut originally proposed in 1946 was 1,80,000 acres. In 1961, the Mysore Government proposed an ayacut of 2,41,550 acres. In 1969 the ayacut was 2,42,310 acres.⁽⁵⁴⁾ The cropping pattern was changed from time to time.

Right to utilisation of 56.8 T.M.C.

The Madras-Mysore agreement of July, 1944 permitted the Mysore Government to draw 57 T.M.C. for irrigation and power purposes from the Bhadra Reservoir.⁽⁵⁵⁾ The other riparian Governments were not bound by the agreement but Hyderabad, Bombay and Sangli agreed to raise no objection to the construction of the project. In 1946, the Mysore Government sanctioned construction of the project with the declared object of utilising 57 T.M.C. annually.⁽⁵⁶⁾ At the inter-State conference of 1951, the Mysore Government proposed to utilise 57 T.M.C. under the Project. To this proposal, no objection was raised by the other Governments.⁽⁵⁷⁾

(48) Report of the Irrigation and Power Team on Nagarjunasagar Project (Committee on Plan Projects) 1960, p. 13, see also Nandikonda Project Report APPK I, p. 85.

(49) MRDK XIII, Sheet XXXIII; KGCR Ann. VIII, pp. 11, 14.

(50) MRDK VIII, p. 64.

(51) KGCR Ann. IX, pp. 74-75.

(52) APK II, pp. 168-174.

(53) MYDKXX, p. 1.

(54) KGCR Ann. IX, pp. 74, 78; MYPK VI, pp. 15, 17; MYK I, p. 98.

(55) APK II, p. 168; MYDK II, p. 401; APDK V, p. 32.

(56) MYPK VI, p. 13.

(57) APDK I, p. 28; MRDK I, p. 118, 124.

Before the Krishna Godavari Commission, ⁽⁵⁸⁾ the Mysore Government stated that the annual irrigation requirement of the project was 56.75 T.M.C.

The list of sanctioned projects prepared by the Government of India in June, 1967 stated that the sanctioned annual diversion under the Bhadra Reservoir Project was 56.8 T.M.C. ⁽⁵⁹⁾

We find that since 1946 the Mysore Government has implemented the Project with the fixed and definite purpose of utilising at least 56.8 T.M.C. annually. *Prima facie*, Mysore has established that an annual utilisation of 56.8 T.M.C. was committed as on September, 1960.

Andhra Pradesh's contention.—Andhra Pradesh argued that Mysore, having repudiated the agreement of July, 1944 cannot claim protection for the agreed annual utilisation of 56.8 T.M.C. According to Andhra Pradesh, the annual water requirement of 2,42,310 acres was 46.6 T.M.C. on the basis of the cropping pattern proposed in 1946 and the duty proposed in 1961 and that consequently, an annual use of 46.6 T.M.C. of water only should be protected. We are unable to accept this contention.

Regarding Tunga anicut also, Andhra Pradesh advanced a similar argument. Subsequently, Andhra Pradesh abandoned the argument and agreed that the utilisation of 11.5 T.M.C. under the Tunga anicut should be permitted as contemplated by the Madras-Mysore agreement of July 1944.⁽⁶⁰⁾

Mysore has established the right to the annual utilisation of 56.8 T.M.C. independently of the agreement of July 1944. Since 1946, Mysore took up the construction of the project with the avowed object of utilising 56.8 T.M.C. without any protest from the other States, and erected valuable permanent installations. Significant sector of its economy have become dependent upon the uses of those waters. Those uses must now be regarded as existing uses arising independently of an agreement and, as such, entitled to protection.

Conclusion.—In allocating the waters of the river Krishna, the annual utilisation of 56.80 T.M.C. and evaporation loss of 4.90 T.M.C. under the Bhadra Reservoir Project of Mysore should be preferred to contemplated uses.

(7) Tungabhadra Left Bank Low Level Canal:

Dispute.—Mysore claims that an annual utilisation of 92.3 T.M.C. under the Tungabhadra Left Bank Low Level Canal should be protected. Maharashtra supports the claim. Andhra Pradesh contends that the protection should be limited to 56.0 T.M.C. In the agreed list of projects(1), it is the common case of the parties that one half of the evaporation loss from the Tungabhadra reservoir to the extent of 9 T.M.C. annually is attributable to the Left bank canal. ⁽⁶¹⁾

Project.—The agreement of June 1944 enabled the Hyderabad and Madras Governments to start the construction of the Tungabhadra Project. Construction of the Left Bank Low Level Canal was started in February, 1945 and completed in 1963. The Canal extends up to mile 141 within Mysore State limits. There was a proposal to extend the Canal beyond mile 141 to Telengana areas in Gadwal and Alamapur Taluks, but the proposal was not implemented.

Water demand up to September 1960.—The agreement of June 1944⁽⁶²⁾ allowed Hyderabad to draw 65 T.M.C. of water from the Tungabhadra reservoir.

The Tungabhadra Project Report 1947 proposed a cropping scheme and a demand table of 92.25 T.M.C. of water for 4,50,000 acres of first and second crops and 1,35,000 acres of fuel and pasture in the Karnataka areas up to mile 141.⁽⁶³⁾

In 1951, the Hyderabad Government claimed 100 T.M.C. for the Canal and 35 T.M.C. for the Canal extension. ⁽⁶⁴⁾ The memorandum of agreement of 1951 allowed 65 T.M.C. for the Canal and made a lump sum allocation for projects under contemplation. Thereafter in 1952, the Hyderabad

(58) KGCR Ann. IX, p. 77.

(59) MYDK I, p. 216; MRDK II, p. 114.

(60) MRDK VIII, p. 62.

(61) MRDK VIII, p. 64.

(62) APK II, pp. 164-167.

(63) Tungabhadra Project Report (Hyderabad) pp. 8, 28, Ex. MYK 270.

(64) APK III, pp. 246, 251.

Government proposed to utilise 65 T.M.C. for the Canal and 20 to 35 T.M.C. for the Canal extension.⁽⁶⁵⁾

In 1954, the Hyderabad Government finally approved of a cropping scheme for 5,80,000 acres in the Karnataka region up to mile 141.⁽⁶⁶⁾ In 1956, the Chief Engineer, Tungabhadra Project, prepared a demand table of 82.007 T.M.C. covering the water requirements of the approved cropping scheme. It was decided that more water would be utilised in the Telengana region in case of extension of the Canal beyond mile 141.⁽⁶⁷⁾

Since 1956 up to September 1960, the use of 82 T.M.C. was considered sufficient for meeting the requirement of the approved cropping scheme for 5,80,000 acres in the Karnataka region to be irrigated from the Tungabhadra Left Bank Low Level Canal. We think that the annual utilisation of 82 T.M.C. of water under the Canal was committed as on September, 1960.

We are unable to accept Andhra Pradesh's contention that the use of 56 T.M.C. was sufficient for the requirement of the canal.

Subsequent increase in water demand.—In 1961, Mysore proposed to utilise 92.25 T.M.C. for irrigating 5,80,000 acres.⁽⁶⁸⁾ Recently Mysore proposed to utilise 111 T.M.C. for irrigating 6,55,000 acres.⁽⁶⁹⁾

The list of sanctioned projects prepared by the Government of India in June, 1967 stated that the sanctioned annual diversion under the Tungabhadra Project (Mysore) was 111.3 T.M.C.⁽⁷⁰⁾ However, it was not stated by whom and when the sanction was given.

Tungabhadra Project Left Bank High Level Canal.—Some water is required for the Tungabhadra Project Left Bank High Level Canal. So far the highest annual utilisation for the Left Bank High Level Canal was 0.636 T.M.C. in 1964-65.⁽⁷¹⁾ Mysore desires that the water allowance for the Left Bank Low Level Canal should cover the requirement of the Left Bank High Level Canal. An allowance of 1 T.M.C. should be sufficient for the High Level Canal.

Conclusion.—In allocating the waters of the river Krishna, the annual utilisation of 83 T.M.C. an evaporation loss of 9 T.M.C. under the Tungabhadra Project Left Bank Low Level Canal (including the Left Bank High Level Canal) of Mysore should be preferred to contemplated uses.

(8) *Vajayanagar Channels of Mysore :*

Dispute.—Mysore claims that an annual utilisation of 13.7 T.M.C. under the Mysore Vijayanagar Channels should be protected. Andhra Pradesh and Maharashtra contended that the utilisation under the Channels ought not to be separately provided for as they have been taken into account in fixing the gross utilisation under minor irrigation.⁽⁷²⁾

Irrigation Schemes.—Several irrigation schemes, compendiously known as Vijayanagar or Pre-Moghul Channels were constructed by the Vijayanagar kings during 1509 A.D. to 1560 A.D.⁽⁷³⁾ Each scheme consisted of an anicut and an irrigation channel. One of the schemes viz., Rampur Channel is situated in Andhra Pradesh.⁽⁷⁴⁾ The requirement of Rampur Channel has been provided for under minor irrigation and is not the subject-matter of the present discussion. The names and location of the schemes situated in Mysore are shown in the following table.⁽⁷⁵⁾

(65) APPK X pp. 14, 16.

(66) APDK X p. 134; SP III p. 95.

(67) SP III pp. 95-97.

(68) KGCR Ann. IX pp. 20, 22.

(69) MYPK VIII pp. 13-15, 29.

(70) MYDK I p. 216; MRDK I pp. 114, 119.

(71) MYDK X pp. 3-11.

(72) MRDK VIII p. 65.

(73) MYPK VI, p. 71; H. C. Hart, New India's Rivers, p. 44.

(74) SP IV p. 7.

(75) MYPK VI pp. 70, 74. See also KGCR Ann. VIII pp. 140, 142.

Sl. No.	Name of Channel	Name of Weir	Location of weir		Remarks
			Name of Stream	Distance downstream of Tungabhadra Dam in miles	
1	2	3	4	5	6
Bellary District (on right side of river)					
1. Basavanna	Vallabhapur		Submerged in Tungabhadra reservoir Do.	1-1/2	Channel takes off directly from Tungabhadra dam on right side. Do.
3. Bella	Hosur	Tungabhadra		1-1/2	
4. Kalaghatta	Drainage channel	Halla		5 10	Channel utilises seepage from higher channels
5. Turtha	Turtha	Tungabhadra			
6. Ramsagar	Ramsagar	Tungabhadra		18	
7. Kampli	Kampali	Tungabhadra		19	
8. Belagoduhal	Drainage channel	Halla		22	Channel utilises seepage from higher channels.
9. Sirugappa	Sirugappa	Tungabhadra		50	Consists of 7 bits.
10. Desnur	Desnur	Tungabhadra		50	
Raichur District (on left side of river)					
11. Koregal	Koregal	Submerged in Tungabhadra reservoir Tungabhadra	1-1/2		Channel takes off directly from Tungabhadra Left Bank Canal.
13. Shivapur	Shivapur	Do.		5	
14. Aneundi	Sanapur	Do.		10	
15. Upper Gangawati	Upper Gangawati	Do.		17	
16. Lower Gangawati	Lower Gangawati	Do.		19	
17. Bichal	Bichal	Do.		86	
18. Bennur (In ruins)					

Utilisation under Vijayanagar channels have not been taken into account under minor irrigation : In the pleadings ⁽⁷⁶⁾ and the agreed list of projects ⁽⁷⁷⁾ Mysore did not treat Vijayanagar Channels as minor irrigation projects, though most of the channels taken separately might be using less than 1 T.M.C. of water annually. We are satisfied that the utilisations under the Vijayanagar Channels have not been taken into account in fixing the gross utilisations under minor irrigation. This fact is now conceded by learned Counsel for Maharashtra and Andhra Pradesh. ⁽⁷⁸⁾

Water utilisation : The annual gross utilisation in T.M.C. for the Vijayanagar Channels in Mysore

was :— ⁽⁷⁹⁾							
1951-52	52-53	53-54	54-55	55-56	56-57	57-58	
5.71	5.71	5.71	5.71	5.71	5.71	5.71	
58-59	59-60	60-61	61-62	62-63	63-64	64-65	
5.71	5.71	5.71	9.64	9.64	9.64	9.64	
65-66	66-67	67-68	68-69				
9.64	9.64	9.64	9.64				

Thus, the annual utilisation committed as on September 1960 was 5.71 T.M.C.

Conclusion : In allocating the waters of the river Krishna, the annual utilisation of 5.71 T.M.C. for the Vijayanagar Channels of Mysore should be preferred to contemplated uses.

(76) MYK I p. 98.

(77) MRDK VIII p. 65.

(78) See Minutes of Proceedings of the Tribunal on the 28th March. 1973.

(79) MRDK VIII pp. 13-14.

(9) Rajolibunda Diversion Scheme :

Scheme.—The Rajolibunda Diversion Scheme comprises an anicut across the Tungabhadra river near Rajolibunda village in Raichur District and a left bank canal about 89 miles long. The canal is lined and partly perennial and partly two seasonal. ⁽⁸⁰⁾ The Hyderabad Government started construction of the project.

The States Reorganisation Act, 1956 and consequential arrangements.—Upon the reorganisation of States in 1956, the headworks and the initial 26/27 miles of the canal with an ayacut of 5,900 acres fell within Mysore State and the remaining portion of the canal with an ayacut of 87,000 acres fell within Andhra Pradesh. ⁽⁸¹⁾

In October 1959, the Chief Engineers of Mysore and Andhra Pradesh agreed on a full supply discharge of 850 cusecs out of which 770 cusecs would be available at the Mysore-Andhra Pradesh border. ⁽⁸²⁾ The two States agreed that the annual utilisation under the project in Mysore and Andhra Pradesh would be 1.1 T.M.C. and 15.9 T.M.C. respectively. ⁽⁸³⁾ On January 25, 1971, Counsel for the two states made the following joint statement before the Tribunal :—

"The States of Mysore and Andhra Pradesh state that the benefits of utilisations under the existing Rajolibunda Diversion Scheme are shared between the two States as mentioned herein below :—

Mysore	1.2 T.M.C.
Andhra Pradesh	15.9 T.M.C."

Dispute.—The project report contemplated that the Project's requirement of 17 T.M.C. would be met partly from 6.3 T.M.C. of return flow from irrigation under the Tungabhadra Project, and partly from the flow below Tungabhadra dam. ⁽⁸⁴⁾ Maharashtra and Mysore contended that if return flow from irrigation is not taken into account in allocating the Krishna waters the utilisation of 10.8 T.M.C. only under the Project should be protected, Mysore and Andhra Pradesh getting 0.80 T.M.C. and 10 T.M.C. respectively. ⁽⁸⁵⁾ Andhra Pradesh disputed the contention.

Conclusion.—We think that the requirement of the Project can be met fully from the intermediate yield below Tungabhadra dam and regulated releases from the dam. Moreover, in allocating the Krishna waters we have, as far as possible, taken into account the return flow from irrigation.

We hold that in allocating the waters of the river Krishna, the annual utilisation of 1.2 T.M.C. by Mysore and 15.9 T.M.C. by Andhra Pradesh under the Rajolibunda Diversion Scheme should be preferred to contemplated uses.

(10) Kurnool-Cuddapah Canal:

Dispute.—Andhra Pradesh claims protection for an annual utilisation of 69.4 T.M.C. under the Kuraool-Cuddapah Canal. Mysore contends that the protection should be limited to an annual utilisation of 19 T.M.C. only. Maharashtra says that the use of 20 T.M.C. only should be protected. ⁽⁸⁶⁾

Scheme.—The K. C. Canal scheme comprises an anicut across the Tungabhadra river at Sunkesala and a right bank canal. Part of the main canal is lined. ⁽⁸⁷⁾ The canal serves chronically drought affected areas in Kurnool, Mahboobnagar and Cuddapah districts. It provides water supply to Kurnool and Nandyal and some navigation facilities.

The K.C. Canal is one of the oldest irrigation works on the Tungabhadra. It is in operation since 1866.

The designed capacity of the canal was 3,000 cusecs. The canal had a large command area and an ayacut of 1,96,227 acres was envisaged. The design, construction and working of the canal disclosed serious defects. Due to damage to the anicut, lowering of the crest and general deterioration, the capacity was greatly reduced and the ayacut shrank to 1,03,000 acres. ⁽⁸⁸⁾

During 1940-41 to 1950-51, the average irrigated area was 97,878 acres and the average annual utilisation was 33.02 T.M.C. ⁽⁸⁹⁾ At the inter-State conference of July 1951, Madras stated that the area

(80) KGCR Ann. IX, p. 27; MYPK X p. 5.

(81) SP II p. 132; KGCR Ann. IX, p. 27.

(82) SP III p. 103.

(83) SP III p. 132.

(84) APPK XVI pp. 1, 2.

(85) MRDK VIII p. 65.

(86) MRDK VIII p. 65.

(87) KGCR Ann. VIII pp. 17, 21; APPK XVII p. 23.

(88) KGCR Ann. VIII pp. 17, 18; APPK XVII pp. 23, 24; SP III p. 14; APPK II pp. 11-12.

(89) KGCR Ann. VIII, p. 19.

irrigated annually was 75,000 acres first crop and 10,000 acres second crop. The C.W. & P.C. technical note prepared for the conference showed an annual utilisation of 10 T.M.C. only. ⁽⁹⁰⁾

The river supplies were used mainly for irrigation of dry crops in year of deficient rainfall. A large area of Cholan was watered and the duty allowed for was 120 acres per cusec. For paddy, the working duty was about 30 to 45 acres per cusec. ⁽⁹¹⁾

Remodelling.—The Khosla Committee (Technical Committee for optimum utilisation of Krishna and Godavari Waters) recommended that the K. C. Canal should be remodelled for a discharge of 6,000 cusecs to feed its own requirement and that of several other canals. The Committee was of the view that the K. C. Canal required a discharge of 1,940 cusecs for its ayacut of 1.94 lakh acres. ⁽⁹²⁾

However, the Andhra Government decided to remodel the Canal for a discharge of 3,000 cusecs with a view to irrigate annually 1,96,227 acres, half paddy and half other crops. ⁽⁹³⁾

The remodelling was taken up in 1955 and completed in 1960-61 at a cost of Rs. 7.09 Crores. ⁽⁹⁴⁾ The Central Government granted loan assistance during the Second Five Year Plan. ⁽⁹⁵⁾ The Canal was shown as continuing scheme in the Third Five Year Plan. ⁽⁹⁶⁾

Ayacut and cropping pattern.—In March 1960, the Andhra Pradesh Government approved of the localisation of ayacut and the following crop pattern for an area of 2,78,000 acres :—⁽⁹⁷⁾

Crop	Area in Acres
1	2
Single wet Abi	1,26,000
Single dry	1,28,000
Double wet	10,000
Sugarcane	14,000
	2,78,000

Out of the ayacut of 2,78,000 acres, only 45,000 acres is within the Krishna drainage basin; the remaining 2,33,000 acres lie in Pennar valley. ⁽⁹⁸⁾

In 1961, the Andhra Pradesh Government proposed the following cropping pattern :—⁽⁹⁹⁾

Crop	Cropped area in acres	Percentage of cropped area	Delta at canal head in feet
1	2	3	4
Kharif paddy	1,36,000	47.2	4.4
Kharif other crops	64,000	22.2	1.5
Rabi Paddy	10,000	3.5	6.1
Rabi other crops	64,000	22.2	1.5
Perennial (Sugarcane)	14,000	4.9	7.4
	2,88,000	100	

Annual withdrawals and irrigated areas.—The annual withdrawals and areas irrigated under the K. C. Canal were as follows :—⁽¹⁰⁰⁾

Year	Annual diversion in T.M.C.	Area irrigated annually in acres		Perennial	Total
		Kharif	Rabi		
1	2	3	4	5	6
1951-52	33.69	82,446	14,696		97,142
1952-53	33.43	85,560	13,375		98,935
1953-54	41.70	91,284	17,717		1,09,001
1954-55	29.32	1,00,752	11,379		1,12,131
1955-56	23.92	99,689	7,733		1,07,422

(90) APDK IV p. 31; MRDK I p. 117.

(91) W. M. Ellis, College of Engineering Manual 1955 Ed. pp. 1, 7; Kistna-Pennar Project (1951-Scheme) APPK II, pp. 11-12, 60-61.

(92) Report of the Technical Committee for Optimum Utilisation of Krishna and Godavari waters, pp. 49, 53, 55-58, 85, 99-101.

(93) APDK VIII pp. 21, 26; KGCR Ann. VIII pp. 17, 18; APPK XVII, p. 24.

(94) CMP. 16(75)/71-KWDT, Ex. APK 430.

(95) APDK X pp. 144-145.

(96) Third Five Year Plan p. 413.

(97) APDK X pp. 42-44.

(98) KGCR Ann. VIII p. 21.

(99) KGCR Ann. VIII p. 20.

(100) MRDK XIII, Sheet XXXIV.

	1	2	3	4	5	6
1956-57		30.63	95,974	6,264		1,02,238
1957-58		38.47	1,05,522	12,897		1,18,419
1958-59		40.56	1,27,620	21,521		1,49,141
1959-60		39.53	1,25,471	10,688		1,36,139
1960-61		60.98	1,27,620	21,521		1,49,141
1961-62		54.56	1,52,785	35,723		1,88,508
1962-63		60.63	1,44,435	44,527		1,88,962
1963-64		66.33	1,55,183	52,487		2,07,670
1964-65		60.41	1,64,668	67,311		2,31,979
1965-66		67.28	1,60,871	62,805		2,23,676
1966-67		68.45	1,43,242	68,689		2,11,931
1967-68		72.68	1,51,364	1,05,287	16,093	2,72,744
1968-69		83.23	1,56,591	1,09,254	17,760	2,83,605

See KGCR Ann. IV pp. 282-84, MRDK VIII pp. 21-22, APDK VII pp. 12-19, APDK VI pp. 8-11, APDK II, pp. 60-62, SP III pp. 171-172.

There is a foot note at page 39 of KGCR Ann. IV as under for year 1960-61 :—

"Not considered for calculating the average, as the canal was also used for escaping river supplies in view of repair work to the anicut."

Larger withdrawal during rabi since 1953-54 due to release from Tungabhadra dam.—Increased withdrawals during rabi since 1953-54 became possible because of temporary releases from the Tungabhadra dam for the benefit of the second crop cultivation in the Krishna Delta. The Tungabhadra dam started functioning in July, 1953. Releases were made from the Tungabhadra dam since 1953-54 on the clear understanding that they would not give rise to any special right. ⁽¹⁰¹⁾ Due to such releases, there were large increases in the inflow at Sunkesula anicut during the rabi season, January to May, from 1953-54 to 1968-69. ⁽¹⁰²⁾

The withdrawals by K. C. Canal during the rabi season, January to May, which were 4.62 T.M.C. in 1952-53 increased to 31.19 T.M.C. in 1968-69. ⁽¹⁰³⁾ The increased withdrawals during rabi since 1953-54 could not be made unless there were larger inflows at Sunkesula anicut on account of the temporary re-

leases from the Tungabhadra dam. In view of the larger withdrawals, the area irrigated during the rabi Season by the K.C. Canal increased from 13,375 in 1952-53 to 1,09,254 acres in 1968-69.

Committed utilisation of K.C. Canal as on September 1960.—Before the Krishna Godavari Commission, the Andhra Pradesh Government proposed the annual utilisation of 39.87 T.M.C. for irrigating 2,78,000 acres. The monthly demands were June 5.81, July 5.97, August 6.07, September 6.60, October 6.50, November 1.27, December 1.88, January 1.36, February 1.35, March 1.45, April 0.93, May 0.68 : Total 39.87 T.M.C. ⁽¹⁰⁴⁾

The list of sanctioned projects prepared by the Government of India in June 1963 stated that the annual sanctioned diversion under the K.C. Canal was 39.9 T.M.C. ⁽¹⁰⁵⁾

(101) SP III, pp. 189-192.

(102) KGCR Ann. II, p. 89; APDK-VI, pp. 8-11.

(103) KGCR Ann. IV, p. 39; APDK VI, p. 11.

(104) KGCR Ann. VIII, p. 19.

(105) MYDK I p. 215.

1 M of I & P/73—18

Andhra Pradesh Government admits that the committed utilisation as on September 1960 was 39.9 T.M.C.⁽¹⁰⁶⁾

Andhra Pradesh's claim.—Andhra Pradesh claims protection for the annual utilisation of 69.9 T.M.C. as shown below :—⁽¹⁰⁷⁾

For K. C. Canal committed as on September, 1960	39.9 T.M.C.
For improvements to K. C. Canal Committed after September, 1960	29.5 T.M.C.
	69.4 T.M.C.

Andhra Pradesh's claim for protection of excess withdrawals since September 1960 is rejected.—They committed utilisation as on September 1960 was 39.9 T.M.C. only.

In 1961. Andhra Pradesh Government admitted that the annual utilisation of 39.9 T.M.C. would be sufficient to meet the requirements of an ayacut of 2,78,000 acres. It is not shown to our satisfaction that for irrigating the same area, the annual utilisation of 69.4 T.M.C. is necessary.

The annual diversions for the K.C. Kanal do not furnish a correct estimate for the actual water supplied to the fields. The diversions by the K.C. Canal have been relatively high when compared with the areas irrigated, largely because there was considerable seepage and wastage from the canal.⁽¹⁰⁸⁾ With more economical management, the waste can be avoided. The earlier proposals show that efficient irrigation is possible with a higher duty of water. Avoidable waste is a relevant factor in determining whether the excess withdrawals should be given a preferred status in equitable apportionment.

The Khosla Committee recommended the utilisation of 29.20 T.M.C. under the K.C. Canal, and the Andhra Pradesh Government agreed to the proposal.⁽¹⁰⁹⁾ The ayacut under the Canal was then 1.94 lakh acres.⁽¹¹⁰⁾ On this basis also, the utilisation for an ayacut of 2,78,000 acres works out to

$$(29.2 \times 270) / 194 = 40.06 \text{ T.M.C.}$$

For all these reasons we hold that the annual withdrawals in excess of 39.9 T.M.C. under the K.C. Canal should not receive protection.

Mysore argument.—Mysore argued that in view of the fact that the requirement of the K.C. Canal when remodelled to 3,000 cusecs capacity would be 29.2 T.M.C. and in view of the finding of the Khosla Committee that the canal's own requirement was 1940 cusecs, the utilisation of the canal works out to about 19 T.M.C. We are unable to accept this contention. As already stated, the Khosla Committee recommended the utilisation of 29.20 T.M.C. by the K.C. Canal for an ayacut of 1.94 lakh acres, and on this basis the utilisation for an ayacut of 2.78 lakh acres works out to 40.06 T.M.C.

Maharashtra argument.—Maharashtra argued that for an average ayacut of 97,778 acres during 1941-42 to 1951-52⁽¹¹¹⁾ an utilisation of 10 T.M.C. was considered sufficient by the C.W.&P.C.,⁽¹¹²⁾ and, therefore, for an ayacut of 1,96,227 acres, the canal should receive protection for the use of $(10 \times 1,96,227) / 97,778$ or 20 T.M.C. only. But we find that before the remodelling, the canal was not functioning efficiently because of reduction in canal capacity and general deterioration of the canal condition and the actual withdrawals during 1941-42 to 1951-52 do not furnish a correct estimate of the requirement of the ayacut under the canal.

Conclusion.—The annual utilisation of 39.9 T.M.C. committed as on September 1960 is necessary and sufficient for irrigating 2,78,000 acres under the remodelled K. C. Canal.

We hold that in allocating the waters of the river Krishna, the annual utilisation of 39.90 T.M.C. under the K.C. Canal should be preferred to contemplated uses.

Minor irrigation works using less than 1 T.M.C. annually :

Agreements.—On the 26th August, 1971, the parties filed agreed statements giving minor irrigation particulars in respect of areas irrigated in the Krishna

(106) APK I pp. 52, 123.

(107) APK I pp. 123-124.

(108) KGCR Ann., VIII, p. 21.

(109) APDK VIII p. 26.

(110) Report of the Technical Committee (Khosla Committee) on the optimum utilisation of the Krishna and Godavari waters p. 55

(111) KGCR Ann. VIII p. 22.

(112) MRDK I p. 117.

basin in Maharashtra, Mysore and Andhra Pradesh and the average gross utilisation computed on the basis of average irrigated areas and agreed average duties for the periods 1941-42 to 1950-51, 1951-52 to 1960-61 and 1960-61 to 1966-67.⁽¹¹³⁾

On the 27th and 30th August, 1971, the parties filed agreed supplementary statements showing that the figures of minor irrigation in the earlier statement did not include certain minor irrigation works and irrigation from wells.⁽¹¹⁴⁾

On the 1st September, 1971, the parties filed another agreed supplementary statement giving basinwise

irrigated area and utilisation under minor irrigation works in Krishna basin in the three States.⁽¹¹⁵⁾

On the 4th April, 1973, the parties filed an agreed statement that the figures of average utilisation under minor irrigation works included evaporation losses. Water spread of tanks is inordinately large as compared with the corresponding ayacut with the result that losses by evaporation are as large as supplies diverted for irrigation from these works.⁽¹¹⁶⁾

Utilisation of water under minor irrigation works upto 1960-61.—The sub-basinwise average area irrigated and utilisation under minor irrigation works in Krishna basin in Maharashtra State for the decade 1951-52 to 1960-61 are given below :—

Sr. No.	Sub-basin							Area irrigated in Acres			Utilisation in Mcft.		
								1st Crop	2nd Crop	Total	1st Crop	2nd Crop	Total
1	2							3	4	5	6	7	8
1. K-1	.	.	.	.	.	.	.	64,175	9,106	73,281	10,406	728	11,134
2. K-2	.	.	.	.	.	.	.	896	177	1,073	112	14	126
3. K-3	.	.	.	.	.	.	.	5,293	125	5,418	1,018	10	1,028
4. K-5	.	.	.	.	.	.	.	33,555	7,277	40,832	3,661	584	4,245
5. K-6	.	.	.	.	.	.	.	764	116	880	99	9	108
TOTAL	.	.	.	.	.	.	.	1,04,683	16,801	1,21,484	15,296	1,345	16,641

Our attention was drawn to the following projects of Maharashtra using less than 1 T.M.C. of water annually.

Sr. No.	Sub-basin	Name of project	Utilisation in T.M.C.
1	2	3	4
1. K-1	Nehr Tank	.	0.5
2. K-5	Budihal tank	.	0.9
3. K-5	Mehkari project	.	0.7
4. K-5	Kada project	.	0.5

1.	2	3	4
5. K-5	Chandani project	.	0.9
6. K-6	Hami project	.	0.6
TOTAL	.	.	4.1

Learned Advocate General of Maharashtra stated that he would be asking for allocation of waters in respect of these six projects. As Maharashtra will get allocation of waters for these six projects, he is not asking for any special protection or preference over contemplated users regarding these projects.

(113) MRDK VIII pp. 25-27.

(114) MRDK VIII pp. 58-60, 68A.

(115) MRDK VIII pp. 69-79.

(116) Krishna Godavari Commission Report, pp. 166-167; COPP Report on minor Irrigation Works (Mysore State), pp. 7-8.

The sub-basin-wise average area irrigated and utilisation under minor irrigation works in Krishna basin in Mysore State for the decade 1951-52 to 1960-61 are given below :—

Sl. No.	Sub-basin	Area irrigated in acres			Utilisation in Mcft.		
		1st Crop	2nd Crop	Total	1st Crop	2nd Crop	Total
1	2	3	4	5	6	7	8
1.	K-1	1,823	176	1,999	161	20	181
2.	K-2	13,733	879	14,612	2,354	112	2,466
3.	K-3	10,330	1,016	11,346	913	119	1,032
4.	K-4	51,131	1,224	52,355	3,904	136	4,040
5.	K-5	156	20	176	13	2	15
6.	K-6	20,743	579	21,322	5,788	181	5,969
7.	K-7	2,431	28	2,459	678	11	689
8.	K-8	3,06,568	10,521	3,17,089	45,427	2,510	47,937
9.	K-9	1,11,871	9,886	1,21,757	26,618	3,251	29,869
		5,18,786	24,329	5,43,115	85,856	6,342	92,198

The above figures do not include the following utilisations.

Sl. No.	Sub-basin	Utilisation in M.C. ft.		
		I Crop	II Crop	Total
1	2	3	4	5
1.	K-1	161	20	181
2.	K-2	2,354	112	2,466
	K-4	Kolchi weir	.	0.53
	K-6	Hathikoni	.	0.50
	K-8	Jambad Halla	.	0.70
	K-8	Kanakanala	.	0.40

1960-61 was as follows :—

1	2	3	4	5
3.	K-3	913	119	1,032
4.	K-4	4,434	136	4,570
5.	K-5	13	2	15
6.	K-6	6,288	181	6,469
7.	K-7	678	11	689
8.	K-8	46,527	2,510	49,037
9.	K-9	26,618	3,251	29,869
	TOTAL	87,986	6,342	94,328

The utilisation under Chitwadgi and Harinala Schemes are not included in the above figures for the decade 1951-52 to 1960-61, as the construction of those schemes were started subsequently. Vijayanagar channels of Mysore are not included under minor irrigation works.

The sub-basinwise average area irrigated and utilisation under minor irrigation works in Krishna Basin in Andhra Pradesh for the decade 1951-52 to 1960-61 are given below :—

Sl. No.	Sub-basin	Area irrigated in acres			Utilisation in T.M.C.		
		I Crop	II Crop	Total	I Crop	II Crop	Total
1	2	3	4	5	6	7	8
1.	K-6	19,986	2,036	22,028	3.000	0.509	3.509
2.	K-7	2,34,899	37,500	2,72,399	35.598	9.422	45.020
3.	K-8	29,897	3,538	33,435	5.446	1.009	6.455
4.	K-9	24,725	8,755	33,480	4.945	2.627	7.572
5.	K-10	1,05,056	20,328	1,25,384	15.758	5.082	20.840
6.	K-11	37,416	6,138	43,554	5.613	1.533	7.146
7.	K-12	1,50,511	12,554	1,63,065	22.578	3.131	25.709
	TOTAL in Andhra Pradesh	6,02,490	90,849	6,93,345	92.938	23.313	116.251

We think that the committed utilisation for both first and second crops as on September 1960 should be protected. All utilisation for first and second crops have been taken into account in fixing the dependable flow of the Krishna. The fact that the utilisation for second crop is dependent on uncertain north-east monsoon rainfall and is more variable than the utilisation for first crop is not a sufficient ground for refusing protection to the utilisation for second crop.

It is common case before us that the average utilisation under minor irrigation works for the decade 1951-52 to 1960-61 should be taken to be the utilisation under those works as on September 1960.

Conclusion.—We hold that in allocating the waters of the river Krishna, the following sub-basinwise annual utilisation under minor irrigation works, using less than 1 T.M.C. of water annually and committed as on September 1960 should be preferred to contemplated uses.

Utilisation in T.M.C.					
Sl. No.	Sub-basin	Maha-rashtra	Mysore	Andhra Pradesh	Total
1	2	3	4	5	6
1.	K-1	.11.13	.18		11.31
2.	K-2	.13	2.47		2.60
3.	K-3	1.03	1.03		2.06
4.	K-4		4.57		4.57
5.	K-5	4.25	.02		4.27
6.	K-6	.11	6.47	3.51	10.09
7.	K-7		.69	45.02	45.71
8.	K-8		49.04	6.46	55.50
9.	K-9		29.87	7.57	37.44
10.	K-10			20.84	20.84
11.	K-11			7.15	7.15
12.	K-12			25.71	25.71
		16.65	94.34	116.26	227.25

Final conclusion under Issue 11(3).—In allocating waters of the river Krishna, the following utilisations (including evaporation losses) of water of the Krishna river system by the three States should be preferred to contemplated uses :—

MAHARASHTRA			
Sub-basin	Project	Water utilisation including In evaporation losses	T.M.C.
1	2	3	4
K-1			186.23
	Krishna canal ex Khodsi Weir	2.70	
	Koyna Hydro-Electric	74.80	
	Warna	47.70	
	Tulshi	2.60	
	Radhanagri	11.00	
	Krishna	36.30	
	Minor Irrigation	11.13	
		186.23	
K-2			0.13
	Minor Irrigation	.13	
K-3			1.03
	Minor Irrigation	1.03	
K-5			250.65
	Mutha System ex Khadakwasla	23.50	
	Tata Hydel Works	45.00	
	Ghod	10.40	
	Kukadi	20.10	
	Visapur Tank	0.50	
	Bhima	90.20	
	Nira Canal System	34.60	
	Vir Dam	14.70	
	Mhaswad	2.20	
	Ashti Tank	0.70	
	Mangi Tank	1.10	
	Ekrutank	1.80	
	Khasapur Tank	1.30	
	Sholapur city Water Supply	0.30	
	Minor Irrigation	4.25	
		250.65	
K-6			1.61
	Kurnoor	1.50	
	Minor Irrigation	.11	
		1.61	
TOTA			439.65

MYSORE			
Sub-basin	Project	Water utilisation including In evaporation losses	T.M.C.
1	2	3	4
K-1			.18
	Minor Irrigation	.18	

1	2	3	4
K-2	.	.	105.47
Upper Krishna	.	103.00	
Minor Irrigation	.	2.47	
		105.47	
K-3	.	.	37.63
Ghataprabha Stages I & II	.	36.60	
Minor Irrigation	.	1.03	
		37.63	
K-4	.	.	41.77
Malaprabha	.	37.20	
Minor Irrigation	.	4.57	
		41.77	
K-5	.	.	.02
Minor Irrigation	.	.02	
K-6	.	.	8.37
Chandrapalli	.	1.90	
Minor Irrigation	.	6.47	
		8.37	
K-7	.	.	.69
Minor Irrigation	.	.69	
K-8	.	.	272.35
Bhadra Anicut	.	3.10	
Tunga Anicut	.	11.50	
Ambligola	.	1.40	
Anjanpur	.	2.50	
Dharma canal and Dharma Project	.	2.20	
Tungabhadra Project Right Bank Low Level canal	.	22.50	
Tungabhadra Project Left Bank Low Level Canal (including Left Bank High Level canal)	.	92.00	
Tungabhadra Right Bank High Level Canal Stages I and II	.	17.50	
Hagari Bomanhalli	.	2.00	
Bhadra Reservoir	.	61.70	
Vijayanagar Channel	.	5.71	
Rajolibunda Diversion	.	1.20	
Minor Irrigation	.	49.04	
		272.35	
K-9	.	.	38.07
Vanivilas Sagar	.	8.20	
Minor Irrigation	.	29.87	
		38.07	
TOTAL	.	.	504.55

ANDHRA PRADESH			
Sub-basin	Project	Water utilisation including evaporation losses	In T.M.C.
K-6	.	.	5.51
Kotipallavgu	.	2.00	
Minor Irrigation	.	3.51	
		5.51	
K-7	.	.	523.32
Koilsagar	.	3.90	
Okachettivagu	.	1.90	
Dindi	.	3.70	
Guntur Channel	.	4.00	
Vaikunthapuram Pumping Station	.	2.60	
Nagarjunasagar	.	281.00	
Krishna Delta Canals	.	181.20	
Minor Irrigation	.	45.02	
		523.32	
K-8	.	.	126.26
Tungabhadra Right Bank Low Level Canal	.	29.50	
Tungabhadra Right Bank High Level Canal Stages I and II	.	32.50	
Gajuledinne	.	2.00	
Rajolibunda Diversion	.	15.90	
Kurnool Cuddapah Canal	.	39.90	
Minor Irrigation	.	6.46	
		126.26	
K-9	.	.	12.47
Bhairavanitippa	.	4.90	
Minor Irrigation	.	7.57	
		12.47	
K-10	.	.	34.14
Musi	.	9.40	
Water Supply to twin city of Secunderabad and Hyderabad	.	3.90	
Minor Irrigation	.	20.84	
		34.14	
K-11	.	.	11.15
Palair	.	4.00	
Minor Irrigation	.	7.15	
		11.15	
K-12	.	.	36.31
Pakhal Lake	.	2.60	
Muniyeru	.	3.30	
Lankasagar	.	1.00	
Wyra	.	3.70	
Minor Irrigation	.	25.71	
		36.31	
TOTAL	.	.	749.16

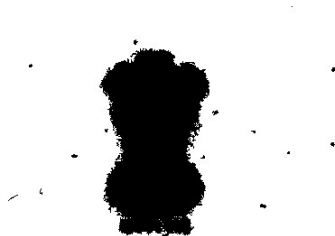
The preferred utilisation in the Krishna basin is shown sub-basinwise in the following table :—

Sub-basin	Maha-rashtra	Mysore	Andhra Pradesh	Total
1	2	3	4	5
K-1 . . .	186.23	.18		186.41
K-2 . . .	.13	105.47		105.60
K-3 . . .	1.03	37.63		38.66
K-4 . . .		41.77		41.77

	1	2	3	4	5
K-5 . . .		250.65	.02		250.67
K-6 . . .		1.61	8.37	5.51	15.49
K-7 . . .			.69	523.32	524.01
K-8 . . .			272.35	126.26	398.61
K-9 . . .			38.07	12.47	50.54
K-10 . . .				34.14	34.14
K-11 . . .				11.15	11.15
K-12 . . .				36.31	36.31
		439.65	504.55	749.16	1693.36

Issue 11(3) is answered accordingly.

Price : Inland : Rs. 6.00
Foreign : £ 0.70 or \$ 2.16



GOVERNMENT OF INDIA

KRISHNA WATER DISPUTES TRIBUNAL

**THE REPORT
OF
THE KRISHNA WATER DISPUTES TRIBUNAL
WITH THE DECISION**

VOLUME II

**NEW DELHI
1973**

ERRATA

(Volume II of the report of the Krishna Water Disputes Tribunal)

S. No.	Page No.	Column	Line No.	For	Read
1	2	3	4	5	6
1.	125		1 of foot note	)	(1)
2.	125		3 of foot note (2)	others.	others, Arbitration (France v. Spain)
3.	126	First	20	Arbitration France v. Spain),	
4.	126	First	23	observed	observed
5.	127		1 of foot note (12)	Missori	Missouri
6.	129	Second	Heading Col. 1 of the Table	ef	of
7.	130		Heading Col. 7 of the Table	Mk Wh.	MkWh
8.	130		Under Col. 2 against Sl. No. 1 (i) of the table	Seheme	Scheme
9.	131	First	last but one	MKWh	MkWh
10.	131	Second	last line	MKWh	MkWh
11.	132		under col. 6 against S. No. 3 of Second Table	1,90,000	1,90,000
12.	132		3 under col. "Project" of Third Table	Projects	Project
13.	133		4 of foot note (23)	schemes	schemes
14.	136	Second	18	Sulnear	Sul near
15.	138	First	16	'Lipper out	"Lipper points out
16.	138		2 of foot note (49)	interets ; UN. Doc. E/ECE 136	interest, UN. Doc. E/ECE/136
17.	138		foot note (52)	1965	1955
18.	138		2 of foot note (59) at the end	Chin	Chih
19.	144	First	36	energe	energy
20.	145	First	3	end	and
21.	147	Second	1	plants	plans
22.	148	First	11	cheep	cheap
23.	149	Second	36	15,000	15,500
24.	149		2 of foot note (113)	Specialty	Speciality
25.	150	First	33	streams".	stream".
26.	155	First	11	Krishna System	Krishna River System
27.	161	First	5	utilisable	utilisable 1
28.	161	First	7	basis	basis ²
29.	165	Second	43	take	make
30.	174	First	Heading of the last col. of second table	Total T.M.	Total T.M.C.
31.	180	First	16	as follow: —	as follows :-
32.	181	First	24	bhandars,	bhandaras,
33.	182	Second	42	by State	by a State
34.	183	First	39	Cuddapa	Cuddapah
35.	184	First	3 of para 3(ii)	States,	State,
36.	185	Second	42	form	from

1	2	3	4	5	6
37.	188		Title	Appropriation of the water	Apportionment of the waters
38.	192	Second	9	railfall	rainfall
39.	193	First	27	5.450	5,450
40.	193	Second	7	seasons	seasonals
41.	193	Second	12	This	The
42.	195	First	7	bhandharas	bandharas
43.	196	Second	11	States	State
44.	196	Second	15	Konnan	Konkan
45.	203	First	15-16	Karmala of Sholapur	Karmala Taluka of Sholapur
46.	204	First	12	49.8	49.3
47.	204	First	18	12.0	12.20
48.	204	First	22	and	end
49.	206	First	32	areas	area
50.	207		2 of heading of Col. 2 of first table	MRKP-31	MRPK-31
51.	207	First	7 below the Table	Shown the	Shown in the
52.	212	Second	36	Situated in	Situated is
53.	214	First	31	Left	Left
54.	218	Second	2 of Heading of col. 2 of the table	cases	acres
55.	222	First	Note: — (1) below the table	areas are MYPK-9	areas are from MYPK-9
56.	224	Second	8	need	need
57.	230	Second	37	This	The
58.	232	First	against sl. No. 6 under para 'B'.	CWP&PC	CW & PC
59.	232	Second	against item (c) of para 'C'	Ghaatprabha	Ghataprabha

GOVERNMENT OF INDIA

KRISHNA WATER DISPUTES TRIBUNAL

•

THE REPORT
OF
THE KRISHNA WATER DISPUTES TRIBUNAL
WITH THE DECISION
IN THE MATTER OF WATER DISPUTES REGARDING
THE INTER-STATE RIVER KRISHNA & THE RIVER VALLEY THEREOF
BETWEEN

1. The state of Maharashtra	
2. The state of Karnataka	
3. The state of Andhra Pradesh	
4. The state of Madhya Pradesh	}
5. The state of Orissa	
	Parties to the dispute until 19th April, 1971

VOLUME II

NEW DELHI
1973

CONTENTS

	PAGE
CHAPTER XIII — Diversion of the Krishna Waters outside the Krishna Basin	151
CHAPTER XIV — Apportionment of the waters of river Krishna	151
CHAPTER XV — Concluding observations	224
CHAPTER XVI — Final Order of the Tribunal	226

CHAPTER XIII

DIVERSION OF THE KRISHNA WATERS OUTSIDE THE KRISHNA BASIN

Part I—*Legality of diversion of river water to another watershed.*

Proposals and contentions of the parties.—Mysore has no existing project nor does it contemplate any future project for diversion of the Krishna waters outside the basin. Maharashtra diverts and proposes to divert large quantities of water outside the Krishna basin for generation of hydropower and, wherever possible, for irrigation from the tail-race waters. Andhra Pradesh diverts and proposes to divert large quantities of water outside the Krishna basin for purposes of irrigating lands in other basins.

Mysore contends that diversion outside the basin is illegal and that only in-basin needs should be considered in determining a State's equitable share. Maharashtra asserts that transfer of water to another watershed for purposes of both power generation and irrigation is lawful and that, while in-basin needs only should be considered in determining a State's equitable share, a State should be permitted to divert its share of the water outside the basin. Andhra Pradesh contends that out-of-basin needs are a relevant factor and that diversion outside the basin for irrigation needs only should be permitted. On the subject of diversion of the Krishna waters outside the Krishna basin generally, the following issue was raised :—

Issue II(4) "Should diversion or further diversion of the waters outside the Krishna drainage basin be protected and/or permitted ? If so, to what extent and with what safeguards ?"

Necessity of diversion to another watershed.—The diversion of river water to a different watershed for purposes of irrigation, generation of hydropower, municipal water supply and other beneficial uses may be made sometimes, and no objection can be raised

to this practice merely on the ground that the diversion is from an inter-State river. The diversion to another basin may be useful for the benefit of the region as a whole ⁽¹⁾. One river basin may have a surplus of excellent land capable of being irrigated but a shortage of irrigation water, while another basin may have a surplus of water but a shortage of arable land; such a situation may be rectified by moving surplus water to areas where it is needed and can be used beneficially.

Large scale and technically complex diversions of water have become common with the advance of modern technology. There are many instances of such diversions in U.S.A., South America, Australia, France, Switzerland, Russia, China and other countries ⁽²⁾. In India also, the waters of the Ravi, the Beas, the Jhelum, the Sutlej, the Chenab, the Krishna, the Mula Mutha, the Indrayani, the Periyar, the Chelakudi, the Subarnarekha and other rivers have been diverted to other watersheds. Currently, the feasibility of the Ganga Cauvery link is being seriously debated.

An inter-State river basin is an indispensable unit for meteorological, hydrological and engineering studies and is an important unit for organising and carrying out economic and social development including the improvement of land and water use practices. Only a river basin study can give intimate knowledge of the quantity, quality and distribution of water resources and the optimum location of dam sites and engineering works. At the same time a comprehensive river basin development plan must always take account of competing projects, demands and service areas within wider boundaries than merely those of the basin. Natural and social factors may indicate a wider area for optimum growth⁽³⁾.

(1) Second Five Year Plan, p. 349.

(2) L.A. Teclaff—The River Basin in History & Law (1967), pp. 184-192, 202; R.C. Martin and others, River Basin Administration and the Delaware, pp. 19-20, 230; E. Kuiper, Water Resources Development, Planning Engineering and Economics (1965), p. 351; R. J. Chorley, Water Earth & Man, pp. 507-508; A. H. Garretson and others. The Law of International Drainage Basins, pp. 324, 492-495; The International Law Association, Report of the Fifty-Second Conference Helsinki 1967, p. 461. In China, an irrigation canal diverting the Ching river and discharging it into the Lo river was completed in 246 B.C., see History of Mankind by Luigi Pareti Vol. II, Part II, p. 383 (English translation by Guy E.F. Chilver and Sylvia Chilver).

(3) J.D. Chapman, The International River Basin (1963), p. 2; R.E. Clark, Water and Water Rights (1967) Vol. II, pp. 427-429

Hydropower produced from the basin waters may be and is often needed and transmitted for the benefit of other areas. For optimum utilisation of water resources, it may be necessary to divert surplus waters for irrigating lands in scarcity areas outside the basin.

Legality of the diversion.—On several occasions, the U.S.A. Supreme Court has allowed diversions of waters of Inter-State rivers outside the watershed.

In *New Jersey v. New York* 283 U.S. 336(1931) at p. 343 the Court observed :

"The removal of water to a different watershed obviously must be allowed at times unless States are to be deprived of the most beneficial use on formal grounds. In fact it has been allowed repeatedly and has been practised by the States concerned. *Missouri v. Illinois*, 200 U.S. 496, 526. *Wyoming v. Colorado*, 259, U.S. 419, 466. *Connecticut v. Massachusetts*, 282, U.S. 660, 671."

In *Lake Lanoux Arbitration France v. Spain*, *International Law Reports* (1957) Lauterpacht, p. 101 at p. 125, an International Arbitral Tribunal observed :

"The Tribunal does not overlook the reality, from the point of view of physical geography, of each river basin, which constitutes, as the Spanish Memorial (at p. 53) maintains 'a unit'. But this observation does not authorise the absolute consequences that the Spanish argument would draw from it. The unity of a basin is sanctioned at the juridical level only to the extent that it corresponds to human realities. The water which by nature constitutes a fungible item may be the object of a restitution which does not change its qualities in regard to human needs. A diversion with restitution, such as that envisaged by the French project, does not change a state of affairs organised for the working of the requirements of social life. The state of modern technology leads to more and more frequent justifications of the fact that waters used for the production of electric energy should not be returned to their natural course. Water is taken higher and higher up and it is carried ever farther, and in so doing it is sometimes diverted to another river basin, in the same state or in another

country within the same federation, or even in a third State. Within federations, the judicial decisions have recognised the validity of this last practice (*Wyoming v. Colorado*..... (259 U.S. 419) and the instances cited by Dr. F. J. Berber, *Die Rechtsquellen des internationalen Wassernutzungsrechts*, p. 180, and by M. Sauser-Hall, 'L' Utilisation industrielle des fleuves internationaux', (in) *Recueil des Cours de l'Académie de Droit international de la Haye*, 1953, Vol. 83, p. 544; for Switzerland, (see) *Recueil des Arrêts du Tribunal Fédéral*, Vol. 78, Part I, pp. 14 et seq."

Mysore relied on a statement of Dr. Gamal M. Badr (Algeria) at the fifty second conference of the International Law Association at Helsinki that diversions of waters beyond the geographical limits of the drainage basin was illegal. He proposed that the draft Article IV of the Helsinki Rules should be amended to read "Each basin State is entitled to a reasonable and equitable share in the beneficial uses within the part of the basin lying in its territory, of the waters of the international river basin". But it is to be observed that Mr. J. L. Macallum (Canada) and Dr. Zarbrugg (Switzerland) and other participants did not agree with Dr. Badr and the conference approved of Article IV which reads "Each basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an International drainage basin⁽⁴⁾".

For all these reasons, we hold that diversion of water of an inter-State river outside the river basin is legal. In the present case, all the areas outside the Krishna basin to which the Krishna waters are diverted or proposed to be diverted are situated within the territories of riparian States. We express no opinion on the question whether the Krishna waters can lawfully be diverted to areas situated in the territories of a non-riparian State.

Relevance of need for diversion of water outside the basin.—The need for diversion of water to another watershed may be a relevant factor in equitable apportionment. Transmountain diversions were considered by the parties to the Upper Colorado River Basin Compact, 1948 in arriving at a fair share of the riparian States in the waters of the inter-State Colorado River system⁽⁵⁾. A State is one integral unit and its interests encompass the well being

(4) The International Law Association Report of the Fifty Second Conference Helsinki 1966, pp. 448-449, 460-461, 476, 486.

(5) A.H Garretson and others, *The Law of International Drainage Basins* (1967), pp. 494-495.

of all its inhabitants within its territory including areas outside the river basin. Under Section 3 of the Inter-State Water Disputes Act, 1956, the crucial question is whether the interest of the State or of any of its inhabitants in the waters of the inter-State river and river valley is prejudicially affected by the action of another State. Thus, the relevant consideration is the interest of the State as a whole and all its inhabitants and not merely the interest of the basin areas of the State.

However the fact that the water diverted to another watershed is wholly lost to the river basin and no part of it appears as return flow or adds to the ground water recharge in the basin is also a relevant factor in equitable apportionment ⁽⁶⁾.

Permissible limits of diversion to another watershed.—Though out-of-basin diversions and needs may be relevant in determining a State's equitable share, the weight to be given to them depends upon the circumstances of each case. Each river basin has its own peculiar problems and there is no set of rigid-norms that can be applied to all river systems under all circumstances.

If there is an agreement permitting the removal of the water to a different watershed, the agreement furnishes the law and no further question arises. Otherwise complex questions of distribution may arise ⁽⁷⁾.

Diversion of water from one river basin to another is viewed with distrust and resisted by the basin population⁽⁸⁾ and in some places statutory restrictions are imposed on such transfer ⁽⁹⁾. Some publicists hold that barring exceptional circumstances large scale transfers of water do not maximise economic benefits ⁽¹⁰⁾—and some assert that all future needs of areas of origin must be provided for before surplus water can be exported⁽¹¹⁾. Comprehensive river basin plans have been formulated on the basis that generous allowance should be made for all present and prospective uses within the parent drainage basin before water would be exported to an adjacent drainage area⁽¹²⁾.

On the other hand, there are publicists who maintain that water resources of the river should be used to optimum advantage over the entire area served or likely to be served by the water including areas outside the river basin⁽¹³⁾.

With respect to diversion of the Godavari waters to the Krishna basin, the Khosla Committee ⁽¹⁴⁾ observed that "In any actual scheme of diversion, it will, however, have to be laid down that Godavari areas having prior claims on the Godavari, diversion will be allowed only when the waters are actually in excess of the requirements of the Godavari basin". The question of diversion of the Godavari waters out of the Godavari basin will be discussed by us separately.

(6) Report of the Special Master, Michael J. Doherty, pp. 131-152 in the case of Nebraska v. Wyoming 325 U.S. 589, 665.

(7) The Nation's Water Resources, U.S. Water Resources Council 1968, p. 6-13-10.

(8) Transactions of the American Society of Civil Engineers Vol. 104(1939), p. 1822 Paper No. 2055—Final Report of the Committee of the Irrigation Division on Inter-State Water Rights (The people dependent on the waters of a stream view with distrust any attempts to divert a portion of its waters to another watershed or basin).

Francis A. Engelbert, Federation and Water Resources Development, Law and Contemporary Problems Vol. 22(1957), p. 325 at p. 336.

(9) In U.S.A., many local statutes restrict the diversion of water from one river basin to another, See Ven Te Chow, Handbook of Applied Hydrology (1964), p. 27-14, The Water Resources Planning Act of 1965 enjoins that no entity established or acting under the Act may "study, plan, or recommend the transfer- of waters between areas under the jurisdiction of more than one river basin commission."

(10) C.W. Howe, K.W. Easter, Inter Basin Transfers of Water, Economic Issues and Impacts (1970), p. 168 (Except for certain sets of circumstances in so called "rescue operations", the national economic benefits from the use of the water provided would, be less than the cost of the transfers); Joseph L. Sex, Water Law Planning & Policy (1968), pp. 20-22 (Engineering feasibility must not be confused with social policy and economic gain).

(11) L.A. Teclaff, The River Basin and Beyond-changing concepts in U.S. Water Resources Planning, International Association for water law, Annales Juris Aquarum (1968), p. 114; L.A. Teclaff, The River Basin in History and Law pp. 191, 192. L.A. Teclaff even asserts that the future needs or uses of the areas of origin take precedence over existing or prior uses of the receiving-areas, UN Inter regional Seminar on Current Issues of Water Resources Administration, New Delhi, 1973 ESA/RT/Meeting V/8 Reading 3.

N.D. Gulhati, Development of inter-State rivers, Law and Practice in India, p. 93 (The lands of a river basin have prior claim on the waters of a river system and any part of these waters can be used for irrigation outside the basin only if that part is surplus after meeting the full requirements of the lands within the basin. Any irrigation use outside the basin, ignoring the claims of the basin itself, must sooner or later lead to undesirable complications).

(12) Missouri River Basin Project, Lower Platte River Basin, A plan of development for the Lower Platte Basin, September, 1951, pp. 173-174 (U.S. Dept. of the Interior, Bureau of Reclamation Region 7).

(13) R.C. Martin and others, River Basin Administration and the Delaware, pp. 19-20, 23-24.

(14) Report of the Technical Committee on the optimum utilisation of the Krishna and the Godavari Waters (1952), p. 103.

The preponderance of opinion seems to indicate that diversion of water to another watershed may be permitted, but normally, in the absence of any agreement, the prudent course may be to limit the diversion to the surplus waters left after liberally allowing for the pressing needs of basin areas. In general, basin areas are more dependent on the water than other areas. Maximum economic benefit can rarely be achieved by ignoring the pressing needs of the areas of origin and permitting development elsewhere.

However, where water has already been allowed to be transferred and used in another watershed, the settled economy of the region should not be lightly disturbed. Normally, existing works based on such a transfer should receive the same protection that may be given to existing works based on diversions inside the basin. If a populous city outside a river basin receives its water supply from the river, it is unjust and unrealistic to hold that the water should be restored to the basin and the city deprived of its drinking water.

For a long period of time, large quantities of water have been diverted outside the Krishna basin and used for beneficial purposes. Admittedly, however, the available supplies of the Krishna river system are not sufficient to satisfy the demands of all the existing and proposed projects of the States.

Conclusion.—Subject to consideration of the question whether in case of conflict between uses for irrigation and power production the claims for power production by westward diversion of water should be allowed to prevail at the expense of irrigation, three propositions may be safely laid down with regard to the Krishna river basin:

- (1) Diversion of water of the inter-State river Krishna outside the river basin is legal.
- (2) In equitable allocation, future uses requiring diversion of water outside the basin are relevant, but more weight may be given to uses requiring diversion of water inside the basin.
- (3) All existing uses based on diversion of water outside the basin should receive the same protection that may be given to existing uses based on diversion of water inside the basin.

Part II—*Diversion of water of the Krishna river for irrigation outside the river basin.*

Water is and will be diverted outside the Krishna basin for the purpose of irrigation from the following projects⁽¹⁵⁾ :—

- (1) Krishna Delta Canals,
- (2) Kurnool Cuddapah Canal,
- (3) Nagarjunasagar project (Right Bank Canal),
- (4) Tungabhadra Project (Right Bank High Level Canal) Stages I and II (Andhra Pradesh's share), and
- (5) Guntur Channel.

The Krishna Delta Canal system was constructed in 1855 for irrigation of the Delta areas. The characteristic of the delta formed at the mouth of a river by the deposit of river-borne silt is that its general surface slope is away from the river margins and most of its drainage reaches the sea through minor streams. A large part of the delta area is thus technically outside the river basin. But the entire delta area is dependent on the river for irrigation; its soil is usually very fertile, and being soft, facilitates the cheap construction of canals⁽¹⁶⁾. About 95% of the area irrigated in the Krishna delta by the Krishna Delta canals is in the Gundlakamma and other minor valleys outside the Krishna basin. The Guntur Channel will supply water for irrigation to the high lands adjoining the Krishna Delta.

The Kurnool Cuddapah Canal was constructed in 1866 to alleviate distress in the famine-stricken areas of the Pennar basin. About 90% of the area irrigated by the Kurnool Cuddapah Canal lies in the Pennar valley⁽¹⁷⁾. At the point of diversion of the Krishna waters, a low ridge separates the Pennar valley from the Krishna basin.

The Tungabhadra Project High Level and Low Level Canals are intended partly for the benefit of Bellary, Anantpur, Cuddapah and Kurnool districts⁽¹⁸⁾. A part of the area irrigated from the Tungabhadra High Level Canal lies in the Pennar valley. Water is diverted outside the Krishna basin from the Nagarjunasagar Project Right Bank Canal also.

(15) MRDK XII, Sheet No. XXIII.

(16) See W.M. Ellis, College of Engineering Manual 1963, pp. 62-65.

(17) Report of the Krishna Godavari Commission, p. 162.

(18) The Andhra State Act, 1953 section 66(5); Report of the Tungabhadra Project 1942 Low level Canal Scheme, APPK XVIII pp. 3-5.

All the out-of-basin areas irrigated by the Krishna waters lie in the territories of Andhra Pradesh. It is conceded by all parties that all these projects should be protected. Only the extent of their protection is disputed and this will be dealt with under Issue II(3).

Maharashtra and Mysore argue that restrictions should be imposed on Andhra Pradesh regarding the quantity of water which may be diverted by Andhra Pradesh for irrigation outside the Krishna river basin. It is to be observed that all diversions by Andhra Pradesh outside the basin are for purposes of irrigation only and not for purposes of power production. The delta area, though technically outside the basin, is heavily dependent on the Krishna waters for its irrigation needs. Diversion of the Krishna waters for irrigation of scarcity areas in the Pennar valley has been practised for a long time. Irrigation from the Nagarjuna-sagar Project and the Tungabhadra Left Bank High Level Canal of Andhra Pradesh is not yet fully developed and it is not known how much water will be diverted from these projects for irrigation outside the basin. On a consideration of all relevant materials, we do not propose to impose any specific restrictions on Andhra Pradesh regarding diversion of water outside the basin for purposes of irrigation.

Part III—Maharashtra's westward diversion schemes and conflict between uses for irrigation and power.

Existing westward diversion projects.—For over half a century, waters of the Krishna river system are being diverted westwards for purposes of generation of hydropower. In the Tata Hydel Power Supply, Andhra Valley Power Supply and Tata Power Schemes, the headwaters of the Bhima are impounded in storages, conducted through tunnels or open ducts to steel penstocks and dropped to power houses at the foot of the Western Ghats. The three schemes collectively known as the Tata Hydel Works are operated by the Tata group of limited companies.

The gigantic Koyna Hydel Project diverts the waters of the river Koyna westwards for purposes of power generation. The Koyna is an important tributary of the river Krishna. The project has an underground power house at Pophali. The seasonal rainfall is impounded in the huge Koyna reservoir so that a dependable water supply is available throughout the year. The water is taken from the reservoir through an underground head-race tunnel, surge shaft, pressure shafts and penstocks and dropped from a considerable height to the turbines in the power house at the foot of the Western Ghats.

The Koyna station has 4 generators of 75 MW each and 4 generators of 60 MW each. The load factor of the station utilising 67.5 T.M.C. of water annually is 54% with one generator as a stand-by and 46.5% with all generators working. Normally, except during periods of repairs, maintenance etc., all generators work for 24 hours in the monsoon season and during day time in the non-monsoon season ⁽¹⁹⁾.

The Koyna dam suffered damage from earthquakes in December 1967 and soon thereafter the lowering of the crest gates was stopped. The strengthening of the dam was completed in May 1972.

All the westward diversion projects lie in the territories of Maharashtra. The protected annual westward diversion for the projects including incidental evaporation losses is as follows:—

- Name of project	Westward diversion in T.M.C.	Evapo- ration- losses in T.M.C.	Total in T.M.C.
1	2	3	4
Tata Hydel Projects	42.6	2.4	45
Koyna Hydro-electric Project	67.5	7.3	74.8
TOTAL	110.1	9.7	119.8

All the parties have conceded that the annual utilisation, of 119.8 T.M.C. for these projects should be protected.

Particulars of the power generated at the Tata Hydel Works and the Koyna Hydel Project Stages I, II & III are given in the following table ⁽²⁰⁾.

(19) MR Note No. 16.

(20) MR Note No. 15.

Sl. No.	Name of Project	Head for power generation in feet	Number and size of units installed kW.	Firm capacity at 100% L.F kW.	Capacity available and L.F. for which station is designed kW. (taking one unit standby)	Total energy generated in MkWh.
1	2	3	4	5	6	7
1.	Tata Hydel Works		5x12,000=60000 1x10,000=10,000 <u>70,000</u>	26,300	58,000 kW @45.3%L.F.	*1225 (Average at 50.7% load factor).
	(i) Tata Hydel Power Supply Scheme	1725		34,050	60,000 kW @	
	(ii) Andhra Valley Power Supply Scheme	1721	6 x 12,000=72,000	90,100	56.8% L.F.	
	(iii) Tata Power Scheme (Mulshi Dam)	1638	6 x 22,000=1,32,000		1,10,000 kW @82%L.F.	
2.	(i) Koyna Hydro electric Project Stages I & II	1600	4 x 60,000=2,40,000 4 x 75,000=3,00,000 <u>5,40,000</u>	2,51,600	5,40,000 kW @ 54% L.F. 4,65,000 kW @ 46.5 L.F.	2200 with 67.5 T.M.C. diversion.
	(ii) Koyna Hydro-electric Project Stage III	400	4 x 80,000=3,20,000	64,000	3,20,000 @20%to30%L.F.	590 with 67.5 T.M.C. diversion.

* The average of the combined energy generation of the 3 power schemes for the period 1966-67 to 1971-72.

The annual diversion of water for hydro power generation from Tata lakes from year to year during 1952-53 to 1967-68 was ⁽²¹⁾ as follows:—

Sl. No.	Year	Tata Hydel Power Supply	Andhra Valley Power Supply	Tulshi Dam	Total
1.	1952-53	5.97	8.35	24.37	38.69
2.	1953-54	6.92	8.00	25.22	40.14
3.	1954-55	5.87	8.60	27.36	41.83
4.	1955-56	6.89	9.01	27.09	42.99
5.	1956-57	8.74	10.31	28.19	47.24
6.	1957-58	5.94	9.72	25.34	41.03
7.	1958-59	7.79	10.81	25.92	44.52
8.	1959-60	9.64	12.56	26.43	48.63
9.	1960-61	7.07	9.01	26.53	42.61
10.	1961-62	10.39	13.55	30.53	54.47
11.	1962-63	7.98	8.90	29.19	46.07
12.	1963-64	7.74	10.42	27.99	46.15
13.	1964-65	6.48	7.94	27.95	42.37
14.	1965-66	5.85	8.59	26.31	40.75
15.	1966-67	4.25	6.36	22.66	33.27
16.	1967-68	5.27	7.31	26.24	38.82

Koyna Project

The proposal of the Bombay Government for westward diversion of the Koyna waters for purposes of power production met with considerable opposition from the lower riparian States and was one of the main reasons for calling the conference of the States interested in the Krishna waters in July 1951.

Opening the discussion at the inter-State conference on the 27th July, 1951, Shri V. T. Krishnamachari stated:

"In considering the issues placed before the meeting, two points of view should be reconciled. The first was the need from an all-India point of view for increasing available food supplies within the shortest possible time and on the most economic basis. The Irrigation Commission reporting over 50 years ago emphasised the need regarding irrigation development as a national all-India question. This was even more important now than it was in the past. India's food problem can be solved only on such a basis. The shortage of power in the Bombay City and surrounding areas should also be regarded as an urgent problem. On the other hand, regional development was important, especially the development of backward regions, and could not be ignored."

The memorandum of agreement drawn up as a result of the deliberations at the conference provided that the diversion of supplies across the Western Ghats for the Koyna Project would be limited to 67.5 T.M.C. of water. Formal sanctions to Stages I & II of the Koyna Hydel Project were given by the Planning Commission subject to the condition that the westward diversion of water would be limited to 67.5 T.M.C. of water annually. Maharashtra proposes to divert from the Koyna Project an additional 32.5 T.M.C. of water westwards for power generation and 16 T.M.C. of water eastwards for purposes of irrigation.

Particulars of the Koyna Hydel extension scheme and the allied Koyna-Krishna Lift Irrigation scheme are as follows :—

Name of Project	Source of supply	Westward diversion in T.M.C.	Eastern irrigation in T.M.C.	Total utilisation in T.M.C.
Koyna Hydel Scheme with reservation of 16 T.M.C. for lift scheme	Koyna	32.5	16	48.5
Koyna Krishna Lift Irrigation Scheme	Koyna		5.6	5.6
				in addition to 16 T.M.C. available from Koyna storage.

With an annual diversion of 100 T.M.C. of Koyna water, the Koyna Hydel Station Stages I and II will produce 3,260 MKWh of electricity and will operate at 80 per cent L.F. with

one generator of 75 MW as stand-by and at 69 per cent L. F. with all generators working. With this diversion, Koyna Hydel Project Stage III will produce 785 MKWh of energy at 20 to 30 per cent L. F.

(21) KGCR Ann. IV pp. 109-144; MRDK V pp. 34-40, 44-50, 54-60; MR Note No. 44.

New Multiple purpose westward diversion schemes:
Maharashtra proposes new multi-purpose schemes for westward diversion of 108.1 T.M.C. and eastward

diversion of 23.5 T.M.C. of water. Particulars of the new schemes are as follows:—

Name of Project	Source of supply	Westward diversion including evaporation in T.M.C.	Eastward diversion in T.M.C.	Total utilisation including evaporation in T.M.C.
1	2	3	4	5
Hiranyakeshi	Hiranyakeshi	27.2	5	32.2
Multi-purpose Vedganga	Vedganga	22.7	5	27.7
Multi-purpose Kasari	Kasari	34.4	Nil	34.4
Multi-purpose Kumbhi	Kumbhi	10.5	7	17.5
Multi-purpose Kadvi	Kadvi	9.1	6.5	15.6
Multi-purpose Phonda	Bhogavati	4.2	Nil	4.2
Multy purpose				
TOTAL		108.1	23.5	131.6

Particulars of the power potential and other details of the new westward diversion schemes are given in ⁽²²⁾ the following table :—

SI No	Name of Project	Head for power generation in feet	Number & size of units installed kW	Firm capacity at 100% L.F. KW	Capacity available & L.F. for which station is designed kW	Cost of generation paise per kWh.	Total energy generated in MkWh
1	2	3	4	5	6	7	8
1.	Hiranyakeshi and Vedganga	1688 (& 190 for ridge power house).	8x80,000=6,40,000 1 x 13,500	1,76,250	6,40,000 at 25% L.F. 13,500 at 76% L.F.	4.95	1517
			6,53,500				
2.	Kasari	1283 and 197	6x55,000=3,30,000 1x6,000=6,000	82,000 6,000	3,30,000 at 26.2% L.F - 6 000 at 100% L.F	5.45	730
			3,36,000	88,000			
3.	Kumbhi	1380	2x95,000=1,90,000	38,000	1,90,000 at 20 %L.F.	6.25	262
4.	Kadvi .	1510	2x66,500=1,33,000	33,225	1,33,000 at 25 % L.F.	6.25	228
5.	Phonda .	1415	1x75,000=75,000	14,730	75,000 at 20 % L.F.	6.25	99
	TOTAL		13,87,500	3,50,205			2836

Thus Maharashtra seeks to utilise 260.4 T.M.C. of water for westward diversion including evaporation losses as follows:—

Project	Westward diversion including evaporation losses in T.M.C.
Tata Hydel Projects Koyna Hydel Project (authorised) . Koyna	45
Hydel Projects (extension) New Multi-Purpose Projects .	74.8
	32.5
	108.1
TOTAL	260.4

Maharashtra passed the following resolution :—

"The Government of Maharashtra has carefully considered the question of the westward diversion of the waters of the river Krishna and is hereby pleased to authorise the Advocate General of Maharashtra, Shri H. M. Seervai, appearing before the Honourable Tribunal hearing the Krishna water dispute to make a statement on behalf of the State of Maharashtra that for all practical⁽²²⁾ MR Note No. 9.

On December 15, 1970, the Government of Maha-

purposes, it is not possible to divert more than 260 T.M.C. of water to the West and he is further authorised to inform the Honourable Tribunal that the Honourable Tribunal may by its final order restrain the State Of Maharashtra from diverting more than 260 T.M.C. of water to the west."

Even in 1951, when irrigation was not yet fully developed, westward diversion of water was resisted by the lower riparian States and only a limited quantity of water was allowed to be diverted westwards for production of electric energy. Since 1951, irrigation in the Krishna basin is being intensively developed. The question is whether further westward diversion of the Krishna waters should be permitted.

The States of Mysore and Andhra Pradesh strongly object to the westward diversion of additional water for purposes of power production.

Irrigation and other uses in the Ratnagiri District :

Maharashtra asserts that westward diversion of the Krishna waters is necessary not only for power production, but also for irrigation, water supply and industrial uses in Ratnagiri.

The major portion of the tail-race waters of the existing westward diversion from Koyna Hydel Project⁽²³⁾ and Tata Hydel Works ⁽²⁴⁾ is not utilised for purposes of irrigation or other beneficial uses in the Ratnagiri district.

Maharashtra proposes to utilise the tail-race waters of new westward diversion schemes for irrigation, water supply and other uses in Ratnagiri.

Particulars of westward irrigation under the new westward diversion schemes will appear from the following table:-

Name of Project		Westward diversion/ gross utilisation for westward irrigation (T.M.C.)	Irrigated area (in thousand acres)	Talukas to be irrigated	District
1	2	3	4	5	
1. Kadvi	 9.1/9.1	18.2	Lanja Mahal	Ratnagiri	
			Sangamsshar	"	
2. Kasari	 34.4/25.85	55.81	Lanja Mahal	"	
			Rajapur	"	
3. Kumbhi.	 10.5/10.5	23.0	Kankavli	"	
			Gagan Bavda Mahal	Kolhapur	
4. Phonda	 4.2/4.2	9.0	Kankavli	Ratnagiri	
5. Hiranyakeshi	 49.9/34.26	80.5	Kudal Mahal	"	
6. Vedganga			Sawantwadi	"	
			Vengurla	"	
			Malvan	"	
		108.1/83.91	186.51		

All the areas in Ratnagiri and Kolhapur districts proposed to be irrigated from westward diversion schemes have heavy and assured rainfall during the monsoon months. The normal annual and June to

November monthly rainfall in millimetres and the number of rainy days in these areas are shown in the following table⁽²⁵⁾.

⁽²³⁾ in its statement of case (MRK I p. 47) Maharashtra said that, except for the Koyna Project, most of the water required for the proposed westward diversion schemes will be used for irrigation in Konkan areas. However, the note on Koyna Hydel Scheme (MRPK XXVIII, pp. 5-9) states that about 10 T.M.C. of the tail-race water released from Koyna Project will be used for irrigation and water supply in the Konkan region. Most of the proposed irrigation schemes are still under investigation.

⁽²⁴⁾ The Note on Tata Hydel Works (MRPK XXVIII, pp. 55-56) states that a part of the tail-race waters from the Khopoli and Bhivpuri power houses are used for industries, lift irrigation schemes and for irrigation of about 4,000 acres under the Raja Nala Scheme and that the tail-race waters from Bhira Power House will be used for irrigating about 33,000 acres under the Kal Project.

⁽²⁵⁾ Memoirs of the India Meteorological Department 1962 Vol. XXXI, Part III. (Monthly and Annual Normals of Rainfall and of Rainy days), MYDK XIX pp. 7-9, 16.

RAINFALL IN MILLIMETRES AND NUMBER OF RAINY DAYS

Station	June	July	August	September	October	November	Annual
Vengurla	836.2	910.6	457.7	263.4	96.0	34.3	2671.0
	21.3	26.5	23.1	14.8	5.8	2.0	96.6
Malvan	682.2	700.5	355.6	241.3	82.8	33.0	2154.7
	19.4	23.7	19.9	13.2	4.4	1.8	85.1
Rajapur	806.2	1173.2	664.7	367.3	122.7	32.7	3213.2
	20.6	28.6	26.1	16.2	6.2	1.9	102.0
Lanja	604.0	1409.2	833.4	660.7	112.5	59.2	3759.3
	20.4	29.8	24.6	21.2	6.6	3.2	110.9
Kankavli	557.0	1407.9	832.1	553.5	112.0	64.5	3616.4
	18.7	29.8	26.8	21.2	7.6	2.2	112.7
Sawantwadi	981.5	1370.1	759.2	344.2	177.0	51.1	3758.2
	22.4	28.9	26.4	17.2	8.5	2.6	109.6
Kudal	875.0	1102.4	581.9	289.6	129.8	40.1	3082.0
	21.6	28.1	24.8	15.8	6.9	2.2	102.3
Ganganbavada	1196.9	2237.0	1595.6	799.3	246.4	53.6	6212.3
	24.0	30.6	29.9	23.9	10.9	3.0	128.6

(Figures in the second line against the stations denote number of rainy days).

On account of heavy rainfall in this region, irrigation is not necessary during the kharif season⁽²⁶⁾.

As the west flowing rivers are virtually dry during non-monsoon months, irrigation is useful during the rabi season for growing a second crop of paddy or pulses. ⁽²⁷⁾ However, on account of the difficult terrain, irrigation possibilities are very limited⁽²⁸⁾.

At present, the enormous water potential of the west flowing streams is being wasted to the sea. Suitable projects on the west flowing streams can be constructed for storing and using this water for purposes of irrigation and other uses in Ratnagiri. The Central Water & Power Commission made the following alternative proposals for irrigation from west flowing rivers ⁽²⁹⁾.

Sl. No	Name of project based on westward diversion of waters from the Krishna	Alternative sites on west flowing streams proposed by the C.W. & P.C.
1	2	3
1.	Kasari .	Pastewadi, Puwarwadi
2.	Kumbhi	Sutarwadi, Sanguwadi
3.	Phonda	Ghonsari
4.	Vedganga	Shivdav
5.	Ajra (Hiranyakeshi)	Talamba

The projects on the alternative sites on the west flowing rivers particularly at Shivdav and Puwarwadi are feasible⁽³⁰⁾.

The cost per m.c.ft. of live storage in dam at the alternative sites is comparatively higher, but it is not prohibitive ⁽³¹⁾.

(26) The report of the Maharashtra State Irrigation Commission at p. 203 observed that in the coastal strip comprising the districts of Ratnagiri, Thana and Kolaba, 'No irrigation water was required during the Kharif season on account of heavy rainfall'.

The First Five Year Plan at p. 338 observed : "In areas of high rainfall, like the west coast and north-eastern India, irrigation is either not necessary or is needed only to a very limited extent."

(27) Report of Maharashtra State Irrigation Commission, p. 203.

(28) Report of Maharashtra State Irrigation Commission, p. 36. With regard to future development of the basin of the west flowing rivers, the report of the Irrigation Commission 1972 Vol. HI Part I at p. 278 observed "Maharashtra has stated that because of the ruggedness of much of the terrain and steep gradient there is not much scope for future development of projects in the basin."

(29) MRK II p. 272.

(30) Notes on Shivdav Irrigation Project and Puwarwadi Irrigation Project MRPK XXVIII pp. 104-135; Report of the Maharashtra Experts Coin nittee on possible replacement of irrigation in th3 Ratnagiri district under the proposed multipurpose projects by the water potential of west flowing streams, pp. 1-38.

(31) MYDK II pp. 241-243.

Clearly Ratnagiri district is not a scarcity area.⁽³²⁾

All the areas proposed to be irrigated from the tail race waters of the westward diversion schemes are non-scarcity areas. Their water needs can be fully satisfied from the local rainfall and the west flowing streams. It is not necessary to divert the waters of the Krishna for satisfying those needs. The priority list of projects submitted by Maharashtra gives the first priority to additional westward diversion from the Koyna Project. No part of the tail-race water of this additional westward diversion will be used for irrigation and other uses in Ratnagiri district. Clearly, Maharashtra's need for westward diversion from Koyna and other projects is for purposes of power production only and not for purposes of irrigation. The real question, therefore, is whether further westward diversion of the Krishna waters for purposes of power generation should be permitted

Claim of Maharashtra regarding westward diversion of water for power generation :

According to Maharashtra, the Government of India recognised that, having regard to the special claim of Maharashtra with regard to production of cheap power, westward diversion of water cannot be ruled out altogether. For this purpose, Maharashtra relies on the statement of the Minister of Irrigation and Power in the Lok Sabha on the 23rd March, 1963. In paragraph 19 of his statement ⁽³³⁾, the Minister said :

"As regards the question of diversion across the Western Ghats for power generation, while it goes without saying that the irrigation needs of scarcity areas should receive the first priority, one cannot overlook other consideration. Each area and each group of people have to be developed on the basis of their geography and such natural advantages as may be available to them. Areas which cannot have agriculture as

the main base, have to be developed in other ways. It has been stated that certain parts of Maharashtra cannot be developed except through industry based on cheap power. The land resources there are limited and even such lands may not get irrigation. Some way has to be found to develop the economy of such areas, and the only best way may be to supply them with cheap power, provided, of course that the economy of the people lower down in the river basin is not seriously jeopardised, now or in the future. A suitable balance may have to be struck between the requirements of the people of the region on an equitable basis."

Referring to this statement, the Government of Mysore in its letter dated 14th June, 1963 ⁽³⁴⁾ addressed to the Ministry of Irrigation and Power said that "westward diversion of Krishna should once for all be ruled out giving preference to the irrigation needs of the basin." But the Ministry of Irrigation and Power in its reply dated 26th August, 1963⁽³⁵⁾ observed: "Westward Diversion: the suggestion of Mysore Government that Western diversion should be ruled out once for all, has, been carefully considered, Paragraph 19 of the Minister's statement sums up the position of this Government correctly in this regard."

However, on December 31, 1963⁽³⁶⁾, Shri Jawaharlal Nehru, Prime Minister wrote to Sri V. P. Naik, Chief Minister, Maharashtra—

"The question of diverting the river to the other side of the Western Ghat remains. You want this water for power production and not for irrigation. It should be possible to provide you with power for this area from various places, without your having to divert the river, which will mean lack of irrigation facilities in other parts of the country."

(32) With regard to Ratnagiri district, the report of the Fact-finding Committee for survey of scarcity areas in Bombay State 1960 Vol. II Part I at p. 236 observed :—"During the last 10 years, land revenue suspension was given only in a few villages in Sawantwadi taluka during the year 1956-57. Except for this, no part of the district has been affected in the past. As will be seen from the rainfall figures, this district has heavy and assured rainfall and there is no part in which rainfall was less than 42.86", during the last 27 years. The district cannot, therefore, be considered as affected by scarcity.

The Report of the Indian Irrigation Commission 1901-1903 Part I at page 3 para 13 observed : "On the other hand in Eastern Bengal and Assam, and in the narrow strip between the Western Ghats and the Arabian sea, the rainfall, which exceeds 70 inches, has always been so abundant that the chance of its serious failure may be regarded as remote."

(33) MYDK I p. 156 at pp. 169-170.

(34) MYDK I p. 175 at p. 177.

(35) MYDK I p. 188 at p. 190.

(36) MRK II p. 61.

Other instances of diversion outside the basin for power generation :

In support of its claim for westward diversion of Krishna waters outside the Krishna basin for purposes of power generation, Maharashtra cites the instances of (1) Lake Lanoux diversion (2) the Plata basin diversion and (3) the Kistna Pennar Project.

Lake Lanoux lies on the southern slopes of the Pyrenees in French territory. Its waters emerge by the Fon-Vive Stream, a tributary of the river Carol which after flowing through French territory enters Spanish territory near Puigcerda before joining the river Segre, a tributary of the Ebro. The French Government proposed to carry out works involving the diversion of the waters of Lake Lanoux towards the river Ariege for production of electric energy, the diverted waters ultimately losing themselves in the Atlantic Ocean and not, as previously, in the Mediterranean. The proposal envisaged that, in order to compensate for the diversion, an equal quantity of the waters of the Ariege would be restored to the Carol above Puigcerda within French territory by means of an underground tunnel. The Spanish Government complained that the proposal for diversion of the waters of Lake Lanoux was in contravention of the Franco-Spanish Treaty of Bayonne of May 26, 1866 and the Additional Act of the same date. It was not alleged that the returned waters had a chemical composition or temperature or some other characteristic which could injure Spanish interests. An International Arbitral Tribunal⁽³⁷⁾ held that the carrying out of works involving the diversion of the waters of Lake Lanoux with restitution as envisaged in the French Project, without prior agreement between the two Governments was not contrary to the Treaty and the Additional Act of 1866.

It is to be observed that there is no analogy between Maharashtra's westward diversion schemes and the French proposal for diversion of waters of Lake Lanoux. The westward diversion schemes do not propose restitution of water nor do their legality depend upon the interpretation of a treaty.

In the Plata basin, the waters of a Parana affluent are diverted out of the basin to enable production of electric energy at the power plant near Sao Paulo city in Brazil after falling over 2000 feet inside a mountain. But the Plata basin is not, on the whole, a water scarce region. Navigation has been the primary use of the river system and, although irrigation is practised in the basin, the general sufficiency of rainfall and the relative abundance of water has not led to any major works for the purpose⁽³⁸⁾. There can be no objection to diversion of surplus water to another watershed for producing electric energy, if the water would otherwise be wasted. But such a diversion is objectionable if there is shortage of water and the river supply is not sufficient to meet the full requirements of irrigation in the lower reaches of river. Citing the case of the Paraiba do Sul near Rio de Janeiro, it has been observed that a large water diversion to feed a hydro-electric station outside the basin has led to a serious loss of water in its lower channel⁽³⁹⁾.

The Kistna Pennar Project proposed to carry the Krishna waters 300 miles away outside the Krishna basin and the construction of two dams with full power development facilities. The Project Report⁽⁴⁰⁾ stated that large blocks of electric power developed at the dams would give an impetus to industry and the environs of Madras would become great industrial cities with assured supplies of industrial power. However, a major controversy arose in the Andhra region in regard to the proposal to carry the Krishna waters to distant areas near Madras⁽⁴¹⁾. The Khosla Committee found that the Project had many objectionable features⁽⁴²⁾. In the letter of transmittal of their report the Committee pointed out that one of the adverse features of the project was that "the benefits will largely go to areas already served by canals or tanks while vast tracts lying close to the Krishna and having no alternative means of irrigation supplies will be permanently denied such supplies." Eventually, the Kistna Pennar Project was replaced by the Nagarjunasagar Project. The history of the Kistna Pennar Project does not support Maharashtra's argument regarding westward diversion of water for power generation.

(38) Lake Lanoux Arbitration (France v. Spain), International Law Reports (1957) Lauterpacht, pp. 101-142. See also American Journal of International Law Vol.53(1959), pp. 37-39, 62, 156-157; F.J. Berber, Rivers in International Law (1959), PP. 162-167.

(38) A.H. Garretson, R.D. Hayton, C.J. Olmstead, The Law of International Drainage Basins (1967), pp. 324, 325, 333, 402.

(39) Richard J. Chorley, Water, Earth and Man pp. 507-508.

(40) Kistna Pennar Project Report (1951-Scheme) Vol. I (APPK Vol. II p. ix).

(41) N.D. Gulhati, Development of Inter-State Rivers (1972), pp. 86, 190-191.

(42) Report of the Technical Committee on the optimum utilisation of the Krishna and the Godavari waters 1953, pp. 3, 44.

Conflicting claims of power development and Irrigation of basin areas :

There can be no doubt that generation of electric energy is an important water use, but the water diverted westwards will not be available for downstream irrigation.

The sanctioned utilisations of the existing irrigation projects and westward diversion schemes for generation of hydro-electric energy can be met from the available supply in the basin. But the States have proposed numerous new projects and extensions of existing projects both for irrigation and westward diversion of water. The available river supplies in the Krishna basin are insufficient to satisfy the demands of all the existing uses and the projected additional uses as well. The river Krishna commands extensive irrigation potential along the natural course of the river. The demands for the pressing needs of irrigation alone are so large that they cannot be wholly satisfied from the river supplies. Until irrigation from the new projects is fully developed, it may be possible to allow westward diversion of some additional water for purposes of power production. But upon full development of such irrigation, it will be impossible to satisfy the demands of the irrigation projects as well as the additional demands for the westward diversion schemes. There is a clear conflict of interest between claims of downstream irrigation and power development by westward diversion of water. The question is whether, in allocating the waters of the river Krishna, the claims of power production by westward diversion of water should be allowed at the expense of irrigation.

In this connection we must consider Issue No. II(5). *Issue No. II(5) — Should any preference or priority be given to irrigation over production of power?*

Preferential uses and equitable allocation :

Water has manifold uses for the community. It may be used for drinking, domestic and sanitary purposes, irrigation, generation of electric power.

industry, navigation, and other purposes. If two uses are mutually exclusive and conflicting or if the available water is not sufficient to meet the requirements of both, it may be necessary to decide how far one use should give way to another in the larger interests of the community. The problem of establishing the order of priority arises in national planning, ⁽⁴³⁾ legislation as well as equitable apportionment.

The study on legal aspects of the hydro-electric development of rivers and lakes of common interest prepared by Pierre Sevette⁽⁴⁴⁾ observed:

"The question arises whether these various uses can be classified according to their economic importance and an order of priority established * * * When a conflict arises in international law, as of course in other branches of law, between opposing interests (even though they are legitimate when taken singly), it is necessary to assess these interests, classifying them in order of importance and deciding which of them should come first."

H. A. Smith observed.⁽⁴⁵⁾ "The chief practical function of law consists in regulating the conflicts of different interests. In order to do this it must make some attempt to appraise and rank them in order of value, laying down that in a given situation one interest is to be preferred over another."

There is no inherent preference of one use over another⁽⁴⁶⁾ but one use may be preferred to another because of its greater value and importance to the community as a whole. ⁽⁴⁷⁾

The preference of one use to another differs from basin to basin and from one part of a basin to another, and it may even vary within the same basin or sub-basin as conditions change and the relative importance of the use develops with time.⁽⁴⁸⁾ Economic, social, engineering and resource studies supply the basis for determining the priorities appropriate to the needs

(43) Five Year Plan, p. 348.

(44) Legal Aspects of the Hydro-electric Development of Rivers and Lakes of Common Interest, U.N. Doc. E/ECE/136/EP/98 Rev. 1, pp. 26-27.

(45) H.A. Smith, *The Economic Uses of International Rivers*, 1931, p. 139.

(46) Helsinki Rules, Article VI.

(47) Legal Aspects of the Hydro electric development of rivers and lakes of common interest, U.N. Doc. E/ECE/136 E/ECE/EP/98 Rev. 1 (1952), pp. 26-37. H.A. Smith, *The Economic Uses of International Rivers* (1931), p. 141.

(48) R.E. Clark, *Water and Water Rights* (1967) Vol. II, p. 425, *Legal Aspects of the Hydro Electric Development of Rivers and Lakes of Common Interest*, U.N. Doc. E/ECE/136, E/ECE/HP/98 Rev. 1 (1952), pp. 26-37; R.C. Martin and others, *River Basin Administration and the Delaware* (1960), p. 275. 2 M of I&P/73—3

and possibilities of each basin and in appropriate cases to portions of the same basin. ⁽⁴⁹⁾ Each river has its unique problem which must be examined and determined separately. ⁽⁵⁰⁾ For this reason, there is no general rule of universal application establishing an order of priority for different uses either in international law or in our national law.

There is no Central Act in India laying down an order of priority for different uses. But we cannot accept Maharashtra's argument that, in the absence of legislation, one use cannot be preferred to another while allocating river water. In the absence of enacted law, the order of priority of different uses must be determined by applying the principles of equitable apportionment.

R. E. Clark observed⁽⁵¹⁾ 'Lippen out that the two most significant factors in apportionment are preferential uses and existing uses * * * Preferred uses and existing uses are two of the many variables that must be considered' Clyde Eagleton observed ⁽⁵²⁾ "In a number of cases and treaties something is said concerning certain uses of the water to be regarded as more important than other uses, and consequently to be given priority of rights. The establishment of such priorities in each situation belongs, I think, to equitable apportionment."

Instead of laying down a rigid order of priority, a pragmatic and flexible solution is more appropriate. The question whether one use should prevail over

another should be decided on a consideration of all relevant factors in each particular case.⁽⁵³⁾

The economic relativity of different uses may become very important in Court decisions as the amount of available water diminishes with increasing utilisation of water resources. ⁽⁵⁴⁾

A Tribunal appointed under the Inter-State Water Disputes Act, 1956 is charged with the duty of deciding disputes with regard to the use, control and distribution of waters of an inter-State river. If two uses are mutually exclusive and conflicting, the Tribunal may have to decide which of the two uses will prevail in the equitable utilisation of the river water. *Need for water* : All life depends on water. Apart from the air we breathe, water is the most fundamental necessity of life. Use of water for drinking, household purposes and watering of cattle is regarded as the primary use to which all other uses are subordinated. ⁽⁵⁵⁾ The U.S.A. Supreme Court⁽⁵⁶⁾ said that "drinking and other domestic purposes are the highest uses of water". If the need for water for drinking and domestic purposes is genuine, it must prevail over all other needs. ⁽⁵⁷⁾

There is no fixed order of priority for other uses. Irrigation may become the major use of the world's rivers, but it does not follow that it should occupy a preferred position in every river basin⁽⁵⁸⁾ over hydro electric power. ⁽⁵⁹⁾ The relative importance of the two uses in the river system should be examined to ascertain which of them should prevail over the other.

(49) J. D. Chapman, *The International River Basin* (1963), p. 16 Historical, geographical and political considerations should also be borne in mind, *Legal Aspects of the Hydro-Electric Development of Rivers and Lakes of Common Interests*, UN. Doc. E/EC/E 136, E/EC/E/EP/98 Rev. 1 (1952), p. 36; R.E. Clark, *Water and Water Rights* (1967) Vol. II, p. 425; U.N. Memorandum of 1950 cited in F. J. Berber, *Rivers in International Law* (1959), p. 159.

(50) A. H. Garretson and others. *The Law of International Drainage Basins* (1967), pp. 61, 787.

(51) R.E. Clark, *Water and Water Rights* (1967) Vol. II, pp. 424, 425.

(52) Clyde Eagleton, *The use of waters of International Rivers*, 33 *Canadian Bar Review* Vol. 33 (1965), pp. 1018, 1025.

(53) A. H. Garretson and others, *The Law of International Drainage Basins* (1967), pp. 47, 62, 64.

(54) *Economic and Public Policy in Water Resources Development*, Edited by S.C. Smith and E.N. Castle, p. 287.

(55) Use of water for drinking, household purposes and watering of cattle is regarded as ordinary or primary, and other uses are regarded as secondary or extraordinary. See *Mcartney v. Londonerry and Lough Swilly Railway Company Limited*, 1904, A.C. 301, 306-307; *Secretary of State for India v. Subbarayadu* LR 59 IA 56, 64; *Belbhadar Pershad Singh v. Sheikh Barkat Ali*, 11 CWN 85, 88, 93-98; *Indian Easements Act, 1872*, s. 7 Illustration (j); T. Guthrie Brown, *Hydro Electric Engineering Practice* (1958) Vol. III, p. 152.

(56) *Connecticut v. Massachusetts* 282 U.S. 660, 673. See also *Report of the Indus (Rau) Commission*, Vol. 1, p. 11.

(57) A. H. Garretson and others, *The Law of International Drainage Basins* (1967), pp. 61, 788.

(58) A. H. Garretson and others, *The Law of International Drainage Basins* (1967), p. 61.

(59) Irrigation enjoyed the first preference in the Nile basin, see *Legal Aspects of the Hydro Electric Development of Rivers and Lakes of Common Interest* in U.N. Doc. E/EC/E/136, E/EC/E/EP/98, Rev. I (1952), p. 36, in the Indus basin, see *Rolet Chin Shih Chen*, *The Non-Navigational Uses of International Waters* (1965), pp. 150-155, in the Colorado River Compact 1922 Art. IV(b) and in the Rio Grande. Colorado and Tijuana Treaty 1944 Art. 3.

Hydro-electric power had precedence in Columbia River Basin Co-operative Development Treaty 1961, A.H. Garretson and others, *The Law of International Drainage Basins* (1967), pp. 61, 88. The two uses were bracketed together in the Boundary Waters Treaty 1909 Art. VIII and the Report of the Indus (Rau) Commission Vol. I, p. 11.

Importance of power :

Production and distribution of electric energy and its conversion into motion, heat or light for a multitude of uses are vital not only for industrial development, but also for rural development, cottage and small scale industries, pumping of river and underground water, lift and well irrigation and numerous other operations in agriculture. Electric power has brought about revolutionary changes in modern society, improvement in man's material welfare and the advance of civilization. Modern life depends so largely on the use of electricity that consumption per capita in a country is an index of its material development and standard of living. ⁽⁶⁰⁾

Sources of power.—The chief sources of power are coal, water, atomic fuel, oil and natural gas. The generation of hydro-electric energy, is an important water use because it makes energy available at a lower cost than other alternative sources of generation.

Importance of irrigation and priority of irrigation use:

Irrigation of land for agriculture represents one of the oldest and most important uses of water next only to providing water for drinking and domestic purposes. ⁽⁶¹⁾

O. W. Israelson and V. E. Hansen observed. ⁽⁶²⁾

"The importance of irrigation in the world today is well stated by N. D. Gulhati of India : 'Irrigation in many countries is an old art—as old as civilization—but for the whole world it is a modern science—the science of survival.' The pressure of survival and the need for additional food supplies are necessitating a rapid expansion of irrigation throughout the world. Even though irrigation is of prime importance in the more arid regions of the earth it is becoming increasingly important in humid regions."

For irrigation use, there is no substitute for water, but power may be generated from coal, oil, nuclear energy and other sources. In general, whenever production of hydro-electric power interferes with irrigation and the two uses cannot be reconciled, increasing priority may have to be given to irrigation. Rapid growth in population calls for increased food production which in turn calls for intensified irrigation. ⁽⁶³⁾

In countries with a hot and arid climate, water is absolutely indispensable for cultivation of the soil, and the use of water for irrigation is regarded as an ordinary or primary use for satisfying a natural want. In the arid and semi-arid parts of the country, irrigation makes the difference between waste land and highly productive crop land. ⁽⁶⁴⁾ J. Guthrie Brown observed ⁽⁶⁵⁾ "Finally it may be said that in arid areas the use of water for irrigation will, where soil conditions are suitable, take precedence over its use for power production".

In India, with the rapid growth of population, the demand for additional food supplies and raw materials is increasing. For survival, the nation must have more food and more raw materials. The supplies and prices of agricultural commodities, particularly of food, play a crucial role in attaining economic and social stability. Indian economy is predominantly agrarian, as 75% of the country's population depends on agriculture for livelihood. Nearly 60% of total household consumption and 85% of the commodity consumption of households are composed of agricultural products or manufactures based principally on agricultural raw materials. ⁽⁶⁶⁾ A strong agricultural base is essential for industrial development. Agro-based industries like textiles, starch products, sugar and oil pressing can be fed only by agriculture. For good, the basic requirement of life, the nation cannot afford to depend on imports. Development of agriculture calls for irrigation on a large scale. The use of water resources for irrigation to the fullest extent possible is an essential condition for diversifying agriculture and increasing crop yields. Thus, irrigation plays a key role in the planned development of

(60) First Five Year Plan, p. 345.

(61) U.N. ECAFE, Multiple purposes River Basin Development Part I, Manual of River Basin Planning 1955, p. 3.

(62) O. W. Israelson and V. E. Hansen—Irrigation Principles and Practices (1962), p. 3.

(63) E. Kuiper, Water Resources Development, Planning Engineering and Economic (1965), pp. 13, 15.

(64) The Nations Water Resources. U.S. Water Resources Council, p. 4-4-1.

(65) J. Guthrie Brown, Hydro-Electric Engineering Practice (1958) Reprinted (1963), p. 155. See also Otis W. Freeman. H. F. Raup, Essentials of Geography 2nd Edn., pp. 390-391.

(66) Fourth Five Year Plan, pp. 12, 13, 28, 35, 38.

the country. ⁽⁶⁷⁾ Without irrigation, large arid tracts of the country would be permanently waste, ⁽⁶⁸⁾ while many other tracts having low and uncertain rainfall could be cultivated only in favourable seasons. In view of the pressing necessity for irrigation, India has more irrigated land than any other country in the world. ⁽⁶⁹⁾

For determining the priority of irrigation and power projects *inter se* for inclusion in our national plans, the following broad principles are observed ⁽⁷⁰⁾:—

(1) Projects which will add to the food production in the country must receive priority over projects relating to other uses of river waters.

(2) Projects which are more remunerative in direct financial returns, in terms of cost of irrigation per acre or per unit of power generated and in total benefit to the community, and those which would yield quick results should be given preference.

(3) Region-wise requirements of food and power must receive due consideration, and also the need of backward areas.

There is a large volume of opinion in India that use of water for irrigation should have preference over its use for power generation. ⁽⁷¹⁾ Irrigation is of prime importance in India because of the agrarian nature of the population and the pressure of expanding population on the land.

Since irrigation is a type of water use, which may be given increasing priority in the future, it is important to appraise all economic, social and other factors which will determine the relative priority that irrigation should have in relation to other water uses. ⁽⁷²⁾ Regional needs and the best means of developing the region on the basis of its geography and the natural advantages available to it must receive due consideration.

Multiple purpose projects :

The conflict of interest between hydro-electric and irrigation uses should be reconciled as far as possible by integrated development of the river basin.

The concept of integrated river basin development implies orderly marshalling of water resources of river basins for multiple purposes to promote human welfare. The fact that the waters of the river flow from a higher to a lower level gives rise to numerous possibilities of using the flow more than once at several points in the course of the river for purposes of generation of hydro-electric power and irrigation of land. The principle now adopted by most countries is that hydro-electric power should be produced, where feasible, as part of a comprehensive development of a river basin so that the water released from the power plant may be used for irrigation and other beneficial purposes downstream. ⁽⁷³⁾

Where the tail-race water after generation of electricity is returned to the river, the hydro-electric use is non-consumptive, except for losses in the water conductor system and storages, and there is no substantial conflict of interest between the hydro-electric use and downstream irrigation and other uses.

Shortage of power in Maharashtra :

There is shortage of power in Maharashtra. The demand for 1973-74 as assessed in the Seventh Annual Electric Power Survey of India 1972 ⁽⁷⁴⁾ is 2098 MW. According to Maharashtra, the installed capacity by 1973-74 would be 2306 MW, and allowing 30% for stand-by, spinning reserve etc., the effective capacity by 1973-74 would be 2306 x 0.7 = 1614 MW. Thus by the end of Fourth Plan there would be shortage of capacity to the extent of 484 MW ⁽⁷⁵⁾.

According to Maharashtra, by the end of the Fifth Five Year Plan i.e. by 1978-79, the power demand

(67) Water Resources Series No. 38 U.N. ECAFE, p. 132.

(68) Development of Irrigation in India 1965, Publication No. 78, Central Board of Irrigation and Power, p. 5.

(69) See Otis W. Freeman, H. F. Raup, Essentials of Geography 2nd Ed., p. 390.

(70) First Five Year Plan, pp. 365-366. For similar principles for inclusion of irrigation and power projects in the Second Five Year Plan, See Multipurpose River Basin Development, Part 2B, Flood Control Series No. 11, St/EC/FE/Ser. F/11, p. 63.

(71) Report of the Study Team on Agricultural Administration (1967) Vol. I, p. 141, Administrative Reforms Commission (Irrigation should have first priority over water in preference to any other use).

The Census of India 1961, Monograph No. 6 by M. Datta, Electricity Supply in India, p. 5 (A further limitation on hydro-power schemes is set by irrigation which overrides all other considerations).

V. S. Rao & M. K. Sambamurthy—Planning for hydro-power development in India, C.W. & P.C.'s contribution,— Central Water & Power Commission Silver Jubilee Souvenir 1970, p. 109 (In India, irrigation requirements generally claim the first priority on the available water supplies).

(72) E. Kuiper, Water Resources Development, Planning Engineering and Economics (1965), pp. 13-14.

(73) U.N. ECAFE, Multiple Purpose River Basin Development, Part I, Manual of River Basin Planning (1955) St/ECAFE/Ser. F. 7, p. 4.

(74) Seventh Annual Electric Power Survey of India 1972, p. 21.

(75) MR Note No 13, pp. 12, 22.

in Maharashtra will be 3650 MW and allowing for 30% stand-by and spinning reserve an installed capacity of about 5214 MW will be required to meet the demand by 1978-79. L. B. Dudhane, Chairman, Maharashtra State Electricity Board stated ⁽⁷⁶⁾ that an installed capacity of about 4730 MW will be required in Maharashtra by 1978-79.

Steps are being taken to meet this shortage from thermal and hydro schemes without diverting more water west wards. ⁽⁷⁷⁾

Sri Dudhane observed⁽⁷⁸⁾ "in Maharashtra the Bombay-Poona area has been showing a rapid increase in the power demand. At the same time the Hydro Power sources in the Western Ghats are exhausted. Therefore the State as a whole has to depend on Thermal Power for all its future Power demands".

Power resources of Maharashtra :

Along the Western Ghats within the State of Maharashtra, there are excellent sites for power generation with advantages of ample water supply from heavy rainfall and high heads obtainable by westward diversion of water. Though the rainfall is seasonal, there are excellent storage sites for impounding water. The twin advantages of high head and ample water supply are exceptionally favourable for production of electric power at unusually cheap rates, considering that the power produced in a hydro-electric plant is directly proportional to the quantity of water flowing through the plant and the head or distance through which the water falls.

The known coal reserve in Chanda-Ballarshah area in Maharashtra is about 3600 million tonnes, and this can sustain the generation programme of 6600 MW of power for 250 years. ⁽⁷⁹⁾ Coal of non-coking type with high ash content may be used for thermal power plants⁽⁸⁰⁾ and this is available in abundance in the country. ⁽⁸¹⁾

The Central Government has established the Tarapur Atomic station in Maharashtra. The station has an installed capacity of 420 MW, comprising of two

units of 210 MW each, supplying power on a commercial basis since October, 1969, to the combined Maharashtra and Gujarat systems. This capacity constitutes about 20% of the combined Maharashtra and Gujarat systems' installed capacity. The station has supplied a large part of the total power requirements of Maharashtra and Gujarat and the effect of this has been apparent in that no power cut had to be imposed in Maharashtra even when Koyna lake was depleted. ⁽⁸²⁾ Maharashtra's share of the nuclear power is 190 MW. In 1971-72, Maharashtra was unable to get its full share of the power due to a breakdown in the Tarapur station.

Need of hydro-electric power for meeting peak demands and working of Koyna station :

A typical daily load curve of Maharashtra at the end of the Fourth Five Year Plan shows that 30% of the load at the top of the curve and 1/8.5 of the total energy represents the peak demand.

Maharashtra's peak demands are supplied by the Koyna and Tata hydel stations and a few thermal stations. During argument, Maharashtra's Counsel stated :—"In Western Maharashtra, peak fluctuations in loads are being taken mostly by Koyna and Tata Hydro stations and also to a small extent by the old Thermal Plant of the Central Railway at Chola *** In the Vidarbha system, peak loads are at present being met by Puma Hydro station (22.5 MW) and the old sets of the Ballarshah and Khaparkheda Thermal stations in the same way as the Chola Plant. Sometimes small assistance for peaking is also taken by this system from the western Maharashtra System." The old sets of Khaparkheda, Chola and Ballarshah will be retired soon and replaced by other thermal power stations.

Instead of generating peaking energy at the Koyna station, Maharashtra now seeks to work the station as a base load station at 69/80% load factor with an annual westward diversion of 100 T.M.C. of water. But Stage II of the Koyna Project was cleared by the Planning Commission in April, 1961 subject to the

(76) An article by L.B. Dudhane in the Times of India, New Delhi Edition, March 30, 1973, pp. 27-28 (Ex. MYK-300).

(77) An article by L.B. Dudhane, in the Times of India, New Delhi Edition, March 30, 1973, pp. 27-28; Summary Record of the Working Group Meeting in the Planning Commission, Maharashtra on 5th January, 1973 to consider the Annual Plan 1973-74 proposals regarding power sector of Maharashtra (Ex. MRK-335).

(78) L.B. Dudhane, Selection of Extra High Voltage for the National Grid in India (December 1970), MRDK IX, pp. 56, 63.

(79) L.B. Dudhane, Article in the Times of India, New Delhi Edition, March 30, 1973, pp. 27-28; See also MR Note No. 9.

(80) First Five Year Plan, p. 366.

(81) L.B. Dudhane, Selection of Extra High Voltage for the National Grid in India, MRDK IX, pp. 56, 59.

(82) Report of Power Economy Committee 1971, pp. 59, 60.

condition that westward diversion of water would be limited to 67.5 T.M.C. of water per annum. ⁽⁸³⁾ On the 25th November, 1961,⁽⁸⁴⁾ the Maharashtra Government requested the Planning Commission to sanction the thickening of the dam relevant to a storage of 98 T.M.C. of water and raising the height of the dam for full reservoir level (2,158.5) on condition that there would be no change in the scope of the project in regard to the maximum westward diversion of water. On the 3rd January, 1962,⁽⁸⁵⁾ the Planning Commission granted the sanction asked for. Nevertheless, after raising the height of the dam and installing crest gates, the Maharashtra Government, in breach of its assurances and without the sanction of the Planning Commission, has been diverting westwards more than 67.5 T.M.C. annually. Since 1966-67, the yearly westward diversions in T.M.C. were⁽⁸⁶⁾ :—

1966-67	.	.	.	.	.	.	.	85.8
1967-68	.	.	.	.	.	.	.	88.3
1968-69	.	.	.	.	.	.	.	85.9
1969-70	.	.	.	.	.	.	.	89.2
1970-71	.	.	.	.	.	.	.	97.6

The working of the Koyna station as a base load station with annual westward diversion of 100 T.M.C. of water which will be wasted to the sea after power generation cannot be permitted in the Krishna basin where there is shortage of water and such a large westward diversion will hamper the development of irrigation potential in the lower reaches of the river.

As power requirements increase, hydro electric plants are shifted to generate peaking power and new thermal and nuclear plants are constructed to generate the base load.⁽⁸⁷⁾ Hydro electric power has found its most efficient utilisation for peaking rather than for base load. In a hydro electric plant, generation rates can be varied quickly and inexpensively in response to fluctuating energy demands by simply regulating the flow of water through the plant. It is much more expensive to maintain steam plants in a state of readiness and keep the boiler furnaces burning at low heat. Costs of generation from thermal and nuclear power stations are at their lowest when the power stations

are operated at high load factors. According to Maharashtra's estimate, the cost of power at Koradi thermal station is 6.28 paise/kWh at 70% L.F. while the cost of peaking power at the same station at 25% L.F. is 13.52 paise/kWh. Nuclear and thermal power are best utilised for base load, allowing hydro power stations like the Koyna hydel station to supply the peak energy and thereby permitting the most economical and optimum use of power. Therefore, the Koyna Project. Stage II Report ⁽⁸⁸⁾ stated that "an overall economy would accrue to the country, if hydro power stations are operated (in the ultimate stage) at lower load factors and the thermal stations at higher load factors."

The load factor at a hydro-electric station may be reduced by installing more plants, but Maharashtra says that it is not technically feasible to install more plants at the Koyna station. However, the load factor at the Koyna station may be reduced by using less than 67.5 T.M.C. of water, while the remaining water may be used at another hydro-electric station for generating energy at a low load factor. To give an example, if Maharashtra utilises 37 T.M.C. instead of 67.5 T.M.C. of water at the Koyna Station and the balance 30.5 T.M.C. at another hydro-electric station in the Upper Krishna (K-1) sub-basin, both stations will produce energy at very low load factors. The total energy generated at the two stations will be somewhat less and more expensive, but as peaking energy at a low load factor, it will be more valuable. Whether in the long run the adoption of this method will result in net financial gain or loss cannot be determined off-hand and the point requires close investigation.

Pumped storage schemes.—Pumped storage is an alternative method for meeting the demand for peaking power. In this system, the surplus energy available in thermal and nuclear plants during off-peak periods is used to pump water from a lower to a higher level and the water pumped to the higher level is used again to generate power during the period of peak demand. Pumped storage developments require a supply of inexpensive off-peak energy from thermal and nuclear plants for pumping. The optimum use

(83) MRDK VI pp. 105-106.

(84) MRDK I pp. 161-163.

(85) APK II p. 118.

(86) MR Note No. 16.

(87) L. Douglas James & Robert R. Lee, Economics of Water Resources Planning, p. 327 para 13-3; Energy International, January 1967, p. 21, APDK X p. 97; Energy International, March 1967, p. 10, APDK X p. 98.

(88) The Koyna Hydro-electric Project Stage II Report, July 1960, Vol. I, p. 13 para 10.01.

of pumped storage projects is for the provision of peaking power and reserve capacity. ⁽⁸⁹⁾ L. Douglas James and Robert R. Lee observe⁽⁹⁰⁾ "Where hydro sites are too few to provide even peaking capacity, pumped storage is used. A pumped-storage plant uses power generated during low demand periods to pump water to a high reservoir for later release through the turbines to generate peaking power. Such plants are most economical where two low cost reservoir sites are available at high head differential.*** Pumped storage plants have a fuel cost equal to the value of the off-peak thermal power used for pumping". Pumped storage plants have been commissioned in many foreign countries. ⁽⁹¹⁾ A pumped storage scheme at Nagarjunasagar in Andhra Pradesh with an installed capacity of 2x50 MW has been sanctioned by the Planning Commission in 1972.

At Koyna and other places along the Western Ghats, excellent reservoir sites at high head differentials are available. But Maharashtra contends that thermal stations are working at high load factors, that now or in the near future no spare off-peak capacity will be available for use in pumped storage schemes and that the economic feasibility of such schemes in Maharashtra is not established. The economics of such storages raise complex problems and require careful study. ⁽⁹²⁾ However, we find that the Draft Fifth Five Year Plan⁽⁹³⁾ envisages a pumped storage scheme (300 MW) in Maharashtra. L. B. Dudhane, Chairman, Maharashtra State Electricity Board has stated⁽⁹⁴⁾ that there is a proposal in Maharashtra for pumped storage schemes (100 MW). The summary record of the Working Group meeting held in the Maharashtra Planning Commission on 5th January, 1973 to consider the Annual Plan 1973-74 proposal regarding power sector of Maharashtra shows that the Maharashtra Government has recommended for advance action pumped storage scheme requiring outlay of Rs. 72 lakhs in 1973-74. Having regard to all these proposals, it is hoped that the economic feasibility of pumped storage schemes for providing peaking power in Maharashtra will be established soon.

Other hydro-electric schemes to provide peaking power :

Particulars⁽⁹⁵⁾ of hydro-electric projects in Maharashtra State" other than Koyna Stages I, II and III and Tata Hydel Works are as follows :

Sl. No.	Name of Project	Installed capacity in MW	Load factor percentage	Energy generated in MkWh
1	2	3	4	5
<i>Projects already completed</i>				
1.	Purna	22.5	27.4	53.97
2.	Radhanagari	4.8	40	16.8
<i>Projects under construction</i>				
3.	Bhatgar	16	38.8	54.53
4.	Vir	9	55.7	44.149
5.	Vaitarna Stage I	60	27	141
6.	Bhira Tailrace	80	10	66.5
7.	Tillari	60	25	125.20
8.	Paithan (Pumped storage)	12	20	20.60
9.	Pench Hydel (Total) (1/3 for Maharashtra share)	160	17.8	83.2
	(53)			
<i>Projects proposed</i>				
10.	Kas	11.4	20	19.73
11.	Panshet	10	25.3	22.17
12.	Pawna	10	20	17.78
13.	Warasgaon	10	37.8	33.00
14.	Bhandardara			
	Power House I	10	67.6	59.31
	Power House II	35	20.0	58.21
15.	Vaitarna Stage II	6	63	31.8

Maharashtra's argument concerning Srisaillam Project:

Maharashtra argues that if 33 T.M.C. of water is allowed for the Srisaillam Hydra Electric Project there is no reason why an additional westward diversion of 32.5 T.M.C. of water at the Koyna Station for purposes of power generation should not be permitted. We are unable to accept this argument. Unlike the Koyna Project, the water released for the

(89) The Nation's Water Resources, U.S. Water Resources Council, Washington D.C. 1968, pp. 4-3-1, 4-3-2.

(90) L. Douglas James & Robert R. Lee, Economics of Water Resources Engineering 1971, pp. 326-328 para 13-3.

(91) Energy International April 1970, p. 17 (APDK X p. 38).

(92) J. Guthrie Brown, Hydro-Electric Engineering Practice (1958), Vol. III, pp. 134-151.

(93) Draft Fifth Five Year Plan (1974/75-78/79), Power Development Programme, All India, Government of India, Ministry of Irrigation and Power, April 1972, p. 10.

(94) L.B. Dudhane, Article in the Times of India, New Delhi Ed., March 30, 1973, pp. 27-28 (Ex. MYK-300).

(95) MR Note No. 16.

Srisaillam power plant is used for irrigation downstream. The storage reservoir at Srisaillam involves an annual lake loss of 39 T.M.C., but regulated releases from the reservoir are necessary for downstream irrigation. The storage provides valuable carry-over storage and conserves irrigation water which would otherwise be wasted to the sea. Thus, there is no real conflict of interest between hydro-electric use of water at Srisaillam and irrigation use.

Cost of power production from westward diversion and other sources ⁽⁹⁶⁾ : The cost of energy generated at Koyna Hydel Project Stages I and II and delivered at Bombay is 2.66 paise/kWh with 67.5 T.M.C annual diversion. The cost is low because Koyna Project Stages I & II were executed mostly during the pre-devaluation period.

With 100 T.M.C. annual diversion, the cost of energy at Koyna will be 1.78 paise/kWh. The fixed charges remaining the same, the cost per unit of hydel power decreases with larger power production. ⁽⁹⁷⁾

The cost of energy generated at Koyna Hydel Project Stage III and delivered at Bombay is 7.4 paise/kWh with 67.5 T.M.C. annual diversion. The cost will be 5.6 paise/kWh with 100 T.M.C. annual diversion.

The cost of generation at the proposed Hiranyakeshi-Vedganga and other hydel stations will vary from 4.95 to 6.25 paise/kWh. The transmission cost to Bombay will be 0.75 paise/kWh. ⁽⁹⁸⁾

The cost of power generated at Koradi thermal station at 70% load factor is 6.28 paise/kWh. The estimated cost of peaking power at the station at 25% load factor is 13.52 paise/kWh. The cost of transmission of the power to Bombay is 1.26 paise/kWh.

The average unit energy sale price for Tarapur nuclear power is 5.61 paise/kWh ⁽⁹⁹⁾. It is said that, in actual practice, the price works out to be 6 paise/kWh.

Maharashtra says that if an additional diversion of 32.5 T.M.C. of water at the Koyna-project Stages I

and II is not permitted, it will lose 1060 MkWh of power available free of cost apart from the loss of 195 MkWh of power at Koyna Project Stage III and by substituting thermal power costing 7.5 paise/kWh at Bombay, it will suffer an annual financial loss of Rupees 7.20 crores. ⁽¹⁰⁰⁾ It is difficult to see how Maharashtra can complain of this financial loss, considering that it obtained the sanction of the Planning Commission and grants from the Union Government for construction of the Koyna station upon condition that the westward diversion of water at the station would be limited to 67.5 T.M.C. annually. Maharashtra also says that if the new westward diversion schemes are not permitted, it will have to replace cheap hydro energy by thermal power costing 14.5 paise/kWh and will thereby suffer an annual loss of Rs. 25.87 crores. The argument regarding financial loss is based on the assumption that 140.6 T.M.C. of water can be allotted to Maharashtra for westward diversion from K-1 and K-3 sub-basins in addition to the water allowed for its protected projects. As a matter of fact, much less water can be allotted to Maharashtra for its needs in K-1 and K-3 sub-basins having regard to the available supply and the needs of the other States in the Krishna basin.

Moreover, Maharashtra's estimate of cost of hydro-electric energy assumes that water has no value and is available free of cost. But if the water supply is not ample enough to satisfy all demands upon it and one use of water restricts other uses, water cannot be regarded as a free good. The paper "Water Demand forecasting and Related Administrative Implications" prepared by the United Nations Secretariat pertinently observes ⁽¹⁰¹⁾ :—

"When the natural supply is 'ample' relative to the draft upon it the economic problem is limited to the acquisition and placement of the hydraulic facilities. Under such conditions water *per se* is considered a free good, since no use of water is curtailed by the satisfaction of other uses. ***

If, however, one use of water restricts one or more other uses, water is no longer 'free' even though the uses that are restricted are

(96) MR Note No. 8, MR Note No. 9, MR Note No. 15.

(97) Report of the Power Economy Committee 1971, p. 39.

(98) The transmission costs from distant stations like Hiranyakeshi-Vedganga may be more than 0.75 paise/kWh.

(99) Report of the Power Economy Committee, 1971, p. 62.

(100) MR Note No. 9, p. 2.

(101) United Nations Secretariat, Water Demand Forecasting and Related Administrative Implications. United Nations Secretariat, Inter-regional Seminar on current issues of water resources administration, ESA/RT Meeting v/3, New Delhi Jan./Feb. 1973. The paper is based on material extracted from the draft report currently under preparation by United Nations Secretariat "Water Requirements Forecasting".

neither priced nor rationed in some other way. As soon as a restriction in the use and enjoyment of water is experienced a double economic problem arises: (1) how important are the uses that are restricted in comparison with the uses that are satisfied (2) what costs must be undertaken to augment supply so that usage is less restricted, and how do the costs compare with the benefits. It is seen that both of these questions are most vexing as they bear upon the uses of water that traditionally are unmarketed or unpriced and, therefore, 'free' in a naive sense of the word."

Irrigation and power uses in the Krishna basin :

In the Krishna basin, water is a scarce commodity. The westward diversion of water for power generation seriously restricts the use of water for downstream irrigation. Consequently, the water utilised by the westward diversion schemes cannot be regarded as a free good. For the present, it is not possible to augment the supplies of surface water in the Krishna basin. It is, therefore, necessary to ascertain how important are irrigation uses that are restricted in comparison with hydro-electric uses that are satisfied and which of the two uses should prevail and to what extent.

In theory, benefit cost analysis provides an optimum solution of the choice of alternatives. But Maharashtra does not show that the benefit cost ratio of the westward diversion projects would be higher than that of the eastward irrigation schemes. Moreover, one of the basic weaknesses of the traditional benefit cost analysis is its inability to assess important intangible benefits in terms of money and monetary benefits. ⁽¹⁰²⁾ The intangible socio-economic benefits from irrigation in arid and semi-arid regions far outweigh the benefits derived from hydropower. The basic objective of promoting human welfare by water resources development in those regions is best achieved by irrigation.

C.V. Davis observed ⁽¹⁰³⁾ "Results of irrigation enterprises cannot be evaluated solely on the basis of areas irrigated and value of crops grown. Proper consideration must be given to the community de-

velopment which accompany the construction of irrigation works and the growth of prosperous agricultural areas. Many of the thriving cities and towns in western United States with their millions of dollars residential, commercial and industrial valuations, have attained their present status largely as a result of the successful development of irrigation enterprise".

For irrigation use water is a priceless treasure, since without water there can be no irrigation and without irrigation successful crop production is not possible in the arid and semi-arid regions of the Krishna basin. These regions depend for survival on agriculture which provides the basis of living for more than 75 per cent of their people. The economic efficiency of this agrarian society clearly depends on proper diet standards which alone can ensure happy living, healthy children and economic efficiency.

Henry Olivier observed ⁽¹⁰⁴⁾ :—

"Diet deficiency has pronounced impact on national economy as regards output per man hour, expectancy of life, health requirements, import of foodstuffs, hence foreign currency problems and, therefore, political alignments.***

Most developing countries depend on agriculture which constitutes approximately 60 per cent of their gross national product and provides the basis of living for about 80 per cent or more of their people. As the country develops the agricultural sector provides initially 'the raw materials for industrial growth, the means for mobilizing capital and the facilities for earning foreign exchange.

However, it is questionable, for reasons already mentioned, whether the measurement of benefits only in monetary units provides a fair representation of the value of water on both a short and a long-term basis. The economic efficiency of the community clearly depends on diet standards and hence there is, for each environment, a critical nutrient level, below which the prime motive of the agrarian society must be preservation, and only above which it can be fully profit motivated. This consideration is of prime importance in forward planning".

(102) See R.E. Clark, Water and Water Rights (1967), Vol. II, p. 141.

(103) C.V. Davis, Handbook of Applied Hydraulics, 2nd Ed., p. 812.

(104) Henry Olivier, Irrigation and Water Resources Engineering (1972), pp. 90, 92-93. See also O.W. Israelson and V.E. Hanson Irrigation Principles and Practices, 3rd Ed., p. 8.

The Approach of Maharashtra State to the Fifth Five Year Plan ⁽¹⁰⁵⁾ demonstrates the paramount importance of irrigation in the scarcity areas within the State and the direct, indirect and intangible socio-economic costs of scarcity which can be avoided only by providing irrigation. This paper reveals that in extensive drought-prone areas in Poona, Sholapur, Satara, Sangli, Ahmednagar, Osmanabad and other districts of Maharashtra, sub-normality of monsoon has become more a rule rather than an exception. The last seven years since 1965-66 show a disturbing trend in respect of consecutive years of scarcity, area affected and the severity of scarcity. The 1971-72 scarcity conditions involved an expenditure of more than Rs. 42 crores on scarcity relief alone. The number of workers employed on scarcity works reached 15 lakhs at one stage. Apart from expenditure on famine relief, the scarcity of 1971-72 alone meant the loss of 18.6 lakhs tons of foodgrains, suspension and remission of land revenue, suspension and non-recovery of dues of cooperative, banking and Government institutions, and impoverishment and indebtedness of the farmer. The remedy is to undertake irrigation works to the full extent possible as an insurance against scarcity. Even with all possible stress on irrigation, a considerable area would remain devoid of irrigation benefits. The State attaches very high importance to the extension of power for agriculture and small industries. Power is a vital sector and the power situation also is not happy. However, the hydel potential of the State is limited, and Maharashtra has to depend increasingly on thermal and atomic power. Planning for Maharashtra has no meaning, unless there is a steep acceleration of irrigation and agricultural production. Direct attack on poverty will be ineffective, unless accompanied by increase in such production. Self sufficiency in food and agricultural commodities must be the principal objective of the Fifth Plan.

The westward diversion of water restricts not only irrigation use, but also downstream power production. If the water is not diverted westwards, it may be utilised for firm power production at a series of drops as it flows eastwards and particularly at the foot of dams in ghats, and at Almatti, Narayanpur and Srisailem where the average fall in feet utilisable

for generation of power is 85, 75, 300 and 320 feet respectively. ⁽¹⁰⁶⁾ The remaining water after allowing for lake and transit losses may be used for downstream irrigation.

Waste of tail race waters of westward diversion projects:

The tail race water of westward diversion in excess of 67.5 T.M.C. from Koyna Hydel Project will not be used for any beneficial purpose in Ratnagiri.

Instead of using the tail race water of the new westward diversion schemes for irrigation in Ratnagiri, the waters of the west flowing streams can be harnessed and used for such irrigation. At present, the enormous water potential of the west flowing streams is being wasted to the sea. By harnessing this water potential, needless waste of water may be prevented and optimum development of the water resources of the nation can be achieved.

Hydro-electric sites in the Western Ghats :

There are excellent sites for power production in the Western Ghats. As early as 1919, J.W. Meares observed ⁽¹⁰⁷⁾:—

"Bombay—There are probably endless sites in the Western Ghats, of which the best have already been examined by Messrs. Tata's engineers. The rainfall is heavy, especially at the scarp of the Ghats, where it locally reaches 200 and even 250 inches; but nearly all concentrated between June and September. Storage is therefore an essential of practically every project in this area; the levels are prima facie favourable; the fall is generally of the order of 1,000 to 1,800 feet, obtained for the most part by piercing the watershed; the demand for power is large; and the tail water could sometimes be used further on for irrigation".

The special peculiarity of the hydro-electric potential in Western Ghat region is that the water used for power generation is entirely lost to the basin and cannot be used for irrigation on the eastern side.

(105) Approach of Maharashtra State to the Fifth Five Year Plan, Broad policies as finalized by Planning Sub-committee of the Cabinet in its meetings on 21st and 22nd September 1972, pp. 1, 2, 7, 18-23 (Ex. MRK 344).

(106) Letter of Sri V.P. Naik, Chief Minister, Maharashtra to Pandit Jawaharlal Nehru dated 7-5-1964, MRK II pp. 254, 265.

(107) Hydro-Electric Survey of India, Preliminary Report on the Water Power Resources of India (1919) ascertained by G.T. Barlow and compiled by J.W. Meares, p. 41. Maharashtra relied on the passage at p. 41, but at pp. 30-31, the Report pointed out that one of the dangers to be guarded against in giving a concession to a public utility company was "Existing water rights and future irrigation demands must be safeguarded, or, in other words, no concession should be given until the irrigation possibilities have been fully considered."

The rivers rising in the Western Ghats near the Arabian Sea flow in an easterly direction and eventually fall into the Bay of Bengal. On the eastern side, the country gently slopes and the cultivable area lies offering vast possibilities of irrigation while the hills have steep slopes towards the west of the Western Ghats and, for obtaining high heads for power generation, water has to be diverted towards the west. By cutting off the highly productive head waters of the Krishna and diverting them to the west coast, considerable power may be generated but at the cost of depriving the low rainfall areas on the eastern side of the water solely needed for irrigation⁽¹⁰⁸⁾

Considerations of eastward irrigation are of prime importance in the case of east flowing rivers, and the adverse effect on such irrigation is a ground for rejecting westward diversion schemes for the generation of power⁽¹⁰⁹⁾

In assessing the theoretical limit of hydro-electric potential of Indian rivers, the sites in the Western Ghats may be included, but the report of the Energy Survey of India Committee 1965 pointed out⁽¹¹⁰⁾ that there are serious limitations to such a theoretical approach. One of such limitations is —

"Further, in some cases there are restrictions imposed by irrigation and other priority uses which again depend on topography, climate etc and impose in turn restrictions on available waters and storages. These cannot be taken into account with any reasonable degree of accuracy in overall theoretical estimate and derivations therefrom".

The Committee held⁽¹¹¹⁾ 'The most important east flowing rivers in southern India from the point of power development are the Godavari, the Krishna and the Cauvery. These rivers, excepting some of the tributaries of the Godavari, take their rise in the Western Ghats and traverse almost the full width of the Deccan plateau to fall into the Bay of Bengal. They command considerable irrigation

potential and plants for power development have to be integrated with development of irrigation. For instance, there are a number of possibilities of storing the waters of tributaries of the Godavari and the Krishna in the upper reaches in Western Ghats and diverting them westwards where they can be utilised for power generation at heads, of 450 to 600 m. At present, plans to use the waters of these rivers for irrigation along their natural courses are under consideration and westward diversion beyond what is used at the Tata Hydro and Koyna Stations can be considered only after these studies are completed. The power potentials of these rivers are restricted to that corresponding to using of the waters, reserved for irrigation developments in the lower reaches of the river".

The project reports exhibited in the present case show that the river Krishna commands extensive irrigation potential along the natural course of the river. From the point of view of location, topography, fertility and drainage, there is abundant land suitable for agriculture but in view of the scanty and uncertain rainfall irrigation is essential for successful crop production. In these and semi-arid regions, irrigation water gives value to land and in the correct combination of water and land, lies the foundation of all agriculture and the population carrying capacity of the country. Depletion of the waters of the Krishna by excessive westward diversion is injurious to the full development of the vast irrigation potential in the lower reaches of the river.

75-8 per cent of the population in the Krishna basin lives in rural areas and 68 per cent of the working force is engaged as cultivators or agricultural labourers. The agrarian population is entirely dependent on the Krishna waters for irrigation. Having regard to the economic and social needs of the population, their dependence on the Krishna waters for irrigation and the hydrology, climate and physical characteristics of the basin, irrigation use is of prime importance and of the greatest value to the basin community as a whole. In view of the overall scarcity of the Krishna waters, preference should be given to irrigation use over power production by westward diversion of water.

(108) J. Outline Brown, Hydro Electric Engineering Practice 1958, Vol. III, p. 170

(109) A scheme for generation of power by westward diversion of waters of the river Pravara from Bhandardara storage was rejected by Maharashtra on inter alia the following grounds —

"This proposal yields larger quantum of power but will not be economically as attractive as the proposals of the present report * * *. Another important consideration against this proposal is that it will adversely affect the present irrigation from Bhandardara dam. This is the only source of water to the area which lies in low rainfall zones." See The Bhandardara Hydro Electric Project Report 1968, MRPG XXI p. 3, para 3.5

(110) Report of the Energy Survey of India Committee 1965, p. 185

(111) Report of the Energy Survey of India Committee 1965, p. 190

The Irrigation Commission pertinently observed:⁽¹¹²⁾

"Multipurpose river valley projects offer the best use of surface water resources; but apart from situations where both power generation and irrigation may be possible, there may be other cases in which a choice has to be made between the use of water either for irrigation or power generation. The Western Ghats offer sites with high heads for the generation of cheap hydro-electric power by diverting westwards the waters of east flowing streams. In Maharashtra, part of the waters of the Koyna, a tributary of the Krishna, has already been partly diverted westwards to generate hydro-electric power at the Koyna power-station, which has an installed capacity of 560 MW. In such cases, where a choice is involved, the priority has to be determined not only by economic considerations, but by recognition of the fact that irrigation is possible only by the use of water, whereas power can be generated from alternative sources such as coal, gas, oil and atomic fuels. In view of the overall scarcity of water resources, we recommend that wherever a choice has to be made between irrigation and power generation, preference should be given to irrigation. The east flowing rivers rising in the Western Ghats traverse areas which have low rainfall and suffer from water scarcity. The needs of these areas should receive priority."

We hold that irrigation use of the waters of river Krishna should prevail over hydro-electric use requiring diversion of the water across the Western Ghats and that westward diversion of water beyond what is allowed for the Koyna Hydro-electric Project and the Tata Hydel Works should not be permitted in the Krishna basin. We have protected the annual westward diversion of 67.5 T.M.C. by the Koyna Hydel Project and 42.6 T.M.C. of water by the Tata Hydel Works. This water represents more than 5 per cent of the 75 percent dependable flow of the Krishna river.

The Koyna Hydel Project diverts westwards outside the Krishna river basin water from the river supplies in the Upper Krishna (K-1) sub-basin. The State of Maharashtra should not be permitted to divert outside the Krishna river basin from

the river supplies in the Upper Krishna (K-1) basin more than 67.5 T.M.C. of water in any water year for the Koyna Hydel Project or any other project.

The Projects collectively known as the Tata Hydel Works divert water outside the Krishna river basin water from the river supplies in the Upper Bhima (K-5) sub-basin. The quantity of water diverted westwards for these Projects fluctuated from year to year, the maximum annual diversion being 54.47 T.M.C. during the years 1952-53 to 1967-68, while the protected annual westward diversion is 42.6 T.M.C. The State of Maharashtra should not be permitted to divert outside the Krishna river basin from the river supplies in the Upper Bhima (K-5) sub-basin for the aforesaid Projects or any other project more than 54.5 T.M.C. of water in any one water year and more than 212 T.M.C. in any period of five consecutive water years commencing on the 1st June, 1974.

Transitional Provisions :

Maharashtra has argued that an abrupt reduction of westward diversion of water at Koyna station will paralyse the power situation in the State and that the limitation of the diversion to 67.5 T.M.C. of water annually should not take effect for some time.

On a full consideration of the matter, we are inclined to hold that Maharashtra should be permitted to divert westwards for the Koyna Hydel Project 97 T.M.C. of water annually during the period of 10 years commencing on the 1st June, 1974 and 87 T.M.C. of water annually during the next period of 5 years and 78 T.M.C. of water during the next succeeding period of 5 years. As it will take several years to develop the irrigation potential of all the States, the larger westward diversion for this limited period will not injure the irrigation interests in the lower reaches of the river. Counsel for Mysore and Andhra Pradesh conceded that irrigation interests in the lower reaches of the river will not be injured by the larger diversions for the first 15 years. On the expiry of 20 years, the annual westward diversion of water from Koyna Hydel Project will be limited to 67.5 T.M.C. of water.

Restriction should be imposed on westward diversion of water :

Maharashtra argues that once an allotment of the Krishna waters is made, Maharashtra may divert a

⁽¹¹²⁾ Report of the Irrigation Commission 1972, Vol. I, p. 90.

portion of its share of the water (not exceeding 260 T.M.C. annually) westwards and that so long as its total appropriation does not exceed the aggregate quantity allotted to it, westward diversion of water cannot cause any injury to the other States and should not be restrained by the Tribunal. We are unable to accept this argument.

The case of the other States is that irrigation use should enjoy preference over hydro-electric use requiring westward diversion of the Krishna waters and that more westward diversion of water for purposes of power production should not be permitted. The dispute must be settled and the reciprocal rights and obligations of the States must be determined by applying the rule of equitable apportionment of the benefits of the river. The process of equitable allocation involves determination of the relative values of conflicting uses, the extent to which irrigation and other uses should prevail over hydro-electric uses requiring westward diversion of water and the quantity of water that may be diverted westwards consistently with the available supply and the needs of the other States. On a consideration of all relevant factors, we have found that Maharashtra should be allowed to divert westwards a limited quantity of water only and that excess westward diversion would be injurious to full development of the irrigation potential in the lower reaches of the river. The equitable allocation fixes the limits of westward diversion of water. Any westward diversion by Maharashtra in excess of those limits involves an injury to the other States and must be restrained.

We cannot permit westward diversion of water allotted to Maharashtra for its irrigation and other uses within the Krishna basin and particularly for the irrigation needs of its scarcity areas. If Maharashtra did not need the water for its irrigation needs within the basin, we would have allotted the water to the other States for developing their irrigation potential.

The special features of the Krishna basin necessitate the imposition of restrictions with regard to westward diversion of water and other restrictions with regard to the use of the water allotted to the States. Subject to these restrictions, each State is free to use the water allotted to it in any way it likes. But the restrictions imposed by the Tribunal must be obeyed.

We may now examine the materials and authorities upon which reliance was placed by Maharashtra.

Maharashtra relied on the literature concerning equitable allocation of the waters of the river Jordan. In 1954 and 1955, W.D. Criddle, adviser for the United States of America, formulated a plan for the development of the waters of the Jordan river system. A basic assumption of the plan was that, in so far as possible, each country was entitled to beneficially use water on all irrigable lands within the basin, and that once the division was made between the countries, water so allocated could be used on lands within the basin or out of the basin as the country might choose. Israel wished to use much of her allotted water outside the basin.⁽¹¹³⁾ In October 1955, there was a revised unified plan under which the reasonable needs of all in-basin users in the riparian States was to be provided before out-of-basin uses could be considered. The United States authorities contended that the waters accruing to Israel represented its share after equitable Arab claims had been deducted, and that Israel's share could be used legitimately either in or out of the basin. The technical representatives of the riparian States unanimously endorsed the revised Plan. But eventually the plan was vetoed and nothing definite emerged.⁽¹¹⁴⁾ The negotiations regarding the allocation of the Jordan waters do not establish any precedent for settling inter-State water controversies.

The decisions of the U.S.A. Supreme Court relied upon by Maharashtra turned upon the construction of a decree in *Wyoming v. Colorado* 259 U. S. 419 as modified in 260 U.S.1. That decree affirmed "the right of the State of Colorado or of any one recognised by her as duly entitled thereto" to divert and take annually 15,000 acre feet of water for the Laramie Poudre Tunnel appropriation, 18,000 acre feet of water for the Skyline Ditch appropriation 4250 acre feet of water for the Meadowland appropriation and 2000 acre feet of water for the Wilson Supply Ditch, that is, 39,750 acre feet of water in all. In *Wyoming v. Colorado* 298 U.S. 573 and 309 U.S. 572, the Court held that it was not the purpose of the decree to withdraw water claims dealt with therein from the operation of the local laws under which water rights acquired by appropriation were transferable and the use of water could be changed from the irrigation of one tract to another, if the change did not injure other appropriations.

(113) H.F. Blaney and W.D. Criddle, Determining Water Requirements for settling water disputes, *Natural Resources Journal* Vol. 4 No. 1, pp. 29, 39, 40; The Methods of Estimating Evapotranspiration, Irrigation and Drainage Specialty Conference, Las Vegas, Nov. 2-4, 1966, published by American Society of Civil Engineers, p. 27.

(114) Samir N. Salioa, *The Jordan River Water Disputes*, pp. 106, 107 (Martinus Nijhoff/The Hague).

Accordingly, the Court ruled that diversions by Colorado in excess of 18,000 acre feet of water for the Skyline Ditch appropriation and in excess of 4250 acre feet of water for the Meadowland appropriation did not constitute an infraction of the decree so long as the diversions for all the Colorado appropriations did not exceed its total allotment. The decree, on its proper interpretation, imposed a limitation on the amount of water divertible by Colorado, but it did not place any restriction on the place of diversion or the purpose for which diversion could be made.

But where, for purposes of equitable allocation, it is necessary to impose specific restrictions on the place or purpose of diversion, the Court may by its decree direct that not more than a specified quantity of water can be diverted to another watershed or can be withdrawn from particular reaches of the river and that the diverted water shall be used for certain specific purposes and areas only. If such a decree is passed, it must be carried out and the specific restrictions imposed by it must be obeyed. Instances of such specific restrictions may be cited.

Para A to D of article IV of the decree passed in *Arizona v. California* 376 U.S. 340 permitted the State of New Mexico to divert water from certain streams and to use the water for irrigation of certain areas on those streams. Para (F) of article IV of the decree enjoined that no diversion from a stream authorised in para (A) to (D) "may be transferred to any of the other streams nor may any use for irrigation purposes within any area on one of the streams be transferred for use for irrigation purposes to any other area on that streams". Obviously, the State of New Mexico could not claim immunity from the specific restrictions imposed by article IV(F) of the decree by invoking the authority of the decisions in 298 U.S. 573 and 309 U.S. 572.

Clause I of the decree in *Nebraska v. Wyoming* 325 U.S. 589, 665 restrained the State of Colorado from diverting water from the North Platte River for irrigation of more than 1,35,000 acres of land in Jackson County, Colorado and from exporting out of the basin of the North Platte River and its tributaries in Jackson County, Colorado to any other stream basin more than 60,000 acre feet of water in any period of ten consecutive years. In view of these specific restrictions, Colorado could not lawfully export a larger quantity of water to another

watershed on the plea that the larger export would not cause any injury to the other States so long as its total appropriation did not exceed the aggregate quantity of water allotted to it.

On a consideration of all relevant factors we propose to pass the following order :—

- (1) The State of Maharashtra shall not out of the water allocated to it divert or permit the diversion of more than 67.5 T.M.C. of water outside the Krishna river basin in any water year from the river supplies in the Upper Krishna (K-1) sub-basin for the Koyna Hydel Project or any other project.

Provided that the State of Maharashtra will be at liberty to divert outside the Krishna river basin for the Koyna Hydel Project water to the extent of 97 T.M.C. annually during the period of 10 years commencing on the 1st June, 1974 and water to the extent of 87 T.M.C. annually during the next period of 5 years commencing on the 1st June, 1984 and water to the extent of 78 T.M.C. annually during the next succeeding period of 5 years commencing on the 1st June, 1989.

- (2) The State of Maharashtra shall not out of the water allocated to it divert or permit diversion outside the Krishna river basin from the river supplies in the Upper Bhima (K-5) sub-basin for the Projects collectively known as the Tata Hydel Works or any other project of more than 54.5 T.M.C. annually in any one water year and more than 212 T.M.C. in any period of five consecutive water years commencing on the 1st June, 1974.
- (3) Except to the extent mentioned above the State of Maharashtra shall not divert or permit diversion of any water out of the Krishna river basin.

Eastward irrigation :

Maharashtra's demand for Koyna Krishna Lift Irrigation Scheme as also its demand for eastward irrigation under the proposed multiple purpose westward diversion schemes will be dealt with separately.

CHAPTER XIV
APPORTIONMENT OF THE WATERS OF THE RIVER KRISHNA
PART—I

In this chapter we proceed to embark upon the difficult and delicate task of the division of waters of the river Krishna between the States of Maharashtra, Mysore and Andhra Pradesh. This is also the subject matter of Issue No. II and the sub-issues under it. These are set out below :—

II. What directions, if any, should be given for the equitable apportionment of the beneficial use of the waters of the Krishna river and the river valley.

SUB-ISSUES

- (1) On what basis should the available waters be determined ?
- (2) How and on what basis should the equitable apportionment be made ?
- (3) What projects and works in operation or under construction, if any, should be protected and/or permitted ? If so, to what extent ?
- (4) Should diversion or further diversion of waters outside the Krishna drainage basin be protected and/or permitted ? If so, to what extent and with what safeguards ? How is the drainage basin to be defined ?
- (5) Should any preference or priority be given to irrigation over production of power ?
- (6) Has any State any alternative means of satisfying its needs ? If so, with what effect ?
- (7) Is the legitimate interest of any State affected or likely to be affected prejudicially by the aggregate utilisation and requirements of any other State ?
- (8) What machinery, if any, should be set up to make available and regulate the allocations of waters, if any, to the States concerned or otherwise to implement the decision of the* Tribunal.

While devising the scheme for equitable apportionment of the waters of the river Krishna, we shall also be deciding Issue No. IV(B)(a) which runs as follows :—

"Should any directions be given for the release of water from the Tungabhadra Dam :—

- (i) for the benefit of the Kurnool Cuddapah Canal;
- (ii) for the benefit of the Rajolibunda Diversion Scheme; and
- (iii) by way of contribution to the Krishna river ?"

We have determined the 75 per cent dependable yield of the river Krishna upto Vijayawada as 2060 T.M.C. as mentioned in Chapter IX. We have further determined in Chapter X the quantities of water which shall be available for distribution between the parties on account of return flows. We have also held that in the equitable apportionment of the waters of the river Krishna, utilisations in each State to the extent mentioned in the concluding part of Chapter XII should be preferred to contemplated uses. We have also held in the concluding part of Chapter XIII that irrigation use in the Krishna basin should prevail over hydro-electric use requiring diversion of the Krishna water across the Western Ghats and westward diversion of water beyond what is allowed for the Koyna Hydel Project and the Tata Hydel Works should not be permitted except to the extent it has been allowed as a transitional measure in respect of the Koyna Hydel Project.

We have also held that all the three States will be free to make use of underground water within their respective State territories and that the rights, if any, under the law for the time being in force of private individuals, bodies or authorities relating to the use of underground water, are not altered and that the use of underground water resources shall not be reckoned as alternative means of satisfying the need of any State and will not be taken into account for the purpose of equitable apportionment of the waters of the river Krishna. This relieves us from

discussing whether the use of underground water resources should be taken as alternative means of satisfying the need of any State or not because it is not to be taken into account for the purpose of equitable apportionment of the waters of the river Krishna.

It will be proper to set out at this stage the case of the parties on the subject-matter of division of the waters of the river Krishna between the three States. In paragraph 7.59 at pages 194 to 195 of MRK-I, the State of Maharashtra has stated that taking the dependable flow at 75 per cent dependability to be 2200 T.M.C., the equitable distribution of water of the Krishna System between the three States should be worked out as in Statement MK.VII-2 at page 207 of MRK-I. In this statement the State of Maharashtra has worked out the percentage of the following factors in respect of each of the three States :

- (1) drainage contribution to the basin,
- (2) scarcity area in the basin,
- (3) culturable area in the basin and percentage share based on weighted culturable area, and
- (4) population in the basin.

Taking the average of all these percentages, it is stated that the apportionment of the flow of the river Krishna at the 75 per cent dependability between the three States should be as follows :—

Maharashtra	908 T.M.C
Mysore	865 T.M.C
Andhra Pradesh	427 T.M.C

In paragraph 7.59.3 at page 196 of MRK-I the State of Maharashtra has also claimed share in the additional flow exceeding 75 per cent dependable supplies in the same proportion as stated above. It has further claimed that each State should be entitled, at its own discretion, to build storages of larger capacities for utilising the additional supplies upto say 50 per cent dependable flows or any other prescribed lower per cent dependable flows than 75 per cent. In paragraph 7.59.4 at pages 196-197, the State of Maharashtra has stated that during shortages the percentage in the shares of the three States should be the same as the percentage in the contributions by the States to the basin flow.

The State of Maharashtra had got prepared a Master Plan by a committee appointed by the Government of Maharashtra by Resolution No. ISW. 1067-KG, dated the 18th October, 1967, which envisages

the use of 900 T.M.C. water of the river Krishna out of the 75 per cent dependable supplies for irrigation, power and domestic and industrial requirements (MRK-II pages 49 to 60). The demand of the State of Maharashtra as given in Annexure II at page 50 of MRK-II may be summarised as follows : —

ANNEXURE II - ABSTRACT

Abstract of water requirements of Maharashtra State in the Krishna basin in accordance with the Master Plan.

Gross utilisation in T.M.C.					
Serial No.	Type of Projects	Projects existing and cleared.	Projects pending with CW & PC and Planning Commission	Other Planned Projects	Total of Cols. 3 to 5
1	2	3	4	5	6
1.	Irrigation Projects within the Krishna	335	83	150	568
2.	Westerly diversion projects	120	117	24	261
TOTAL		455	200	174	829

NOTE:—The utilisations indicated above do not include the future probable requirements of Industrial and Domestic water supply which are expected to be of the order of 70 to 80 T.M.C. as also the utilisation of 32.5 T.M.C. from regenerated flow.

Details of the water requirements for each project in the various sub-basins are given in Statement Nos. 1, 2 and 3 to that Annexure at pages 51 to 60 of MRK-II. The details given in the aforesaid statements show that not only the dependable flow but the water available on account of regeneration is also planned for use in the case of several projects. The State of Maharashtra has further stated that for future projects, that is, projects which would mature after 15 to 20 years further diversions would be necessary from the less dependable flows.

The State of Mysore has stated that there are vast possibilities of irrigation in the Krishna basin and that of the three States it has the largest :—

- (a) Drainage area ;
- (b) Culturable area ;
- (c) Net sown area ; and
- (d) Population

in the Krishna basin. The State of Mysore has shown the Statewise distribution of these factors in the Table

given in paragraph 107 at page 50 of MYK-I. This statement is set out as follows

State	Drainage Area		Culturable-Area		Net Sown Area		Population	
	Sq. Miles	Percentage Col. 2x100	Lakh Acres	Percentage Col. 4x100	Lakh Acres	Percentage Col. 6x100	Lakhs	Percentage Col. 8x100
		Total of Col. 2		Total of Col. 4		Total of Col. 6		Total of Col. 8
1	2	3	4	5	6	7	8	
Mysore .	43,734	43.7	229.4	45.3	177.3	46.2	117.6	37.6
Andhra Pradesh	29,441	29.5	134.9	26.7	87.7	22.8	98.1	31.4
Maharashtra .	26,805	26.8	141.4	28.0	119.2	31.0	96.7	21.0
TOTAL	99,980		505.7		384.2		312.4	

It has been further stated that it has five rich Doabs in the State of Mysore at the confluence of the river Krishna with its major tributaries and that it has maximum arid tracts as compared with other States and these tracts are in need of water. The total requirements of the State of Mysore for irrigation in the Krishna basin as given in Statement Nos. 5, 6 and 7 of Annexure III of MYK-I are for 1430 T.M.C. at 75 per cent dependability. It is stated by the State of Mysore that this assessment of requirement is rather on the conservative side and it does not include needs for domestic and industrial uses (paragraph 114 at pages 52-53 of MYK-I). The consolidated picture of the requirements of the State of Mysore, as claimed by it, is given in Statement 7 of Annexure III at page 102 which is quoted below.

ANNEXURE III

Statement 7

Statement showing water requirements of Projects by Valleys in Krishna Basin Mysore State.

Sr. No.	Name of Valley	Require-ments of Projects completed or under construc-tion in T.M.C.	Require-ments of proposed projects in T.M.C.	Total require-ments of projects in each valley in T.M.C.
1	2	3	4	5
1.	Krishna Main Stem	451.84	87.34	539.18
2.	Ghataprabha Valley	101.73	43.40	145.13
3.	Malapiabha Valley .	51.10	25.48	76.58
4.	Bhima Valley .	13.03	120.47	133.50
5.	Tungabhadra Valley	354.33	181.28	535.61
	TOTAL	972.03	457.97	1430.00

Figures in Column 3 and Column 4 have been taken from Statement 5 and Statement 6 respectively.

2 M of I&P/73—5

The State of Mysore has also prayed that its share may be increased or reduced when the water available is more or less than the total yield determined at 75 per cent dependability in the same proportion that 1430 T.M.C. bears to the total yield determined at 75 per cent dependability (see Relief B in paragraph 139 at page 65 MYK-I).

The State of Andhra Pradesh has stated that its economy is dependant on its agriculture, that it has the maximum commandable area in the Krishna basin, that it has most fertile soil types eminently fit for irrigation, that it is able to produce food in the shortest period, that it has facilities for construction of economic projects, that it has a fitful unseasonal rainfall resulting in large portions of the State being affected by droughts and famines, that it has a low per capita income, that it has a very high ratio of rural population to urban population and that it is vulnerable to heavy flood and frequent cyclones. It is submitted that all these features taken individually and collectively clearly establish the claim of the State of Andhra Pradesh for a large share of the Krishna waters for irrigation purposes (see pages 110 and 111 of APK-I). The State of Andhra Pradesh further stated that its claim in the waters of the river Krishna should be divided in three categories. The first category relates to the existing utilisation upto 1951, the second category relates to the committed utilisations between 1951 and 1960 and the third category relates to the projects for which water is claimed from the balance quantity of water available out of the dependable flow in the river after meeting the needs of first and second categories. The State of Andhra Pradesh has contended that the total water required for all the committed utilisations upto the year 1960 be set apart for the State of Andhra Pradesh to be utilised on daily basis for projects committed upto 1951 and for projects committed between

1951-to 1960 on weekly basis. It has submitted that after allowing in full the water for existing utilisation upto the year 1960 the residual flow available be so divided that the State of Andhra Pradesh gets 60 per cent of the residual flows (see pages 49 to 55 of APK-1). In Appendix XVII of APK-I at pages 123 to 125 the State of Andhra Pradesh has given a statement showing the total utilisations for its schemes. This statement is divided in three lists A & B, C and D. The abstract of these lists at the bottom at page 125 of APK-I giving the total utilisations for all projects as 2008 T.M.C., is as follows: —

A	& B Utilisations for schemes committed upto 1960	956 T.M.C. ft.
C	Utilisations for schemes committed after 1960	84
D	Utilisations for schemes under contemplation	968 „
	or say	2008 T.M.C.ft. 2000 T.M.C.ft.

The following reliefs as mentioned at pages 134 to 136 of APK-I have been claimed with respect to the utilisations mentioned in Lists A & B, C and D and for a share in the excess flows over and above the dependable yields :—

- "2. For a direction that all existing irrigation in Andhra Pradesh prior to 1951 requiring a total quantity of 366 Thousand Million Cubic Feet of Krishna water should get full and timely supply on daily basis as a first priority.
3. For a direction that all the committed utilisations in Andhra Pradesh for projects constructed or under construction between 1951 and 1960 requiring a total quantity of 590 Thousand Million Cubic Feet of Krishna water should get full and timely supply on a weekly basis.
4. For a direction that out of the balance dependable yield available after deducting the existing and committed utilisations upto 1960 in all States, Andhra Pradesh be allotted a share of 60 per cent on weekly basis, on the basis of equitable principles which have already been enunciated in the statement of case.
5. For a direction that in the excess flows over and above the dependable yield, Andhra Pradesh also be given an equitable share on the basis of the ability of Andhra Pradesh to put water for immediate and beneficial use.

6. For a direction that in years of low supply below the dependable yield committed utilisations upto 1951 be fully met and the balance be regulated on a pro-rata basis first for the committed utilisations upto 1960 with second priority to new schemes.

* * * * *

15. For a direction that a suitable and efficient machinery be established to ensure proper regulation and distribution of legitimate shares of each State."

A bare perusal of the demands of all the three States shows that each State has tried to place its demands as high as possible. It need not be emphasised that it is not possible to meet the aforesaid demands of the three States from the water available in the Krishna basin. We have already mentioned that utilisations upto 1684.11 T.M.C. have been protected. This leaves a limited scope for satisfying the needs of the three States. The States of Maharashtra and Mysore have strenuously urged before us that utilisations of the State of Andhra Pradesh have been protected to the extent of 749.16 T.M.C. Which is much in excess of its equitable share and that in the remaining water that may be available for distribution nothing should be allocated to the State of Andhra Pradesh and the entire remaining water should be equitably divided between the States of Maharashtra and Mysore. On behalf of the State of Andhra Pradesh it is submitted that there is no valid reason that the State of Andhra Pradesh should not get anything from the remaining water when its need for utilisation of more water is as great as any of the other two States. Elaborate arguments have been addressed by the parties before us on all aspects of the matter of which we shall take notice presently.

At this stage we may point out that in any scheme for the division of water of the river Krishna it should be made possible that all the utilisable water available in the Krishna basin may be utilised. So far as the utilisation of underground water is concerned, there is now no controversy and we are here concerned with the utilisation of the surface water by the three States. The surface water is likely to be augmented every year from the return flow which may be available from the water diverted and used for beneficial uses. Most of this is to come from water used for irrigation. If in any scheme for division of the water this increase in the flow of the river Krishna due to return flow is taken into account automatically every year without entering into a meticulous and detailed examination of the various factors which affect the return flow, it would shut the

door to all controversies between the parties regarding the exact or even approximate quantity of water which may be available as return flow. At the same time under such a scheme, the parties would be able to get water which may be available due to return flow for utilisation every year. In drawing up any scheme for the division of waters of the river Krishna this aspect of the matter may be examined.

Another important aspect of the matter is that in view of the vast gap between the supply and demand of water in the Krishna System, time has come when it should be made possible that the surplus water which may be flowing in 75 years over and above the flow at 75 per cent dependability may be impounded and utilised if it is so feasible. The question is of conservation of water which would be flowing in excess of the dependable flow. The distinction between annual storage and overyear storage must be made clear at this stage. Annual storage refers to storage from the period of surplus to the next period of shortage in the same irrigation year. Over-year storage is storage from high-years for use in low-years. The demands of the three States for beneficial use particularly for irrigation are already so high that no water should be allowed to go waste for 75 years without seriously exploring all possibilities for its utilisation. We have already referred to the case of parties as set out in their pleadings. They themselves are alive to this problem and are keen on utilisation of such water. Each State has claimed equitable share in the dependable flow and also in the water in excess over the dependable flow. /

Chapter VI on 'Policies and Considerations in Irrigation' in the Report of the Irrigation Commission (1972) Volume I, deals with this subject at page 125. It will be useful to quote the views of the Commission on this point :

"6.53. The rainfall in various catchment areas varies from year to year and so does the volume of water in rivers. Irrigation projects have to be so designed that their full requirements are met in most years. At present, the practice is to design the projects to utilise river flows of 75 per cent dependability. It means that in 75 years there is some surplus in the river, and in 25 years some shortage, ranging from marginal to substantial. It is obvious that the higher the dependability, the less the quantity of water available for utilisation. *Availability can, however, be improved by providing an extra capacity in the reservoir*

for carrying over supplies from surplus years to lean years. By adopting this device, a project can be designed on river flows of lower dependability to provide a larger volume of water to irrigators, with the same degree of assurance. But the provision of carryover capacity in a reservoir entails additional cost, and it becomes a matter of evaluating the additional supply against the additional cost. The more precious the water in an area, as in drought areas, the greater is the justification for providing a carryover. We have dealt with the policies regarding irrigation in drought affected areas in Chapter VIII.

- 6.54. We consider that the farmer should be assured of getting the designed supply in 75 per cent of the years, and the existing practice of planning irrigation schemes on the basis of 75 per cent dependability should continue. Where a carryover is provided, the 75 per cent dependability can be figured out taking into account the carryover water.
- 6.55. As variations in the year to year supply are inherent in all major irrigation schemes, we suggest that, well before the rabi season, the farmer should be informed of the quantity of water likely to be available from a reservoir, so that he may adjust his crop ping suitably. The information in respect of run-of-the-river schemes would be less definite, but even a broad indication would be helpful."

(We have *italicized* some portions in the above passages).

The *italicized* portions emphasise the importance of conservation of water in carryover storages for use in the lean years in areas where the demand for the water outpaces the supplies and show that the water carried over in carryover reservoirs would increase the dependability for the purpose of irrigation. In our opinion in the Krishna basin, the genuine demands for irrigation are outstripping the supplies and a serious attempt should be made to use the entire water available in the basin by constructing carryover storages wherever possible.

We may also point out that the history of development of irrigation in the Nile Valley is also the history of conservation of water for use by construction of overyear storages.

"The decade following the completion of the Aswan Dam was a period of intensive investigation and planning under the technical direction of Sir William Garstin, the Under-secretary of Public Works in Egypt. In 1904 a four point program was recommended to provide more water for Egypt and for the Sudan during the low period. The plan included in addition to the Aswan Dam and the Sennar Dam on the Blue Nile, of which more later, a series of works in the Sudd region on the White Nile to reduce the great losses of water in that swampy region. In addition, overyear storage in Lake Victoria and Lake Albert was recommended and overyear storage in Lake Tana at the origin of the Blue Nile was proposed. Additional proposals for storage on the Atbara were set out. At the close of this period of planning and survey there occurred in 1913-14 the lowest year on the Nile yet recorded. This tended to give even greater urgency to the overyear storage proposals."⁽¹⁾

The agreement between the United Arab Republic and the Republic of Sudan dated the 8th November, 1959 specifically mentions that water is to be stored in Aswan Dam for use in the next year. In Art. II of the Treaty, reference is made to Nile control works and the sharing of their benefits between the two Republics. It is mentioned therein that:

2. "In order to make use of the full natural river supply and stop the flow of any excess to the sea the two Republics agree to the construction by the U.A.R. of the Sudd el Aali Reservoir at Aswan as the first of a series of overyear storage schemes on the Nile.
3. The net benefit from the Sudd el Aali Reservoir shall be calculated on the basis of the mean natural river supply at Aswan in the past years of this century and which amounts to 84 milliards of cubic metres per year. The established rights of the two Republics referred to in Article I as well as the mean value of the overyears storage yearly losses in the Sudd el Aali Reservoir

shall be deducted from the above mentioned mean natural river in order to obtain the net yearly benefit to be shared by the two Republics."

We may, however, point out that it is not our intention to say that average of the flows of all the years for which data is available should be taken to be the proper available supplies for distribution between the parties. This will mean utilising the waters of the Krishna river at 50 per cent dependability. The river Krishna is, of course, much more dependable river than many rivers in India, yet without further study it will be too much to say that the water should be impounded in the Krishna basin to such an extent that we may make 50 per cent dependability a basis for division of the water. In this connection it will be worthwhile to notice the following observations in Wyoming vs. Colorado ⁽²⁾:—

"Colorado's evidence, which for convenience we take up first, is directed to showing the average yearly flow of all years in a considerable period, as if that constituted a proper measure of the available supply. We think it is not a proper measure—and this because of the great variation in the flow. To be available in a practical sense the supply must be fairly continuous and dependable. No doubt the natural flow can be materially conserved and equalized by means of storage reservoirs, but this has its limitations, both financial and physical. The construction of reservoirs of real capacity is attended with great expense, and unless an adequate return reasonably can be foreseen the expenditure is not justified and will not be made. The years of high water and those of low do not alternate. Often several of the same kind follow in succession. The evaporation of stored water in Colorado and Wyoming is from five to six feet per year. So, while it generally is practical to store water in one part of the year for use in another, or in one year for use in the next, it often, if not generally, is impracticable to store it for longer periods."

The subject of overyear storages with regard to the reservoirs has been discussed (1) in the Physical Department paper No. 35. "The hydrology of the

(1) AH. Garretson and others "The Law of International Drainage Basins", page 265.

(2) Wyoming vs. Colorado 259 U.S. 419 (1922) cited in "Documents on the use and control of the waters of inter State and International Streams", compiled and edited by T. Richard Witmer, second edition, p. 674.

Lake Plateau and Bahr El Jebel", The Nile Basin Vol. V pp. 81-87 with reference to Lake Albert Reservoir Project and (2) in Physical Department paper No. 51, "The Future Conservation of the Nile," The Nile Basin Vol. VII pp. 55-58 with reference to The Lake Albert Reservoir and Century Storage. These studies are instructive as showing the importance of over year storages and theoretical and practical problems encountered while constructing overyear storages.

Studies for determining the advantage that will accrue by carryover storages have been made in the Krishna basin by the expert witnesses of the parties, namely, Mr. K. K. Framji (MRW-1), Mr. Jaffer Ali (APW-6) and Mr. Angadi (MYW-1). Though their conclusions may be different with regard to exact quantity of water which may be available for utilisation yet they are generally agreed that it is possible to utilise surplus water flowing above 75 per cent dependability in 75 years by constructing overyear storages in which excess water in a particular year may be stored for use in the succeeding years.

Mr. Framji taking the dependable flow at 2176 T.M.C. and combined carryover capacity of the Nagarjunasagar and the Srisailem Reservoirs as 180 T.M.C., stated in answer to Question No. 196 that:—

"The general result of the study is that there is an increase of the dependable flow in the Krishna from 2176 T.M.C. to 2300 T.M.C. from the combined use of the carryover capacities in the Nagarjunasagar and Srisailem projects of 180 T.M.C. and that this enables a utilisation upstream of Srisailem of 1680 T.M.C. for the upstream projects."

He submitted Statement No. 1 in the form of a table which is at pages 489 to 491 of his evidence and stated in respect of this statement that:—

"I would draw attention to the general conclusion which can be drawn from this table, namely that 2300 T.M.C. utilisation is available in 38 years out of 51, that is at 75 per cent dependability. 2176 T.M.C. utilisation will be available in 41 years out of 51 years, that is at 80 per cent dependability ; and out of 10 years of failure, the yields are improved in 7 years by the carry-over."

Mr. Jaffer Ali (APW-6) admitted that the effect of the carryover storages is to increase the dependable flow. In this connection his answers to Questions

Nos. 39 to 42 at pages 117 and 118 are relevant. At page 117 he has plainly admitted that the effect of the carryover storage is to increase the dependable flow of the river. But the extent of the effect will depend on the extent of the carryover and on the pattern of the yields received during the years. He also stated that the effect of the increase can be felt throughout the river. Mr. Angadi (MYW-1) stated as follows in answer to Question No. 8 at page 25 of his evidence.

"I have noticed that in a period of 51 years from 1900-01 to 1950-51, there will be very large surplus which is going waste, if we plan utilisation of the Krishna River System considered as a whole for 2176 T.M.C., at 75 per cent dependability. Therefore, I got made, under my personal supervision, a number of trial studies relating to carryover capacity, total benefits and the percentage dependability of that benefit. As a result of these studies, I came to the conclusion that by the best combination of these three variables, namely, the carryover capacity, the total utilisations as a result of it and its dependability, and by providing 283 T.M.C. of carryover capacity it will be possible to increase annual utilisations to 2406 T.M.C., that is to say, by providing 103 T.M.C. more of carryover capacity than what I have found exists in the Srisailem and Nagarjunasagar reservoirs, namely, 180 T.M.C."

He further explained that with the carryover storage at 283 T.M.C., 72.5 per cent dependable flow of 2406 T.M.C. would be obtained. He stated at page 60 of his statement that 75 per cent dependable flow which would be obtained with carryover storage of 283 T.M.C. will be of 2291 T.M.C. It may be mentioned that this witness had taken the dependable flow as 2176 T.M.C. as Mr. Framji had done. The witness in answer to Question No. 12 at page 28 of his evidence stated that there was already a carryover capacity of 180 T.M.C. ft. in the Srisailem and the Nagarjunasagar Reservoirs and in answer to Question No. 13 at the same page stated that the points at which such carryover storages could be constructed are the Almatti Dam site of the Upper Krishna Project and the Malti Reservoir of the Upper Tunga Project and the Mahagundi Dam of the Upper Bhadra Project at Lakkavalli.

The substance of the matter is that by having carryover storages, additional water becomes available for utilisation in the river Krishna. The additional water

rights. Changes in demands upon the water supply and technological improvements in control of waters and of pollution demand continued reevaluation of legal rights. This necessary flexibility has been sought in a variety of ways, none altogether satisfactory. The Supreme Court has issued 'open end' decrees permitting the parties to apply for relief in the event of changed conditions, but this is not a simple procedure and a heavy burden is upon the moving party to show such conditions. Continuing jurisdiction is occasionally implemented by the device of a Court appointed river master who reports regularly to the Court. The master, of course, is without authority to modify the decree.

Extrajudicial adjustments have been effected by the parties themselves when exceptional circumstances have required them. The Great Lake States have consented to temporary diversion from Lake Michigan in excess of that permitted by the Supreme Court in order to remedy a dangerous condition in the Chicago Sanitary Canal. Similarly, in a time of severe drought in the East, the lower basin States did not compel New York City to maintain the requisite low flow specified under the Supreme Court decree. No Court approval was necessary since the affected States agreed not to press their legal rights under these exceptional circumstances." ⁽¹⁰⁾.

However, a Tribunal appointed under the Inter-State Water Disputes Act, 1956 is not a permanent body and it cannot retain jurisdiction to modify its decision, apart from its statutory power to do so upon a reference made to it within three months of the decision, ⁽¹¹⁾.

If any further modification of the final decision is necessary, a new tribunal must be appointed and a new reference must be made to it for this purpose.

For all these reasons, we think it necessary that our Order should expressly provide that the present

allocations will be subject to review and modification after the lapse of a reasonable period of time.

After a careful consideration we are of the opinion that the order of the Tribunal may be reviewed at any time after the 31st May, 2000. This period is considered reasonable by us in view of the fact that during the intervening period there will be increasing demands for water for irrigation and other purposes, in the Krishna basin which may have to be examined in the light of the fresh data that may be available. It may be mentioned that the demands of the three States will by that time take much more realistic shape. Further in view of the stupendous advance in the technology in the matter of conservation of water and its-uses and also for other reasons it may become necessary to examine the subject of apportionment of water after the 31st May, 2000. We have, however, provided that the authority or the tribunal which will be reviewing the order of this Tribunal shall not, as far as practicable, disturb any utilisation that may be undertaken by any State within the limits of the allocation made to it by the Tribunal. The Nile Commission of 1925 had recommended a similar provision to the effect that:—

"The Commission foresees that it will be necessary from time to time to review the question discussed in this report. It regards it as essential that all established irrigation should be respected in any future review of the question." ⁽¹²⁾.

If during the intervening period there is an augmentation of the waters of the river Krishna by the diversion of the waters of any other river, no State shall be debarred from claiming before the aforesaid reviewing authority or Tribunal that it is entitled to a greater share in the waters of the Krishna on account of such augmentation nor shall any State be debarred from disputing such claim.

Two other points may be stressed at this stage. The first is that water is being allocated to the States for their beneficial use. In America there are provisions in the Constitutions of some of the Western States which relate the appropriative right to the use

⁽¹⁰⁾ Harvard Law Review Vol. 75 (1961-62) page 332.

⁽¹¹⁾ Inter-State Water Disputes Act, 1956, Ss. 5(3), 12. Section 131(7) of the Government of India Act 1935 authorised the Governor General or His Majesty in Council, as the case may be, to vary a final decision given on a water dispute see Report of the Indus (Rau) Commission, Vol. I, pp. 49-50, 68.

⁽¹²⁾ A.H Garretson & others "The Law of International Drainage Basins" page 283. See also La Plata River Compact, 1922, Art.VI at page 198 and Upper Colorado River Basin Compact, 1948, Art. XX at page 339, in 'Documents on the use and control of the waters of Inter-State and International Streams' compiled and edited by T. Richard Witmer.

of water to beneficial use ; and the water-rights statutes of ten States—as well as the Federal Reclamation Act—contain the historic pronouncement that beneficial use shall be the basis, the measure, and the limit of the right to the use of water, ⁽¹³⁾. In some compacts beneficial use has been made the basis, the measure and limit of the right to use of water. ⁽¹⁴⁾ The following passage gives the reason for incorporating such conditions :—

"The underlying reason for all this constitutional, legislative, and judicial emphasis on beneficial use of water lies in the relation of available water resources to the ever-increasing demands made upon them. From time immemorial in various American western regions, the aggregate areas of good agricultural land have been greater than areas that could feasibly be served with available water supplies. Beneficial use of water promptly became a matter of public concern and public policy, because with the continuously unfavourable ratio of supply to demand, waste of water—an antonym of beneficial use—or at least unnecessary waste, was not conducive to the public welfare. 'As a general principle, equity abhors waste, and delights to restrain it in a proper case.'

At the same time it was recognized that absolute efficiency in the diversion, conveyance, and distribution of water is not practicable and that at times some so-called 'waste' is inevitable. So the problem is to apply the limitation of economy in use of water within reasonable limits, in the last analysis to preclude any waste of water that can be reasonably avoided." ⁽¹⁵⁾

In our opinion water is to be allocated to the three States for beneficial use and for no other purpose. The term 'beneficial use' may, however, be construed in a wide sense. It may include any use of water which may be conducive to the physical or material well being of the inhabitants of a State or of the Country as a whole. In our opinion beneficial use shall include any use made by any State of the waters of the river Krishna for domestic, municipal, irrigation, industrial, production of power, navigation, pisciculture, wild life protection and recreation purposes.

This does not mean that a State which has not applied water allocated to it to beneficial use and has wasted it or used it for any purpose which can not be considered beneficial use is not to be charged with the quantity of water which it has used.

The second point is that in view of the scarcity of water available in the Krishna basin it is expected that increased attention will be paid by all the three States to minimise the use of surface water as far as possible. Increased efficiency in agriculture, use of underground water, reducing evaporation losses, reclamation of waste water, and lining of the canals are some of the matters which demand urgent and energetic steps to be taken so that there may be increase in supply and economy in utilisations. Some of the demands of the States can be met not by clamouring for more water but by tightening belt in the use of water.

With these general observations we proceed to consider the scheme for division of water.

Various schemes for dividing the water of the river Krishna between the three States were suggested and examined. These envisaged :

1. Allocating the waters of certain tributaries of the river Krishna entirely to one State or another and dividing the remaining water on an equitable basis.
2. Allowing guaranteed supply of water to a lower State by an upper State and permitting the use of remaining water to the upper State with or without any restriction.
3. Restricting diversion by an upper State to its share determined on an equitable basis leaving remaining water for use to a lower State.
4. Allocating the water of the river Krishna to the three States by percentages to be fixed by the Tribunal.
5. Mass allocation of water of the river Krishna to the three States upto a certain limit providing further that the parties are to share the water in certain percentages to be fixed by the Tribunal in surplus as well as deficit years.

After carefully examining all the proposals, the parties submitted document Ex. MRK-340 on the

(13) Waters and Water Rights by Clark, Vol. One page 86, para 19.2.

(14) La Plata River Compact, 1922, at page 198, Upper Colorado River Basin Compact, 1948, at page 339, Sabine River Compact, 1953, at page 292; Pecos River Compact 1948, at page 238 in 'Documents on the use and control of the waters of inter-State and International Schemes' compiled and edited by T. Richard Witmer.

(15) Waters and Water Rights by Clark, Vol. One page 8750, para 19.2.

4th May, 1973 which contained their views on the method of allocation to be adopted by the Tribunal. This document runs as follows :—

The parties submit as follows :—

1. There will be mass allocation of utilizable dependable flow at 75 per cent.
2. There will be allocation on percentage basis of water in surplus as well as deficit years of flow.
3. There will be restrictions with regard to use, the nature of which restrictions will be decided by the Tribunal.
4. There should be a joint control body to give effect to the decision of the Tribunal. The joint control body shall consist of one person with the rank of a Chief Engineer from each State, and two independent Engineers of equivalent rank and qualification to be appointed by the President of India. Such independent person shall have no connection, direct or indirect, with any of the three States. The cost of the said controlling body and of the establishment and equipment for implementing the Tribunal's decision shall be borne and paid equally by the three States.

NOTE 1. According to Maharashtra and Mysore 100 per cent of the 75 per cent dependable flow is utilisable. According to Andhra Pradesh some quantity as determined by the Tribunal must be deducted from the dependable flow towards the inevitable waste

2. There is difference of opinion between the States regarding the percentages, in surplus as well as deficit flows, which difference will have to be adjudicated upon by the Tribunal. Such difference includes the contention of the State of Maharashtra that there are certain tributaries within the territory of a State where the upper States or State are not in a position to provide any relief arising from deficits in the tributaries, a contention which the States of Mysore and Andhra Pradesh dispute, for the said States contend that the overall deficit taking the entire river basin as a unit should be shared on an equitable basis by all the three States.

Sd.
H.M. Seervai
for the State
of Maharashtra
4.5.73

Sd.
T. Krishna Rao
for the State
of Mysore
4.5.73

Sd.
P. Ramchandra Reddi
for the State of
Andhra Pradesh
4.5.73

The scheme proposed

by the parties under Document Ex. MRK-340 was considered in detail. In

substance the scheme was that in every water year the flow available in that year in the river Krishna was to be divided for beneficial use between the parties, the share of the parties being fixed by the Tribunal by prescribing two limits; one limit upto the dependable flow and the other limit for the flow above the dependable flow. The deficiency when the flow was less than dependable flow was to be shared in proportion to the shares of the parties fixed in the dependable flow by the Tribunal. The flow above the dependable flow was to be shared in another proportion to be fixed by the Tribunal. Under this scheme one important question which required consideration was with regard to constitution of the authority which will be supervising that waters of the river Krishna are going to be used by each of the three States in accordance with the order of the Tribunal. The other important point was regarding impounding the surplus water that may be flowing in the surplus years.

The great merit of this scheme was that in every water year, water available for utilisation in that water year was to be divided between the parties. Of course, provisions had to be made for the measurement of the water by a competent authority and for utilisation of water which may be going waste on account of non-development of the projects of any State or damage to its project. Provisions had also to be made laying down the limits for the construction of storages to impound surplus water. Provisions had also to be made for permitting the authority which was to supervise that the parties share water in accordance with the order of the Tribunal to direct the transfer of water from an upper State to a lower State from time to time.

All these matters were carefully considered and after thorough discussion each of the State Governments prepared separate drafts of the scheme for division of the water of the river Krishna between the three States. Each draft was in two parts, Part I and Part II. Part II related to the constitution and powers of an authority which was called in the draft "The Krishna Valley Authority" and which was to supervise that the water was shared by the States in accordance with the order of the Tribunal. Part I related to other matters to which we have just made reference. It was realised that unless a joint control body or inter-State authority was established, it would be difficult to divide the waters of the river Krishna between the parties in every water year on the lines suggested by the parties. For this reason while Part I prepared by the parties differed on some material points, as was naturally to be expected, a common draft was prepared of

Part II.⁽¹⁶⁾ It was considered that at least on this point there must be an agreement between the parties so that the Krishna Valley Authority having the constitution and powers as agreed upon by the parties in Part II be set up. Counsel for all the parties asked for adjournment to ascertain whether each of the State Governments is agreeable to set up the Krishna Valley Authority having the constitution and powers as mentioned in Part II. Necessary adjournment was granted on the 27th July, 1973.

On the 17th August, 1973, learned Counsel for Maharashtra stated that the State of Maharashtra has authorised him to state that it is agreeable to set up the Krishna Valley Authority having the constitution and power as mentioned in Part II. Learned Counsel for Mysore stated that the State of Mysore has authorised him to state that it is agreeable to set up the Krishna Valley Authority having the constitution and powers as mentioned in Part II with certain modifications proposed by the State of Mysore. Learned Advocate General of Andhra Pradesh stated that the State of Andhra Pradesh has authorised him to state that the State of Andhra Pradesh is unable to give its formal consent to set up the Krishna Valley Authority having the constitution and powers as mentioned in Part II. He also stated that the State of Andhra Pradesh was not agreeable to the modifications suggested by the State of Mysore.

Learned Counsel of the State of Maharashtra has strenuously argued that in spite of disagreement between the parties on this point the joint control body can be set up under the order of the Tribunal. In support of this contention he has advanced several arguments. It is submitted that under Article 262 of the Constitution Parliament may by law provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any inter-State river or river valley and the inter-State Water Disputes Act, 1956 was enacted by Parliament to provide for adjudication of disputes relating to the waters of inter-State rivers and river valleys. This Act contemplated the constitution of a Tribunal under section 4 and reference of the dispute to the Tribunal so constituted under section 5. Under section 6 "the decision shall be final and binding on the parties to the dispute and shall be given effect to by them". As contemplated under Art. 262(2) of the Constitution, Section 11 of the Act further provides that "notwithstanding anything contained in any other law, neither the Supreme Court

nor any other court shall have or exercise jurisdiction in respect of any water dispute which may be referred to a Tribunal under this Act".

On the basis of these provisions, it is contended by the learned Counsel for the State of Maharashtra that under the inter-State Water Disputes Act, 1956, it was intended that water dispute should be finally resolved by the adjudication of the Tribunal and the decision of the Tribunal is to bind the parties who have to give effect to it. A final and binding adjudication of a water dispute can only be made by the Tribunal which has power to make its decision effective by setting up, if necessary, a controlling body or authority which would implement the decision of the Tribunal. Though the Act in terms does not state that the Tribunal may set up such an authority, yet such a power is necessarily implied from the object of the Act, its provisions as well as by the ouster of jurisdiction of the Supreme Court or of any other court. It is contended that the Tribunal acting on the principles enunciated in the maxim "*ubi aliquid conceditur, conceditur etiam id sine quo res ipsa non esse potest*" should hold that it has all powers which are reasonably necessary for the accomplishment of the object to be secured, namely, the final adjudication of the dispute between the parties and the State Governments are bound to carry out the order of the Tribunal in the matter of setting up of the joint control body.

It is further submitted that the inter-State Water Disputes Act, 1956 is enacted by Parliament in exercise of its legislative powers under Entry 56 List 1, Schedule Seventh of the Constitution. Under Art. 73(1) of the Constitution, the executive power of the Union extends "to the matters with respect to which Parliament has power to make laws". Under Art. 256 of the Constitution the executive power of the State shall be so exercised as to ensure compliance with the laws made by Parliament and the executive power of the Union extends to the giving of such directions to a State as may appear to the Government of India to be necessary for that purpose and thus the executive authority of the Union extends to giving directions to the State which would ensure compliance with the decision of the Tribunal,

It is further contended that compliance of the order of the Tribunal can also be secured by a writ of mandamus. Such a writ will not be barred under section 11 of the inter-State Water Disputes Act, 1956

(16) Appendix 'R';

because such enforcement does not fall within the definition of a 'water dispute' under that Act, The decision of the Tribunal resolves a dispute, and Section 6 gives effect to that decision and any party not carrying out the decision of the Tribunal is committing breach of its statutory duty and can be compelled by a writ of mandamus to perform its mandatory duty to do or abstain from doing things which the decision of the Tribunal has directed it to do or abstain from doing.

It is further submitted by the State of Maharashtra that document Ex. MRK-340 filed by the parties on the 4th May, 1973, must be construed as an agreement between the parties and that agreement gives sufficient authority to the Tribunal to set up a machinery or authority to ensure the use of water by the States as directed by the Tribunal. The agreement shows that the States had agreed that there should be a joint control body to give effect to the decision of the Tribunal. It also mentions the composition of the joint control body and the qualifications of its Members. It further provides that the costs of the joint control body shall be borne by the three States equally. It is contended that there is an express term in the agreement that there should be a joint control body the constitution of which has been defined under the agreement. The other powers of the joint control body as detailed in Part II of the common draft are merely ancillary and can be spelt out by implication as it must be taken that the parties intended that the joint control body should have the power to engage the necessary staff and maintain the necessary establishment and should have all other powers to give it business efficacy. It is submitted that the State of Maharashtra should not be put at a disadvantage because of the refusal of the Lower States to agree to the establishment of the authority as thereby there is danger that it might be deprived of its rightful share in the surplus water. In this connection it is submitted that even the State of Andhra Pradesh had prayed that a suitable and efficient machinery be set up to ensure proper regulation and distribution of legitimate shares of each State and now it cannot go back and assert the contrary.

Learned Counsel for the State of Mysore has urged that it is the Tribunal which has to decide as to how and in what manner control on the use of water made by the States should be effected so that in good as well as bad years proper distribution of water is ensured. This cannot be done without setting up a proper machinery. Effective guidelines for the working of the machinery may be laid down by the Tribunal, but the setting up of the

machinery is a necessity which cannot be avoided. The decision of the Tribunal would necessarily involve the setting up of a machinery and the machinery so set up would become part of the decision of the Tribunal which would have to be given effect to by the States.

The State of Andhra Pradesh has submitted that the Krishna Valley Authority as proposed would be a corporate body with powers to make its own rules regulating its business, employing its own personnel, entering into contracts and consequently suing or being sued in its own name. The power to create such a corporation is vested exclusively in Parliament under Entry 44 of List I of the Seventh Schedule to the Constitution of India. Such a corporation with objects extending over more than one State can be created only by Parliament and that power cannot be usurped by two or more States by entering into an agreement to set up such an authority. In view of this difficulty the Government of Andhra Pradesh felt that it is incompetent to enter into an agreement or to give its consent for the setting up of such a body without reference to Parliament.

It is contended that even in creating an inter-State Corporation under Entry 44 of List I of the Seventh Schedule, if any powers are conferred on such a corporation, which impinge upon the powers of the State legislature as mentioned in List II, it is necessary that the procedure laid down in Art. 252 of the Constitution should be followed and resolutions should be passed by the concerned State legislatures empowering Parliament to legislate with respect to such matters as are contained in List II. The other mode by which such an authority can be created is by legislation by Parliament under Entry 56 of List I of the Seventh Schedule and in such a case there is no question of the States giving their consent to the creation of such an authority. It is contended that the inter-State Water Disputes Act does not envisage the setting up of the authority for enforcing the decision of the Tribunal. It is submitted that power to adjudicate is different from the power to execute the decision and in the absence of conferment of any express power on the Tribunal to pass an executable order the Tribunal cannot exercise this power. The Tribunal is constituted to adjudicate only disputes referred to it by the Central Government and it will be dissolved as soon as the Central Government is satisfied that no further reference to the Tribunal is necessary. It is argued that the Tribunal has no jurisdiction to constitute an authority to execute its own decision or to prescribe the mode of this decision by framing any scheme.

It is further submitted that the agreement dated the 4th May, 1973 cannot furnish any legal basis for setting up of any joint control body in respect of an inter-State river which can only be done by Parliament. Further, Clause 4 of the said agreement while contemplating the necessity of a Central Control Authority to give effect to the decision of the Tribunal does not touch upon the two relevant aspects as to who is to set up the joint control body or what should be the powers and functions of the said authority.

Learned Counsel for the States of Maharashtra and Mysore have submitted that the argument urged on behalf of the State of Andhra Pradesh that this Tribunal in setting up a joint control body will be setting up a corporation is altogether erroneous.

We have carefully considered the elaborate arguments advanced by the learned Counsel for the parties. Under Section 6 of the inter-State Water Disputes Act, 1956, it is provided that the Central Government shall publish the decision of the Tribunal in the Official Gazette and the decision shall be final and binding on the parties to the dispute. It is further provided that the decision of the Tribunal "shall be given effect to by them.". The law has not provided any separate machinery for giving effect to the decision of the Tribunal. In the best tradition of International Law and also in view of the fact that all the States are units of the Federation of India and are bound to obey the law made by Parliament, Parliament in its wisdom left the matter of giving effect to the decision of the Tribunal to the good sense of the States concerned. It did not provide any separate machinery for it. It cannot be said that there is an omission in the law in the matter of providing a machinery for giving effect to the decision of the Tribunal. It is clear that Parliament considered this matter and was content by saying that the decision shall be given effect to by the parties to the dispute.

At the same time* it is also evident that Parliament did not place any limitations on the Tribunal in making the adjudication. The adjudication can take any shape. The water disputes are bound to differ from river to river. In determining the respective rights of the contending parties, a multitude of factors has to be considered and while in a given case an injunction restraining the upper States from utilising more water than a particular quantity may be sufficient in any other case further directions may have to be given. If the decision of a tribunal contemplates that for effective utilisation of the waters of a river a machinery is to be set up which will allocate

water from year to year to the contending parties and the States concerned cannot without the assistance of such machinery by their own acts give effect to the decision of the Tribunal, the provisions relating to the setting up of a machinery become an integral part of the decision of the Tribunal. Under section 6 of the inter-State Water Disputes Act, 1956, the States which are parties to the dispute have to give effect to the entire decision including that of setting up of the machinery. For example, if in the instant case we decide to make an order that the deficiency or the surplus, as the case may be, in every water year is to be shared by the parties in certain proportions it will be necessary that there must be an authority which shall determine in each water year whether there has been deficiency or surplus and to see that the waters of the river are divided according to the proportions fixed by the Tribunal. This means that the matter of setting up of an authority becomes the back-bone of the decision and an integral part of it and the States are bound to give effect to it. The States have to give effect to the decision of the Tribunal and set up an authority on the lines laid down in the order of the Tribunal. Of course, the Order of the Tribunal would provide for only doing such things as the States can perform by their volition. The order cannot provide for doing things which are dependent on the will of any authority which is not a party to the proceedings before the Tribunal.

However, the real difficulty lies elsewhere. The authority which will be constituted under this scheme shall have to give findings on a number of matters on which there may be conflict between the three States. In Upper Colorado River Basin Compact, 1948⁽¹⁷⁾, the major purpose of which was the equitable division and apportionment of the use of the waters of the Colorado River System, the use of which was apportioned in perpetuity to the Upper Basin by the Colorado River Compact, a Commission which was the administrative agency for working out the Compact was created. The various articles of that Compact provided that the Commission is to give its finding on a number of matters. For example in Article VIII Clause (d) it was provided that :

"The Commission, so far as consistent with this Compact, shall have the power to:

* * * * *

- (5) Collect, analyze, correlate, preserve and report on data as to the stream flows, storage, diversions and use of the waters of

(17) Upper Colorado River Basin Compact, 1948, at page 339 in 'Documents on the use and control of the waters of inter-State and International Streams' compiled and edited by T. Richard Witmer.

the Colorado River, and any of its tributaries;

- (6) Make findings as to the quantity of water of the Upper Colorado River System used each year in the Upper Colorado River Basin and in each State thereof;
- (7) Make findings as to the quantity of water deliveries at Lee Ferry during each water year;
- (8) Make findings as to the necessity for and the extent of the curtailment of use, required, if any, pursuant to Article IV hereof;
- (9) Make findings as to the quantity of reservoir losses and as to the share thereof chargeable under Article V thereof to each of the States;"

* * *

In Sabine River Compact, 1953⁽¹⁸⁾ a Commission appointed therein had to give findings on several matters involving apportionment of water between the States. In Pecos River Compact, 1948⁽¹⁹⁾ the main purpose of which was also to provide for equitable division and apportionment and the use of the water of Pecos River an inter-State Administrative Agency known as Pecos River Commission was created and this Commission had to give findings on several matters relating to apportionment of water according to the Compact.

In our case also while determining whether there is deficiency or surplus such an authority shall have to find out the utilisations made by all the States in a water year. This naturally involves a comprehensive collection of data regarding utilisations of all the States by that authority. There are bound to arise differences between the parties with regard to the quantity of water utilised by a party in a water year at one place or the other. The nature of the differences may be varied and unless the determination of utilisation made by that authority is made final and binding on the parties there will always be room for trouble. Again, when and how much water should be transferred from the reservoir of the upper States to meet the need of the lower State for use in a water year may be a cause of conflict between the parties and one or the other party may not be easily reconciled with the decision of the authority. There may

be similar other matters of considerable importance to the parties on which the parties may differ. The State of Maharashtra has submitted that compliance of the order of a Tribunal can be secured by a writ of mandamus which shows that dispute regarding the compliance of the order of the Tribunal can be brought in a court of law. It can be legitimately argued that the decision of the authority set up by the Tribunal could equally be a subject matter of writ of mandamus. This will leave room to the parties to question the decision of the authority in a court of law. We are mentioning all these things only to point out that the best way of resolving such differences would be to set up an authority which may command respect and confidence of the parties and then to make the determination of any dispute between the parties by that authority as final and binding on the parties, otherwise there may be endless litigation between the parties which it is our intention to avoid. The common draft of Part II which deals with the constitution, powers and duties of the authority, prepared by the parties clearly mentioned in sub-clause (C) of Clause XII that the decision of the authority on matters referred to in sub-clauses (A) and (B), shall be final and binding on the parties. The matters referred to in sub-clauses (A) and (B) of Clause XII of the common draft refer to the composition, powers and duties of the authority and the manner in which the authority is to perform its duties. This sub-clause (C) was purposely put in the common draft as it was considered that setting up of an authority without such a sub-clause may prove meaningless.

The common draft has not been agreed upon by the parties. However wide may be the powers of the Tribunal in the matter of setting up of an authority, it is not possible to take the view that the Tribunal by its own decision can provide that a decision of an authority set up by it shall also be final and binding on the parties. ' If the decision of such authority is not going to be final and binding on the parties it may happen that the differences between them may take a turn which may take the functioning of the authority tedious and difficult at every step. These circumstances have impelled us to take the view that it will not be proper to set up any authority without the consent of the parties. Propriety of the matter rather than legality is playing a decisive part in our decision on this point.

(18) Sabine River Compact, 1953, at page 292 in 'Documents on the use and control of the waters of inter-State and International Streams', compiled and edited by T. Richard Witmer.

(19) Pecos River Compact, 1948, at page 238 in 'Documents on the use and control of the waters of inter-State and International Streams', compiled and edited by T. Richard Witmer.

We may also point out that it is not possible for us to take the view that we can infer the consent of the parties from Ex. MRK-340 filed on the 4th May, 1973. In para 4 of that document there is a reference to a joint control body and its composition and also to the cost of sanctioning of that authority. But the composition is contingent on the appointment of independent engineers of the rank and qualification of a Chief Engineer by the President of India. There is no guarantee that this contingency is to be fulfilled. Then the manner in which this control body will exercise its powers has not been defined precisely in this paragraph. This is a lacuna which the Tribunal is unable to fulfil. A court of law or a tribunal can only interpret an agreement as it exists. It cannot make out an agreement for the parties. Thus it is not possible to derive any assistance from Ex. MRK-340 for inferring that the parties have agreed to constitute an authority irrevocably and finally.

We may, however, mention that the argument urged on behalf of the State of Andhra Pradesh that in setting up an authority we will be setting up a corporation, does not appeal to us. We need not give elaborate reasons for our view as we have decided not to set up a controlling authority.

We recognise that had it been possible to set up an authority on the lines envisaged in Part II of the common draft there would have been better utilisation of the waters of the river Krishna. Due to possibility of future change of conditions, inter-State water allocations necessitate expert administration rather than the imposition of a hard and fast rule.⁽²⁰⁾ Only through continuous administrative processes, can the control of withdrawals and diversions be dynamically related to changing conditions so as to ensure equitable use of the waters of a river.⁽²¹⁾

In an inter-State water controversy,⁽²²⁾ the U.S.A. Supreme Court appointed a river master to administer the provisions of the decree relating to diversions, releases and yields and other matters. However, it is unwise and impractical to impose an administrative agency by a judicial decree without the unanimous consent and approval of the parties.⁽²³⁾

It has recently been suggested that the jurisdiction of Federal courts and inter-State compacts in the United States do not provide sufficient continuing discretion for the efficient use of national water resources, and that a Federal regulatory agency should therefore be created. "Such a structure should comprehend these basic elements; a federal agency which can reflect and express national rather than sectional interest and goals; a democratic decision-making body, impartial and technically expert which can consider and evaluate projects in terms of national goals and development; adjudications rendered which embody sufficiently long-term guarantees to justify expenditure of enormous amounts of money but which are flexible enough to allow adjustment to changing conditions; legal authority to divert waters in accordance with optimum economic needs and to require suitable compensation in terms of money, low-flow supplementation, water preference, hydroelectric preference, or other things of value". Forer, 'Water Supply, Suggested Federal Regulation.'⁽²⁴⁾

An administrative agency can be set up by law made by Parliament under Entry 56 List I in the Seventh Schedule to the Constitution which may vest it with powers of unitary management of the river basin.⁽²⁵⁾

After deeply pondering over the matter we have come to the conclusion that it would be better if we devise two schemes for the division of the waters of the river Krishna between the States of Maharashtra, Mysore and Andhra Pradesh. These schemes will be called Schemes A and B. Scheme A will come in operation on the date of the publication of the decision of this Tribunal in the Official Gazette under Section 6 of the Inter-State Water Disputes Act, 1956. Scheme B may be brought into operation in case the States of Maharashtra, Mysore and Andhra Pradesh constitute an inter-State administrative authority which may be called the Krishna Valley Authority by agreement between them or in case such an authority is constituted by legislation made by Parliament, Scheme A does not at all depend upon the agreement of the parties and comes into operation by virtue of the order of the Tribunal. It is altogether independent of Scheme B.

(20) *Colorado v. Kansas* 320 U.S. 383, 392.

(21) Clyde Eagleton 'The use of Waters of International Rivers, *The Canadian Bar Review* Vol. 33(1955) p. 1018, 1027; R.C. Martin and others, *The River Basin Administration and the Delaware* p. 146. Felix Frankfurter and James M. Landis; *The Compact Clause of the Constitution*, *Yale Law Journal* Vol. 34 pp. 685, 701 707; Joseph L. Sax *Water Law Planning and Policy* 1968 pp. 178—80.

(22) *New Jersey v. New York* 347 U.S. 995, R.C. Martin and others. 'The River Basin Administration and the Delaware' pp. 316-320.

(23) Report of Michael J. Doherty p. 123 in the case of *Nebraska v. Wyoming* 325 U.S. 589.

(24) 75 *Harvard Law Review* 332, 347—349 (1961).

(25) A U.S.A. statute authorised the Secretary of the interior to allocate and distribute the waters of the main stream of the inter-State Colorado river, within the limits defined by the Statute, see *Arizona v. California* 373 U.S. 546, 590.

Before discussing these schemes in detail, we first give the general outline of both the schemes. Under Scheme A, we divide the 75 per cent dependable flow of 2060 T.M.C. after taking into consideration certain factors to which we shall make reference presently. Having done that, we take note of the fact that in future there is likely to be augmentation in the dependable flow of the river Krishna on account of return flows. We have made a conservative estimate of such augmentation and under this Scheme we divide this additional water between the three States. We restrain the States of Maharashtra and Mysore from using more water than that which is allocated to each of them. We permit the State of Andhra Pradesh to use the remaining water but we lay down that by such use the State of Andhra Pradesh shall not acquire any right to use the waters of the river Krishna except to the extent allocated to it. In making allocations to the three States in this manner under Scheme A we do not expressly provide for the sharing of deficiency. But we may mention that we have taken notice of the fact that out of 100 years, there may occur deficiencies in 25 years and in these 25 years the State of Andhra Pradesh is likely to suffer more than the States of Maharashtra and Mysore. In this connection we have discussed the carryover capacities of the Nagarjunasagar Dam and the Srisailem Dam and have permitted the State of Andhra Pradesh to utilise the carryover capacities available in these two Dams.

Under Scheme B we declare that in every water year the parties shall be entitled to use the waters of the river Krishna in certain proportion, if the total use made by all the three States in that water year is upto the dependable flow and if the total use made by the States in a water year is more than the dependable flow, it is to be shared by the three States in certain different proportions. This Scheme takes note of the fact that in every water year, surplus or deficiency, as the case may be, is to be shared by the three States.

We take up the subject as to how, in our opinion, the water should be divided between the three States under Scheme A. In India, irrigation projects are designed on the basis of 75 per cent dependable flow available at the dam site so that it may be assured that the water stored at that dam will meet the demands for irrigation in at least three out of four years. We have already mentioned that the Indian Irrigation Commission, 1972, has recommended that this practice should continue in future.

This method of devising irrigation projects has by now become an established practice in India. ⁽²⁶⁾ The Indian Standards Institution on the 9th December, 1969 adopted as one of the general factors for design of live storages the followings :—

"3.3 The storage provided in an irrigation project should be able to meet the demand of 75 per cent of the time whereas in power and water supply projects the storage should meet the demand for 90 per cent and 100 per cent of the time respectively, ⁽²⁷⁾".

We, therefore, think it proper that under Scheme A, water available at 75 per cent dependability should be distributed between the States of Maharashtra, Mysore and Andhra Pradesh.

We have already mentioned that for the purpose of this case, the 75 per cent dependable flow of the river Krishna upto Vijayawada is 2060 T.M.C. The case of the State of Andhra Pradesh is that in every water year some water is likely to go waste unutilised to the sea, as is borne out by the evidence on record. The learned Advocate General of the State of Andhra Pradesh has placed reliance on the evidence of Mr. Jaffer Ali (APW-6) pages 63 to 74 in this connection. The substance of his evidence is that 30 per cent of the available flow between the Nagarjunasagar Dam and Vijayawada could be utilised for irrigation in the Krishna Delta and the rest is likely to go waste unutilised to the sea. In Table No. 4(a) at page 64 of his evidence he has pointed out that in a year of 75 per cent dependability, taking the dependable flow to be 2002 T.M.C., the available free flow in the catchment will be 63.2 T.M.C. out of which only 18.9 T.M.C. could be utilised and the rest will go waste unutilised to the sea.

The contention of the States of Maharashtra and Mysore is that no water would go waste in any water year out of the dependable flow and the entire water would be utilised. It is further submitted that in any case steps should be taken by the State of Andhra Pradesh that no water goes waste unutilised to the sea.

We proceed to examine the evidence on this matter. Mr. Jaffer Ali has given the following reasons to support his views (see page 68 of his evidence).

- (i) There is no active storage available at the Krishna Barrage.

(26) COPP Report on Nagarjunasagar page 5 (MRDK-II p. 11) CWPC; Silver Jubilee Number p. 65 (MRDK-II p. 225).

(27) Indian Standard Methods for fixing The Capacities of Reservoirs Part III Live Storage, p. 4.

- (ii) The bulk of the available yield from the intermediate catchment, that is, between the Nagarjunasagar Dam and Vijayawada will be received from June to November and much of it during freshets.
- (iii) The intermediate catchment is heavily intercepted by minor dams and numerous tanks. These ordinarily start surplusing from about the end of August intermittently for a few days at a time till about the end of October and on the days when these are surplusing there will be heavy discharge from the intermediate catchment very much in excess of the canal withdrawals.
- (iv) Whenever there is heavy rainfall in the ayacut, the demand for irrigation - waters gets reduced and the canal discharge is also reduced. It is quite likely that when there is heavy rainfall in the ayacut, there is also heavy rainfall in the catchment adjoining to the ayacut which will bring in heavy discharges at a time when the withdrawal by the canals is considerably reduced.
- (v) The supply of water for delta irrigation will be from the unregulated discharge from the intermediate catchment and the releases to be made from the Nagarjunasagar Dam and it will not be possible to make a correct forecast of the daily releases from the Nagarjunasagar Dam two or three days in advance, which is the time that is likely to be taken for the waters released from the Nagarjunasagar Dam to reach the Krishna Barrage, and the tendency will be to err on the safe side. Thus a considerable part of the discharge from the intermediate catchment is likely to be wasted during the monsoon months.

It is further pointed out by the learned Advocate General of Andhra Pradesh that even Mr. Framji (MRW-I) has admitted that there is likely to be some waste, as the entire water available from the catchment between the Nagarjunasagar Dam and Vijayawada cannot be utilised by diverting it from the Krishna Barrage for irrigation in the Krishna Delta. In this connection the learned Advocate General has referred to Table No. 2, which is the working table prepared by Mr. Framji of the Srisailam Dam, the Nagarjunasagar Dam and the Krishna Delta. In column 36 of this working table, divertable flow of this catchment is mentioned and Mr. Framji

at page 544 of his evidence has stated that when the monthly flow at Vijayawada from the catchment below Nagarjunasagar is more than 10 T.M.C. 85 per cent of the flow has been assumed to be divertable subject to a maximum of the monthly canal diversions plus the pond losses, the remaining 15 per cent spilling over as mentioned in Column 37. When the monthly flow at Vijayawada from the catchment below Nagarjunasagar is less than 10 T.M.C. the entire quantity is assumed to be divertable.

We proceed to examine the evidence of the parties on this point. First we take up the point whether there is any storage available at the Krishna Barrage. Mr. Framji has made an assumption that a pondage of 4 T.M.C. will be available at the Krishna Barrage. At the bottom of page 1262 and beginning of page 1263 of his evidence he has explained as to how he had assumed that a pondage of 4 T.M.C. will be available. He has stated that 4 T.M.C. of water has been claimed by the State of Andhra Pradesh as evaporation losses at the Krishna Barrage and it is a substantial quantity indicating a large pondage with a large water spread. He has calculated the pondage as 6 T.M.C., but he has stated that he had conservatively assumed the modest figure of 3 to 4 T.M.C. as pondage. He has also pointed out that the combined capacity of the Krishna East Canal and the Krishna West Canal is of the order of 18,710 cusecs and has stated that considering the available pondage and the large capacity of the delta canals a flood peak of 50,000 to 60,000 cusecs can be absorbed. In our opinion the assumption that the pondage to the extent of 3 to 4 T.M.C. will be available at the Krishna Barrage is not wrong; specially in view of the fact that the State of Andhra Pradesh has claimed 4 T.M.C. of water as evaporation losses, as mentioned hereinbefore, which has been allowed to it as protected use. It may also be mentioned that the Krishna Barrage Report, MRK-175 prepared by the State of Andhra Pradesh mentions that the State of Andhra Pradesh could not afford to spill its share of water over the Anicut and run it to waste and that the purpose of construction of the barrage was to reduce wastage of water. Even taking all these circumstances into consideration, it is clear from the evidence that some water out of the flow between Nagarjunasagar and Vijayawada is likely to go waste unutilised to the sea, but it is not possible to assess exactly the quantity of such water likely to be so wasted. Even Mr. Jaffer Ali at page 66 of his evidence has stated that a rough estimate is only possible from the daily discharges of available yield.

We now examine this matter from the point of view whether it is possible to store water in the carryover storages in the territory of the State of Andhra Pradesh so that the reduction in the dependable flow that may be due to water thus going waste may be compensated.

It has been argued on behalf of the States of Maharashtra and Mysore that there will be augmentation in the dependable flow on account of the fact that the water in excess of the 75 per cent dependability flowing in 75 years and going waste unutilised to the sea can be impounded in a chain of reservoirs in the three States. It is submitted that there are already two such reservoirs in the State of Andhra Pradesh, (i) the Nagarjunasagar Dam, if the crest gates are allowed to be raised and (ii) the Srisailem Dam, which is under construction. It is further submitted that the installation of crest gates on the Nagarjunasagar Dam was not sanctioned. The States of Maharashtra and Mysore have been consistently opposing the installation of crest gates on this Dam. When the State of Maharashtra learnt that the Government of Andhra Pradesh was proceeding with the erection of crest gates on the Nagarjunasagar spillway, that State lodged a strong protest on the 12th April, 1967 apprehending that the simultaneous provision of the Nagarjunasagar crest gates and the Srisailem Dam would prejudice the present and future rightful interests of the upper States. Even in June, 1969, after the Tribunal had been appointed, the Planning Commission accorded clearance to the revised Nagarjunasagar Project for an amount of Rs. 163.54 crores excluding crest gates on the spillway of the dam.

The salient features of the revised Nagarjunasagar Project are given in Annexure to letter No. 11-2(11)/67-I&P dated the 13th/16th June, 1969 of the Planning Commission to the Secretary, Government of Andhra Pradesh, Hyderabad (MRK-II pages 88-90). The features relevant for our discussion as given in the Annexure to that letter are as follows :—

Salient features of Revised Nagarjunasagar Project (Andhra Pradesh)-

1. Estimated Cost (Rs. crores):

(i) Dam	71.65	Excluding crest gates on the spillway of dam.
(ii) Right Bank Canal	47.74	Revised estimates in respect of Right and Left Bank Canals should be submitted at an early date.
(iii) Left Bank Canal	44.15	
	163.54	-

2. Annual Irrigation (Lakh acres). Crop.

	Right Bank Canal	Left Bank Canal	Total
(a) Paddy .	4.35	6.00	10.35
(b) Irrigated dry paddy .	1.60		1.60
(0) Ground nuts .	5.79	2.00	7.79
(d) Jowar		0.80	0.80
	11.74	8.80	20.54

It is contended by the State of Maharashtra that the State of Andhra Pradesh should not be allowed to raise the reservoir level at Nagarjunasagar to F.R.L. 590 by raising the crest gates unless it is prepared to share the benefit which would accrue to it by conserving more water therein with the upper States. The case of the State of Maharashtra is that the capacity of the Nagarjunasagar Dam is increased by 117 T.M.C. as admitted by Mr. Jaffer Ali at page 224 of his evidence, (Mr. Framji has taken it as 120 T.M.C.) and as such to that extent the Nagarjunasagar Dam will act as carryover reservoir. On this point the case of the State of Andhra Pradesh is that impounding of water by raising the crest gates is necessary even for the purpose of utilising the sanctioned quantity of water i.e., 264 T.M.C. and no carryover storage is available at Nagarjunasagar. In support of this contention the State of Andhra Pradesh has relied on the evidence of Mr. Jaffer Ali.

Now coming to the carryover storage which according to the States of Maharashtra and Mysore is available at Srisailem, Mr. Framji has stated at pages 611 to 619 of his evidence that at the Srisailem Reservoir the dead storage capacity is 158 T.M.C. and, therefore, the useful life of the reservoir is considered more than 300 years. The life may perhaps be even greater as due to the construction of a larger number of reservoirs in the upper reaches the amount of silt coming down to the Srisailem Reservoir will be coming less than at present. In his opinion a life of over 200 years would be no demerit to the Srisailem Reservoir with a lower M.D.D.L. of R.L. 830 and thus lowering the M.D.D.L. to R.L. 830 will provide additional carryover of 60 T.M.C. Mr. Jaffer Ali stated at page 110 of his evidence that the dependability of the Krishna Delta irrigation would be increased by drawing water from the dead storage of the Srisailem Reservoir in lean years. He submitted statement C in which he showed that the Srisailem Reservoir level could be lowered down to R.L. 838 so as to make more water to the extent of 43.3 T.M.C. available for the Krishna Delta. The case of the State of Andhra Pradesh is that the Srisailem Reservoir level should not be lowered below R.L. 838.

In 1962 Project Report of Srisailem Hydro-Electric Project (Parts I to III) it is stated at page 10 that : —

' The M.D.D.L. of 854 has been fixed to ensure minimum cutting of the leading channel from the irrigation sluices, when undertaken at a future date. The C.O.P.P. Committee in their report on Nagarjunasagar Project have recommended lowering the M.D.D.L. to 830 as in their opinion the firm power potential could be increased to 377 M.W. at 60 per cent L.F. The working table for the reduced M.D.D.L. as proposed by Committee is appended."

Mr. Jaffer Ali in answer to Question No. 266 at page 209 of his evidence admitted that it was correct that if the dependability of the Krishna Delta was not to be increased beyond 75 per cent, then there was a minimum carryover of 43.3 T.M.C. (available at Srisailem). But this was on the assumption that the dependability of the Krishna Delta will be brought down to 75 per cent dependability in future. Mr. Jaffer Ali further admitted that not only storage to the extent of 43.3 T.M.C. will be available, but also extra water will be available for 94 per cent dependability. At page 219 of his evidence when asked whether the Srisailem Project could operate efficiently for the generation of sanctioned power at M.D.D.L. 830, the witness simply stated "It may, but I cannot commit myself".

In this state of evidence we are of the view that M.D.D.L. at Srisailem can be reduced substantially and still the project will function efficiently and a carryover ranging from 45 to 60 T.M.C. is available at the Srisailem Dam.

Now coming to the Nagarjunasagar Dam, Mr. Framji has submitted detailed carryover studies for a number of years which he had grouped together in five groups taking the additional storage available to the extent of 120 T.M.C. in the Nagarjunasagar Dam and 60 T.M.C. in the Srisailem Dam; total 180 T.M.C. These detailed studies are mentioned in the evidence of the witness at pages 499 to 564. In these studies gross flow figure for the year 1900-01 is taken from MRDK-I page 119 corrected by 10 per cent and upstream extractions of 270 T.M.C. added to it. The gross flow figures for the other years are taken from the results of model experiments carried out at Peona in the year, 1967 with upstream extractions added. The crop pattern is taken as sanctioned in 1909 and the water requirements for these crops have been taken on the basis of the water requirements for such crops in the neighbouring

projects, namely, the Munneru Project, the Wyrva Project, the Pakhal Project and the Palair Project. With these assumptions he has prepared a working Table for the Srisailem Project, the Nagarjunasagar Project and the Krishna Delta and has come to the conclusion that there is increase of dependable flow in the Krishna river from 2176 T.M.C. to 2300 T.M.C.

Mr. Jaffer Ali also prepared working Tables 8 and 9 for the Srisailem and the Nagarjunasagar Reservoirs taking flow series from 1900-01 to 1950-51 as recorded by the State of Andhra Pradesh and mentioned in the Krishna Godavari Commission Report Annexure II pages 10 to 13 and taking the annual utilisation as agreed upon by the three States. His conclusions are given in his statement in answer to Question No. 30 at pages 108 and 109 of his evidence which are as follows :—

"It will be seen from the working Tables of Srisailem and Nagarjunasagar reservoirs, i.e., Tables 8 and 9, that the storages as planned at these two reservoirs, i.e., F.R.L. 885 and M.D.D.L. 854 for Srisailem and F.R.L. 590 and M.D.D.L. 510 for Nagarjunasagar are just adequate to meet the full requirements of power generation at Srisailem and irrigation requirements under Nagarjunasagar and Krishna Delta in a dependable year, the extra storage available at Nagarjunasagar above the minimum draw down level of 510 is only 23 thousand million cubic feet which is just about fortnight's requirement of irrigation. It is necessary that the tail reservoir on a river system should not Surplus during a dependable year as otherwise it will fail to the extent it has surplused. The reservoir can surplus even in a dependable year if the inflow during some of the monsoon months are so heavy that the reservoir is not able to hold these. Such a probability cannot be ruled out. It is, therefore, desirable to have adequate extra storage, particularly in the case of a tail reservoir over that obtained on the study made from the flow of the river in a dependable year which has occurred in the past. In my opinion, extra storage of 23 thousand million cubic feet at Nagarjunasagar is rather inadequate to meet such eventualities and possible delayed inflows."

It may be mentioned that it is clear from pages 87 to 91 of the evidence of this witness that he has not strictly adhered to the crop pattern as mentioned in the letter dated 13th/16th June, 1969 of the Planning Commission and has changed it. The reason given for the change is that the total water requirements for the cropping scheme given in the

letter of sanction with the deltas as mentioned in the Table will be 289.4 T.M.C and would thus exceed 264 T.M.C. by 25.4 T.M.C. The witness, therefore, changed the cropping pattern to 7.75, lakh acres of Khariff paddy and 12.79 lakh acres of irrigated dry crops in Rabi so that limit of 264 T.M.C. may not be crossed. It will appear from the evidence of Mr. Framji and Mr. Jaffer Ali that the requirements of 11.95 lakh acres of paddy as worked out by both the witnesses tally very closely. Mr. Framji estimated it as 210 T.M.C. at page 245 of his evidence while Mr. Jaffer Ali estimated this as 207 T.M.C. at page 288 of his evidence. The difference in the total water requirements between the two expert witnesses arises mainly for the areas of Rabi crops under the Jowar and groundnut. Mr. Framji has estimated this requirement as 54 T.M.C. whereas Mr. Jaffer Ali had estimated it 82.4 T.M.C. Mr. Framji's assumption of total requirements fit in with the sanctioned utilisation of 264 T.M.C. Mr. Jaffer Ali's assumption would make it 25.4 T.M.C. more than the sanctioned utilisation. The deltas of the crops are not mentioned in the sanction letter. Mr. Jaffer Ali made calculations of the water requirements on the basis of the deltas for such crops in Tungabhadra sub-basin and came to the conclusion that 289.6 T.M.C. will be required for irrigating the area of 20.54 lakh acres instead of 264 T.M.C. It has been shown on behalf of the State of Maharashtra that irrigation of 20.54 lakh acres as mentioned in the sanction letter utilising 264 T.M.C. is possible without, installation of crest gates if the water requirements for Rabi crops are taken as prevailing in the neighbourhood of the Nagarjunasagar Dam in the State of Andhra Pradesh itself. In these circumstances we must reject the contention of the State of Andhra Pradesh that irrigation of 20.54 lakh acres with 264 T.M.C. is possible only by changing crop pattern and for this reason larger storage capacity will be required. Mr. Jaffer Ali has stated that some extra storage should be permitted for a terminal reservoir. Even then there is an extra storage capacity of about 90 T.M.C. available at the Nagarjunasagar Dam, if the crest gates are allowed to be put up.

The learned Advocate General of Andhra Pradesh has submitted that it will be hazardous to predict that the dependable flow will be augmented to a particular extent by storing excess waters that may be flowing to the sea in the surplus years in these two reservoirs. This argument has enough substance. Considerable research is required to give even an approximate idea of the additional water which may be available by storing waters in these

two reservoirs. It has been pointed out in "The Nile Basin" Vol. VII on the subject of the 'Future Conservation of the Nile' by Hurst, Black & Simaika (Reprinted 1951) in Chapter 7 "The Lake Albert Reservoir and Century. Storage" at page 57 that:

"The problem therefore is to discover a general relation between the capacity of a reservoir and the output which it can guarantee. Obviously questions of probability are involved and an extended investigation is needed. This investigation has been made. It has meant research extending over a number of years on phenomena which resemble river discharges in their statistical characteristics, and some theoretical investigations involving the theory of probability. Part of this investigation is described in the 'The Nile Basin'; Vol. V, p. 81 et seq."

The expert evidence which is before us is no doubt very helpful for saying that there will be some augmentation in the quantity of dependable flow, if water is permitted to be stored in the carryover capacity available at the Nagarjunasagar Dam and at the Srisailem Dam. But the study is confined to particular flow series. Much more extensive study is required, if we have to make a definite finding as to the extent to which the dependable flow will be augmented.

The learned Advocate General of Andhra Pradesh has also argued that under this Scheme of apportionment in deficit years when the flow is less than 2060 T.M.C., it will be the State of Andhra Pradesh which will suffer most on account of deficiency as its contribution to the total flow of the Krishna river is proportionately very small and the upper States may store bulk of the water available in the deficit years in the upstream storages, thus making it difficult for the State of Andhra Pradesh to meet its need for irrigation. It is submitted that the State of Andhra Pradesh should be permitted to utilise the carry-over storage capacity that may be available in these two Dams for storing waters in the surplus years for use in the deficit years. It is also urged that the crop pattern may change in future and there may also be changes in flow pattern. While considering Scheme A, in which no provision is made for sharing of deficiency, the argument of the learned Advocate General of Andhra Pradesh that in the deficit years it is likely to suffer most and for this reason it may be permitted to store water by utilising the carry over capacity that may * be available in these Dams deserves consideration.

The learned Advocate General of Andhra Pradesh has made a statement that "in view of the installation of crest gates in the Nagarjunasagar Dam and the completion of the Srisailem Dam in the near future, the entire quantity of the 75 per cent dependable flow, that is, 2060 T.M.C. of the Krishna river may be allocated between the three States of Maharashtra, Mysore and Andhra Pradesh".

In view of the fact that a way has to be found out by which the State of Andhra Pradesh may be relieved of the difficult situation in which it may be placed in the deficit years and further in view of the fact that it is not possible to assess with any amount of definiteness the augmentation in dependable flow which is likely to take place on account of water being stored in the Nagarjunasagar Dam and the Srisailem Dam to the extent of carryover capacities available in them and further in view of the fact that it is not possible to determine exactly how much water, out of the flow of the river Krishna between Nagarjunasagar Dam and Vijayawada, will be going waste unutilised to the sea, we are of the opinion that it will be proper that till our decision is reviewed, the State of Andhra Pradesh may be permitted to store water by installation of the crest gates in the Nagarjunasagar Dam and also in the Srisailem Dam after its completion to the extent and in the manner it is feasible* for it to do so and to utilise the water so impounded in these storages in any manner it deems

proper and in lieu thereof no deduction be made in the dependable flow on account of the circumstance that some water out of the flow of the river Krishna between the Nagarjunasagar Dam and Vijayawada will be going waste unutilised to the sea thus reducing the dependable flow.

Thus, we are of the opinion that the entire quantity of 75 per cent dependable flow, that is, 2060 T.M.C. of the river Krishna upto Vijayawada is available for division between the three States of Maharashtra, Mysore and Andhra Pradesh.

The next question to be determined is how the dependable flow of 2060 T.M.C. is to be divided between the States of Maharashtra, Mysore and Andhra Pradesh. The case of the States of Maharashtra and Mysore is that the State of Andhra Pradesh should not get any more water, that is, its share should be limited to 749.16 T.M.C. (roughly 750 T.M.C.). The State of Maharashtra has filed MR Note No. 26 dated the 25th July, 1973, which contains Statement No. I, giving details of population, culturable area, scarcity area and drainage contribution of each State and taking the percentage of each of these items and then taking average of these percentages, it has worked out the equitable share of the three States in 2060 T.M.C., and also in 2310 T.M.C.

The relevant extract of this statement is given below :—

State	Population (millions)	%age	Culturable area (in T. Hectares)	%age	Scarcity area sq. miles	%age	Drainage contribution TMC	%age	Equitable %age
1	2	3	4	5	6	7	8	9	10
Andhra Pradesh	12.06	31.20	5,429	26.40	1,929	13.0	336.6	16.34	21.74
Mysore	14.50	37.40	9,270	45.43	6,113	31.30	760.9	36.94	37.77
Maharashtra	12.15	31.40	5,749	28.17	8,940	55.70	962.5	46.72	40.49
	38.71	100.00	20,448	100.00	16,982	100.00	2,060.0	100.00	100.00

	Equitable share in 2060 TMC	Equitable share in 2310 TMC
Maharashtra	834.10	936.32
Mysore	778.06	872.49
Andhra Pradesh	447.84	502.19
Total	2060.00	2310.00

On the basis of this statement, it is contended by the State of Maharashtra that had there been no committed uses by any State of the waters of the river Krishna, the share of the State of Andhra Pradesh would not have exceeded 447.84 T.M.C.

Another Statement No. II has been filed by the State of Maharashtra, in which the factor of scarcity area has been omitted and the following shares of the three States have been worked out, taking into consideration population, culturable area, and drainage contribution :-

State	Equitable share in 2060 TMC	Equitable share in 2310 TMC
Andhra Pradesh	508	569
Mysore	822	922
Maharashtra	730	819

It is contended on behalf of the State of Maharashtra that the State of Andhra Pradesh is held entitled to receive protection to the extent of 749 T.M.C. of water, but this is far in excess of what it could have got as its equitable share, had there been no prior appropriation of water by any State and that the only way to remedy this inequity is to apportion the remaining water between the two States of Maharashtra and Mysore. It is further submitted by the State of Maharashtra that if the Tribunal decides to allocate any further quantity of water over and above the protected uses to the State of Andhra Pradesh it should be minimum and it should only be from the surplus flows and not from the 75 per cent dependable flow of 2060 T.M.C., otherwise it will cause serious detriment to the upper States who would be left comparatively with small quantity of water for meeting the needs of their existing, under construction and contemplated projects. In preparing the two statements, the State of

Maharashtra has taken notice of the areas which are within the basin, taking its stand that in deciding the equitable share of the Krishna waters between the three States, the needs of water for areas outside the basin should not be taken into consideration. It is urged that if the needs of other areas are to be taken into consideration then the resources available in those areas should also be taken into consideration. It is also contended that the culturable area and population in all the three States should also have to be taken into consideration in such a situation.

The State of Mysore has also proceeded on the same lines. It has submitted MY Note No. 13 dated the 2nd May, 1973 which contained a statement showing the percentage share of the basin States in the Krishna basin according to the State of Mysore. That statement is reproduced below:

STATEMENT SHOWING THE PERCENTAGE SHARE OF THE BASIN STATES IN KRISHNA BASIN

	Percentage share in			Reference
	Mysore	Maharashtra	Andhra Pradesh	
(a) Extent of drainage area	43.7	26.8	29.5	MRDK-XII, XIII III(7)
(b) Climate affecting the basin :				
(i) Area getting rainfall less than 400 mm in June-September period.	65.0	25.9	9.1	MYK VOL. I, p. 23
(ii) Area with potential evapotranspiration more than 180 cm.	51.8	13.8	34.4	Area Planimetered from map at p. 41 MYDK-XX enlarged.
(iii) Area having coefficient of variability more than 30 % of rainfall June-September period	47.5	32.7	19.8	MRDK Vol. XII XXII Page 1(3)
(c) Economic and social needs:				
(i) Extent of culturable command area under projects within the drainage basin.	52.1	18.1	29.8	As per figures furnished by the States in their Statement of Case. Charts and project reports.
(ii) Net area sown	45.8	30.7	23.5	Agreed statement filed on 1st May, 1973.
(iii) Culturable area	45.3	28.1	26.6	EX. MYK 301, MYDK XXI
(d) Population:				
(i) Total population	37.5	31.4	31.1	MRDK XII Page XXIV (1)
(ii) Population depending on agriculture in Krishna basin for livelihood.	38.0	28.1	33.9	MYDK-20 pp. 35-38
AVERAGES	47.4	26.2	26.4	

The case of the State of Mysore is that according to this statement, the shares of the three States, out of the dependable flow of 2060 T.M.C. would work out as follows:—

Maharashtra	540 T.M.C.
Mysore	976 T.M.C.
Andhra Pradesh	544 T.M.C.
TOTAL	2060 T.M.C.

The State of Mysore has submitted that out of 2060 T.M.C. which is the 75 per cent dependable flow, 1693.4 T.M.C. has been reserved for protected uses in the three States. It is contended that as against 570 T.M.C., which is the in-basin need in Maharashtra, uses to the extent of 439.65 T.M.C. have been protected which means that Maharashtra's needs are already met with to the extent of 77 per cent. Similarly, as against the in-basin needs of 977 T.M.C. in the State of Andhra Pradesh, their protected uses are 749.16 T.M.C. thus meeting 77 per cent of their needs. But uses of the State of Mysore are protected only to the extent of 504.55 T.M.C. as against the needs of 1430 T.M.C. which means that only 35 per cent of the needs are allowed. It is urged that water now available for allocation out of the dependable flow is to be reserved for Mysore in the interest of justice and equity. Even this would satisfy the needs of Mysore only to the extent of 61 per cent.

The State of Mysore has also worked out various alternative formulae in paras 3.1, 3.2, 3.3 and 3.4 of MY Note No. 17 dated 25-7-1973 for the allocation of water between the three States. The shares of each State under the various alternative formulae of allocation are as follows:—

	Maharashtra T.M.C.	Mysore T.M.C.	Andhra Pradesh T.M.C.	Total T.M.C.
I. Allocation of virgin flows based on in-basin factors (para 1) .	540	976	544	2060
II. Allocation of virgin flows based on total in-basin demands (para 2)	439	872	749	2060
III Balance flows (after limiting Andhra Pradesh's use to protected use), shared by Maharashtra and Mysore in proportion to their respective in-basin factors (para 3) .	465	846	749	2060
IV. Balance flows (after meeting all the protected use in the three States) shared between Maharashtra and Mysore in proportion of the total irrigable area under the remaining projects in the two States (para 4)	524	787	749	2060

The substance of the matter is that according to the States of Maharashtra and Mysore, Andhra Pradesh should not be allocated any water in the river Krishna beyond 749.16 T.M.C.

We have carefully considered this matter. As we have already pointed out that there is no mechanical formula for equitable apportionment of water and it will be a needless endeavour on our part to search for a formula which may assist us in dividing the waters of the river Krishna between the parties by taking into consideration certain factors and then working out percentages in the manner done by the States of Maharashtra and Mysore. Nonetheless the various factors which have been mentioned in the statements filed by the States of Maharashtra and Mysore go to show that these two States, in spite of their need for water, could not or did not utilise the waters of the river Krishna in the past to the extent they would have been held entitled to do so had an equitable distribution taken place at some earlier date. But we are dividing the waters of the river Krishna on the basis of the conditions and circumstances as prevailing at present and for reasons which we have already given, we have held that uses made by all the three States upto 1693.4 T.M.C. should prevail over the contemplated uses. It is earnestly submitted by the learned Advocate General of Maharashtra and the Counsel for the State of Mysore that to allocate any more water to the State of Andhra Pradesh out of the remaining water would be to perpetuate the inequity further. It would mean that the State which is making the least contribution and which has benefited to the largest extent would still claim more water at the expense of the States who are in dire need of water for irrigation. This, it is contended, is making the rich richer while the other States entitled to a much larger share will not even get the crumbs. It is argued that the balance has already tilted too heavily in favour of the State of Andhra Pradesh and any further allocation of water to it would amount to the denial of justice to the States of Maharashtra and Mysore. Their submission is that even when the entire remaining water is allocated to the States of Maharashtra and Mysore, their grievances will be redressed only partially.

We realise the force of the arguments of the learned Counsel for Maharashtra and Mysore. From the point of irrigable area, population or contribution to the total flow, the State of Andhra Pradesh for historical reasons is enjoying the benefit of the river Krishna to an extent which may appear to be disproportionate. But it has entered into field much earlier than the other States, and it has been able to develop

its economy by bringing large tracts of land under cultivation in its territory by the hard labour and valiant efforts of its people and at great cost. It is no fault of the State of Andhra Pradesh that it had undertaken to build economy of the State much earlier than the other States. Nature also favoured it as ample water was available to it.

The arguments of the learned Counsel of Maharashtra and Mysore go too far when it is submitted by them that even pressing and urgent needs of the State of Andhra Pradesh for allocation of water should not be taken notice of by the Tribunal. At the same time all extravagant claims of the State of Andhra Pradesh for the share in the remaining water should be rejected. It is only when we are convinced that allocation of water for a particular project would generally benefit all the parties or that there are other special circumstances for allocation of water for any project or in any area that we may consider the claim of the State of Andhra Pradesh in a favourable light. But the door should not be entirely closed to it for allotment of some more water out of the water now available for allocation.

We proceed to consider the demands of the State of Andhra Pradesh. All the demands of the State of Andhra Pradesh are summarised in the tabular form in Table No. 1, which for the sake of convenience is given in Part II of this Chapter. The State of Andhra Pradesh has submitted AP Note No. 14 dated the 25th July, 1973 in which they have urged that out of the dependable flow, water should be allocated to it for two sets of projects; (i) allocation be made for committed and/or actual uses not included in the protected uses to the following extent:—

(i) Minor Irrigation		36.88 T.M.C.
(ii) Srisailem Hydro-Electric Project		33.00 T.M.C.
(iii) Kurnool Cuddapah Canal		20.87 T.M.C.
(iv) Krishna Delta		23.01 T.M.C.
TOTAL		113.76 T.M.C.

and (ii) allocation be made for future uses to the following extent:—

1. MINOR IRRIGATION WORKS UNDER CONSTRUCTION: 5.3 TMC ft.
The locations of the above works have already been submitted to the Tribunal vide Sheet No. VIII, Annexure II, page No. 3B of the minutes of discussion held on 12th and 13th February 1973.
(Vide MRDK-Vol. XIV-Ex. MRK-331).

2. JURALA IRRIGATION SCHEME- Stage I :	23.00 TMC ft.
This is to serve the area in Gadwal, Alampur and Atmakur Taluks of Mahabubnagar District which is a drought affected area. (Vide APPK-36 Ex. APK-364).	
3. PROPOSED MINOR IRRIGATION WORKS:	14.09 TMC ft.
Vide the Minutes of discussions referred to under item No, 1.	
4 MUNNERU PROJECT (KHAM-MAM DISTRICT) (K-12) .. (Vide APPK-31)	1.5 TMC ft.
5, KALIKOTA PROJECT (KHAM-MAM DISTRICT) (K-12) (Vide APPK-17)	3.5 TMC ft.
6 . VARADARAJASWAMY PROJECT (KURNOOL DISTRICT) (K-7) (Vide APPK-31)	1.00 TMC ft.
TOTAL	48.39 TMC ft.

We proceed to examine the first set. The first item is 'Minor Irrigation' and the case of the State of Andhra Pradesh on this point is that the actual development of minor irrigation in the State of Andhra Pradesh, the extent of which is admitted by all the three States, shows an average utilisation of 153.14 T.M.C. from 1961-62 to 1966-67 and the quantity that has been allowed as protected use for minor irrigation is 116.26 T.M.C. Thus the balance of 36.88 T.M.C. should be allocated to it as this water is required for existing uses in minor irrigation. It is further submitted that almost the entire development of the minor irrigation was in the scarcity and backward regions of the erstwhile Hyderabad State and of Rayalaseema region and that on no principle of equity this developed irrigation in scarcity and backward areas can be permitted to be destroyed by denying water for these schemes. The entire development carried out during the Third Five Year Plan at a huge cost, both to the Centre and the State, and also to the individual citizen should not be ignored in making further allocation of the balance of dependable flow.

The State of Mysore has submitted in MY Note No. 22 dated the 20th August, 1973 that just because the State of Andhra Pradesh has gone on increasing its scope of irrigation beyond its legitimate share, water for utilisation under minor irrigation should not be further allocated to the State of Andhra Pradesh at the cost of other States. The plan of the Central Government to boost minor irrigation programme does not mean that one State should develop its minor irrigation resources at the cost of other States.

If the State of Andhra Pradesh is eager to go in for minor irrigation, the entire quantity of water for all such irrigation should come out of its equitable share based on in-basin factors. The State of Maharashtra has also supported the State of Mysore.

There is substance in this contention of the State of Mysore. The Tables based on the agreed statement of minor irrigation filed by the parties show that in the decade 1941-42 to 1950-51, the State of Andhra Pradesh was utilising on an average only 76.79 T.M.C. for minor irrigation. In the next decade it started utilising on an average 116.51 T.M.C. while in the 7 years, 1961-62 to 1966-67, it started utilising on an average 153.14 T.M.C. We have already held that so far as minor irrigation is concerned, 116.25 T.M.C. is to be taken to be a protected use. We are of the opinion that if any more water is required for minor irrigation it must come by effecting economy in the use of water by the State of Andhra Pradesh elsewhere. The State of Andhra Pradesh has not lined its canals and even by lining the main canals it can save sufficient quantity of water to preserve its existing utilisation under minor irrigation. If we accept the argument of the State of Andhra Pradesh that the requirements for all the developed minor irrigation upto 1966-67 are to be set apart, it will mean further substantial depletion in the water available for allocation to the other States which will not be in consonance with the justice and equity in this case. We are, therefore, unable to allocate any more water to the State of Andhra Pradesh beyond 116.20 T.M.C. under the head 'Minor Irrigation'.

The second item is the Srisailem Hydro-Electric Project. It is submitted by the State of Andhra Pradesh that the Srisailem Project was sanctioned in 1963 and is actually under construction and an expenditure of over Rs. 40 crores has already been incurred on it. It is submitted that a sanctioned project which is under advanced stage of construction, should not be treated in any way different from the projects of other States which were sanctioned much later and on some of which hardly any work has been commenced. Both the States of Maharashtra and Mysore are opposed to the grant of any water for the Srisailem Project. The State of Maharashtra has submitted that it has been restrained from diverting water to the west from its share of water for future projects on the ground that irrigation should be preferred to power and for this very reason there is no justification to permit the State of Andhra Pradesh to evaporate 33 T.M.C. of water purely for power generation at the Srisailem Project. It is submitted that

simply because the project has been sanctioned and is under construction and money is being spent on it, the State of Andhra Pradesh should not be allowed any water for it as it was being constructed after the State of Maharashtra had raised an objection to its construction. It is further submitted that the Koyna Hydel Project had also been constructed at an enormous cost and was producing power by using water, yet a restriction has been put on the utilisation at Koyna.

All these arguments lose much of their force when we find that the Srisailem Project, besides producing power of which there is a great need to the State of Andhra Pradesh, will serve other very useful purpose. The storage at the Srisailem Reservoir will serve as a carryover reservoir. We have earlier pointed out the necessity of conserving the surplus water of the river Krishna for use in lean years and for this purpose a chain of carryover reservoirs shall have to be constructed in the Krishna basin. In all carryover reservoirs there are going to be evaporation losses, but their usefulness from the point of view of conservation of water for irrigation or for other purposes will be immense. When the necessity of carryover reservoirs is also being advocated by the States of Maharashtra and Mysore it would not be proper to hold that the carryover reservoir which is under construction at an enormous cost by the State of Andhra Pradesh should be allowed to go in ruin. We are, therefore, of the opinion that 33 T.M.C. should be further allowed to the State of Andhra Pradesh for the Srisailem Project.

The next item under the first set is the Kurnool Cuddapah Canal. It is submitted by the State of Andhra Pradesh that next to the Krishna Delta this is the oldest scheme on the Krishna River System as it was commissioned as early as 1866. For this scheme 39.9 T.M.C. is allowed as protected use. It is submitted that the cropping pattern was settled in G.O. Ms. No. 750, PWD, dated 22-3-1960 and the quantity of 39.9 T.M.C. was estimated as sufficient for the area to be irrigated, but this was an unrealistic estimate. The average utilisation during the period 1961-62 to 1968-69 is 66.68 T.M.C. In APK-I Appendix XVII at pages 123 to 125 the following demands have been shown for the Kurnool Cuddapah Canal.

Committed utilisations as on 1960

(1) Kurnool Cuddapah Canal	.	.	39.9 T.M.C.

Committed after 1960

(2) Improvements to Kurnool Cuddapah Canal	.	.	.	.	29.5 T.M.C.

TOTAL	.	.	.	.	69.4 T.M.C.

The State of Andhra Pradesh has confined its demand to 60.77 T.M.C. for this canal in AP Note No. 14 and has submitted that 20.87 T.M.C. should be further allocated to it to protect the irrigation which has actually developed. We have already pointed out that in 1961 Andhra Pradesh Government admitted that annual utilisation of 39.9 T.M.C. would be sufficient to meet the requirement of the area to be irrigated. We are, therefore, not inclined to allocate any more water for the Kurnool Cuddapah Canal.

The last item in the first set is the Krishna Delta. The State of Andhra Pradesh has submitted that the requirement under the Krishna Delta for 1.5 lakh acres cannot be met from out of the quantity of 264 T.M.C. allowed for the Nagarjunasagar Project as this quantity is required for irrigating the areas under the command of the Nagarjunasagar Canals. It is submitted that the requirement for the additional area of 1.5 lakh acres in the Delta is 23.1 T.M.C. and it is to be met separately. We have examined this matter. The State of Andhra Pradesh has been granted protection to the extent of 264 T.M.C. for the Nagarjunasagar Project and 181.20 T.M.C. for the Krishna Delta. The State of Andhra Pradesh can by economic use irrigate the areas under the Nagarjunasagar Canals and the Krishna Delta by utilising 445.20 T.M.C. We are not inclined to grant any more water for these projects out of the dependable flow of 2060 T.M.C. We may, however, mention that we have given a share in the return flow to the State of Andhra Pradesh. The State of Andhra Pradesh may utilise part of its share in the return flow to which it will become entitled after the specified time as mentioned hereinbefore for the integrated operation of these two Projects. Meanwhile, enough water will be available to the State of Andhra Pradesh because the projects of the upper States are likely to take time to spring up and it will not suffer in any way.

Now let us examine the second set of demands made by the State of Andhra Pradesh. First item in this set is minor irrigation works under construction for which the demand is 5.3 T.M.C. It is submitted by the State of Andhra Pradesh that these works are under construction at places which are mentioned in MRDK-Vol. IV and water should be allowed to the State of Andhra Pradesh out of the dependable flow. This demand may be treated as at par with the demand for minor irrigation under the first set. For the reasons that we have already given we have refused that demand. For the same reasons we are not inclined to accept this demand also.

2M of I & P/73—8

The next item in this set is the Jurala Irrigation Scheme Stage-I. There are certain special considerations with regard to this project. This project envisages to irrigate scarcity areas in Taluks of Gadwal, Alampur and Wanaparthy in Mahboobnagar District. The erstwhile Hyderabad State had taken up investigations of the Bhima Project and the Upper Krishna Project in the year 1930 for irrigating certain areas in Telengana region of the present Mahboobnagar District along with areas lying in the head reaches in Karnataka region which merged with the State of Mysore after the States reorganisation. These projects were included in the schemes put forward by the erstwhile Hyderabad State at the time of 1951 Conference.

The case of the State of Andhra Pradesh is that the State of Mysore has now made changes in the Right Bank Canal of the Upper Krishna Project without extending benefits to contiguous areas in the State of Andhra Pradesh which were formally proposed to be irrigated. Under these circumstances the State of Andhra Pradesh is compelled to propose a substitute to benefit the scarcity areas in Telengana region. It has submitted a note on this Project which is APPK-36. Technically the feasibility of the Project is yet to be examined. In the note the proposal is to put a reservoir at about 5 miles upstream of Gadwal metergauge railway bridge with gross storage of 33 T.M.C. and live storage of 16 T.M.C. The irrigation under the Project is proposed in two Stages. In Stage-I irrigation will be confined to flow irrigation on either side to an extent of 1,05,000 acres. However, in Stage-II irrigation by lift will be taken up to the extent of 1,80,000 acres. In the first Stage there will be two canals; (1) the Right Bank Canal will be about 17 miles long serving the areas of Gadwal and Alampur Taluks in Mahboobnagar District which are scarcity affected areas, (2) the Left Bank Canal which will be about 36 miles serving Taluks of Atmakur and Wanaparthy of Mahboobnagar District which are also scarcity affected areas. The total water requirement in Stage-I for the Right and Left Bank Canals is 16.80 T.M.C. Reservoir losses are taken to be 6.2 T.M.C. The crop pattern proposed is 60 per cent wet and 40 per cent dry and the requirements for wet and dry are taken at 20 T.M.C. and 10 T.M.C. respectively for one lakh acres.

The State of Andhra Pradesh, no doubt, has been allocated enough water for historical reasons, but still Telangana part of the State of Andhra Pradesh stands in need of irrigation. The area which we are considering for irrigation formed part of Hyderabad State and had there been no division of that State

there were better chances for the residents of this area to get irrigation facilities in Mahboobnagar District. We are of the opinion that this area should not be deprived of the benefit of irrigation on account of the reorganisation of States. If properly managed, Jurala Project Stage-I can operate by utilising about 18 T.M.C. We, therefore, think it proper that 17.84 T.M.C. of water at 75 per cent dependability should be allocated for Stage-I of the Project.

If it turns out that the Jurala Irrigation Project is not a practical proposition, it is expected that 17.84 T.M.C. would be utilised by the State of Andhra Pradesh elsewhere in Telangana region. We cannot conceive that the State of Andhra Pradesh having put forward the claim for allocation of water for Telangana region and having received an allocation for use in that region would use it elsewhere outside that region.

The third item in this set is 'Proposed Minor Works' and the demand for this item is 14.09 T.M.C. We do not think any water is available out of the dependable flow for allocation to the State of Andhra Pradesh for other minor irrigation projects. The three other items which are under this set are new projects and the total demand for them is 6 T.M.C. The State of Andhra Pradesh should try to meet the demands by economising in the use of water at other places.

Thus 800 T.M.C., as detailed below, is allocated to the State of Andhra Pradesh as its share in the dependable flow of 2060 T.M.C.:—

1. Protected uses	749.16 T.M.C.
2. Srisailem Project	33.00 T.M.C.
3. Jurala Irrigation Project Stage-I	17.84 T.M.C.
TOTAL	800.00 T.M.C.

The next question arises as to what should be the basis for division of the remaining dependable flow between the States of Maharashtra and Mysore. We have referred to the statement filed by the State of Mysore. The case of the State of Mysore is that the division of water between the two States must take place on the basis of that statement. The State of Maharashtra has submitted that this statement gives erroneous impression as the State of Mysore has worked out percentages by taking area factor four times (drainage area, net sown area, culturable area, culturable commanded area) and population factor twice (total population, population depending on agriculture) and it has ignored the factor of contribution. Mysore has the largest percentage of drainage area in the Krishna basin and, therefore, the other

areas will also be larger and for this reason the State of Mysore wants the area factor to be taken four times. We are of the opinion that on the very face of it the division of water between the two States on the basis of the statement submitted by the State of Mysore is neither just nor equitable.

In MY Note No. 17 dated the 25th July, 1973, the State of Mysore has further submitted four methods of the division of the dependable flow between the three States. Out of the four methods, the first is based on the assumption that the allocation is being made of the virgin flows of the river Krishna taking into consideration only the in-basin factors and the State of Andhra Pradesh is to get only 544 T.M.C. out of 2060 T.M.C. The other three methods take note of the protected uses of the State of Andhra Pradesh to the extent of 749 T.M.C. For reasons already mentioned the first three methods do not deserve consideration. The fourth method proposes to divide the remaining water between the States of Maharashtra and Mysore in proportion to the total irrigable area under the remaining projects which have not been protected in the two States. Under this method the shares of the three States, according to the State of Mysore, should be as follows:—

The State of Maharashtra	524 T.M.C.
The State of Mysore	787 T.M.C.
The State of Andhra Pradesh	749 T.M.C.
TOTAL	2060 T.M.C.

Division of the remaining water between the States of Maharashtra and Mysore in proportion to the total irrigable area under the remaining projects in the two States cannot form a sound basis of our decision for division of water between the two States, unless all the remaining projects are examined in order to find out which areas are sought to be irrigated under the various projects by the two States, how far such irrigation is practicable, what quantity of water shall be required for irrigating the area under each project and which projects can be undertaken within the space of next 25 to 30 years. In substance we have to examine how far it is possible to satisfy the reasonable demands for irrigation of these two States by allocating the remaining water between them. This will furnish better criteria for division of the remaining water between the two States than any academic or mechanical formula.

Generally speaking the allocation of water should be made after a full consideration of the needs and requirements of these two States which is reflected in the Krishna case by the projects which they have

under contemplation. What we have, therefore, done is to examine each project of these States and express our views whether it is worth consideration or not in the sense that it meets the requirements of an area in the States concerned. In saying that the project is worth consideration we do not wish to be understood to say that the project, if feasible, should be adopted. Likewise when we say that the project is not worth consideration we do not say that no water should ever be allowed for it. If at some future date more water becomes available it is possible that more projects may come upto the worth consideration standard. In assessing whether the project is worth consideration or not we have taken into account the physical characteristics of the area like rainfall etc., the catchment area, the commanded area, the ayacut of the project, the fact whether the project is meant for irrigating the scarcity area or not and such other facts. In other words we determine on pragmatic considerations what needs of the States of Maharashtra and Mysore can be satisfied so that an equitable way may be found out for distributing the balance of the dependable flows between the two States. It should not be taken that our observations relating to the projects which we have noted as worth consideration are to be accepted in any way as final and binding by the Planning Commission or any other authority. Our examination of the project reports and other relevant documents has a very limited purpose and it is to determine what are the reasonable needs of the two States so that an equitable way may be found out for distributing the remaining water between the two States. It is, of course, always to be borne in mind that the allocation of waters though based on consideration of certain projects being found to be worth consideration are not on that account to be restricted and confined to those projects alone. Indeed the States (and this applies to all the States) would be entitled to use the waters for irrigation in such manner as they find proper subject always to the restrictions and conditions which are placed on them.

One important aspect which has to be kept in mind is that besides its own contribution the State of Andhra Pradesh is to receive a large quantity of water from contributions made from other States to the waters of the river Krishna. The river Bhima which rises in the Western Ghats in Poona District of Maharashtra flows for a total length of 535 miles through the States of Maharashtra and Mysore and falls in the river Krishna. The river Tungabhadra which rises in the Mysore State falls in the river Krishna beyond Kurnool. This river is formed by the union of two rivers—Tunga and Bhadra— which

rise in the Western Ghats. The united river Tungabhadra flows for 338 miles through the States of Mysore and Andhra Pradesh. Both these rivers make a very substantial contribution to the river Krishna. If the interests of the State of Andhra Pradesh are to be safeguarded in the matter of receiving water from the river Krishna, it is necessary that the main stream of the river Krishna, should continue to receive sufficient water from the river Bhima and the river Tungabhadra. It is only then that all the three sources of supply of water to the State of Andhra Pradesh will remain open. This means that there should be no overcrowding of projects in K-5 and K-6 sub-basins, as also in K-8 and K-9 sub-basins. The Krishna Godavari Commission has mentioned at page 287, paragraph 15-36 that on the river Krishna until river flow data have been observed for a number of years in accordance with the recommendations made in paragraph 9-44, it would not be advisable to undertake any further major or medium project in sub-basins K-8, K-9, K-10, K-11 and K-12. It has further observed that the requirements of all the projects in sub-basins K-1 to K-8, as indicated by the State Governments, could not be met by the available supplies even if these could be made fully utilisable. The maximum shortage was in sub-basin K-7.

The State of Mysore has submitted MY Note No. 19 dated the 25th July, 1973 in which it has been contended that the 75 per cent dependable flow of the river Tungabhadra upto Tungabhadra Dam is 456 T.M.C. On this point it has relied on the evidence of Mr. Framji, (MRW-1) page 287. Against this the committed use upstream upto Tungabhadra Dam is 319 T.M.C. The State of Mysore has further claimed 58 T.M.C. of water upto Tungabhadra Dam.

The State of Mysore has calculated the 75 per cent-dependable flow of the river Tungabhadra at Sunkesula as 565 T.M.C. as shown below:—

	T.M.C.
1 Upto Tungabhadra Dam.	455.6
2. From Tungabhadra Dam upto Rajolibunda Diversion Scheme	95.9
3. From Rajolibunda Diversion Scheme to Mysore Border	9.5
4. From Mysore Border upto Sunkesula	4.1
TOTAL	565.1

(Items (1) to (3) are as per p. 287 of MRW-1. Item (4) is in proportion to catchment areas below Mysore border upto Sunkesula and from Sunkesula to confluence).

The case of the State of Mysore is that after meeting the further requirements of the State to the extent of 79.2 T.M.C. of water ($58 + 21.2 = 79.2$) about 39 T.M.C. of water will be available out of the dependable flow at Sunkesula and below Sunkesula further 15.6 T.M.C. of water will be available. Thus 54.6 T.M.C. of water would flow down to the river Krishna.

So far as Vedavathi sub-basin (K-9) is concerned, even according to the State of Mysore there is very little scope for allocation of water in that sub-basin.

The State of Andhra Pradesh has given a very dismal picture of the flow of the river Tungabhadra that will go to the river Krishna after meeting the committed utilisation. The total protected utilisation in the Tungabhadra (K-8) and Vedavathi (K-9) sub-basin are as follow :—

Tungabhadra Sub-basin (K-8).	398.61 T.M.C.
Vedavathi Sub-basin (K-9)	50.54 T.M.C.

The balance of the dependable flow after deducting the quantum under protected uses is as follows according to the State of Andhra Pradesh (see A.P. Note No. 16 dated the 26th July, 1973).

Average yield of T.B. River (including Vedavathi) at Sunkesula	558.6 T.M.C. (APA 65, dated 12-9-72)
Average yield of Tungabhadra River below Sunkesula upto confluence with Krishna	10.45 T.M.C. (APA 67, dated 13-9-72)
Average yield of Tungabhadra including Vedavathi upto junction with Krishna	569.05 T.M.C.
75 per cent dependable yield of Tungabhadra (including Vedavathi) upto Sunkesula would work out to (by arranging the gross yields given in APA 65, dated 12-9-72 in descending order)	471.7 T.M.C.
	471.7×569.05
On prorata basis, 75 per cent dependable yield of Tungabhadra (including Vedavathi) upto junction with Krishna would work out to.	558.6 = 480.6 T.M.C.
Balance 75 per cent dependable yield available in Tungabhadra river after deducting the utilisations protected so far.	$480.6 - 449.15 = 31.45$ T.M.C.

The State of Andhra Pradesh has, therefore, submitted that no further allocation should be made to the State of Mysore in view of the fact that there is • already over appropriation in the Tungabhadra and Vedavathi sub-basins.

The Krishna Godavari Commission at page 23 of its report has observed that the Tungabhadra river is perhaps the only well observed river in the Krishna and Godavari River Systems. Regular discharge observations have been made at Sunkesula since 1904. According to the Krishna Godavari Commission Report the average yield in K-8 sub-basin is 520 T.M.C.

only (see page 243). The sharp difference of opinion between the States of Mysore and Andhra Pradesh is due to the fact that while the State of Mysore has relied on the discharge data available at the Tungabhadra Dam, the State of Andhra Pradesh has relied on the discharge data available at the Sunkesula Anicut. The relative value of these data have been a subject matter of lengthy arguments before us. No useful purpose would be served in going into detail about the merits of the data available at these two places as it is clear from the case of the State of Mysore itself that if the river Tungabhadra is to continue to contribute a significant quantity of water to the main stream of the river Krishna after meeting the demands under the protected uses of the States of Mysore and Andhra Pradesh there is a very limited quantity available for further allocations in K-8 sub-basin unless further study of the discharge data in K-8 sub-basin gives a different picture. The same applies with greater force with regard to Vedavathi (K-9) sub-basin. According to Krishna Godavari Commission Report the average annual yield in this sub-basin is 56.4 T.M.C. which has been rounded off to 50 T.M.C. (see page 246 of the Krishna Godavari Commission Report). According to the States of Maharashtra and Mysore the average annual yield in the sub-basin is 87.8 T.M.C. [see the evidence of Mr. Framji (MRW-I) Pages 301-302]. The average annual yield may be taken to be in between the two estimates. The protected utilisation of the two States of Mysore and Andhra Pradesh in this sub-basin is already 50.54 T.M.C. Thus there is very limited scope for further utilisation of water at 75 per cent dependability in this sub-basin.

So far as the river Bhima is concerned, there is also a need for caution. There is limited scope for allowing further utilisation of the water of the river Bhima if it is to continue to make some contribution to the main stream of the river Krishna. While it would be difficult to place restrictions on the States of Maharashtra and Mysore for utilising the waters of the tributaries of the river Bhima, it would be proper that further exploitation of the waters of the main stream of the river Bhima by any State should be permitted only under exceptional circumstances. These considerations are to be borne in mind while examining the project reports of the States of Maharashtra and Mysore.

We shall first examine the demands for irrigation of the State of Maharashtra. The State of Maharashtra has filed MR Note No. 30 on the 16th August, 1973 showing the sub-basinwise demand as per Master Plan, the quantity of water protected and further demand of the State of Maharashtra from the 75 per cent dependable flow for projects in the Krishna basin on the assumption that further westward diversion of water will not be permitted. That note shows that in all the

sub-basins K-1, K-2, K-3, K-5 and K-6 in the State of Maharashtra its demands for irrigation according to Master Plan are for 860 T.M.C. Out of these, demands for 439.6 T.M.C. have been protected. Thus according to Master Plan, the unsatisfied demand is for 421.2 T.M.C. out of which the State of Maharashtra has now confined its claim to 280.3 T.M.C. as shown in the Statement MR Note No. 30. That statement gives all the projects for which water for irrigation is claimed according to Master Plan and the reduced demands according to MR Note No. 30. In addition to the demands contained in the Master Plan, the State of Maharashtra has filed MRPK-31 which contains the details of the existing and under construction bhandaras, weirs and lift irrigation schemes some of which are not included in the Master Plan. According to the State of Maharashtra, the utilisation of the bhandaras, weirs and lift irrigation schemes mentioned in MRPK-31 but not included in the Master Plan amounts to 19.06 T.M.C. Out of this, demands for some weirs, bhandaras and lift irrigation schemes may merge with the demands for projects claimed by the State of Maharashtra. The State of Maharashtra has claimed that the demand for bhandaras, weirs and lift irrigation schemes which may not merge with the projects must be given preference over other demands.

We have got prepared Table No. 2 which shows the demands of the State of Maharashtra as shown in the Master Plan, the utilisation for each demand for which protection has been granted and the future demands made in accordance with MR Note No. 30. This Table also mentions demands for bhandaras, weirs and lift irrigation schemes. In this Table demands for minor irrigation requiring less than 1 T.M.C. have been consolidated basinwise instead of demand for each minor irrigation project being shown separately.

Coming to the demands of the State of Mysore, we find that in Statements Nos. 5 and 6 Annexure III at page 97 of MYK-I the details of the demands for projects for which water for irrigation is claimed have been given. In Appendix II to MY Note No. 17, a statement has been filed by the State of Mysore showing the demands basinwise. We have got prepared Table No. 3 of the demands of the State of Mysore on the same lines as Table No. 2. That Table shows the demands made by the State of Mysore in Statements Nos. 5 and 6 Annexure III in MYK-I, the utilisation for which protection has been granted for each demand and the quantity of water claimed under MY Note No. 17.

We have examined all the project reports of both the States and also the other demands and have formed our opinion as to which of the demands of both the States are worth consideration and how much water

should be allocated for each demand so that the reasonable demands of both the States may be assessed. In order to facilitate further discussion it is not proper to break the chain by giving the details of such examination at this place. The better way would be only to mention here the demands which, in our opinion, are worth consideration for assessing the needs of both the States and the quantities of water required for them and give the details of our examination along with the two Table Nos. 2 and 3 in Part II of this Chapter.

The demands for allocation of water from the dependable flow for the State of Maharashtra, which were assessed as worth consideration by us in Part II of this Chapter, excluding the demand for protected uses, are as under :—

	T.M.C.
1. Krishna Canal Ex-Khodshi weir	3.00
2. Koyna Hydrel and Koyna Krishna Lift Scheme	23.40
3. Dudhganga	14.00
4. Gudavale Lift Scheme	3.10
5. Mutha System ex-Khadakwasla	9.60
6. Kukadi Project	18.80
7. Barhanpur Project	1.48
8. Sina at Nimgaon	1.70
9. Sina at Kolegaon	4.50
10. Hingni Pangaon	1.50
11. Bhandaras, etc.	17.80
12. Minor Irrigation	26.47
TOTAL	125.35

The demands for allocation of water from the dependable flow for the State of Mysore which were assessed as worth consideration by us, excluding the demands for protected uses are as under :—

	T.M.C.
1. Dudhganga Project	4.00
2. Upper Krishna Project	52.00
3. Ghataprabha Project	55.00
4. Malaprabha Project (including upper Malaprabha Project)	9.00
5. Ramthal Lift Irrigation Scheme	4.50
6. Bhima Irrigation Project	11.00
7. Diksanga Project	1.00
8. Amaria Project	2.27
9. Bennithora Project	5.43
10. Gandhorinala Project	2.20
11. Upper Mullamari Project	1.30
12. Lower Mullamari Project	4.40
13. Kagna Project	2.00
14. Vijayanagar Channels	6.35
15. Minor Irrigation	30.00
TOTAL	190.45

We are of the opinion that out of 2060 T.M.C., 1693.36 T.M.C. be allocated to the three States for protected uses as already mentioned and the remaining may be divided between the three States as follows :—

	T.M.C.
1. State of Maharashtra	125.35
2. State of Mysore	190.45
3. State of Andhra Pradesh	50.84
TOTAL	366.64

Thus out of the dependable flow of 2060 T.M.C. the share of each State is as follows :—

	T.M.C.
1. State of Maharashtra	565.00
2. State of Mysore	695.00
3. State of Andhra Pradesh	800.00
TOTAL	2060.00

We have already determined the quantity of water which will be added to the 75 per cent dependable flow of the river Krishna upto Vijayawada on account of return flows and we have also determined how this water is to be shared by each State. This completes our discussion as to how the dependable flow of the river Krishna available for distribution is to be divided between the States of Maharashtra, Mysore and Andhra Pradesh.

We have to make some provisions relating to certain matters which arise out of this scheme for apportionment. Many of these provisions are based on agreed statements filed by the parties, some of them are merely incidental to the scheme of apportionment. In order to give a complete picture and to facilitate further discussion we consider it proper to refer to the Final Order of the Tribunal which is set out in Chapter XVI and which embodies all the provisions on the subject of apportionment of water of the river Krishna between the States of Maharashtra, Mysore and Andhra Pradesh.

Clause I of our Order gives the effective date on which the Order will come into force.

Clause II relates to underground water and is based on the agreed statement of the parties.

Clause III relates to the dependable flow and augmentation in the dependable flow due to return flows which we have already discussed.

Clauses IV and V embody the scheme for apportionment of water of the river Krishna between the

three States of Maharashtra, Mysore and Andhra Pradesh which we have already discussed in detail. In Clause V we have stated with regard to the States of Maharashtra and Mysore that each of them shall not use in any water year more than a particular quantity of water specified therein. It is necessarily implied that both these States may use, in any water year, water of the river Krishna upto the quantities specified in that Clause subject to the conditions and restrictions imposed by us and subject to the availability of water.

We make it clear that water has been allocated to each of the three States enbloc and that subject to the conditions and restrictions placed by us, each State shall have the right to make beneficial use of the water allocated to it in any manner it thinks proper. We further make it clear that the water allocated to each State is for all beneficial purposes including domestic and industrial uses and no separate allocation is made for such uses.

Clause VI gives the definition of beneficial use which we have already discussed.

Clause VII defines how a use is to be measured and is self-explanatory. The second part of Clause VII is based on the agreed statement filed by the parties.

Clause VIII is self-explanatory.

In Clause IX we have placed restrictions on the use of water in the Krishna basin by the three States. We have already explained the reasons for placing such restrictions in the case of Tungabhadra and the Veda-vathi sub-basins and on the main stream of the river Bhima. We have also placed restriction on the State of Maharashtra that it shall not use in any water year more than 7 T.M.C. from the Ghataprabha sub-basin (K-3) as otherwise the requirements of the State of Mysore for the projects in that sub-basin may suffer. We have also placed restriction on the State of Andhra Pradesh that it shall not use more than 6 T.M.C. from the catchment of the river Kagna in the State of Andhra Pradesh so that waters of that river may reach the main stream of the river Bhima. While placing restrictions on the use of water beyond the stated quantity by State we have laid down an upper limit which is slightly above the total requirements of that State as assessed from the demands which have been either protected or which we have held as worth consideration.

Clause X relates to the restrictions placed on the State of Maharashtra on the westward diversion. We have already assigned our reasons for incorporating this Clause.

Clause XI is self-explanatory and does not require any discussion.

Clause XII is regarding Gauging sites in the Krishna River System and is self-explanatory. It is based on the agreed statement dated the 20th August, 1973 (Appendix N) of the parties.

In Clause XIII provision is made for preparation and maintenance of certain records and is self-explanatory.

The provisions contained in Clauses XII and XIII are necessary as they would furnish the machinery for determining how much water is "used by each State in each water year. They will also furnish valuable data which may be of considerable importance in future.

Clause XIV deals with the review of the order of the Tribunal by a competent authority or tribunal after the 31st May, 2000. We have already assigned our reasons for incorporating this Clause.

Clause XV is self-explanatory and does not require any discussion.

Clause XVI is regarding definition of certain terms and does not require any explanation.

Clause XVII provides that any matter covered by the order of the Tribunal may be altered, amended or modified either by agreement between the parties or by legislation by Parliament.

These provisions of the Final Order cover all matters mentioned in Issue No. II and its sub-issues.

Issue No. II is, therefore, decided as provided in these clauses of the Final Order.

With regard to Issue No. IV (B) (a) we may mention that we have divided only the dependable flow of the river Krishna between the States of Maharashtra, Mysore and Andhra Pradesh and we have also placed restrictions on the use of water by the States of Mysore and Andhra Pradesh in the Tungabhadra sub-basin (K-8) as mentioned hereinbefore. In our opinion no further directions are necessary for the release of the waters from the Tungabhadra Dam.

- (i) for the benefit of the Kurnool Cuddapa Canal;
- (ii) for the benefit of the Rajolibunda Diversion Scheme; and
- (iii) by way of contribution to the Krishna river.

Issue No. IV (B) (a) is decided accordingly.

Now we proceed to examine how the waters of the river Krishna should be divided between the parties under Scheme 'B'. The essential element in this

Scheme is that the States of Maharashtra, Mysore and Andhra Pradesh share the utilisable waters of the river Krishna in each water year in stated proportions depending on the availability of water in that year, that is, if there is any deficiency in that year all the States suffer and if there is surplus all the States get the benefit, according to their shares fixed by the Tribunal. Another important feature is that it provides for fuller utilisation of the waters of the river Krishna by permitting the parties to construct additional storages in their territories to impound the water that may be flowing in excess of the dependable flow in any water year to be used in that very water year or in the succeeding water years. We have already laid stress on the point that for such a scheme to be workable, an inter-State administrative authority, which may be called the Krishna Valley Authority, should be established by agreement between the parties and failing such agreement between the parties by any law made by Parliament under Entry 56 List I of the Seventh Schedule of the Constitution.

For the fuller utilisation of the waters of the river Krishna we are of the opinion that such an authority should be established to supervise and regulate, if necessary, that the water available for utilisation in the river Krishna in each year be shared by the three States. For reasons which we have already mentioned we are not setting up such an authority under our Order. But if such an authority is set up either by agreement between the parties or under the law made by Parliament we consider it proper to place on record our views as to how in that case the waters of the river Krishna should be divided between the States of Maharashtra, Mysore and Andhra Pradesh. Ultimately it is for the parties or for the law made by Parliament to draw up a final scheme and our views are subject to modification in both the cases.

We may sum up our views in the following paragraphs :—

1. An inter-State administrative authority to be called the Krishna Valley Authority may be established by agreement between the parties and failing such agreement between them, such authority may be established by any law made by Parliament.

2. Upon the establishment of the Krishna Valley Authority, the waters of the river Krishna shall be divided between the States of Maharashtra, Mysore and Andhra Pradesh as mentioned hereinafter.

(A) In case the total quantity of water used by all the three States in any water year is not more than 2060 T.M.C.. the States of

Maharashtra, Mysore and Andhra Pradesh shall share the water in that year in the following proportions :—

State of Maharashtra	.	.	.	565 T.M.C.
State of Mysore	.	.	.	695 T.M.C.
State of Andhra Pradesh	.	.	.	800 T.M.C.

- (B) If the total quantity of water used by all the three States in a water year is more than 2060 T.M.C., the States of Maharashtra, Mysore and Andhra Pradesh shall share the water in that water year as mentioned below :—

Upto 2060 T.M.C. as stated in paragraph 2 (A) and remaining water above 2060 T.M.C. equally by all the three States.

3. (A) If in any water year any State is not able to use any portion of the water allocated to it during that year on account of the non-development of its projects, or damage to any of its projects or does not use it for any reason whatsoever —

- (i) that State will not be entitled to claim the utilised water in any subsequent water year ; and
- (ii) any other State may make use of the utilised water, and such use shall not be charged to the share of that other States, but thereby it shall not acquire any right whatsoever in any such use.

(B) Failure of any State to make use of any portion of the water allocated to it during any water year shall not constitute forfeiture or abandonment of its share of water in any subsequent water year nor shall it increase the share of any other State in any subsequent water year even if such State may have used such water.

4. For the fuller utilisation of the waters of the river Krishna the States of Maharashtra, Mysore and Andhra Pradesh may construct such storages and at such places as may be determined by the Krishna Valley Authority for impounding water which would otherwise go waste to the sea.

5. It shall be the duty of the Krishna Valley Authority to ensure that the waters of the river Krishna are stored, appropriated and used to the extent and in the manner provided in these paragraphs and for this purpose the said authority may do all things necessary, proper or convenient for the performance of its duties independently or in co-operation with the Government agency of the three States and of the Government of India.

6. The Krishna Valley Authority is charged with the duties of ensuring that from time to time the waters of the river Krishna are made available for the beneficial use of the States of Maharashtra, Mysore and Andhra Pradesh in accordance with the provisions contained in these paragraphs and of maintaining the account of the use made by each State in each water year.

7. (A) The Krishna Valley Authority shall collect the details of the uses made by each State from time to time and after such scrutiny as it deems proper it shall subject to the provisions contained in paragraph 3 charge each State with the use made by it.

(B) When the water is not flowing over the terminal reservoir in the State of Andhra Pradesh, the releases from such terminal reservoir either for production of power or for irrigation shall be so regulated as to avoid any waste of water by spilling it over the terminal reservoir.

Any waste resulting solely from the defective regulation of the releases from such terminal reservoir as determined by the said Krishna Valley Authority shall be reckoned as use by the State of Andhra Pradesh.

8. In every water year in the second week of October, last week of December and last week of May, the Krishna Valley Authority shall determine tentatively the quantity of water which is likely to fall to the share of each State in accordance with the aforesaid paragraphs and adjust the uses of the parties in such a manner that by the end of the water year each State is enabled, as far as practicable, to make use of the water according to its share.

9. A(i) For giving effect to the aforesaid provisions the Krishna Valley Authority may from time to time direct the transfer of water from the project of an upper State to the project of a lower State and may take any other step for ensuring that each State may use in each water year the quantity of water allocated to it in that water year.

(ii) During the period 1st of May to 30th of September in any water year the Krishna Valley Authority shall not direct transfer of water from any project in any upper State —

- (a) except in times of acute water shortage and for urgent need of water by a lower State; and
- (b) if greater hardship or distress is caused to the project of the upper State from which

water is directed to be transferred than to the project of the lower State to be benefited by such transfer.

When directing the transfer of water the Krishna Valley Authority may give appropriate directions regarding the manner in which the water so transferred shall be used by the State receiving the water.

10. If it is found on final accounting at the end of the water year that the water used in the water year by any State is in excess of or less than its share under Paragraph 2, the said Authority may, subject to the provisions of Paragraph 3, take such steps as it deems necessary to adjust the water accounts of the parties by regulating the extent of the use of water to be made by each State in succeeding years.

11. If the water stored in one State is released for use of any other State by the directions of the Krishna Valley Authority, the State using the water shall be charged with the losses due to evaporation, after it has received the water in its storage, but the losses incident to the diversion, impounding or conveyance of water in one State for use in another State shall be deducted from the total water available for distribution.

The provisions contained in Clauses II, VI, VII, IX, X, XI, XIV, XV, XVI and XVII of Scheme A may with such modifications, as may be deemed necessary, form part of Scheme B.

It may appear that the division of water in every water year in the stated proportions as envisaged by us in the above paragraphs may present unsurmountable difficulties even if the Krishna Valley Authority is established for it may be difficult to forecast in each water year as to how much water will be flowing in the river Krishna in that water year and how much water is being utilised by each State. Much of this difficulty is solved by nature. In the Krishna basin all the rivers are rain-fed rivers getting waters during monsoons. As we have already mentioned, the south-west monsoon season during June to September contributes about 73 per cent of the annual rainfall of the Krishna basin, the normal date of the on-set of the south-west monsoon in the Krishna basin is between 1st and 10th June. The normal date of the withdrawal of the South-west monsoon in the Krishna basin is between 1st October and 15th November. We have also mentioned that other rainy seasons are as well defined. The north-east monsoon causes occasional showers, the amount of rainfall decreasing as the monsoon advances from the coast towards the interior. The season, October to December, contributes only about 17 per cent of the normal rainfall

of the Krishna basin. There is a little rain during the winter season during the months of January and February and very little rain in the hot weather season during the months of March, April and May. This being the position in every water year one can get an approximate idea of the total amount of water that is going to be available in a water year by the end of the month of October. No doubt the picture will not be complete but a workable data is available on the basis of which steps can be taken by the Krishna Valley Authority to see that in the waters of the river Krishna the parties get their share as mentioned aforesaid. Under our scheme in every water year in the second Week of October, last week of December and last week of May, the Krishna Valley Authority shall tentatively determine the shares of all the States. The Krishna Valley Authority will be in a position to give directions to the parties to adjust their utilisations in such a way that the use made by each State at the end of a water year is, as far as practicable, according to its share. This does not mean that any appropriate directions cannot be given earlier. The Krishna Valley Authority is to ensure that the parties get waters in proportion to their shares. For this purpose it can take any step which it deems proper at any time. The Krishna Valley Authority may even direct transfer of water from the project to upper State to the project of the lower State from time to time.

The States of Maharashtra and Mysore have raised objections to conferring on the Krishna Valley Authority the power of transfer of water from the reservoir of the upper State to the reservoir of the lower State in a water year before the end of October on several grounds :—

- (i) It is not practicable for water once released from an upper State storage to be brought back to that State later, if the necessity arises.
- (ii) Transfer of water may prejudicially affect the predominantly Rabi crop in the upper project form which water is being directed to be released for the benefit of lower project.
- (iii) Greater hardship or distress may be caused to the project of an upper State from which water is directed to be released than is caused to the project of the lower State for whose benefit water is being directed to be transferred.
- (iv) Beneficial use from the north-east monsoon in the months of October to December is the highest in the State of Andhra Pradesh and least in the State of Maharashtra.

It has been further submitted that as far as practicable water should be released from the nearest upper storage to ensure least loss in transit and time and that the release of water at a time from an upper storage should be for small quantities for short period of about a week, so as not to seriously affect or prejudice the upper State in getting its share of water when account is taken in the months of October and December.

We take it that the Krishna Valley Authority will be composed of high ranking engineers who are expected to use their discretion in the matter of transfer of water from one State to another judiciously. In exercising this discretion they are bound to take notice of the following :—

- (1) That it is not practicable that water once released from the upper State storage cannot be brought to that State later on in case such water is required to adjust the claim of the upper State for its share.
- (2) That the water is to be released for relieving the distress to the lower State and the extent or manner in which the distress is to be relieved should be such that greater hardship or distress is not caused to the upper State.
- (3) That the rainfall from the north-east monsoon in the months of October to December is higher in the lower States than in the uppermost States.
- (4) That water is to be released from the place where there exists sufficient quantity to permit such release.
- (5) That releases in early part of south-west monsoon are to be avoided as far as possible for the reason that even the fate of the upper States in the matter of receiving rainfall is uncertain and further it is expected that the lower State will keep some water in their storages for irrigating the Khariff crops in case there is deficiency in the rainfall in the months of May and June.

These are some of the obvious matters which are expected to be kept in view by the Krishna Valley Authority while directing transfer of water from one State to another. But it is not possible to envisage all the situations in which the transfer of water from one State to another may be necessary. A highly competent body such as the Krishna Valley Authority which will not only consist of the representatives of

the States but also of the Government of India will take due care while directing the transfer of water from one State to another. As a further safeguard, it may be provided that the direction of transfer of water from one State to another shall be by a resolution passed in a meeting in which all the available members nominated by the Government of India are present.

To remove any misgivings of the upper States, we have thought it proper that some of the points raised by the upper States may be specifically mentioned in Scheme B for giving definite guidance to the Krishna Valley Authority. We have, therefore, considered proper to mention certain safeguards in the matter of transfer of water in Paragraph 9(A) (ii).

It is likely to happen at the end of the year when final accounting is done that there may not be complete adjustment of the shares of the parties. In spite of the able and efficient tackling of the problem by the Krishna Valley Authority a complete -balancing of the account of the parties according to their shares is not to be expected. For this reason we have thought it proper that a provision as mentioned in Paragraph 10 be inserted.

Thus, the objections that this scheme may not prove workable are not so cogent as to dissuade us from advocating that scheme B may be given effect to by the parties or by law.

The question of construction of carryover reservoirs by all the three States was considered by us from two aspects :—

- (1) what should be the extent to which each State should be permitted to construct carry over reservoirs? and
- (2) at which place in their territories?

As we have already mentioned construction of carryover reservoirs is one of the essential elements in this scheme. But to determine how much extra water should be impounded by each State in its territory and at which place is mainly a technical job. It would not be prudent for us to express any opinion on these two aspects. In our opinion this matter may be determined by the Krishna Valley Authority which will be composed of eminent engineers who can give better opinion after examining all the hydrological and technical aspects of the matter.

It is further contended by the States of Maharashtra and Mysore that the State of Andhra Pradesh has been allocated water much in excess of what it is otherwise entitled on account of the protection that has been

granted to its users and it should not be allowed any more share in the water which may be flowing in excess of 2060 T.M.C. in any year. It is contended that such additional water be reserved for the States of Maharashtra and Mysore. The State of Andhra Pradesh has controverted this argument on various ground we have already referred to.

There may be four circumstances under which such additional water may be available. These are : —

- (i) When the water flowing above the 75 per cent dependability is impounded in the chain of reservoirs in the three States to be used in the same year in which it is to be impounded or in subsequent years.
- (ii) When there is augmentation in the flow of the river Krishna on account of return flow.
- (iii) If there has been under-estimation in estimating the dependable flow at 75 per cent dependability as 2060 T.M.C., and
- (iv) Because of increasingly more use of water upstream which would reduce transit losses.

In the first case the State of Andhra Pradesh would be impounding water in its own reservoirs and it will be hard to deny any share to the State of Andhra Pradesh in the waters so impounded. So far as the return flow is concerned, the case of the State of Andhra Pradesh for a share in the return flow is much stronger as the water which shall be available to the State of Andhra Pradesh for irrigation is likely to be somewhat of inferior quality than the rain water and the State of Andhra Pradesh can be compensated by giving a share to it in the return flow. So far as the other two circumstances are concerned, it will not be possible to determine whether the additional water which has become available in a water year is due to any of the first two circumstances or due to any of the last two circumstances. In this view of the matter we are of opinion that in the additional water above 2060 T.M.C. that may be available for utilisation each year all the three States should Share equally.

Yet another objection that may be raised is that it will be difficult to determine the shares of each parties by reference to the water used by each State in each water year. But if each State is in a position to make use of the water allocated to it obviously the water used by each State will furnish the criteria for measuring of the total water available for utilisation in a particular year. But if the upper State is unable to use the water for the non-development of its projects, or damage to any of its projects, separate provision has been made in Paragraph 3 permitting any State to make use of such water without being charged with for making use of it. It has been further provided that the State which is unable to use water shall not be entitled to claim the unutilised water in any subsequent year. This will clear the hurdle in determining the shares with reference to the use made by each State in a particular year.

It was contended before us that considering the present development and progress of some of the projects it will take a very long time for the upper States to be in a position to utilise all the waters falling to their shares under this scheme. We do not think that the scheme should be discarded for this reason. The Krishna Valley Authority after it is established is likely to take time before it can function in a full-fledged manner. In the first instance such an authority may be established with a skeleton staff so that it may collect all the necessary data well in advance of the full development of projects by the upper States. The lower States do not suffer because they have been permitted to use the water which the upper States are not able to utilise on account of non-development of projects or for any other reason.

The other provisions relating to this scheme are self evident and do not require elaborate discussion.

In the end so far as the scheme B is concerned, we leave the question of the enforcement of such a scheme to the good sense of the parties or to the wisdom of Parliament.

CHAPTER XTV
Appropriation of the water of the river KRISHNA
 PART—II

Demands of the State of Andhra Pradesh—As we have mentioned in Part I of this Chapter, Table No. I which is given below shows the demands of the State of Andhra Pradesh as per its cases set out in APK-I, utilisations held protected by us and the demands made by the State of Andhra Pradesh out of the dependable flow as set out in AP Note No 14 :-

TABLE No 1

ANDHRA PRADESH

Statement showing the demands by the State of Andhra Pradesh as per APK-I, protected utilisations and demands made in AP Note No 14 out of the 75 per cent dependable flow

(All figures in T M C)

S l. N o	Name of Project	Demand as per APK-I Pages 123 to 125	Protected utilisation	Balance demand	Demand out of depend- able flow vide AP Note 14
1	2	3	4	5	6
1	Krishna Delta System	214.0	181.20	32.8	23.01
2	Kurnool-Cuddapah Canal (See also item No 23)	39.9	39.9		20.87
3	Muniyeru Project	3.7	3.3	0.4	
4	Tungabhadra Project Right Bank Low Level Canal (Andhra Share)	29.5	29.5		
5	Bhairavanithippa	4.9	4.9		
6	Nagarjunasagar Project	481.0	281.0	200.0	
7	Tungabhadra Project Right Bank High Level Canal Stages I & II	32.5	32.5		
8	Dindi	5.3	3.7	1.6	
9	Palair	4.2	4.0	0.2	
10	Pakhal	2.8	2.6	0.2	
11	Wvra	4.0	3.7	0.3	
12	Koilsagar	3.9	3.9		
13	Rajohbunda Diversion Scheme	15.9	15.9		
14	Musi Project	9.5	9.4	0.1	
15	Minor Irrigation (See also item No 24 and 37)	105.3	116.26		36.88
					(Item No. A (I) (2) (1) 5.30 Item No. A (II) (1) 14.09 Item No. A (II) (3)
16	Lankasagar	1.0	1.0		
17	Kotipallivagu	2.0	2.0		
18	Srisaillam	33.0		33.0	33.0

1	2	3	4	5	6
19. Vaikuntapuram Pumping Scheme		2.6	2.6	. .	. .
20. Okachettivagu		4.8	1.9	2.9	. .
21. Gajuladinne		2.0	2.0	—	—
22. Guntur Channel		7.0	4.0	3.0	. .
23. Improvements to Kurnool-Cuddapah Canal (See also Item No. 2)		29.5	. .	29.5	. .
24. Minor Irrigation (See also items No. 15 and 37)		2.1	. .	2.1	. .
25. Upper Krishna Project Extension to Andhra Pradesh		54.4	. .	54.4	. .
26. Sangameswaram Canal Scheme Statges I & II		315.0	. .	315.0	. .
27. Pulichintala		73.0	. .	73.0	. .
28. Nagarjunasagar Project Stage-III		69.0	. .	69.0	. .
29. Bhima Project		100.7	. .	100.7	23.0*
30. Tungabhadra Project Left Bank Low Level Canal Extension to Andhra Pradesh		19.2	. .	19.2	. .
31. Rajolibunda Right Canal Scheme		12.9	. .	12.9	. .
32. Muneru Project		1.5	. .	1.5	1.5
33. Kalikota		3.5	. .	3.5	3.5
34. Varadarajaswamy Project		1.0	. .	1.0	1.0
35. Srisailem Left Canal Scheme		150.0	. .	150.0	. .
36. Water Supply and Industrial Use		120.0	3.9	116.1	. .
37. Minor Irrigation (See also Hems No. 15 and 24)		47.5	. .	47.5	. .
TOTAL		2,008.1	749.16	1269.9	162.15

We have discussed the projects for which demands have been made out of the dependable flow in Col. No. 6 of the above Table in Part-I of this Chapter. We have allocated 800 T.M.C. as detailed below to the State of Andhra Pradesh as its share in the dependable flow of 2060 T.M.C. :—

1. Protected uses	749.16 T.M.C.
2. Srisailem Project	33.00 T.M.C.
3. Jurala Project Stage I	17.84 T.M.C.
Total :	800.00 T.M.C.

The demands of the State of Andhra Pradesh for a share in the flow in excess of 2060 T.M.C., (Which is called the 'Surplus Flow') as mentioned in AP Note No. 14, are as follows :—

1. Krishna Delta	65.00 T.M.C.
2. Nagarjunasagar Project	42.00 T.M.C.
3. Jurala Irrigation Scheme Stage-II	28.20 T.M.C.
4. Sangameswaram Canals	40.90 T.M.C.
5. Srisailem Left Bank canal	150.00 T.M.C.
6. Nagarjunasagar Project Stage-II	203.00 T.M.C.
Total :	529.10 T.M.C.

The quantity of water which is available in excess of the dependable flow of 2060 T.M.C. is that due to return flow as already mentioned in Part-I. We have given a share to the State of Andhra Pradesh in the return flow. As compared to the demands made by the State, this will be a very small quantity. The State of Andhra Pradesh may utilise the quantity of water allocated to it as its share in the return flow for any of its projects, subject to the conditions and restrictions imposed by us on the utilisations of the waters of the river Krishna.

This completes our discussion so far as the demands of the State of Andhra Pradesh are concerned.

Demands of the State of Maharashtra.—We proceed to discuss the various projects for which demands of the State of Maharashtra are to be considered in the light of the observations made by us in Part-I of this Chapter. These demands are contained in the following Table No. 2 which shows the sub-basinwise demands as per Master Plan, the utilisations protected and the future demands made in MR Note No. 30 from 75 per cent dependable flow for projects in the Krishna basin of the State of Maharashtra on the assumption that further westward diversion of water is not permitted :—

* In place of the Bhima Project and Upper Krishna Project Extension to Andhra Pradesh, the State of Andhra Pradesh has now claimed the quantity of water as shown in col. No. 6 for Jurala Project Stage-I.

TABLE No. 2

Statement showing the Sub-basinwise demand as per Master Plan, the utilisations protected and the future demands made in MR Note No. 30 from 75 per cent dependable flow for projects in the Krishna basin of Maharashtra State on the assumption that further west-ward diversion of water is not permitted.

													(All figures in T.M.C.)			
Sl. No	Name of the Project												Demand as per Master Plan	Protected utilisation	Balance according to Master Plan	Future demand from 75 per cent dependable flow (vide MR Note 30)
1	2												3	4	5	6
I. K-1 Sub-basin (Upper Krishna)																
1.	Krishna Project	.	.	.	.	.	.	.	.	.	.	.	35.9 (1.0)	36.3 (1.0)	(0.6)	
2.	Urmodi Project	.	.	.	.	.	.	.	.	.	.	.	6.2		6.2	6.2
3.	Tarali Project	.	.	.	.	.	.	.	.	.	.	.	6.7		6.7	6.7
4.	, Krishna Canal ex-Khodshi Weir					.	.	.	.	.	.	.	5.7 (2.5)	2.7	3.0 (2.5)	3.0
5.	Koyna Hydel and Koyna Krishna Lift Scheme with Varunji Weir												129.4	74.8	54.6	54.6
6.	Wang Project	.	.	.	.	.	.	.	.	.	.	.	12.1		12.1	12.1
7.	Warna Project	.	.	.	.	.	.	.	.	.	.	.	57.4	47.7	9.7	9.7
8.	, Radhanagari Project	.	.	.	.	.	.	.	.	.	.	.	11.0	11.0		
9.	Kadvi Irrigation Project	.	.	.	.	.	.	.	.	.	.	.	15.6		15.6	8.0
10.	Kasari Irrigation including Kaljewadi												42.4		42.4	12.0
11.	Kumbhi Irrigation	.	.	.	.	.	.	.	.	.	.	.	17.5		17.5	10.0
12.	Phonda Irrigation Project	.	.	.	.	.	.	.	.	.	.	.	4.2		4.2	3.0
13.	Vedganga Irrigation Project	.	.	.	.	.	.	.	.	.	.	.	27.7		27.7	10.0
14.	Tulshi Project	.	.	.	.	.	.	.	.	.	.	.	3.5	2.6	0.9	
15.	Dudhganga Project (Maharashtra portion)												26.0		26.0	18.0
16.	Morna Project	.	.	.	.	.	.	.	.	.	.	.	1.6		1.6	1.6
17.	Phaye Project	.	.	.	.	.	.	.	.	.	.	.	1.4		1.4	1.4
18.	Minor Irrigation (utilising less than one T.M.C. annually)												42.3	11.1	31.2	26.2
	GRAND TOTAL of K-1	.	.	.	.	.	.	.	.	.	.	.	446.6 (3.5)	186.2	260.8 (3.1)	182.5
II. K-2 Sub-basin (Middle Krishna)																
19.	Minor Irrigation (utilising less than one T.M.C. annually)												2.0	0.1	1.9	1.3
	GRAND TOTAL of K-2	.	.	.	.	.	.	.	.	.	.	.	2.0	0.1	1.9	1.3
III I. K-3 Sub-basin (Ghataprabha)																
20.	Hiranyakeshi Irrigation Project	.	.	.	.	.	.	.	.	.	.	.	32.2		32.2	12.0
21.	, Gudavale Lift Scheme	.	.	.	.	.	.	.	.	.	.	.	3.1		3.1	3.1
22.	Minor Irrigation (utilising less than one T.M.C. annually)												1.9	1.0	0.9	0.9
	GRAND TOTAL of K-3	.	.	.	.	.	.	.	.	.	.	.	37.2	1.0	36.2	16.0

1	2	3	4	5	6
[V. K-5 Sub-basin (Bhima)					
23.	Tata Hydel Works	45.0	45.0		
24.	Mutha System ex-Khadakwasla	33.1 (1.1)	23.5	9.6 (1.1)	9.6
25.	Kukadi Project	38.9 (2.0)	20.1	18.8 (2.0)	18.8
26.	Ghod Dam Project	10.4	10.4		
27.	Chaskaman Project	(10.0)		(10.0)	
28.	Kundali Project	(2.5)		(2.5)	
29.	Bhima Irrigation Project	90.7	90.2	0.5	
30.	Nira System ex-Vir	65.2	34.61	15.9	15.9
31.	Barhanpur Project	1.5	0.7	1.5	1.5
32.	Mhaswad Project	2.2	2.2		
33.	Ashti Project	1.0	0.7	0.3	
34.	Begumpur Lift Scheme	5.3 (10.1)		5.3 (10.1)	5.3
35.	Sina at Nimosaon	1.8		1.8	1.8
36.	Mangi Project	1.2	1.1	0.1	
37.	Sina at Kolegaon Project	4.3		4.3	4.3
38.	Ekruk Tank Project	2.0	1.8	0.2	
39.	Khasapur Project	1.3	1.3		
40.	Hinani Pansoon Project	1.6		1.6	1.6
41.	Sina Lift Scheme	3.0 (3.0)		3.0 (3.0)	3.0
42.	Sholapur City Water Supply	1.6	0.3	1.3	
43.	Minor Irrigation (utilising less than one T.M.C. annually)	28.5	4.8	23.7	16.4
GRAND TOTAL of K-5		338.6 (28.7)	250.7	87.9 (28.7)	78.2
VK-6 Sub-basin					
44.	Kurnoor Project	1.9	1.5	0.4	
45.	Minor Irrigation (utilising less than one T.M.C. annually)	2.5	0.1	2.4	2.4
GRAND TOTAL of K-6		4.4	1.6	2.8	2.4
Grand total of AM to K-3 and K-5 to K-6					
(a)	Major and Medium works above one T.M.C.	751.6	422.5	329.5	233.2
(b)	Minor works less than one T.M.C.	77.2	17.1	60.1	47.2
TOTAL (a + b)		828.8 (32.2)	439.6	389.6 (31.8)	280.4

NOTE : Figures in brackets in Cols. 3 and 5 are of regeneration flows.

We proceed to examine the following projects for which the State of Maharashtra has claimed water out of the dependable flow :—

1. Urmodi Project
2. Tarali Project
3. Krishna Canal ex-Khodshi Weir
4. Koyna-Krishna Lift Irrigation Scheme
5. Wang Project
6. Warna Project
7. Kadvi Irrigation Project

8. Kasari Hydro Electric Project
and
Kajewadi Lift Irrigation Scheme
9. Kumbhi Multipurpose Project
10. Phonda Irrigation Project
11. Vedganga Irrigation Project
12. Dudhganga Project
13. Morna Project
14. Phaye Project
15. Hiranyakeshi Irrigation Project

16. Gudavale Lift Scheme
17. Mutha System ex-Khadakwasla
18. Kukadi Project
19. Chaskaman Irrigation Project
20. Nira System ex-Vir
21. Barhanpur Project
22. Begumpur Lift Irrigation Scheme
23. Sina at Nimgaon Gangurda Project
24. Sina at Kolegaon Project
25. Hingani Pangaon Project
26. Sina Lift Scheme
27. Bandharas etc.
28. Minor Irrigation.

URMODI PROJECT

The Report on the Urmodi Project is given at pages 1 to 36 of MRPK-26. The Project envisages the construction of—

- (a) A storage on the Urmodi river at Parali in Satara Taluka of Satara District ;
- (b) Left and Right Bank Canals from the storage to irrigate 25,000 acres (cropped area 38,750 acres) in Satara and Karad Talukas. This includes the irrigation on the existing Walse Bandhara on the Urmodi river. The existing Walse Bandhara is just downstream of the proposed Urmodi Dam; and
- (c) It also provides for water supply to Satara town.

The Urmodi Project has not been cleared by the Government of India.

In the Master Plan, the demand stipulated is 6.2 T.M.C. of dependable flow for an irrigation of 20,000 acres. The Project Report, however, shows that the Project is planned to utilise 7.08 T.M.C. for irrigation and 0.16 T.M.C. for water supply to Satara town (last para, page 7, MRPK-26). The storage proposed at Parali has a gross capacity of 5.20 T.M.C. (page 8, *ibid*) ; the live storage proposed is 5.05 T.M.C. (page 7, *ibid*).

The Left Bank Canal has a gross commanded area of 17,100 acres with an ayacut of 11,050 acres entirely in Satara Taluka. The Right Bank Canal has a gross commanded area of 21,600 acres with an ayacut of 13,950 acres, of which 10,600 acres are in Satara Taluka and 3350 acres in Karad Taluka. The total ayacut of the Urmodi Project is thus 25,000 acres (pages 8 and 9 of MRPK-26).

The Project proposes to utilise 6.49 T.M.C. of water at canal head annually (page 15, MRPK-26) for 38,750 acres of irrigation. The total area under cultivation including 2,500 acres of unirrigated pulses is 41,250 acres. The duty at canal head will be 5.97 acres per mcft. of water. The delta works out to 3.87 feet.

The area commanded lies in Satara and Karad Talukas of Satara District. The normal rainfall in the commanded area of Satara Taluka is 39.79 inches and that in the commanded area of Karad Taluka is 29.33 inches (page 3, Sr. No. 10, MRPK-26).

The Project Report (MRPK-26) mentions at page 9 that the existing Walse Bandhara irrigates a small area of Khariff crops in the commanded area of the Urmodi Project, but this irrigation is very uncertain due to lack of storage support and therefore this existing area is included in the area proposed to be irrigated from this Project.

Looking to the intensity of rainfall and other factors, in our opinion the demand for this Project is not worth consideration for the present. The demand for bandhara will be considered separately.

TARALI PROJECT

The Report on the Tarali Project is given at pages 37 to 77 of MRPK-26. The Project envisages the construction of—

- (a) A storage on the Tarali river near Awarde village in Patan Taluka of Satara District.
- (b) A Right Bank Canal from the storage and the remodelling of the existing Left Bank Canal from the Tarali Bandhara to irrigate 26,100 acres (cropped area 40,450 acres) in Patan, Karad and Satara Talukas of Satara District. This includes the irrigation on the existing bandhara on the Tarali river downstream of the proposed dam and irrigation from an existing bandhara on the Mand river (page 47, MRPK-26).

The Project has not so far been cleared by the Government of India.

In the Master Plan, the demand stipulated is 6.7 T.M.C. of dependable flow for an irrigation of 19,000 acres. The Project Report, however, shows that the Project is planned to utilise 7.56 T.M.C. for an ayacut of 26,100 acres (pages 44, 45 and 46 of MRPK-26). The storage provided at Awarde has a gross capacity of 5.63 T.M.C. and a live capacity of 5.36 T.M.C. (page 37, MRPK-26).

The Left Bank Canal has a gross commanded area of 7,000 acres with an ayacut of 5,450 acres in Satara Taluka of Satara District. Most of this area is under the command of the existing canal from the Tarali Bandhara. The Right Bank Canal has a gross commanded area of 28,000 acres between the Tarali and the Koyna rivers in Patan and Karad Talukas. The ayacut is 20,650 acres. Therefore, total ayacut of the Project is 26,100 acres.

The Project envisages the utilisation of 7.06 T.M.C. of water annually at the canal head (page 54 of MRPK-26) to irrigate 40,455 acres. The total area under cultivation including 2,610 acres of unirrigated pulses in 43,060 acres. The annual evaporation losses are 0.50 T.M.C. The duty at canal head of utilisation will be 5.72 acres per mcft. The delta at canal head will be 4.04 ft.

The rainfall in the commanded area of this Project in Karad Taluka is 28.15 inches (Sr. No. 9, page 39 of MRPK-26). Rainfall in the commanded area in Satara and Patan Talukas have not been given in the Report. But the Urmodi Project Report states normal rainfall of Satara Taluka as 39.79 inches (page 3 of MRPK-26).

The Project Report (pages 47 and 48 of MRPK-26) states that the existing ayacut under the Tarali Bandhara is 5,450 acres and some seasonal irrigation is done at present, but the supplies to the bandhara are too uncertain. It is proposed to firm up the supplies to the existing bandhara from the proposed Tarali Storage.

Looking to the intensity of rainfall and other factors, we are of the opinion that demand for this Project is not worth consideration for the present. The demand for bandhara will be considered separately.

KRISHNA CANAL EX-KHODSHI WEIR

The note on the Krishna Canal ex-Khodshi Weir is given at page 3 of MRPK-28.

There is an existing weir at Khodshi on the Krishna river with a Left Bank Canal, 41 miles long, commanding an area of 36,800 acres in Karad Taluka of Satara District and Tasgaon Taluka of Sangli District. The ayacut of the scheme is stated to be 36,300 acres. It is stated that this irrigation depends on diverting the run-of-the-river supplies at the pick-up-weir sites. 5.7 T.M.C. of the dependable flow has been stated as the requirement of this Project in the Master Plan and also in the Project Note in MRPK-28. Out of 5.7 T.M.C. claimed, 2.7 T.M.C. has been given as

the protected use of this Project. In MR Note 30, at Sr. No. 4, the balance 3 T.M.C. has been claimed for this Project.

In MRPK-31 under item I (j) (i) it is stated that the existing bandharas and lift irrigation schemes on the Krishna river irrigate 4513 acres of cane and 9005 acres of Kharif and Rabi seasons. As the run-of-the-river supplies at the Khodshi Weir during the latter part of Rabi and hot weather period are not adequate, the irrigators supplement the insufficient canal supplies from the Khodshi Weir by lifting the water directly from the Krishna river. This river supplies lifted water directly from the Krishna river by these bandharas and by the lift irrigation schemes are 2.47 T.M.C. This is in addition to the protected use of 2.7 T.M.C. for canal supplies. As stated in MR Note 30, an additional 3 T.M.C. of water from the dependable flow claimed for the Krishna Canal ex-Khodshi Weir in addition to the protected use of 2.7 T.M.C., will cover the demand of 2.47 T.M.C. for these bandharas and lift irrigation schemes also.

In our opinion, demand for 3 T.M.C. for this Project is worth consideration. It will cover the demand for bandharas and lift irrigation schemes also.

KOYNA-KRISHNA LIFT IRRIGATION SCHEME

The Report on the Koyna-Krishna Lift Irrigation Scheme is given at page 7 and pages 13 to 24 of MRPK-28. The Scheme has the following features:—

- (a) A storage on the Koyna river at Jalkhawadi has already been constructed to store 98 T.M.C. (gross) of water (live storage 94 T.M.C.). A quantum of 16 T.M.C. is reserved from this existing storage for releases during the fair weather for irrigation under the Koyna-Krishna Lift Irrigation Scheme.
- (b) A weir is proposed to be constructed on the Koyna river 30 miles downstream of the existing Koyna Dam at a place called Warunji providing a pondage of 0.7 T.M.C.
- (c) Out of 16 T.M.C. to be released during the fair weather at the foot of the Koyna Dam after generating power, 15.4 T.M.C. will reach the Warunji Weir and will be diverted (lifted) for irrigation. In addition to this 15.4 T.M.C. a part of the flows from the catchment area below the Koyna Dam upto the Warunji Weir, namely 8 T.M.C., will be diverted (lifted) for irrigation during the

monsoon period from the run-of-the-river supplies at Warunji. The total annual irrigation diversion at Warunji will accordingly be $15.4 + 8.00 = 23.4$ T.M.C.

- (d) This 23.4 T.M.C. of water will be lifted by pumping (26 ft. lift) from the Warunji Weir over the Koyna-Krishna Ridge into the Krishna river upstream of the existing Khodshi Weir.
- (e) This will be further lifted by 176 feet from above the Khodshi Weir and fed into the Borkhal Canal (under construction) at Mile 54.
- (f) The Borkhal Canal will be enlarged from Mile 54 onwards and extended to carry this water into Yerala Valley to irrigate an ayacut of 1,10,000 acres in Tasgaon and Miraj Talukas of Sangli District.

The Koyna Dam together with crest gates has already been completed in 1967 to store 98 T.M.C. of water. Other components of this Project as detailed above have not so far been cleared by the Government of India, but the storage contains a reserve of 16 T.M.C. which may be utilised for irrigation downstream of the Koyna Dam.

In the Master Plan, the requirement of water for this Project was 16 T.M.C. under Sr. No. 7, and 5.6 T.M.C. under Sr. No. 10, that is, a total of 21.6 T.M.C. to serve an ayacut of 84,000 acres. The Project Note, however, provides a utilisation of 23.4 T.M.C. to irrigate an ayacut of 1,10,000 acres (cropped area 1,76,000 acres).

For irrigating 1,76,000 acres, the annual diversion proposed is 23.4 T.M.C. Therefore, duty will be 7.5 acres/mcft, and the delta will be 3 feet.

The area commanded under this Scheme lies in Tasgaon and Miraj Talukas of Sangli District (page 13 of MRPK-28). The average annual rainfall of Tasgaon Taluka over a period of 27 years was 22 inches and that of Miraj Taluka was 22.12 inches (Column 13, page 151 of MR-8). It is contended by the State of Maharashtra that both these Talukas have had low annual rainfall during the ten years 1949 to 1958. The Miraj Taluka had an annual rainfall of less than 22.12 inches in five years (1949, 1951, 1952, 1954 and 1958), the lowest annual rainfall being 12.59 inches. The Tasgaon Taluka during these ten years had an annual rainfall less than 22 inches in four years (1949, 1952, 1954 and 1958), the lowest annual rainfall being 16.29 inches (Statement 'B' at page 151 of MR-8). At page 13 of

MRPK-28 it is stated that, "there is a vast culturable land potential in the Yerala basin in dire need of irrigation as it is chronically scarcity-affected area. The Yerala river itself has very meagre water resources as the river rises and flows through very low rainfall areas and the small quantity of water in the river cannot cater to the irrigation requirements of the vast lands in its basin." The State of Maharashtra has given top priority to this Project in their priority list.

In MRPK-31, the State of Maharashtra has indicated that part of the ayacut proposed under this Project is being irrigated from bandharas and lift irrigation schemes which have come into operation after 1960. As given under item I(j) (iii) of MRPK-31, the area irrigated under these bandharas and lift irrigation schemes is 3,556 acres of cane and 7722 acres of seasonal crops, and the corresponding utilisation is 1.865 T.M.C.

In the remarks column against Sr. Nos. 8 and 10 of Statement III attached to MR Note 26, the Maharashtra State has submitted that in case the Tribunal does not allow further westward diversion from the Koyna storage, the scope of the Koyna-Krishna Lift Scheme could be increased to $32.5 + 21.6 = 54.1$ T.M.C., for which an adequate area requiring irrigation exists in the Yerala Valley in Talukas of Walva, Tasgaon and Kavthe-Mahankal (formerly part of Jath Taluka) in Sangli District. Walva Taluka has an average annual rainfall of 26.06 inches (10 years average rainfall of the years 1949 to 1958) and Jath Taluka has an average rainfall of 20.72 inches (27 years average of the years 1930 to 1958)—vide Statement 'B' at page 151 of MR-8. Jath Taluka has been classified as a "scarcity" Taluka in that report and also in the Irrigation Commission Report of 1972 (Vol. I, page 422). It is contended that an additional diversion of 32.5 T.M.C. for irrigating the areas in the Yerala Valley would go a long way towards alleviating the scarcity conditions in Jath and Kavthe-Mahankal Talukas of Sangli District, and in offsetting the vagaries of rainfall in Tasgaon and Walva Talukas.

In our opinion the demand for 23.4 T.M.C. as shown in the Project Report for irrigating 1,76,000 acres of scarcity areas in Tasgaon and Miraj Talukas of Sangli District is worth consideration. This will cover the demand for bandharas (item No. I(j) (iii)—MRPK-31).

WANG PROJECT

The note on the Wang Project is given at pages 78 to 121 of MRPK-26.

The Project envisages the construction of a storage on the Wang river, a right bank tributary of the Koyna river, at Gude Maldan in Patan Taluka of Satara District for irrigation of an ayacut of 42,023 acres (cropped area 56,276 acres). The planned gross utilisation is 12.1 T.M.C.

There are existing weirs, bhandharas and lift irrigation schemes in the commanded area of the Wang Project. The area irrigated by these existing bandharas is 11,657 acres (3487 acres cane, and 8,170 acres seasonal crops). The water utilisation by these works is 1.83 T.M.C. (*vide* item I(j) (v) of MRPK-31).

The gross storage is 11.38 T.M.C. and the live storage capacity is 8.18 T.M.C. The annual evaporation losses are 1.16 T.M.C. (*vide* page 78, Sr. No. 5 i, 5 iii and 5 v of MRPK-26).

Out of 56,276 acres of proposed irrigation, 38,596 acres are to be irrigated in Zone I (rainfall above 30 inches) and 17,680 acres in Zone II (rainfall below 30 inches).

For irrigating 56,276 acres the net diversion at canal head is 10.94 T.M.C. (*vide* page 88 MRPK-28). The duty will work out to 5.14 acres/mcft. The delta will work out to 4.5 feet.

The commanded areas lies in Patan and Karad Talukas of Satara District and Walva Taluka of Sangli District. The average annual rainfall (average of 10 years) of Patan Taluka is 69.5 inches and that of Karad Taluka is 32.1 inches (*vide* page 133 of MR-8). The 10 years average annual rainfall of Walva Taluka is 26.06 inches (*vide* page 151 of MR-8).

In view of the intensity of rainfall and other factors, the demand for this Project is not worth consideration for the present. The demand for bandharas will be considered separately.

WARNA PROJECT

The Project Report of this Project submitted to the Central Water and Power Commission (C.W. & P.C.) in 1964 (MRPK-5 and 6) provided :—

- (a) A storage on the Warna river at Khujgaon with a gross capacity of 87.2 T.M.C.
- (b) Right and Left Bank Canals to irrigate 1,40,550 acres and 1,90,100 acres respectively—total 3,30,650 acres.
- (c) Lift Irrigation of 22,150 acres on the Right Bank and 11,150 acres on the Left Bank—total 33,300 acres (*vide* para 1.1.01, page 1, MRPK-4).

- (d) Gross utilisation 57.25 T.M.C. (*vide* pages 16 and 17, MRPK-4).

While clearing the Project the Central Water and Power Commission deleted the lift irrigation of 33,300 acres (page 5, MRPK-6). The Project was sanctioned for a diversion of 40.50 T.M.C. (page 5, para 3.3.00, and page 6, para 3.5.01, MRPK-6) and for the irrigation of an ayacut of 1,99,000 acres (page 11, MRPK-6) by flow irrigation only. The cropped area proposed to be irrigated was 2,41,800 acres (para 9.1.02, page 19, MRPK-6). The gross storage of 87 T.M.C. (page 7, MRPK-6) was, however, sanctioned without reduction. The estimated evaporation losses are 7.07 T.M.C. (page 17, MRPK-4). This Project has been protected for the gross utilisation of 47.7 T.M.C.

The State of Maharashtra had claimed 9.8 T.M.C. at Sr. No. 11 of MRK-II, page 53 for the lift irrigation area which was deleted at the tune of the sanction of the Warna Project by the Government of India.

The crops that are proposed to be irrigated under the lift irrigation scheme are (page 204, MRPK-5)—

1. Sugar-cane	.	.	.	.	11,300 acres
2. Long Staple Cotton	.	.	.	.	11,000 acres
3. Two Seasonals	.	.	.	.	11,000 acres
TOTAL	.	.	.	.	33,300 acres

With a utilisation of 9.8 T.M.C. (or 9.7 T.M.C. as in MR Note 30) the duty and delta will work out to—

Duty 3.43 acres/mcft.

Delta 6.7 feet.

The area proposed to be irrigated lies in Shirala and Walva Talukas of Sangli District and Panhala, Hatkanangale and Shirol Talukas of Kolhapur District (page 7 of MRPK-5). The average annual rainfall in each of these Talukas is as below:—

Shirala	.	.	.	36.0 inches	Page 151 of MR-8
Walva	.	.	.	26.1 inches	
Panhala	.	.	.	66.2 inches	Page 118 of MR-8
Hatkanangale	.	.	.	29.2 inches	
Shirol	.	.	.	29.1 inches	

There are six bandharas on the Warna river irrigating 8487 acres of sugar-cane and 80 acres of seasonal crops utilising 3.11 T.M.C. of water, and these areas would be merged with this scheme for 9.7 T.M.C. utilisation. (Item I(c) in MRPK-31).

In our opinion, allocation of 9.8 T.M.C. for this Project is not worth consideration. Part of the demand may be met by effecting economy in utilisation in the main project. The demand for the bandharas will be considered separately.

KADVI IRRIGATION PROJECT

The Project Report for the Kadvi Multipurpose Project is at pages 57 to 112 of MRPK-27.

The Project envisages the construction of a storage on the Kadvi river near Nivla Village in Shahuwadi Taluka of Kolhapur District. The Kadvi river is a right bank tributary of the Warna river joining it below the Khujgaon Dam. It was proposed to divert 7.6 T.M.C. for power generation to the west, 5 T.M.C. for irrigating the ayacut of 14,800 acres in the Valley on the eastern side by lift irrigation.

With 3 T.M.C. for evaporation losses, the total proposed utilisation was 15.6 T.M.C. The gross storage provided at Nivla is 38.45 T.M.C. of which 14.95 T.M.C. is the live storage (*vide* page 6. Sr. No. V(a) and V(b) in MRPK-27).

This Project has not been sanctioned by the Government of India so far.

The ayacut of 14,800 acres is proposed to be irrigated under the following crops (page 96, Appendix-6, of MRPK-27):—

1. Sugar-cane	.	.	.	.	9,768 acres
2. Paddy	.	.	.	.	3,552 acres
3. Khariff Vegetables	.	.	.	.	1,480 acres
TOTAL	.	.	.	.	14,800 acres

The duty and delta for irrigating 14,800 acres with a utilisation of 5 T.M.C. would work out to—

Duty	.	.	.	.	2.96 acres/mcft.
Delta	.	.	.	.	7.8 feet

The Project is intended to irrigate areas in Shahuwadi Taluka of Kolhapur District. The recorded average annual rainfall of Shahuwadi Taluka is 75.9 inches (page 118 of MR-8).

In MR Note 26, the State of Maharashtra had contended that in case westward diversion for power generation is disallowed, it would still be possible to use beneficially the entire 12.6 T.M.C. for irrigation on the eastern side in the Kadvi Valley. Later, in MR Note 30, the State of Maharashtra has submitted that in case westward diversion for power generation is not permitted, 8 T.M.C. may be allowed for irrigation on the eastern side instead of 5 T.M.C. shown for irrigation in the Master Plan.

We have already rejected any diversion for irrigation westwards after considering all the relevant materials. Looking to the intensity of rainfall and other factors, we are of the opinion that any demand for water for irrigation eastwards is also not worth consideration for the present.

KASARI HYDRO ELECTRIC PROJECT

AND

KALJEWADI LIFT IRRIGATION SCHEME

These two Projects have been considered together by the States of Maharashtra in MR Note-30. The Kasari Project, as shown in the Master Plan and in the Project Report (MRPK-7 and 8) contemplated the diversion of 31.88 T.M.C. to the west for power generation and irrigation in Konnan; no irrigation was provided on the eastern side. The Kasari Multipurpose Project was submitted in 1966 to the Central Water and Power Commission (C.W. & P.C.), but it has not been cleared so far by the Government of India. The Project for irrigation on the eastern side, as envisaged in this note, has not been cleared by the Government of India.

The Kaljewadi Lift Irrigation Scheme envisages the construction of a storage dam near Pisatri Village in Kolhapur District. The water stored by this dam is to be let down into the river and lifted downstream at five pick-up weirs on the Kasari river to irrigate an ayacut of 25,100 acres in Panhala Taluka of Kolhapur District. The Kaljewadi Storage at Pisatri is on the Kaljewadi nallah, which is a right bank tributary of the Kasari river. The gross storage at the Kaljewadi Dam is 7.45 T.M.C. and the live storage is 7.37 T.M.C. (Page 39, Annexure II of MRPK-28). The net utilisation under the scheme is 7.4 T.M.C. for irrigation; with 0.6 T.M.C. evaporation losses, the gross utilisation would be 8 T.M.C. in all. This Project also has not been cleared so far by the Government of India.

The ayacut of 25,100 acres was proposed to be irrigated under the following crops (Annexure IV at page 42 of MRPK-28) :—

1. Sugar-cane	.	.	.	.	16,566 acres
2. Paddy	.	.	.	.	6,024 acres
3. Khariff Vegetables	.	.	.	.	2,510 acres
TOTAL	.	.	.	.	25,100 acres

To irrigate 25,100 acres it was proposed to utilise 7.4 T.M.C. The duty and delta would work out to:—

Duty	3.4 acres/mcft.
Delta	6.75 feet.

The commanded area lies in Panhala Taluka which has an average annual rainfall of 66.2 inches (page 118 of MR-8).

In MR Note 30, the State of Maharashtra has contended that if westward diversion for the Kasari Power Project is not permitted, it may be allowed to combine the Kasari Storage with the Kaljewadi Scheme and utilise 12 T.M.C. instead of 8 T.M.C. under the Kaljewadi Scheme for the irrigation of lands in the Kasari Valley.

It is stated that there are already existing weirs, bandharas and lift irrigation schemes (Item I (e) of MRPK-31) on the Kasari river irrigating 5,565 acres of cane and 247 acres of Khariff and Rabi seasonals in the proposed ayacut of the Kaljewadi Scheme utilising 2.08 T.M.C. of water.

We have already rejected any diversion for irrigation westwards after considering all the relevant materials. Looking to the intensity of rainfall and other factors, we are of the opinion that any demand for water for both these projects is not worth consideration for the present. The demand for bandharas will be considered separately.

KUMBHI MULTIPURPOSE PROJECT

The Report on the Kumbhi Multipurpose Project is at pages 1 to 51 of MRPK-27.

The Project envisaged construction of a storage on the Kumbhi river near Shenwadi Village in Gaganbawda Taluka of Kolhapur District. The gross use planned was 17.5 T.M.C. of which 9.5 T.M.C. was to be diverted westward for power generation and irrigation in Konkan, 6.0 T.M.C. was to be used for irrigating an ayacut of 18,000 acres on the eastern side and the balance 2 T.M.C. was allowed for evaporation losses. This Project has not been sanctioned by the Government of India. The proposed gross storage was 19.77 T.M.C. with a live storage capacity of 17.07 T.M.C. (page 1 of MRPK-27):—

The crops proposed to be irrigated using 6 T.M.C. on the eastern side are as under (page 4 and page 38 of MRPK-27): —

1. Sugar-cane	.	.	.	.	.	11,880 acres
2. Paddy	.	.	.	.	.	4,320 acres
3. Khariff Vegetables	.	.	.	.	.	1,800 acres
TOTAL	.	.	.	.	.	18,000 acres

The duty and delta, therefore, would work out to:—

Duty 3 acres/mcft.

Delta 7.6 feet.

The ayacut lies in Karvir Taluka of Kolhapur District. The average annual rainfall of Karvir Taluka is 34.2 inches (page 118 of MR-8).

The State of Maharashtra in MR Note No. 26 have contended that if westward diversion for power generation of 9.5 T.M.C. is not permitted, it could and would use the entire 17.5 T.M.C. for irrigation on the eastern side. Subsequently, in MR Note 30, they have claimed a total use of 10 T.M.C. only (including evaporation losses for this Project).

It is pointed out that there are already existing weirs, bandharas and lift irrigation schemes on the Kumbhi and Dhamni rivers serving part of the ayacut of 18,000 acres, proposed under this Project, irrigating $2983+480=3463$ acres of cane and 204 acres of Rabi seasonals and utilising 1.33 T.M.C. of water (*vide* item Iff) and I(g), MRPK-31)

We have already rejected any diversion for this Project for irrigation westwards after considering all the relevant materials. Looking to the intensity of rainfall and other factors, we are of the opinion that any demand for water for irrigation eastwards is not worth consideration for the present. The demand for bandharas will be considered separately.

PHONDA IRRIGATION PROJECT

The note on the Phonda Multipurpose Project is given at pages 29 to 32 of MRPK-28.

The Project envisages the construction of a storage on the Bhogawati River, a tributary of the Panchaganga near Asne village, 8 miles upstream of the existing Radhanagari Reservoir in Radhanagari Taluka of Kolhapur District. It was proposed to divert 3.67 T.M.C. towards the west for power generation and irrigation of 9,000 acres in Ratnagiri District. No irrigation was contemplated on the eastern side (*vide* pages 31 and 32 of MRPK-28).

The proposed gross storage is 4.0 T.M.C. and the proposed live storage is 3.7 T.M.C. The fair weather lake losses are 0.25 T.M.C. (*vide* page 31, MRPK-28).

This Project has not been sanctioned by the Government of India.

In Col. 10 of MR Note 30 it was urged by the State of Maharashtra that if the westward diversion of 4.2 T.M.C. is not permitted by the Tribunal, 3.0 T.M.C. should be permitted to be used for irrigation in the Bhogawati valley as adequate cultivable land is available in that valley. In MR Note 26, it is clarified that

this irrigation will be in Karvir Taluka of Kolhapur District. The ten years average annual rainfall of Karvir Taluka is 34.2 inches (*vide* page 118 of MR-8).

We have already rejected any diversion for this Project for irrigation westwards after considering all the relevant material. Looking to the intensity of rainfall and other factors, we are of the opinion that any demand for water for irrigation eastwards is not worth consideration for the present.

VEDGANGA IRRIGATION PROJECT

The State of Maharashtra has prepared a Project Report in three volumes of the combined "Hiranyakeshi and Vedganga Multipurpose Project" which are in MRPK-9, MRPK-10 and MRPK-11. The Project has not yet been cleared by the Government of India.

The Vedganga Project envisaged the construction of a storage on the Vedganga River near the village Nandoli in Bhudargad and Kagal Talukas of Kolhapur District. It was proposed to divert 19.98 T.M.C. westwards for power generation and irrigation in Ratnagiri District. It was also proposed to divert 4.0 T.M.C. for irrigating 12,850 acres on the eastern side (*vide* MRPK-11, page 3, para 1.2.04 and page 10 of MRPK-9).

There are already existing weirs, bandharas and lift irrigation schemes in the proposed commanded area of the Vedganga Irrigation Project covering the irrigation of 4,522 acres (4392 acres sugar-cane and 130 acres Rabi seasonals) and utilising 1.64 T.M.C. (*vide* item I(d) of MRPK-31).

In the Master Plan, the demand for irrigation on the eastern side was shown as 4.0 T.M.C. to irrigate 12,000 acres (*vide* MRK-II page 53 item 17) while in the Project Report, it was 3.2 T.M.C. for the fair-weather irrigation and 0.71 T.M.C. for the monsoon irrigation, totalling 4.03 T.M.C. to irrigate 12,850 acres (*vide* page 31 of MRPK-9):—

The crops proposed for irrigation on the eastern side are (page 27 of MRPK-9).

Sr. No.	Crop	Percentage	Area in Acres
1.	Sugar-cane	66	8,481
2.	Paddy	24	3,084
3.	Khariff Vegetables . .	10	1,285
			12,850

For irrigating 12,850 acres, the net diversion proposed at the canal head is 4.03 T.M.C. Therefore, the duty will be 3.22 acres per mcft. The delta will be 7.14 feet.

The commanded area lies in Bhudargadh and Kagal Talukas of Kolhapur District (*vide* page 20 of MRPK-10). The 10 years' average annual rainfall of Bhudargadh Taluka is 71.9 inches and that of Kagal Taluka is 29.6 inches (*vide* page 118 of MR-8).

It is claimed that this Project would firm up the irrigation on the existing bandharas covering 4522 acres in the command of this Project with a utilisation of 1.64 T.M.C. of water (item I(d) of MRPK-31).

In MR Note 26, the State of Maharashtra has contended that if westward diversion for power generation and irrigation is not permitted for this Project, then 17 T.M.C. could be beneficially utilised for irrigation on the eastern side. Later, in MR Note 30, the State of Maharashtra has claimed only 10 T.M.C. for irrigation on the eastern side for this Project.

We have already rejected any diversion for this Project for irrigation westwards after considering all the relevant material. Looking to the intensity of rainfall and other factors, we are of the opinion that any demand for water for irrigation eastwards is not worth consideration for the present. The demand for bandharas will be considered separately.

DUDHGANGA PROJECT

The Report on the Dudhganga Project is given in MRPK-15.

The Dudhganga Project Report was first submitted to the Central Water & Power Commission (C.W. & P.C.) in 1964 to irrigate 1,16,000 acres in Maharashtra State only. The C.W. & P.C. suggested extension of the benefits of irrigation to the adjoining Mysore area and also a modification in the yield of water on the basis of the actual gauging data at Radhanagari. The modified Project (MRPK-15) was submitted to the C.W. & P.C. in October 1967, as a joint Project for the benefit of Mysore and Maharashtra. The Project has not been cleared so far by the Government of India.

This Project envisages construction of:—

- (a) A storage dam and reservoir on the Dudhganga River near Assangaon in Radhanagari Taluka of Kolhapur District.

- (b) A Left Bank Canal to irrigate an ayacut of 86,800 acres with a cropped area of 1,13,900 acres in Maharashtra and Mysore States.
- (c) A Right Bank Canal to irrigate an ayacut of 44,800 acres with a cropped area of 64,700 acres in Maharashtra and Mysore States.

The gross storage proposed is 31.34 T.M.C. with a live storage 29.54 T.M.C. Evaporation losses are estimated at 1.8 T.M.C. (page 2 Sr. No. V(i)(iii) & (vi) of MRPK-15). The total ayacut is 1,31,600

acres, of which 99,500 acres lie in Maharashtra and 32,100 acres lie in Mysore (MRPK-15 page IV). The proposed total irrigation is 1,78,600 acres of which 1,36,600 acres lie in Radhanagari, Bhudargadh, Karvir, Kagal, Hatkanangale and Shirol Talukas of Kolhapur District of Maharashtra State and 42,000 acres lie in Chikodi Taluka of Belgaum District of Mysore State (MRPK-15 page 6).

The zone-wise distribution of irrigated area in the two States and the water requirements in the zones are given on the next page (pages 52, 56, 58 and 60 of MRPK-15):--

Zone	Cropped area in acres in Maharashtra	Water required in Maharashtra T.M.C.	Located in talukas of Maharashtra	Cropped area in acres in Mysore	Water required in Mysore T.M.C.	Located in talukas of Mysore	Total cropped area in acres	Total water required in T.M.C.
1	2	3	4	5	6	7	8	9
one I-rain-fall above 50 inches, vide Index Map at the end of MRPK-15	35,700	5.00	Radhanagari and Bhudargadh	••	••	••	35,700	5.00
one II-rain-fall between 30 inches & 50 inches, vide same Map as above	38,200	5.99	Karvir	10,800	1.69	Chikodi	49,000	7.68
one III-rain-fall less than 30 inches, vide same Map as above .	62,700	14.31	Kagal Hatkanangale Shirol	31,200	7.11	Chikodi	93,900	21.42
TOTAL	1,36,600	25.30		42,000	8.80		1,78,600	34.10

It is thus seen that a proposed cropped area of 62,700 acres, having rainfall less than 30 inches lies in Maharashtra and a proposed cropped area of 31,200 acres having rainfall less than 30 inches lies in Mysore.

The Project envisages a total utilisation of 34.10 T.M.C. at Canal head for an irrigation of cropped area of 1,78,600 acres. The duty, therefore, will be 5.25 acres/mcft. The delta will be 4.35 feet.

The average annual rainfall in the commanded area in Maharashtra is given below. The average annual rainfall in Talukas of Kagal, Hatkanangale and Shirol are less than 30 inches (page 48 of MR-8):—

Taluka	Average annual rainfall
1. Radhanagari	158.0
2. Bhudargadh	71.9
3. Karvir	34.2
4. Kagal	29.6
5. Hatkanangle	29.2
6. Shirol	29.1

The average annual rainfall in Chikodi Taluka of Belgaum District of Mysore State is less than 30 inches.

As mentioned above the water requirements of Maharashtra for area in Zone III *i.e.* having rainfall less than 30" is 14.31 T.M.C. Adding 1.3 T.M.C. as proportionate lake losses the total requirement works out to $14.31 + 1.3 = 15.61$ T.M.C. In MR Note 30, a quantity of 18.0 T.M.C has been claimed from the dependable flow for the Project.

There are already six existing weirs, bandharas and lift irrigation schemes in the proposed commanded area of the Dudhganga Project, irrigating 4744 acres and utilising 1653 mcft. (item I(b) of MRPK-31). In the priority list filed by the State of Maharashtra, this Project is given high priority and is included in Group 'A'.

Looking to the facts that this is a joint project of the States of Maharashtra and Mysore, that the State of Maharashtra has attached high priority to this Project and that now the demand for water is mainly confined to the area under Zone No. III, we

are of the opinion that demand for this Project to the extent of 14 T.M.C. is worth consideration. This will cover the demand for bandharas on the Dudhganga river.

MORNA PROJECT

The note on the Morna Project is given at page 1 of MRPK-29.

The Project envisages the construction of a storage reservoir on the Morna river in Shirala Taluka of Sangli District to irrigate 6,030 acres (4,230 acres by flow and 1,800 acres by lift) and utilising 1.6 T.M.C. gross.

It is proposed to irrigate an ayacut of 6030 acres. The following crops are proposed to be irrigated:—

Sr. No.	Crop	Percentage	Area in acres
1.	Perennials	25	1,510
2.	Kharif Seasonal	20	1,205
3.	Rabi Seasonals	35	2,110
4.	Two Seasonals	15	905
5.	Hot Weather Seasonals	5	300
TOTAL		100	6,030

For irrigating 6,030 acres the proposed net diversion at canal head is 1,386 mcft. The duty will be 4.35 acres per mcft. and the delta will be 5.44 feet.

The commanded area lies in Shirala Taluka of Sangli District. The ten years average annual rainfall of Shirala Taluka is 36.0 inches (vide page 151 of MR-8).

Looking to the rainfall and other factors, the demand for this Project is not worth consideration.

PHAYE PROJECT

The note on the Phaye Project is given at page 2 of MRPK-29.

The Project envisages the construction of a storage reservoir on a left bank tributary of the Vedganga river near Phaye in Bhudargadh Taluka of Kolhapur District to irrigate, by lift, an ayacut of 7,200 acres and utilising 1.4 T.M.C. of water.

The ayacut proposed to be irrigated is 7,200 acres and the following crops are proposed to be irrigated :—

Sr. No. Crop	Percentage	Area in acres
1. Perennials	25	1,800
2. Kharif Seasonals	20	1,440
3. Rabi Seasonals	35	2,520
4. Two Seasonals	15	1,080
5. Hot Weather Seasonals	5	360
TOTAL	100	7,200

For irrigating 7,200 acres, the proposed net diversion at the canal head is 1,200 mcft. The duty, therefore, will be 6 acres/mcft. and the delta will be 3.84 feet,

The commanded area lies in Bhudargadh Taluka of Kolhapur District. The ten years average annual rainfall of Bhudargadh Taluka is 71.9 inches (vide page 118 of MR 8).

Looking to the intensity of rainfall and other factors, the demand for this Project is not worth consideration.

HIRANYAKESHI IRRIGATION PROJECT

The State of Maharashtra has prepared a Project Report of the combined "Hiranyakeshi and Vedganga Multipurpose Project" which is MRPK-9, MRPK-10 and MRPK-11.

The Hiranyakeshi Project envisages construction of a storage reservoir on the Hiranyakeshi River near Arja village in Arja Mehal of Kolhapur District. It is proposed to divert westwards ex-Vedganga Reservoir 24.21 T.M.C. for power generation and irrigation in Ratnagiri District. It is also proposed to divert 6.73 T.M.C. for irrigating 21,440 acres on the eastern side in the valley (vide pages 30 and 31 para 2.11.02 of MRPK-9).

The gross storage at Ajra is 27.45 T.M.C. and the live storage is 26.48 T.M.C. The annual evaporation losses are estimated as 2.40 T.M.C. (vide page II Sr. No. 51, 5iii and 5vi).

The Project has not been cleared by the Government of India.

There are already existing weirs, bandharas and lift irrigation schemes in the proposed command of this Project irrigating 4,604, acres (4560, acres of sugar-cane, and 44 acres Rabi seasonals), and utilising 1.69 T.M.C. of water (vide item III (a) of MRPK-31)-

In the Master Plan, a requirement of 5.0 T.M.C. to irrigate 14,500 acres is claimed (vide page 54 item 27), while in the Project Report, the requirement is 6.73 T.M.C. (5.54 T.M.C. in the fair weather and 1.19 T.M.C. in monsoon) for irrigation of 21,440 acres (vide page 31 of MRPK-9).

For irrigating 21,440 acres, the proposed net diversion at the canal head is 6.73 T.M.C. Therefore, the duty will work out to 3.18 acres per mcft. The delta in feet would be 7.20 feet.

The ayacut lies in Arja Mahal and Gadhinglaj Taluka of Kolhapur District (vide page 20 of MRPK-10). The ten years average annual rainfall of Arja Mahal is 74.8 inches and that of Gadhinglaj Taluka is 39.2 inches (vide page 118 of MR-8).

It is claimed by the State of Maharashtra that this Project would firm up the irrigation on the existing seven bandharas irrigating 4,604 acres in the command of this Project utilising 1.69 T.M.C. of water. Of these seven bandharas, Kochari and Gotur bandharas were constructed prior to 1960; but it is claimed that utilisations on them have not been protected.

In MR Note 26, the State of Maharashtra has claimed that if the westward diversion for power generation and irrigation is not permitted on this Project, then 27.2 T.M.C. can be and should be permitted to be utilised for irrigation on the eastern side. Later, in MR Note 30, the State of Maharashtra has claimed only 12 T.M.C. for irrigation on the eastern side for this Project.

Looking to the intensity of rainfall and other factors, demand for this Project is not worth consideration for the present. Demand for existing bandharas will be considered separately.

GUDAVALE LIFT SCHEME

The note on the Gudavale Lift Irrigation Scheme is given at pages 173 to 186 of MRPK-28.

The Project envisages the construction of a storage reservoir on the Ghataprabha river near Kolhapur District, and letting down water into the river for lift irrigation schemes by constructing pick-up-weirs downstream. The total irrigation contemplated is 11,270 acres with gross utilisation of 3.74 T.M.C. (page 176 para 4.4 of MRPK-28).

The gross storage of the dam is 3.57 T.M.C. and the live storage is 3.43 T.M.C. The annual lake losses being estimated to be 0.42 T.M.C. (vide page 176 MRPK-28).

In the Master Plan, a requirement of 3.1 T.M.C. for irrigation of 8,400 acres is shown. In the Project Note, the utilisation contemplated is 3.74 T.M.C. for the irrigation of 11,270 acres.

There are already existing weirs, bandharas and lift schemes in the proposed command of this Project, irrigating 3,692 acres (3578 acres of sugar-cane and 114 acres Rabi seasonals) and utilising $770+395 = 1165$ T.M. Cft. say 1.2 T.M.C. (vide items IIIb and IIIc of MRPK-31).

For irrigating 11,270 acres with the proposed net diversion at canal head of 3.32 T.M.C., the duty would be 3.4 acres per mcft. The delta will be 6.8 feet.

The commanded area lies in Chandgad and Gadhinglaj Talukas of Kolhapur District. The ten-years average annual rainfall of Chandgad Taluka is 115.7 inches and that of Gadhinglaj Taluka is 39.2 inches (vide page 118 of MR-8).

Under the existing weirs, bandharas and lift irrigation schemes 1.2 T.M.C. is already being utilised from the water of the river Ghataprabha. The demand for this Project being only for 3.1 T.M.C. (including 1.2 T.M.C.) is worth consideration.

MUTHA SYSTEM EX-KHADAKWASLA

The report on the Mutha System Ex-Khadakwasla is given at pages 137 to 160 of MRPK-28.

The Khadakwasla Project consists of three storages at Panset, Warasgaon and Khadakwasla and a Right Bank Canal from the Khadakwasla Dam, 152 miles long, to irrigate 1,28,000 acres. Besides this, the Project also assures the irrigation on the existing Left Bank Canal and caters partly to the water supply requirements of the Poona City, the National Defence Academy and the Central Water and Power Research Station, Khadakwasla. It is proposed to utilise 33.1 T.M.C. gross at Khadakwasla, of which 25.9 T.M.C. is for irrigation and 5.0 T.M.C. is for the aforesaid water supply requirements. The annual lake losses from the three lakes are estimated to be 2.2 T.M.C.

However, the Project as cleared by the C.W. & P.C. contemplates a total utilisation of 23.5 T.M.C. only, including 3.1 T.M.C. as water supply to Poona and Kirkee and an irrigation of 77,000 acres (page 144 of MRPK-28). The length of the canal sanctioned is only 101 miles (page 137 *ibid*). The Khadakwasla Project has been protected for a use of 23.5

T.M.C. The Project Report for the utilisation of an additional 9.6 T.M.C. has not yet been cleared by the Government of India.

In the Master Plan, the requirement of water for this Project is shown to be 34.2 T.M.C. (33.1 T.M.C. from the dependable flow, and 1.1 T.M.C. from regeneration), for the irrigation of an area of 1,28,000 acres.

The additional area proposed to be irrigated under this Project (by increasing the capacities of the storages at Panset and Warasgaon and by the extension of the Right Bank Canal by 51 miles) is 1,28,000—77,000 = 51,000 acres, and the corresponding additional cropped area is 58,140 acres.

For irrigating 58,140 acres the annual diversion proposed is 9.6 T.M.C. Therefore, duty will be 6.06 acres per mcft., and the delta will be 3.8 feet.

The commanded area between mile 101 to mile 152 of the Right Bank Canal lies in Indapur Taluka of Poona District (Refer Index Map at page 160 MRPK-28). The average annual rainfall of Indapur Taluka over the period of 27 years is 24.46 inches (column 13 page 221 of MR-8). Indapur Taluka has been classified as a 'B' type scarcity area (vide page 13 of MR-7). The Irrigation Commission Report, 1972, has also identified this Taluka as a drought-prone area (vide Appendix 8-1 page 422 of its report in Volume I). The Government of Maharashtra has given a high priority to this Project in their priority list.

In our opinion, additional demand of 9.6 T.M.C. for this Project is worth consideration, as it will irrigate 51,000 acres in scarcity areas of Maharashtra.

KUKADI PROJECT

(Additional)

The report on the Kukadi Project is given in MRPK-17.

The integrated Kukadi Project submitted to the Central Water and Power Commission in April, 1965 had the following features:—

(a) Storages on:—

- (i) the Kukadi River at Manikdoh and Yedgaon;
- (ii) the Ar River at Pimpalgaon Joge;
- (iii) the Ghod River at Dimbhe Bk; and
- (iv) the Mina River at Wadaj.

(b) A pick-up-weir at Basti Savargaon.

(c) The canal system for irrigation of 1,20,212 acres in the Ghod and Mina valleys and Pushpavati canals, and 1,45,728 acres from the Kukadi Left Bank Canal ex-Yedgaon (MRPK-17, page 21). The total irrigation contemplated was 2,65,940 acres with total utilisation of 42.91 T.M.C. (net use 40.0 T.M.C. and annual evaporation losses 2.91 T.M.C.).

The Planning Commission has cleared only a part of the Project under their Letter No. II-10(1) (14) / 68-IP dated the 4th October, 1968 for the annual irrigation of 1,45,728 acres from the Kukadi Left Bank Canal System for a gross utilisation of 20.07 T.M.C.

This Project has been protected for a utilisation of 20.07 T.M.C. The water claimed now is for providing irrigation in the remaining area of 2,65,940—1,45,728 = 1,20,212 acres. The utilisation claimed is 42.91—20.07 = 22.84 T.M.C.

In the Master Plan (vide MRK-II, page 55, Sr. No. 3.2), the requirement of water for this Project has been shown as 38.9 T.M.C. from the 75 per cent dependable flow and 2.0 T.M.C. from regeneration flow for irrigating 2,98,100 acres. The sanctioned utilisation is 20.07 for irrigating 1,45,728 acres. In MR Note 26 and in MR Note 30 a requirement of 38.9—20.07 = 18.83 T.M.C., say 18.9 T.M.C. has been claimed for the Kukadi Project. The balance area proposed to be irrigated is 2,98,100—1,45,728 = 1,52,272 acres.

In MR Note-33, it has been stated:—

"The area of irrigation proposed in the Kukadi Project was 2,65,940 acres and the net diversion, 40 T.M.C. (vide MRPK-17, page XII). The talukas proposed to be served were Ambegaon, Junnar and Sirur Talukas of Poona District and Parner and Shrigonda Talukas of Ahmednagar District (vide page 11, MRPK-17).

At the time of preparing the Master Plan, it was envisaged that in the ultimate stage of this Project with a net utilisation requirement of 38 T.M.C. (including 2 T.M.C. due to regeneration) the benefits of irrigation would spread to the larger area of 2,98,100 acres (column 9, Master Plan—MRK II, page 55, Sr. No. 3.2). This will be possible by extending the irrigation on the Kukadi Left

Bank Canal into Karjat Taluka of Ahmednagar District and Karmala Taluka of Sholapur District, which are chronically scarcity-affected areas and by reducing the intensity of irrigation".

The ayacut proposed to be irrigated by the part of the project yet to be cleared is 1,52,272 acres (2,98,100—1,45,728 acres).

For irrigating 1,52,272 acres, the proposed annual diversion being 18.0 T.M.C. the duty will be 8.45 acres/mcft.

The delta will be 2.74 feet.

The area proposed to be commanded by part of the Project not yet sanctioned lies in Shrigonda and Karjat Talukas of Ahmednagar District and in Karmala of Sholapur District. The average annual rainfall of Shrigonda Taluka over the period of 27 years is only 19.27 inches, and that of Karjat Taluka is only 22.69 inches (Sr. No. 11 and 12 page 182 of MR-8). The average annual rainfall of Karmala Taluka over the period of 27 years is only 22.96 inches (page 168 of MR-8). The rainfall in all these three Talukas is thus very low. These three Talukas have been classified as 'A' category scarcity areas (*vide* page 14 of MR-7). These three Talukas have also been identified, as drought-affected areas by the Irrigation Commission of 1972 (*vide* page 422 Appendix 8.1 of Vol. I of the Commission's Report).

It is claimed that this Project will help in alleviating the scarcity conditions in the chronically-affected scarcity areas of Shrigonda, Karjat and Karmala Talukas, which are in dire need of irrigation facilities.

In our opinion the demand of 18.80 T.M.C. for this Project is worth consideration, as it will irrigate scarcity areas in Shrigonda, Karjat and Karmale Talukas of the State of Maharashtra.

CHASKAMAN IRRIGATION PROJECT

The report on the Chaskaman Project is given in the volumes I & II of MRPK-19 and MRPK-20.

This Project envisages the construction of—

- (a) Storage reservoir on the river Bhima at the village Bibi in Khed Taluka of Poona District; and
- (b) A Left Bank Canal from the storage for irrigation 72,000 acres in Khed and Sirur Talukas of Poona District.

The Chaskaman Project has not yet been cleared by the Government of India, but the State of Maharashtra has stated that this Project is already under construction as a scarcity work.

In the Master Plan, the requirement is shown to be 10.0 T.M.C. from regenerated flow for an irrigation of 72,000 acres. The Project Report, however, shows that the Project is planned for a utilisation of 10.19 T.M.C. of 75 per cent dependable flow. The storage proposed at Bibi has a gross capacity of 8.56 T.M.C. (page 1, MRPK-19) and live storage capacity of 7.60 T.M.C. (page ii, MRPK-19).

The Left Bank Canal has an ayacut of 72,000 acres in Khed and Sirur Talukas of Poona District.

The Project proposes to utilise annually 9.22 T.M.C. at the canal head (page 14, MRPK-20) for an area of 72,000 acres of irrigation. The duty at canal head will be 7.8 acres per mcft. The delta will be 2.94 feet.

The area commanded lies in Khed and Sirur Talukas of Poona District. The average annual rainfall of Khed Taluka over the period of 10 years has been 23.0 inches and in Sirur Taluka over the same period of 27 years, it has been 18.98 inches (column 12 & 13, page 221 of MR-8). Sirur Taluka has been classified as 'A' type scarcity area (*vide* page 13 of MR-7).

The Irrigation Commission Report, 1972, has also identified Sirur Taluka as a drought-prone area (*vide* Appendix 8.1, page 422 of its report in Volume I).

The Government of Maharashtra has given priority for this Project in their priority list.

In MRK Vol. II at page 55, the State of Maharashtra has claimed 10 T.M.C. for this Project out of the water available on account of regeneration. It is very doubtful whether any water will be available for this Project out of the dependable flow if the water for other projects of the State of Maharashtra upstream is allowed. We have considered the demands for the upstream projects as worth consideration. In these circumstances, the demand for this Project is not worth consideration.

NIRA SYSTEM EX-VIR

(Additional)

The Report on the Nira System ex-Vir is given in MRPK-28 at pages 59 to 64.

The Nira System ex-Vir in operation at present comprises of the following:—

- (a) An existing storage reservoir on the Yelwandi River at Bhatghar with a live storage of 24.2 T.M.C.
- (b) An existing storage reservoir at Vir on the Nira River with a live storage of 9.4 T.M.C.
- (c) Left and Right Bank Canals from the Vir Dam, 100 miles and 106.5 miles long respectively, for irrigating 76,000 acres and 1,79,000 acres respectively, i.e. totalling 2,55,000 acres and utilising 49.8 T.M.C.

This system is protected for a utilisation of 49.3 T.M.C.

It is proposed in addition to construct a storage reservoir on the Nira River at Nandgaon having a gross capacity of 12.42 T.M.C. and a live capacity of 12.0 T.M.C. The existing Nira Left Bank Canal will be remodelled to irrigate an additional area of 44,000 acres in Indapur Taluka of Poona District. The Right Bank Canal will be extended beyond the tail and to irrigate an additional area of 21,000 acres in Sangola Taluka of Sholapur District. The additional gross use on both these canals will be 15.9 T.M.C. and the net use will be 14.1 T.M.C. The proposed extension of irrigation from the Nira Canal has not been sanctioned by the Government of India.

In the Master Plan, a requirement of 16.2 T.M.C. is shown for this Project for irrigating an area of about 66,000 acres (*vide* item 40 page 56, MRK-II).

For irrigating a cropped area of 66,200 acres the annual diversion at canal head is 14.1 T.M.C. The duty, therefore, will be 4.7 acres/mcft.

The delta will be 4.86 feet.

The commanded area lies in Indapur Taluka of Poona District and Sangola Taluka of Sholapur District. The average annual rainfall of Indapur Taluka over the period of 27 years has been 24.46 inches (*vide* Col. 13 page 221 of MR-8) and that of Sangola Taluka over the same period of 27 years has been 19.59 inches (page 168 of MR-8). Indapur Taluka has been classified as 'B' type and Sangola Taluka has been classified as 'A' type scarcity area (*vide* pages 13 and 14 of MR-7). These two Talukas have also been identified as drought-prone areas by the Indian Irrigation Commission of 1972 (*vide* Appendix 8.1 page 422 Vol. I of Commission's Report).

It is claimed that this Project would help in alleviating the acute scarcity conditions in Indapur and Sangola Talukas by providing much-needed additional irrigation facilities.

The Nira System Ex-Vir has already been protected to the extent of 49.3 T.M.C. This Project is an extension of that Project. Savings must be affected in the Nira System Ex-Vir to irrigate the area proposed to be irrigated under this Project. There were complaints of water logging in the Nira Valley. The demand for the Project is not worth consideration

BARHANPUR PROJECT

The note on the Barhanpur Project is given at page 6 of MRPK-29.

The Barhanpur Project envisages construction of a storage reservoir on the Karha River near Barhanpur village in Baramati Taluka of Poona District, for irrigating an area of 14,300 acres utilising 1.48 T.M.C. (gross).

It is proposed to irrigate an ayacut of 11,000 acres with the corresponding cropped area of 14,300 acres.

For the irrigation of 14,300 acres, the proposed net diversion at the canal head is 1,110 mcft. The duty will work out to 12.8 acres/mcft., and the delta will be 1.78 feet.

The commanded area lies in Baramati Taluka of Poona District. The average annual rainfall of Baramati Taluka over the period of 27 years has been 18.07 inches (*vide* page 221 of MR-8). This Taluka has been classified as 'B' type scarcity area (*vide* page 13 of MR-7).

It is claimed that this Project will go a long way in alleviating the scarcity conditions in the Baramati Taluka by providing irrigation facilities to this area.

In our opinion the demand of 1.48 T.M.C. for this Project is worth consideration.

BEGUMPUR LIFT IRRIGATION SCHEME

The note on the Begampur Lift Irrigation Scheme is given at pages 65 to 75 of MRPK-28.

The Project envisages construction of a barrage on the Bhima river near the village Kasur in Sholapur District and lifting water from this barrage into a Left Bank Canal to irrigate 60,000 acres in the scarcity affected South Sholapur Taluka. According to the project note in MRPK-28, the diversion proposed is

14.2 T.M.C. of which 8.2 T.M.C. is from regeneration flows and the balance 6.0 T.M.C. is from the 75 per cent dependable flows (*vide* para 5.2, page 68 of MRPK-28). In the Master Plan the planned diversion (lifting) is 15.4 T.M.C. (Sr. No. 45, column 6, page 56 of MRK-II), of which 5.3 T.M.C. is from 75 per cent dependable flow and the balance 10.1 T.M.C. is from regeneration flows. The net diversion proposed for irrigating 60,000 acres is 14.2 T.M.C. The duty and delta therefore will work out, as below:—

Duty = 4.25 acres/mcft.

Delta = 5.45 feet.

In MR Note 30, the State of Maharashtra has claimed 5.3 T.M.C. of the dependable flow for this Project. The ayacut is situated in South Sholapur Taluka of Sholapur District (page 75 of MRPK-28).

The average annual rainfall of South Sholapur Taluka is 25.77 inches (Statement 'B' page 168 of MR-8). This Taluka has been identified as a scarcity area in the Fact Finding Committee Report (Pages 161, 166 and 167 of MR-8). The Indian Irrigation Commission has also identified South Sholapur Taluka as "Drought-affected" (page 422, Vol. I of Indian Irrigation Commission Report of 1972).

This Project which is a lift irrigation scheme involves construction of a barrage on the river Bhima itself. It is stated in the note on this Project that a large storage cannot be planned at the project site due to costly submergence problems and the scheme is limited to diverting the run-off of the river during the Khariff season and meeting the fair weather requirements mainly by anticipating regeneration flow and the normal post-monsoon flow in the river. Unless a systematic study is undertaken about the yield in the river Bhima at the project site after taking into account the upstream utilisations, the demand for this Project cannot be considered favourably. The rainfall in the commanded area is about 26 inches. Taking all these things into consideration, in our opinion demand for this Project is not worth consideration for the present.

SINA AT NIMGAON GANGURDA PROJECT

This Project envisages the construction of a storage reservoir on the Sina River, a left bank tributary of the river Bhima, near the village of Nimgaon Gangurda in Karjat Taluka of Ahmednagar District, with an ayacut of 16,600 acres and corresponding irrigation (cropped area) of 18,260 acres. The gross utilisation proposed is 1.8 T.M.C.

For irrigating 18,260 acres, the proposed net diversion at the canal head is 1.38 T.M.C., and the duty will, therefore, work out to 13.3 acres per mcft. The delta will work out to 1.74 feet.

The commanded area lies in Karjat Taluka of Ahmednagar District. The average annual rainfall of Karjat Taluka over the period of 27 years has been 22.69 inches (*vide* page 196 of MR-8). This Taluka has been classified as 'A' type scarcity area (*vide* page 14 of MR-7). This Taluka has also been identified as a drought-affected area by the Indian Irrigation Commission of 1972 (*vide* Appendix 8.1 page 422, Vol. I of the Commission Report 1972). The Project is under construction (*vide* MR Note 26, Sr. No. 46) as a scarcity work.

It is claimed that this Project is essential for alleviating the scarcity conditions in Karjat Taluka by providing irrigation facilities to this area.

In our opinion demand of 1.7 T.M.C. for this project is worth consideration.

SINA AT KOLEGAON PROJECT

The note on the Sina At Kolegaon Project is given in MRPK-28 at pages 77 to 87.

This Project envisages the construction of a storage reservoir on the Sina river, a left bank tributary of the Bhima river, near Kolegaon village in Karmala Taluka of Sholapur District. The Right and Left Bank Canals from the storage reservoir would irrigate 44,200 acres in Karmala and Madha Talukas of Sholapur District and Paranda Taluka of Osmanabad District. The Project has not so far been approved by the Government of India.

The gross storage is 4.66 T.M.C. and the live storage is 2.95 T.M.C. The annual evaporation losses are estimated at 0.9 T.M.C. (*vide* page 81 paras 4.3 and 4.4 of MRPK-28).

The gross utilisation proposed is 4.5 T.M.C. and the net utilisation is 3.6 T.M.C. (*vide* page 81, para 4.3 of MRPK-28).

The area proposed to be irrigated is 39,000 acres and the corresponding cropped area proposed is 44,200 acres. For irrigating 44,200 acres, the net diversion at the canal head is 3.6 T.M.C. Therefore, the duty will work out at 12.2 acres per mcft. and the delta will be 1.89 feet.

The commanded area lies in Karmala and Madha Talukas of Sholapur District and in Paranda Taluka

of Osmanabad District. The average annual rainfall of Karmala Taluka over a period of 27 years has been 22.96 inches, and of Madha Taluka over the same period has been 21.23 inches (vide page 168 of MR-8). The average annual rainfall of Paranda Taluka over the 27 years' period has been 25.83 inches (vide page 79 of MR-8). Karmala Taluka has been classified as 'A' type and Madha Taluka is classified as 'B' type scarcity area (vide page 14 of MR-7). All the three Talukas have been identified as drought-prone areas in the Indian Irrigation Commission Report of 1972 (vide Appendix 8.1 page 422, Vol I of the Commission's Report).

It is claimed that this Project would help in alleviating the scarcity conditions in Karmala, Madha and Paranda Talukas by providing irrigation facilities.

In our opinion the demand of 4.5 T.M.C. is worth consideration.

HINGANI PANGAON PROJECT

The note on the Hingani Pangaon Project is given at page 13 of MRPK-29.

The Project envisages the construction of a storage reservoir on the Bhogavati River, a tributary of the Sina river, near Pangaon village in Barsi Taluka of Sholapur District, for an ayacut of 13,900 acres and corresponding irrigation (cropped area) of 16,680 acres utilising 1.50 T.M.C.

For irrigating 16,880 acres, the proposed net diversion at the canal head being 1,340 mcft. the duty will work out at 12.4 acres per mcft, and the delta will be 1.84 feet.

The commanded areas lies in Barsi Taluka of Sholapur District. The average annual rainfall in Barsi Taluka over the period of 27 years has been 27.91 inches (vide page 168 of MR-8). This Taluka has been classified as 'C' type scarcity area (vide page 14 of MR-7). This Taluka has also been identified as drought-prone area by the Indian Irrigation Commission of 1972 (vide Appendix 8.1 page 422, Vol. I of Commission's Report).

The Project is already under construction.

In our opinion the demand of 1.50 T.M.C. for this Project is worth consideration.

SINA LIFT SCHEME

The note on the Sina Lift Scheme is given at pages 91 to 101 of MRPK-28.

The scheme envisages the construction of a barrage on the Sina river near village Chincholi in Sholapur District and lifting water from this barrage into a Left Bank Canal for irrigating 20,000 acres in the scarcity-affected areas of Akkalkot Taluka. According to the Project Note in MRPK-28, 4.70 T.M.C. is proposed to be diverted (lifted) for irrigation at this barrage. The evaporation losses at the barrage are estimated to be 0.4 T.M.C. Therefore, the gross utilisation planned is $4.70 + 0.40 = 5.10$ T.M.C. Out of this, 1.8 T.M.C. is stated to be from regeneration flows and 3.30 T.M.C. from the 75 per cent dependable flows (paras 5.2 and 5.3, page 94 of MRPK-28). In the Master Plan, the diversion planned was 6 T.M.C. (Sr. No. 53, Col. 6, page 57 of MRK-II), of which 3 T.M.C. from the dependable flows and 3 T.M.C. from the regeneration flows. In MR Note 30, the State of Maharashtra has claimed 3 T.M.C. from the dependable flows for this scheme. The net diversion proposed for irrigating 20,000 acres is 4.70 T.M.C. The duty and delta, therefore, will work out as under :—

Duty	4.25 acres/mcft.
Delta	5.45 feet.

The ayacut is situated in Akkalkot Taluka of Sholapur District (page 97 of MRPK-28). The average annual rainfall of Akkalkot Taluka is 27.07 inches (Statement B, page 168 of MR-8). This Taluka has been identified as a scarcity area under category 'C' in the Fact Finding Committee Report (pages 161, 165, 167 of MR-7). The Indian Irrigation Commission has also identified Akkalkot Taluka as a "drought-affected" area (page 422, Vol. I of Indian Irrigation Commission Report of 1972).

This is a lift irrigation scheme for providing irrigation in an area where there is a rainfall of 27 inches. In our opinion demand for this Project is not worth consideration for the present.

Water requirements of Bandharas and Lift Irrigation Schemes of the State of Maharashtra as mentioned in MRPK-31 are given in the Table below which also shows the utilisations which have been protected.

Item No. in MRPK-31	Page No. of MRPK-31	Name of Scheme	Estimated annual withdrawal in Mcft.	Utilisation protected in Mcft.	Utilisation not protected in Mcft.
(1)	(2)	(3)	(4)	(5)	(6)
<i>I—K-1 Sub-basin</i>					
I (a)	2	Urmodi and Tarali bandharas	1,570	—	1,570
(b)	2	Six bandhoras on the Dudhganga river	1,653	—	1,653
(c)	2	Six bandharas on the Warna river	3,111	—	3,111
(d)	2	Six bandharas on the Vedganga river	1,635	—	1,635
(e)	3	Five bandharas on the Kasari river	2,076	—	2,076
(f)	3	Three bandharas on the Kumbhi river	1,151	—	1,151
(g)	3	One bandhara on the Dhamni river	178	—	178
(h)	3	Five bandharas on the Tulshi river	232	232	—
J (i)	4	Lift Irrigation in comanded area of Khodshi Canal	2,470	—	2,470
J (ii)	4	Lift Irrigation on the Left Bank of the Krishna river	720	—	720
J (iii)	4	Lift Irrigation on the Left Bank of the Krishna river in com- manded area of Koyna Krishna Lift Scheme.	1,865	—	1,865
J (iv)	4	Lift Irrigation on Left Bank of the river Krishna upto Mysore State border.	747	—	747
J (v)	4	Lift Irrigation on the Right Bank of the river Krishna in commanded area of Wang Project.	1,832	—	1,832
J (vi)	5	Lift Irrigation on the Right Bank of the river Krishna in the commanded area of sanctioned Warna Left Bank Canal.	4,100	4,100	—
J (vii)	5	Lift Irrigation on the Right Bank of the river Krishna in the commanded area of sanctioned Warna Right Bank Canal.	2,520	2,520	—
J (viii)	5	Lift Irrigation in rest of the area under the Right Bank of the Krishna river upto Mysore State border.	1,234	—	1,234
TOTAL OF K-1			27,094	6,852	20,242
<i>II—K-3 Sub-basin</i>					
3(a)	6	Seven bandharas on the Hiranyakeshi river	1,693	—	1,693
(b)	6	Two weirs on the Tamraparni river	770	—	770
(c)	6	Two weirs on Ghataprabha	395	—	395
TOTAL OF K-3			2,858	—	2,858
GRANDTOTAL OF K-1 & K-3			29,952	6,852	23,100

In MRPK-31, it is mentioned that utilisations for irrigation on bandharas and lift irrigation schemes to the extent of 1570 + 2470 + 4100 + 2520 + 232 = 10,892 Mcft. (I (a)) (I (j) (i)) (I(j)(vi)) (I(j)(vii)) (I(h)) have been shown the Master Plan and therefore, for these no demand is made in MRPK-31 and the demand is confined to—

K-1 Sub-basin	16,202 Mcft.
K-2 Sub-basin	—
K-3 Sub-basin	2,858 Mcft.
K-5 Sub-basin	—
K-6 Sub-basin	—
TOTAL	19,060 Mcft.

In MRPK-31 the total utilisation of 29.952 TMC has been shown for the various bandharas, weirs and lift irrigation schemes. Out of this utilisations to the extent of 6.852 TMC have been protected. We may mention here that utilisations on the existing weirs of Gotur and Kochari on the Hiranyakeshi river have been treated by us as not protected. The following bandharas and lift irrigation schemes will merge with the projects which we have considered worth consideration —

1	Lift irrigation in Khodshi command	2470 Mcft
2	Weirs on Dudhganga river to be covered by Dudhganga Project	1653 Mcft
3	Weirs on Tamraparni river and on Ghata-prabha river to be covered by Gudavale Lift Scheme (770 + 395)	1165 Mcft
TOTAL		5288 Mcft

Now the demand of the State of Maharashtra with

respect to the bandharas, weirs and lift irrigation schemes is as follows —

1	Total requirements of weirs, bandharas and lifts not protected	23,100 Mcft
2	Deductions for bandharas in Khodshi Canal command area, Dudhganga command area and Gudavale command area	5,288 Mcft.
Balance need for bandharas, weirs and lifts		17,812 Mcft

In our opinion, this demand to the extent of 178 TMC is worth consideration as all the bandharas, weirs and lift irrigation schemes are in operation or under construction.

MINOR IRRIGATION

The State of Maharashtra has made the following demands for minor irrigation —

Sl. No	Name of the Project	Demand in Master Plan	Use which has been protected	Balance	Future demand from 75 per cent dependable flow in MR Note No 30
I K-1 Sub-basin (Upper Krishna)				(All figures in TMC)	
1	Minor Irrigation (utilising less than one TMC annually)	42.3	11.1	31.2	26.2
II K-2 Sub-basin (Middle Krishna)		2.0	0.1	1.9	1.3
1	Minor Irrigation (utilising less than one TMC annually)				
III K-3 Sub-basin (Ghataprabha)		1.9	1.0	0.9	0.9
1	Minor Irrigation (utilising less than one TMC annually)				
IV K-5 Sub-basin (Bluma)		28.5	4.8	23.7	16.4
1	Minor Irrigation (utilising less than one TMC annually)				
V K-6 Sub-basin		2.5	0.1	2.4	2.4
1	Minor Irrigation (utilising less than one TMC annually)				
TOTAL		77.2	17.1	60.1	47.2

The demands for minor irrigation includes the demands for the following projects, which according to the State of Maharashtra were in existence even before 1960 .—

Sl. No	Sub-basin	Name of the Project	Utilisation in T.M.C
1	K-1	Nehr Tank	0.5
2	K-5	Budihal Tank	0.9
3	K-5	Kada Project	0.5
4	K-5	Mehkari Project	0.7
5	K-5	Chandani Project	0.9
6	K-6	Harni Project	0.6
TOTAL			4.1

We allow the demand for these Projects

Looking to the entire circumstances, we are of the opinion that in addition to 41 TMC, the demand to the extent of 22.37 TMC be taken as worth consideration. Thus in our opinion the total demand of 26.47 TMC is worth consideration.

As a result of examining the projects of the State of Maharashtra for which water has been claimed from the dependable flow of 2060 TMC, we are of the opinion that the demand for the following pro-

jects is worth consideration to the extent mentioned against each item :—

	T.M.C.
1. Krishna Canal Ex-Khodshi Weir	3.00
2. Koyna Hydel and Koyna Krishna Lift Scheme	23.40
3. Dudhganga	14.00
4. Gudavale Lift Scheme	3.10
5. Mutha System ex-Khadakwasla	9.60
6. Kukadi Project	18.80
7. Barhanpur Project	1.48
8. Sina at Nimgaon	1.70
9. Sina at Kolegaon	4.50
10. Hingani Pangaon	1.50
11. Bhandaras, etc	17.80
12. Minor Irrigation	26.47
TOTAL	125.35

The State of Maharashtra has further claimed 117.1 T.M.C. in the water flowing in excess of the dependable flow of 2060 T.M.C. (which is called the 'Surplus Flow') as follows :—

	T.M.C.
1. Krishna Project	16.30
2. Krishna Canal Ex-Khodshi Weir	2.50
3. Wang Project	2.20
4. Warna Project	9.20
5. Mutha Svstem ex-Khadakwasla	7.40
6. Kukadi Project	16.10
7. Chaskaman Project	16.00
8. Kundali Project	2.50
9. Nira System ex-Vir	27.80
10. Begumpur Lift Irrigation Scheme	10.10
11. Sina at Kolegaon	4.00
12. Sina Lift Scheme	3.00
TOTAL	117.10

TABLE No. 3

Statement showing the Sub-basinwise demand as per Statements 5 and 6 of Annexure III in MYK-I, the quantity protected, and further demand out of 75 per cent dependable flows for projects in the Krishna basin in the State of Mysore.

Sl. No.	Name of Project	Utilisation as per Master Plan (Statements 5 and 6 of Annexure III, MYK-I) T.M.C.	Protected utilisation T.M.C.	Balance Demand T.M.C.	Demand out of balance 75 per cent dependable flows T.M.C.
(1)	(2)	(3)	(4)	(5)	(6)
<i>K-1 Sub-basin</i>					
1.	Dudhganga Project	10.00	—	10.00	4.00
2.	Minor Irrigation	1.71	0.18	1.53	1.03
	TOTAL K-1 SUB-BASIN	11.71-	0.18	11.53	5.03
<i>K-2 Sub-basin</i>					
1.	Upper Krishna Project	442.00	103.00	339.00	125.00
2.	Bijapur Lift Irrigation Scheme	63.00	—	63.00	—
3.	Don Project	3.66	—	3.66	—
4.	Minor Irrigation	15.93	2.47	13.46	9.16
	TOTAL K-2 SUB-BASIN	524.59	105.47	419.12	134.16

On the very face of it this demand cannot be satisfied as the only flow that is available for distribution in excess of the 2060 T.M.C. is that due to the return flow as already mentioned in Part I. We have given a share to the State of Maharashtra in the return flow. The State of Maharashtra may utilise the quantity of water allocated to it as its share in the return flow for any of its projects subject to the conditions and restrictions imposed by us on the utilisation of waters in the various sub-basins.

This completes our discussion so far as the demands of the State of Maharashtra are concerned.

Demands of the State of Mysore : We proceed to discuss the various projects for which the demands of the State of Mysore are to be considered in the light of the observations made by us in Part I of this Chapter. These demands are contained in the following Table No. 3 which shows the sub-basinwise demands as per Statements 5 and 6 of Annexure III in MYK-I, the quantity protected, and further demands out of the 75 per cent dependable flows for projects in the Krishna basin in the State of Mysore :—

(1)	(2)	(3)	(4)	(5)	(6)
<i>K-3 Sub-basin</i>					
1. Ghataprabha Project (all Stages)		120.00	36.60	83.40	55.00
2. Gokak Canal		1.40	—	1.40	1.40
3. Weir Schemes		5.00		5.00	
4. Markandeya Project		4.00	—	4.00	12.00
5. Bellarynala		3.00		3.00	
6. Minor Irrigation		11.73	1.03	10.37	6.85
TOTAL K-3 SUB-BASIN		145.13	37.63	107.17	75.25
<i>K'4 Sub-basin</i>					
1. Malaprabha (including Left Bank Canal and Upper Mala-prabha)		49.00	37.20	11.80	9.00
2. Ramthal Lift Irrigation Scheme		10.00	—	10.00	4.50
3. Minor Irrigation		17.58	4.57	13.01	6.07
TOTAL K-4 SUB-BASIN		76.58	41.77	34.81	19.57
<i>K 5 Sub-basin</i>					
1. Minor Irrigation		1.39	0.02	1.37	0.59
<i>K-6 Sub-basin</i>					
1. Chandrampally		1.87	1.90	—	—
2. Bhima Lift Irrigation Scheme		31.18	—	31.18	10.00
3. Bhima Irrigation Project		37.64	—	37.64	11.0
4. Diksanga Project		0.30	—	0.30	1.00
5. Amarja Project		2.27	—	2.27	2.300
6. Bennithora Project		6.01	—	6.01	6.00
7. Gandhorinala Project		3.46	—	3.46	2.20
8. Upper Mullamari Project		1.30	—	1.30	1.30
9. Lower Mullamari Project		4.38	—	4.38	4.40
10. Kagna Project		12.93	—	12.93	2.00
11. Minor Irrigation		30.77	6.47	24.30	11.40
TOTAL K-6 SUB-BASIN		132.11	8.37	123.77	51.60
<i>K-7 Sub-basin</i>					
1. Minor Irrigation		2.88	0.69	2.19	1.66
<i>K-8 Sub-basin</i>					
1. Tungabhadra Project (Left Bank Canal, Right Bank Low Level Canal, Right Bank High Level Canal)		147.50	132.00	15.50	9.30
2. Vijayanagar Channels		13.70	5.71	7.99	8.00
3. Rajolibunda Diversion		1.20	1.20	—	—
4. Tunga Anicut		11.50	11.50	—	—
5. Bhadra Project		62.00	61.70	—	—
6. Bhadra Anicut		3.10	3.10	—	—
7. Gondi Left Bank Canal Extension		2.00	—	2.00	2.00
8. Ambligola		1.40	1.40	—	—
9. Anjanapur		2.50	2.50	—	—
10. Dharma Project & Canals		2.20	2.20	—	—
11. Hagaribommanahalli		2.00	2.00	—	—
12. Upper Tungabhadra		19.00	—	19.00	—
13. Tungabhadra Foreshore Lift		11.85	—	11.85	—
14. Tungabhadra Diversion		20.00	—	20.00	—
15. Upper Tunga Project		40.00	—	40.00	20.00
16. Upper Bhadra Project		36.00	—	36.00	10.00
17. Madagmasur		2.71	—	2.71	—
18. Dandavathy		2.60	—	2.60	—
19. Varada		7.00	—	7.00	—
20. Hirehalla		1.06	...	1.06	—
21. Minor Irrigation		100.92	49.04	51.88	23.59
TOTAL K-8 SUB-BASIN		490.24	272.35	217.59	72.89

(1)	(2)	(3)	(4)	(5)	(6)
<i>K-9 Sub-basin</i>		8.20	8.20	—	—
1. Vanivilas Sagar					
2. Feeder Channel to Ranikere		1.05	—	1.05	1.00
3. Jinigehalla		0.32	—	0.32	1.00
4. Minor Irrigation		38.20	29.87	8.33	4.25
TOTAL OF K-9 SUB-BASIN		47.77	38.07	9.70	6.25
GRAND TOTAL		1432.40	504.55	926.87	367.00

We proceed to examine the following projects for which the State of Mysore has claimed water out of the dependable flow :—

1. Dudhganga Project
2. Upper Krishna Project
3. Ghataprabha Project
4. Gokak Canal
5. Markandeya Project
6. Malaprabha Project
7. Upper Malaprabha Project
8. Ramthal Lift Irrigation Project
9. Bhima Lift Irrigation Project
10. Bhima Irrigation Project
11. Diksanga Project
12. Amarja Project
13. Bennithora Project
14. Gandhorinala Project
15. Upper Mullamari Project
16. Lower Mullamari Project
17. Kagna Project
18. Tungabhadra Left Bank Low Level Canal
19. Vijayanagar Channels
20. Gondi Left Bank Canal Extension
21. Upper Tunga Project
22. Upper Bhadra Project
23. Feeder Channel to Ranikere
24. Jinigehalla
25. Minor Irrigation

DUDHGANGA PROJECT

The Project Report to be referred to in respect of the Dudhganga Project is MRPK-15.

According to the Project Report, this Project will irrigate 32,100 acres in Chikodi Taluk of Belgaum District utilising 10 T.M.C.

June-September rainfall is 389 mm in the commanded area. October-December rainfall is 147.6 mm (MYDK-19, page 39). Mysore and Maharashtra have entered into an agreement that this would be a joint Project utilising 36 T.M.C. (26 T.M.C. in Maharashtra and 10 T.M.C. in Mysore) with a live storage of 29.5 T.M.C. In view of limited quantity of water available for distribution out of dependable flows it is now proposed to reduce suitably the total utilisation under the Project. Hence, Mysore now proposes to utilise only 4 T.M.C. out of the 75 per cent dependable flows (MY Note 17, Appendix III, page 1). The Project is not sanctioned.

In our opinion the demand of 4 T.M.C. for this Project which is a joint project of Maharashtra and Mysore is worth consideration.

UPPER KRISHNA PROJECT

The Upper Krishna Project had been conceived to harness the waters of the Krishna river to irrigate the famine-stricken areas of Bijapur, Gulbarga and Raichur Districts of Mysore State. The Project Report as prepared in 1960 envisaged two storage dams and canals (i) at Narayanapur and (ii) at Almatti to irrigate a total area of 12 lakhs of acres utilising 206 T.M.C. of water. The entire project was proposed to be executed in three stages (Ex. APK-344).

On further examination, the above Project was modified during July, 1963. As per the modified proposals, the Upper Krishna Project envisaged construction of two dams with canals, namely :—

(i) Almatti Storage with two canals, one on each side ; and

(ii) Narayanpur Storage with two canals, one on each flank to irrigate a total area of 12.00 lakh acres, and to utilise 226 T.M.C. of water (Ex. APK-345).

It was proposed to be executed in two stages. Stage I consisted of Almatti and Narayanpur Storages and

canals to irrigate about 5.33 lakh acres. There was a provision for future expansion to utilise 340 T.M.C.

After a good deal of discussions, the Central Water and Power Commission suggested that the First Stage of the Project may provide about 6 lakh acres for irrigation under the Narayanpur Dam and its two canals and construction of foundation and some other works of the Almatti Dam which are liable to periodical submergence under the Narayanpur Reservoir (Ex. APK-339).

Accordingly, Stage-I of the Project was modified during September, 1963 to utilise 103 T.M.C. under the Narayanpur Dam. The Project sanctioned in November, 1963 envisages the following :—

- (i) Storage dam at Narayanpur, Taluk Shorapur, District Gulbarga ;
- (ii) The Left Bank Canal from the Narayanpur Reservoir ; and
- (iii) The Right Bank Canal from the Narayanpur Reservoir.

Provision for Rs. 30 lakhs also was made in the sanctioned estimate for constructing foundations and some other works of the Almatti Dam which are liable to periodical submergence under the Narayanpur Reservoir (Ex-APK-165).

Under the sanctioned Project, it was proposed to irrigate 6.00 lakh acres in Gulbarga and Raichur Districts. But the execution of the Project was not taken up according to the sanction. The Upper Krishna Project has been modified by the State of Mysore to irrigate an area of 20.84 lakh acres (cropped area 36.57 lakh acres) utilising 442 T.M.C., including 41 T.M.C. of releases from the Koyna Reservoir and the new Project Report (MYPK-3) was prepared. The modified proposals are :—

- (1) Construction of Narayanpur Dam at the Siddapur site with the Right and the Left Bank Canals to irrigate 10.1 lakh acres on the Left bank and 4.30 lakh acres on the right bank;
- (2) Construction of the Almatti Dam with the Right and the Left Bank Canals to irrigate 70,000 acres and 50,000 acres, respectively;
- (3) Construction of the Hippargi Weir and the Lift Canals to irrigate 1,34,000 acres ; and

- (4) The Lift Irrigation from the Narayanpur Reservoir, the Almatti Reservoir and the Narayanpur Left Bank Canal to irrigate 3,90,000 acres.

The Narayanpur Dam and the Left Bank Canal with four branches, namely, Indi Branch, Shahapur Branch, Jewargi Branch and Mudbal Branch to irrigate 10.10 lakh acres utilising 103 T.M.C. in the Districts of Bijapur and Gulbarga, are under construction instead of the sanctioned Stage-I with the Left and the Right Bank Canals from the Narayanpur Reservoir.

Construction of the Almatti Dam to a partial height is also in progress. In the final phase the following constructions are contemplated :—

- (1) Construction of a weir at Hippargi and Lift Canals to irrigate 1.34 lakh acres ;
- (2) Completion of the Almatti Dam to full height;
- (3) The Left and the Right Bank Canals from the Almatti Reservoir to irrigate 1.20 lakh acres ;
- (4) Lift Canals from the Narayanpur Reservoir, the Almatti Reservoir and the Narayanpur Left Bank Canal to irrigate 3.9 lakh acres ; and
- (5) The Narayanpur Right Bank Canal to irrigate 4.30 lakh acres.

In view of limited availability of the 75 per cent. dependable yield, the State has shown a demand of 125 T.M.C. out of the 75 per cent dependable flow over and above the protected use of 103 T.M.C. (MY Note No. 17, Appendix II). The ayacut area and/or the crop pattern is to be adjusted to suit the requirement of 228 T.M.C. It is urged that K-2 sub-basin in which this project is situated in the worst affected area of all the sub-basins in the Krishna basin and is often affected by famines and scarcities and as such it requires special consideration (MY Note No. 13, page 12, para 3.8). It is also urged that due to acute scarcity and drought conditions during 1972-73, work on the Hippargi Weir on the flanks was taken up to provide relief to the people (MY Note No.17, Appendix II, page 3).

The Project serves the following Taluks which are identified as drought-affected by the Indian Irrigation Commission, 1972 :—

Sl. No.	District	Taluk
1	2	3
1.	Bijapur	Bijapur Jamkhandi Bagewadi Muddebi-hal Sindgi Indi Hungund Bagalkot
2.	Gulbaraga	Shorapur Shahapur Jewargi
3.	Raichur	Lingsugur Deodurg

(Report of the Indian Irrigation Commission, 1972, Vol. I, Page 423)

In addition, the Project also serves Athni Taluk of Belgaum District and Raichur Taluk of Raichur District.

This is a very big Project. Already utilisation to the extent of 103 T.M.C. is protected. In MY Note 17, the State of Mysore has claimed 125 T.M.C. out of the dependable flow over and above the protected demand. It is clear that this Project is to be executed by stages. The execution of this Project was not undertaken according to the sanction accorded by the Planning Commission as the construction of the Right Bank Canal of the Narayanpur Dam was not taken up and the entire 103 T.M.C. is sought to be utilised on the Narayanpur Left Bank Canal. In our opinion water may be provided to irrigate an area of 4.3 lakh acres by the Narayanpur Right Bank Canal, as contemplated under the sanctioned Project. The demand for the Right Bank Canal is 52 T.M.C. The demand of the State of Mysore to the extent of 52 T.M.C. for this Project is worth consideration.

GHATAPRABHA PROJECT

The First Stage of the Project, namely the Ghataprabha Left Bank Canal 0-44 miles taking off from the existing Dhupdal Weir, had been sanctioned by the then Government of Bombay in 1949 (Ex. MYK-250, page 20) and the same had been practically completed prior to the States reorganisation during 1956 and irrigation from the run-of-the-river is taken up during monsoon season under this canal. The work on the extension of the Ghataprabha Left Bank Canal miles 45-73 was also in progress prior to the States reorganisation.

The Project Report for the Ghataprabha Stage-II consisting of a storage dam at Hadalga and extension of the Left Bank Canal from miles 45 to 73 had been prepared by the Government of Bombay and sent to the Central Water and Power Commission for clearance (Ex. APK-301). In the meanwhile, Government of Bombay had accorded administrative approval to the storage part during March, 1956 (MYDK-12 page 10, Ex. APK-298) and to the extension of canal during May, 1955 (MYDK-2, page 380, Ex. MYK-122). The Planning Commission had also approved Stage II during February, 1957 (MYPK-13, page 37, Ex. MYK-250).

As a result of reorganisation of the States in the year 1956, there has been a change in the outline of the scheme. The area commanded by this Project came to lie in Mysore State while the two storage sites at Hadalga and Ajra remained in Bombay State. In order to avoid undue delay in the implementation of the scheme, it was considered desirable to investigate a site in the Mysore territory. The site at Hidkal on the Ghataprabha river was found to be suitable for the construction of a storage reservoir.

In view of the extensive and comprehensive nature of the scheme, it has been proposed to execute the scheme in three Stages, viz.

First Stage :

Construction of the Ghataprabha Left Bank Canal First Section (Miles 0 to 44) and two Branches—commanding an area of about 2,57,900 acres. This canal will function as a monsoon canal till the storage dam is constructed utilising the river flow available at the Dhupdal Weir for irrigating about 1.2 lakh acres.

Second Stage :

(a) Construction of the First Stage of Hidkal Dam on the Ghataprabha river to feed the Ghataprabha Left Bank Canal;

(b) Construction of the Second Section of the Ghataprabha Left Bank Canal (miles 45 to 73 and three Branches) commanding an area of 2.98 lakh acres (including 1.2 lakh acres of Stage-I).

Third Stage :

(a) Construction of the Second Stage of the Hidkal Dam by raising the dam to the final height; and

(b) Construction of the Ghataprabha Right Bank Canal.

The plans and estimates for the Hidkal Dam were sent to the Planning Commission for approval during 1958 (MYDK-12, page 78; Ex. APK-303).

The total live storage provided is 49.5 T.M.C. In the first Stage the dam was proposed to be constructed for a partial height but the foundation was to be laid as required for the full storage.

The Planning Commission approved during 1959 the Ghataprabha Stage-II (Hidkal Dam) for a net storage of 21,500 mcft. with section of the dam, spillway, etc. reduced but width of the foundation kept as required for the assumed ultimate net storage of 49,500 mcft. (MYDK-12, page 113; Ex. APK-311). The Planning Commission hoped that by the time the foundations are constructed, the position regarding availability of water for the final stage would be known and that further construction work on the dam could proceed. Approval was also accorded for the extension of the Ghataprabha Left Bank Canal from miles 45 to 73.

The modified Ghataprabha Project consists of the following :—

- A storage dam at Hidkal on the Ghataprabha river with a gross capacity of 51,000 mcft;
 - Ghataprabha Left Bank Canal;
 - Ghataprabha Right Bank Canal; and
 - Ghataprabha Left Bank High Level Canal
- (MYPK-13, page 12).

The gross commanded area under the Ghataprabha Left Bank Canal is 4,43,800 acres, out of which area proposed for irrigation as per sanctioned Project is 2,98,000 acres with the following crop patterns:—

Khariff paddy	0.15	lakh acres
Other Khariff	1.35	lakh acres
Rabi	1.25	lakh acres
Hotweather	0.15	lakh acres
Perennials	0.08	lakh acres
TOTAL	2.98	lakh acres

and this requires 34.78 T.M.C. of water excluding evaporation losses (MYPK-13, pages 11-13).

Assuming the same crop pattern for the Ghataprabha Right Bank Canal and the Left Bank High Level Canal, the State of Mysore has stated that the total ayacut proposed to be provided with irrigation

facilities would be 7.46 lakh acres with a utilisation of 86.95 T.M.C. as under :—

Ghataprabha Left Bank Canal	2.98 lakh acres	34.78 T.M.C.
Ghataprabha Right Bank Canal	2.98 lakh acres	34.78 T.M.C.
High Level Canal	1.50 lakh acres	17.39 T.M.C.
	7.46 lakh acres	86.95 T.M.C.

It is claimed that the requirements of Gokak Mills is 3 T.M.C. and that of the Gokak Canal is 1.4 T.M.C. and evaporation losses in the reservoir is 3 T.M.C. Thus the total water requirements for the Project is 94.35 T.M.C. But 3 T.M.C. of Gokak Mills will return to the river below the Dhupdal Weir. Thus the actual water requirement for the Ghataprabha Valley Development Scheme is 91.30 T.M.C., out of which 36.6 T.M.C. is protected. The balance requirement is $91.30 - 36.6 = 54.7$, say 55 T.M.C.

It is claimed that the Ghataprabha Right Bank Canal will irrigate an area of 2.98 lakh acres in the scarcity-affected areas of Gokak, Hukeri, Saundatti and Ramdurg Taluks of Belgaum District and Mudhol, Bagalkot, Badami and Hungund Taluks of Bijapur District. The rainfall during June-September and October-December periods in the various Taluks irrigated by this Project is as under :—

Taluk	Rainfall in mm	
	June-Sept.	Oct-Dec.
Hukeri	399.0	164.6
Gokak	303.0	164.4
Saundatti	332.8	165.2
Ramdurg	335.6	141.1
Mudho	342.2	133.4
Bagalkot	345.2	126.3
Hungund	361.2	132.0
Badami	341.6	144.6

(MYDK-19, Pages 39, 40 and 41)

It is claimed that the Ghataprabha High Level Canal will irrigate 1,50,000 acres in the scarcity-affected areas of Gokak, Hukeri, Raibag and Chikodi Taluks of Belgaum District. The rainfall during June-September and October-December periods in these Taluks is as under :—

Taluk	Rainfall in mm	
	June-Sept.	Oct-Dec.
Hukeri	399.0	164.6
Raibag	285.0	141.6
Chikodi	389.0	147.6
Gokak	303.0	164.4

(MYDK-19, Page 39)

Bijapur District is one of the worst drought-affected areas and susceptible to famine conditions (MYPK-IV Appendix I, page 35). This District is also identified as drought-affected by the Indian Irrigation Commission (Report of the Indian Irrigation Commission 1972, Volume I, page 423).

This Project in all its three Stages will irrigate scarcity-affected areas in Gokak, Hukeri, Saundatti, Ramdurg and Chikodi Taluks of Belgaum District and in Modhol, Bagalkot, Badami and Hungund Taluks of Bijapur District. In our opinion, additional demand for 55 T.M.C. for the Ghataprabha Project for all the three Stages is worth consideration.

GOKAK CANAL

The Project Report of this Project is MYPK-10, page 3.

The Gokak Canal takes off from the existing Dhupdal Weir on the river Ghataprabha. The weir has a live storage of 0.87 T.M.C. (Krishna Godavari Commission Report Annexure VIII, page 101). In the commanded area the normal rainfall in June to September is about 303 mm and October to December is 164.4 mm (MYDK-19, page 39). The canal irrigates an area of 14,200 acres in Gokak Taluk of Belgaum District. The cropping pattern and the duties are as under —

Crop	Area in acres	Canal Duty cusec)	Head (acres/
Kharriff Paddy	Not available	Kharriff	80
		Rabi	100
Light irrigated crops during Kharriff and Rabi	Not available	Rabi	100
14,200			

It is claimed that the utilisation of 1.4 T.M.C. has not been protected. The Project has been in existence since 1897.

Demand for this Canal is held by us to be included in the demand for the Ghataprabha Project. No separate provision is necessary for this demand.

MARKANDEYA PROJECT

The Project Report of this Project is MYPK-8 pages 130-140.

The Markandeya Project is envisaged to provide irrigation facilities to an area of 72,500 acres in the Taluks of Hukeri, Gokak and Bailhongal of Belgaum District, utilising 12 T.M.C. by means of a live storage of 8.88 T.M.C. There will be two reservoirs;

one across the Markandeya river having a live storage of 7.48 T.M.C. and the other across the Ballary Nala having a live storage of 1.40 T.M.C. The cropping pattern is as under:—

Crop	Cropped area in acres
Sugar-cane	6,025
Other Khariff	36,250
Rabi	36,250
Two-seasonals	18,125
TOTAL	96,650

The rainfall in the commanded area is as below :-

Taluk	District	Normal rainfall in mm	
		June-Sept.	Oct-Dec.
Hukeri	Belgaum	399.0	164.6
Gokak	Belgaum	303.0	164.4
Bailhongal	Belgaum	434.5	163.3

(MYDK-19, Page 39)

It is claimed that in order to augment the short-fall in rain, it is proposed to provide irrigation facilities to this economically backward area. The Project is not sanctioned.

The technical feasibility of this Project is yet to be investigated. The State of Mysore has submitted only a note on this Project. It is to be examined what will be the effect on the other projects seeking to utilise the flow of the river Ghataprabha, if this Project is sanctioned. The commanded area of this Project is situated between the annual isohyets of 600 mm and 700 mm. The rainfall is not so meagre. In our opinion, the demand for this Project is not worth consideration for the present.

MALAPRABHA PROJECT

The Project Report to be referred to in respect of this Project is MYPK-2 and MYPK-5.

The Malaprabha Project was sanctioned in the year 1963 for a gross utilisation of 37.2 T.M.C., vide Planning Commission's letter No. NR-2(54)/60 dated 5th August, 1963 (un-numbered first page of MYPK-2 or MYDK-12, page 7, Ex. APK-313).

The Project is modified in the year 1970 by increasing the utilisation to 44 T.M.C. as under (page 15 and page 17 of MYPK-5).

	Utilisations (T.M.C.)	Area ir- rigated (Acres)
0) Malaprabha Right Bank Canal in- cluding Nargund Branch	21.70	3,32,300
GO Malaprabha Left Bank Canal	11.45	1,17,700
(iii) Extension of existing Kolchi Right Bank Canal	1.95	20,000
(iv) Lift Irrigation Scheme along the periphery of the reservoir	3.90	40,000
(v) Reservoir losses	5.00	—
TOTAL .	44.00	5,10,000

The Dam, the Left Bank Canal and the Right Bank Canal are under construction.

The rainfall in the Taluks benefited is as under :—

Taluk	District	Normal rainfall in mm	
		June-Sept.	Oct.-Dec
Saundatti	Belgaum	332.8	165.2
Bailhongal	Belgaum	434.5	163.3
Ramdurg	Belgaum	335.6	141.1
Hubli	Dharwar	383.5	156.3
Gadag	Dharwar	359.9	165.6
Navalgund	Dharwar	334.5	158.8
Ron	Dharwar	378.7	147.7
Nargund	Dharwar	291.5	129.0
Badami	Bijapur	341.6	144.6

(Source : MYDK-19, pages 39, 40 and 42) Irrigated area : 5,10,000 acres.

Out of the total irrigated area of 5,10,000 acres, the area to be irrigated by lift is 40,000 acres (23,400 acres by lift along the periphery of the reservoir plus 16,600 acres by lift along the Right Bank Canal).

The following Taluks are identified as drought-affected by the Indian Irrigation Commission :—

- (1) Badami (Bijapur District)
- (2) Ron (Dharwar District)
- (3) Gadag (Dharwar District)

(Report of Indian Irrigation Commission, 1972, Volume I, page 423).

In our opinion the demand for the additional 7 T.M.C. for this Project is worth consideration. Our observations made on the note of the Upper Malaprabha Project may also be seen.

UPPER MALAPRABHA PROJECT

The Project Report of this Project is MYPK-8, pages 52-62.

The proposed Upper Malaprabha Project envisages the construction of a reservoir across the Malaprabha river at Asoga in Khanapur Taluk of Belgaum District with both the Left and the Right Bank Canals. The utilisation proposed is 5 T.M.C. The details of the Project are as under :—

- (1) Live storage : 2.16 T.M.C.
- (2) Area irrigated : 40,000 acres
- (3) The rainfall in the Taluks benefited is as under:—

Taluk	District	Rainfall in mm	
		June-Sept.	Oct.-Dec.
Khanapur .	Belgaum	1444.7	149.7
Bailhongal .	Belgaum	434.5	163.3
Belgaum	Belgaum	1015.7	163.0

(Source : MYDK-19, page 39)

- (4) Utilisation : 5 T.M.C.

The Project is not sanctioned and it does not involve any lift irrigation.

It is urged by the State of Mysore that in order to obtain optimum utilisation of the flows of the river Malaprabha, it is necessary to have an integrated operation of the Malaprabha Project and the Upper Malaprabha Project.

In MY Note 17 the State of Mysore has stated that only 9 T.M.C. will be required for the integrated operation of the Malaprabha Project and this Project. If integrated operation can be managed in 9 T.M.C., this Project or a part of it necessary for such integrated operation is worth consideration.

RAMTHAL LIFT IRRIGATION PROJECT

The Project Report of this Project is MYPK-14, pages 12-16.

This Project envisages the providing of irrigation facilities to an area of 67,500 acres in Hungund Taluk of Bijapur District and Lingsugur Taluk of Raichur District, utilising 9 T.M.C. of water. The live storage is 3.69 T.M.C.

The rainfall in the commanded area is as below :-

Taluk	District	Normal rainfall in mm	
		June-Sept.	Oct.-Dec.
Hungund	Bijapur	361.2	132.0
Lingsugur	Raichur	361.6	113.7

(Source : MYDK-19 pages 37 and 40)

The area thus receives insufficient rainfall during both the seasons. The claim is now confined to 4.5 T.M.C. (MY Note 17, App. II, item 30). The Project is not sanctioned.

Both the Taluks served by this Project are identified by the Indian Irrigation Commission as drought-affected (Report of the Indian Irrigation Commission, 1972 Vol. I, page 423).

In our opinion the demand of 4.5 T.M.C. for this Project is worth consideration.

BHIMA LIFT IRRIGATION PROJECT

The Project Report to be referred to in respect of this Project is MYPK-8, pages 63-74.

The Bhima Lift Irrigation Project envisages the providing of irrigation facilities to the drought-stricken areas of Afzalpur, Gulbarga, Chitapur and Aland Taluks of Gulbarga District to an extent of 2,07,500 acres, utilising 31.18 T.M.C. The live storage is 8.73 T.M.C.

The commanded area receives rainfall as below :—

Taluk	District	Rainfall in mm	
		June-Sept.	Oct.-Dec.
Afzalpur	Gulbarga	Not available	Not available
Chitapur			
Gulbarga	Gulbarga	559.5	100.09
Aland	Gulbarga	Not available	Not available

(Source : MYDK-19, page 37)

The State has now confined its demand to 10 T.M.C. for the Project to serve the drought-stricken areas in the first instance (MY Note 17). This is a lift irrigation scheme and is not sanctioned.

All the Taluks proposed to be served by the Project are identified as drought-affected by the Indian Irrigation Commission (Report of the Indian Irrigation Commission, 1972, Vol. I, page 423).

2 M of I&P/73—13

This is a Lift Irrigation Scheme envisaging diversion of the water from the main stream of the river Bhima. Unless a further study is made of the water available in the river Bhima, the demand for this water cannot be considered for the present. The rainfall in the commanded area is not so meagre.

BHIMA IRRIGATION PROJECT

The Project Report of this Project is MYPK-S, pages 75-87.

The Bhima Irrigation Project envisages the providing of irrigation facilities to Yadgir, Chitapur and Shahapur Taluks of Gulbarga District to an extent of 2,01,500 acres (including 66,500 acres by lift) utilising 37.64 T.M.C. The live storage is 7.75 T.M.C. The commanded area receives rainfall as below:—

Taluk	District	Rainfall in mm	
		June-Sept	Oct.-Dec.
Yadgir	Gulbarga	505.6	105.2
Chitapur	Gulbarga	Not available	Not available
Shahapur			

(Source : MYDK-19, page 37)

It is claimed that the commanded area lies in the scarcity area and to relieve the scarcity conditions to some extent, a minimum quantity of utilisation of 11 T.M.C. is claimed in MY Note No. 17. The Project is not sanctioned.

All the Taluks served by this Project are identified by the Indian Irrigation Commission as drought-affected (Report of the Indian Irrigation Commission, 1972, Vol. I, page 423).

This scheme envisages diversion of the main stream of the river Bhima for irrigation in the drought-affected areas. The State of Mysore has reduced its demand to only 11 T.M.C. for this Project. In our opinion, the demand to the extent of 11 T.M.C. for this Project is worth consideration as it will relieve distress in the drought-affected areas.

DIKSANGA PROJECT

The Project Report to be referred to in respect of this Project is MYPK-10, page 48.

The original Diksanga Project envisages to provide the irrigation facilities to 1250 acres in Afzalpur Taluk of Gulbarga District utilising 0.3 T.M.C. of

water. The cropping pattern and delta are as under :—

Crop	Area as percentage of 1250 acres	Delta in inches
Sugar-cane	10	132
Paddy	30	54
Light Perennial	4	80
Garden	4	72
Kharriff dry	52	24
	100	

In MY Note 17, Appendix II, page 6, item 42 at page 11, it is indicated that the scope of the Project be modified to utilise 1 T.M.C. The rainfall in the commanded area is 545 mm during Kharriff and 103 mm during Rabi, distributed unevenly in the crop season (MYDK-19, page 37).

It is claimed that the area is frequently experiencing drought conditions. In order to relieve the distress due to drought conditions, it is proposed to provide irrigation facilities utilising 1 T.M.C. of water. The Project is not sanctioned.

The Afzalpur Taluk is identified by the Indian Irrigation Commission as drought-affected (Report of the Irrigation Commission 1972, Vol. I, page 423).

In our opinion the demand for 1 T.M.C. is worth consideration.

AMARJA PROJECT

The Project Report to be referred to in respect of this Project is MYPK-10, page 13.

The Project envisages irrigation of 18,000 acres in Aland and Afzalpur Taluks of Gulbarga District, utilising 2.27 T.M.C. The rainfall in the area under the command is 532 mm during June-September period and 103.1 mm during October-December period (MYDK-19, page 37). The crop pattern proposed is 40 per cent Rabi dry, 40 per cent Kharriff dry, the balance 20 per cent being under paddy and perennials. It is stated that the commanded area comprises of soils, red to pale brown in colour, sandy to loam, shallow to medium and well drained and, as such, even during Kharriff season, irrigation is very necessary. Further, the left bank of the Bhima in Gulbarga District is devoid of any irrigation facility. During the year 1972-73 this area experienced acute famine and the work was taken up as a scarcity relief work (MY Note 17, Appendix III, page 8).

Both the Taluks served by this Project are identified by the Indian Irrigation Commission as drought-affected (Report of the Irrigation Commission, 1972 Volume I, page 423).

In our opinion the demand of 2.27 T.M.C. is worth consideration.

BENNITHORA PROJECT

The Project Report to be referred to in respect of this Project is MYPK-8, pages 161-169.

The Project envisages to irrigate 50,000 acres (including 16,400 acres by lift) in Chitapur and Sedam Taluks of Gulbarga District, utilising 6 T.M.C. The live storage is 2.87 T.M.C. The pattern is as under:—

Crop	Area in cases
Sugar-cane	1,680
Light perennials	840
Garden	840
Kharriff paddy	3,360
Kharriff dry	24,800
Rabi dry	18,480
Total:	50,000

The rainfall in the commanded area is 532.5 mm during June-September and 103.1 mm during October-December (MYDK-19, page 37). It is stated that even during the Kharriff season, the rainfall is unevenly distributed. During 1972-73 this area experienced acute famine conditions and the Project has been taken up as a scarcity relief work (MY Note 17, Appendix III, page 9).

Both the Taluks served by this Project are identified by the Indian Irrigation Commission as drought-affected (Report of the Irrigation Commission, 1972, Vol. I, page 423).

The river is being gauged from 1961 onwards near Kurikota Village at about 9 miles upstream of the proposed dam site. According to the Project Report the net dependable yield at the gauge site is 5352.90 Mcft and the proportionate net yield at the dam site works out to 6380 Mcft after allowing for minor irrigation works. In the Report the utilisation contemplated is 6.01 T.M.C. In view of the availability of the dependable flow the utilisation should be slightly less than 6.01 T.M.C.

In our opinion the demand for this Project to the extent of 5.43 T.M.C. is worth consideration.

GANDHORINALA PROJECT

The Project Report to be referred to in respect of this Project is MYPK-14, pages 6-11.

Gandhorinala Project envisages to irrigate 23,000 acres in Gulbarga and Chitapur Taluks of Gulbarga District, utilising 3.01 T.M.C. In addition, this Project provides for water supply to Gulbarga City utilising 0.45 T.M.C. The live storage capacity of the reservoir is 1.72 T.M.C. The rainfall in the commanded area in Gulbarga Taluk during the Khariff and Rabi seasons is 560 mm and 100 mm respectively.

The cropping pattern is as under :—

Crop	Area in acres
Khariff dry	7,100
Rabi dry	11,300
Paddy	3,450
Garden	690
Sugar-cane	460
	23,000

The overall delta is 3.00 ft. The Project is not sanctioned. There is no lift irrigation scheme under this Project. The area is frequently affected by drought and scarcity conditions and a quantity of 2.20 T.M.C. has been claimed for this Project (MY Note 17, Appendix II, page 6).

Both the Taluks of Gulbarga and Chitapur are identified as drought-affected by the Indian Irrigation Commission (Report of the Irrigation Commission 1972, page 423, Volume I).

In our opinion the demand for 2.20 T.M.C. for this Project is worth consideration.

UPPER MULLAMARI PROJECT

The Project Report to be referred to in respect of this Project is MYPK-10, page 14.

The Project envisages irrigation of 10,000 acres in Chincholi Taluk of Gulbarga District, Basavakalyan and Humnabad Taluks of Bidar District, utilising 1.30 T.M.C. of water. The live storage capacity of the reservoir is 0.66 T.M.C. The cropping pattern and the delta are as under :—

Crop	Area in acres	Delta in inches
Khariff paddy	2,500	66
Khariff dry	3,500	21
Rabi dry	4,000	24

It is stated that the area is affected by drought conditions and hence relief is to be given to the area. So, a quantity of 1.30 T.M.C. has been proposed for this Project. It is stated that due to the severe famine conditions during the year 1972-73, the work has been taken up as a scarcity relief measure (MY Note 17). There is no lift irrigation scheme involved in this Project. Chincholi Taluk is Identified as drought-affected by the Indian Irrigation Commission (Report of the Irrigation Commission 1972, Volume I, page 423).

In our opinion the demand of 1.30 T.M.C. is worth consideration for this Project.

LOWER MULLAMARI PROJECT

The Project Report to be referred to in respect of this Project is MYPK-8, pages 151-160.

The Lower Mullamari Project envisages to provide irrigation facilities to the drought-stricken regions of 32,000 acres in Chincholi Taluk of Gulbarga District utilising 4.37 T.M.C. The live storage capacity of the reservoir is 1.53 T.M.C. The Khariff normal rainfall of Gulbarga District is about 550 mm and the normal rainfall during the Rabi season is about 100 mm (MYDK-19, page 37). The cropping pattern under the Project is as under :—

Crop	Area in acres
Sugar-cane	1,200
Garden	600
Light perennials	600
Khariff Paddy	7,200
Light Khariff	9,600
Rabi dry	4,800
Second crop	8,000

The overall delta is 3.14 feet. There is no lift irrigation scheme involved in this Project.

It is claimed that in order to relieve the drought conditions a quantity of 4.40 T.M.C. is proposed for this Project. Due to the severe drought conditions during the year 1972-73, the work has been taken up as scarcity relief measure (MY Note 17).

Chincholi Taluk is identified as a drought-affected Taluk by the Indian Irrigation Commission (Report of the Irrigation Commission 1972, Volume I, page 423).

In our opinion the demand of 4.40 T.M.C. is worth consideration.

KAGNA PROJECT

The Project Report of this Project is MYPK-8, pages 141-150.

The Kagna Project envisages the irrigation of an area of 64,000 acres, including 16,000 acres by lift, in Sedam and Chitapur Taluks of Gulbarga District, utilising 12.93 T.M.C. The live storage capacity of the reservoir is 1.26 T.M.C. The Khariiff normal rainfall of Gulbarga District is about 550mm and the Rabi normal rainfall is about 100 mm (MYDK-19, page 37). The cropping pattern is as under:—

Crop	Area in acres
Sugar-cane	2,560
Paddy	51,840
Rabi dry	9,600
	64,000

The overall delta is 4.68 feet. The Project is not sanctioned.

To mitigate the hardship due to shortage of rainfall, the State of Mysore has proposed to provide irrigation facilities by utilising at least 2 T.M.C. Sedam and Chitapur Taluks are identified as drought-affected Taluks by the Indian Irrigation Commission (Report of the Irrigation Commission 1972, Volume I, page 423).

In our opinion the demand for 2 T.M.C. for this Project is worth consideration.

TUNGABHADRA LEFT BANK LOW LEVEL CANAL

The Project Report to be referred to in respect of this Project is MYPK-8, pages 12-30.

The Tungabhadra Left Bank Low Level Canal was sanctioned by the former Government of Hyderabad during 1951 for irrigating an area of 4.50 lakh acres plus 1.35 lakh acres of forest, pasture and fuel reserves (MYDK-8, page 29). The said sanctioned Project also provides for a High Level Canal on the left side.

The printed Project Report of Ex-Hyderabad Government gives a demand table wherein the withdrawals are shown as 92.25 T.M.C. (excluding evaporation losses Ex. MYK-270, page 44). The cropping pattern was changed to irrigate 5.8 lakh acres by the Hyderabad Government during 1955 (APDK-10, page 134).

In 1956, the Chief Engineer, Tungabhadra Project considered 82 T.M.C. as sufficient to irrigate 5,80,000 acres including 10,000 acres of second crop paddy (see Supplemental Pleadings Volume III, page 95).

92 T.M.C. gross (including 9 T.M.C. evaporation loss) has been allowed as protected use.

The State of Mysore has demanded a total allocation of 101.3 T.M.C. including 9 T.M.C. evaporation losses as against 92 T.M.C. It is claimed by the State of Mysore that sanctioned area of 5.8 lakh acres is already localised and canals and the distribution system have been practically completed (MYPK-8, page 15).

AS we have made it clear, unless very necessary, the water in K-8 and K-9 sub-basins should not be further allowed to be depleted. In our opinion, the State of Mysore should manage the irrigation under this Project by utilising 92 T.M.C. The additional demand for 9.3 T.M.C. is not worth consideration.

VIJAYANAGAR CHANNELS

These are ancient channels, 18 in number, existing from the 16th Century from the times of the Vijayanagar Empire. They are in the Districts of Bellary and Raichur. The names of the anicuts and channels now in Mysore State are as under :—

Name of Anicut	Name of Channel	District
1. Vallabhapura Anicut	Basavanna Channel	Bellary
2. Hosakote Anicut	Ray a Channel	Bellary
3. Hosur Anicut	Bella Channel	Bellary
4. Turtha Anicut	Turtha Channel	Bellary
5. Ramasagar Anicut	Ramasagar Channel	Bellary
6. Kampli Anicut	Kampli Channel	Bellary
7. Siruguppa Anicut	Siruguppa Channel	Bellary
8. Desanur Anicut	Desanur Channel	Bellary
9.	Kalghatta Channel	Bellary
10.	Belgodhal Channel	Bellary
11. Koregal Anicut	Koregal Channel •	Raichur
12. Hulgi Anicut	Hulgi Channel	Raichur
13. Shivapur Anicut	Shivapur Channel	Raichur
14. Sanapur Anicut	Anegundi Channel	Raichur
15. Upper Gangavathi Anicut	Upper Gangavathi Channel	Raichur
16. Lower Gangavathi Anicut	Lower Gangavathi Channel	Raichur
17. Bennur Anicut	In ruins	Raichur
18. Bichal Anicut	Bichal Channel	Raichur

Out of the above, Vallabhapura, Hosakote and the Koregal Anicuts are submerged under the Tungabhadra Reservoir. The Bennur Anicut is in ruined condition. The Raya and Basavanna Channels are fed from a sluice in the Tungabhadra Reservoir. The sluice for a discharge of about 375 cusecs which is the normal discharge drawn by both the Raya and Basavanna Channels to command about 7,500 acres is provided (APDK-18, page 76). The Koregal Channel has merged with the Tungabhadra Left Bank Canal. The rest of the channels directly take off from the river and there is no storage.

Ayacut under these channels is about 30,000 acres. It is claimed that these channels work at very low duties and they have acquired a right for such low duties on account of long usage and custom (APPK-18, pages 35-36).

The minimum utilisation claimed is 13.7 T.M.C. out of which the protected use is only 5.71 T.M.C. The actual annual withdrawal of Raya Basavanna Channels for the last ten years is about 10 T.M.C. (MYDK-10, pages 3-12). It is stated by the State of Mysore that the State of Andhra Pradesh had indicated as far back as 1956 a utilisation of 29 T.M.C. for all the Pre-Moghul Channels (APDK-VIII, page 26).

These are very old channels and in our opinion the additional demand for water to the extent of 6.35 T.M.C. may be held as worth consideration.

GONDI LEFT BANK CANAL EXTENSION

The Project Report of this Project is MYPK-10, page 6.

This is an extension of the existing Bhadra Anicut Left Bank Canal. It envisages irrigation of 9,460 acres in Bhadravathy Taluk of Shimoga District utilising 2 T.M.C. It is stated that the area is particularly suited to grow Khariff paddy for which the normal rainfall during the season is not sufficient. As the canal and the anicut are already existing and functioning, 9,460 acres of Khariff paddy at a duty of 50 acres/cusec can be brought under Khariff irrigation at a very economical cost (MY Note 17 Appendix III, page 12). The Project does not involve any lift. The Project is not sanctioned.

In our opinion the demand for this Project is not worth consideration. This demand may be met by effecting economy in utilisation for the Bhadra Project.

UPPER TUNGA PROJECT

The Project Report of this Project is MYPK-8, pages 95—103.

The Upper Tunga Project is proposed to provide irrigation facilities mainly for Ranebennur, Haveri, Shirhatti and Mundargi Taluks of Dharwar District of Ex-Bombay State and Koppal Taluk of Raichur District. The irrigable area under the above Project is 3,20,000 acres including 50,500 acres by lift irrigation, and the cropped area proposed is 4,10,000 acres. June-September period of rainfall in the various Taluks proposed to be served by this Project is given below :—

Area served		Irrigable area in '000 acres	Normal rainfall in mm during June to September
District	Taluk		
Shimoga	Shimoga		526.6
	Honnali		289.1
Dharwar	Hirekerur		498.6
	Ranebennur	320.00	332.5
	Haveri		445.0
	Mundargi		252.9
	Shirhatti /		Not available
Raichur	Shiggaon		426.4
	Hangal		628.8
	Koppal		Not available

Note:— The figures of rainfall are derived from MYDK-19, pages 33, 41 and 42.

The Taluks of Mundargi, Ranebennur and Koppal are identified as drought-affected by the Indian Irrigation Commission, vide Report of Irrigation Commission 1972 (Volume I, page 423).

The major portion of the area proposed for irrigation is in Ex-Bombay Karnatak area. It is now proposed by the State that at least 20 T.M.C. from 75 per cent dependable flows, as against 40 T.M.C. claimed, may be allowed (MY Note 17, Appendix III, page 13).

In our opinion unless a further study is made of the available water in the river Tungabhadra, the demand to the extent of 20 T.M.C. for this Project is not worth consideration for the present.

UPPER BHADRA PROJECT

The Project Report to be referred to regarding this Project is MYPK-8, pages 104—113.

The Upper Bhadra Project is proposed primarily to provide irrigation facilities to the drought-affected

areas of 4,10,000 acres of Chitradurga and Bellary District in the Taluks mentioned below which are chronically drought-affected areas. The Project requires 36 T.M.C. There is no lift involved in this Project. The Project is not sanctioned.

The rainfall during Khariff in the various Taluks of Chitradurga, Bellary, Shimoga and Chikkamagalur Districts for which irrigation facility is proposed is as under:—

Area served		Irrigated area (000 acres)	Normal rainfall in mm during June-September
District	Taluk		
Chikkamagalur	Tankere	33.40	557.0
Shimoga	Channagiri	2.00	454.2
	Bhadravathy	8.10	Not available
	Challakere	161.00	217.4
Chitradurga	Hosadurga	59.50	274.8
	Jagalur	28.00	291.8
	Molakalmuru	38.00	321.8
	Kudligi	69.40	385.3
Bellary	Sandur	10.60	Not available
Total		410.00	

Note :- (1) irrigated areas are MYPK-9, pages 109 and 110.
(2) Rainfall figures are derived from MYDK-19, pages 33 to 36.

It is submitted that the area in Chitradurga and Bellary Districts is one of the worst affected areas in the basin. The aridity of the area and the economic backwardness of the area justify the implementation of this Project at least for a utilisation of 10 T.M.C. (MY Note 17 Appendix HI, pages 13 and 14).

The whole of Chitradurga and Bellary Districts have been identified as drought-affected by the Indian Irrigation Commission (Report of Irrigation Commission 1972, Volume I, pages 422 and 423).

It cannot be said that the demand for this Project is not worth consideration. But unless a further study is made of the water available in the river Tungabhadra, the Project may be deferred.

FEEDER CHANNEL TO RANIKERE

The Project Report to be referred to regarding this Project is MYPK-10, page 18.

This Project will irrigate 10,200 acres in Challakere Taluk of Chitradurga District, utilising 1 T.M.C. of

water. June-September rainfall in Challakere Taluk is 217.4 mm only (MYDK-19, page 35). The cropping pattern proposed under this Project is as under:—

Crop	Area in acres	Delta in inches
Khariff paddy	742	66
Semi dry	9,458	21
	10,200	

There is no lift irrigation involved in this Project. The Project is not yet sanctioned.

The area proposed to be served is one of the worst scarcity-affected areas. This Taluk is identified as drought-affected by the Indian Irrigation Commission vide Report of the Indian Irrigation Commission 1972 (page 422 of Volume I).

Unless a further study is made of the waters available in the river Vedavathi, the demand of 1 T.M.C. is not worth consideration.

JINIGEHALLA PROJECT

The Project Report to be referred to regarding the Project is MYPK-10, page 63.

This Project will irrigate 8,230 acres in Molakalmuru Taluk of Chitradurga District utilising 1 T.M.C. of water. June-September rainfall in Molakalmuru Taluk is 321.8 mm only (MYDK-19, page 35). The cropping pattern under this Project is as under:—

Crop	Area in acres	Delta in inches
Khariff paddy	5,230	66
Khariff semi dry	3,000	24
	8,230	

The irrigation is by flow only and no lift is involved. The work is not yet sanctioned. The area is affected by scarcity and drought conditions frequently and the Indian Irrigation Commission has identified this Taluk as drought-affected vide Report of the Indian Irrigation Commission 1972 (Volume I, page 422).

Unless a further study is made of the water available in the river Vedavathi, the demand of 1 T.M.C. for this Project is not worth consideration.

MINOR IRRIGATION

It is claimed by the State of Mysore that the total utilisation of all the minor irrigation works existing and under construction as on 1969 is 124.26 T.M.C.

(pages 4(a) and 5 of Annexure III to Sheet XXXVIII of MRDK Volume XIV). Against this the protected use is only 94.34 T.M.C. The sub-basinwise details for the balance of 29.92 or say 30 T.M.C. required by the minor irrigation works which came into operation or under construction after 1960 are as under:—

Sub-basin	Requirement in T.M.C. for Minor Irrigation works under operation and under construction from 1960-61.
K-1	0.33
K-2	5.16
K-3	3.20
K-4	1.56
K-5	0.56
K-6	3.77
K-7	1.00
K-8	11.17
K-9	3.25
Total	30.00

Statement 6 of Annexure III, MYK Volume-I provides for a utilisation of 98.3 T.M.C. under future minor irrigation works (utilising less than 1 T.M.C. each). However, the State of Mysore states that under the priority only 34.60 T.M.C. is proposed to be utilised under future minor irrigation works. The sub-basinwise details are as under:—

Sub-basin	Requirement in T.M.C.
K-1	0.70
K-2	4.00
K-3	3.65
K-4	4.51
K-5	0.03
K-6	7.63
K-7	0.66
K-8	12.42
K-9	1.00
Total	34.60

(MY Note 17 Appendix-III, pages 14-15)

We are of the opinion that 30 T.M.C. may be held as worth consideration for Minor Irrigation as this quantity of water is required to meet the demands of the minor works existing or under construction.

We are, however, of the opinion that it is not possible to treat the demand of 34.60 T.M.C. for Minor Irrigation in future as worth consideration for the present.

As a result of examining the projects of the State of Mysore for which water has been claimed from the dependable flow of 2060 T.M.C., we are of the opinion that the demand for the following projects is worth consideration to the extent mentioned against each item:—

	T.M.C
1. Dudhganga Project	4.00
2. Upper Krishna Project	52.00
3. Ghataprabha Project	55.00
4. Malaprabha Project (including Upper Malaprabha Project)	9.00
5. Ramthal Lift Irrigation Scheme	4.50
6. Bhima Irrigation Project	11.00
7. Diksanga Project	1.00
8. Amarja Project	2.27
9. Bennithora Project	5.43
10. Gandhorinala Project	2.20
11. Upper Mullamari Project	1.30
12. Lower Mullatmari Project	4.40
13. Kagna Project	2.00
14. Vijayanagar Channels	6.35
15. Minor Irrigation	30.00
Total	190.45

The State of Mysore in MY Note No. 17 has further claimed 162 T.M.C. out of the water flowing in excess of the dependable flow of 2060 T.M.C., as follows:—

	T.M.C
1. Dudhganga Project	5.00
2. Upper Krishna	100.00
3. Markandeya Project	1.00
4. Malaprabha Project	3.00
5. Upper Tunga	20.00
6. Upper Bhadra	15.00
7. Minor Irrigation	18.00
Total	162.00

On the very face of it, this demand cannot be satisfied as the only flow that is available for distribution in excess of 2060 T.M.C. is that due to the return flow as already mentioned in Part I. We have given a share to the State of Mysore in the return flow. The State of Mysore may utilise the quantity of water allocated to it as its share in the return flow for any of its projects, subject to the conditions and restrictions imposed by us on the utilisation of waters in the various sub-basins.

This completes our discussion so far as the demands of the State of Mysore are concerned.

CHAPTER XV

The Governments of Maharashtra, Karnataka and Andhra Pradesh shall bear their own costs of appearing before the Tribunal. The expenses of the Tribunal shall be borne and paid by the three States in equal shares. This is in accordance with the practice followed in America as well as the precedent of the Indus Commission Report. The expenses could be assessed only after the final dissolution of the Tribunal.

On April 10, 1971, the Tribunal passed an order in terms of agreed minutes filed by the parties regarding the diversion of the Godavari waters. It was stated by the parties that each of the concerned States "will be at liberty to divert any part of the share of the Godavari waters which may be allocated to it by the Godavari Tribunal from the Godavari Basin to any other Basin". None of the States thereafter asked for a mandatory order from the Tribunal for diversion of the Godavari waters into the Krishna Basin. With effect from that date, the Krishna and Godavari cases got separated from each other. In consequence of the order passed by the Tribunal on 19th April, 1971, the States of Madhya Pradesh and Orissa were discharged from the record of Krishna case and were no longer parties. In our order of 19th April, 1971 we directed the States of Madhya Pradesh and Orissa to pay their own costs.

Our order of 19th April, 1971 as also the order of the 27th July, 1971 modifying the previous order are set forth in Appendix 'U' to this Report.

In order to inform ourselves fully about the projects of the different States, as also to assess their relative importance in the general scheme of allocation and above all to comprehend objectively the site problems presented to us by the different States by having a close look at them, we inspected many places in the Krishna basin. Though this tour took little more than four weeks of the Tribunal's time, the experience and the results were very rewarding. The visits to Koyna Nagar, Narayanpur, Alamatti, Nagarjunasagar, Vijayawada, Srisailem, Tungabhadra Dam and Suneksa amongst the many places we saw unfolded at a glance the manifold facets of the problems of the projects and structures located there and left little scope for explanation and elaboration which would have been necessary if arguments before the

Tribunal had been addressed without the visual aid provided by these inspections. The States of Maharashtra, Karnataka and Andhra Pradesh extended to us the utmost courtesy and spared no efforts to make our visit extremely useful and instructive. The officials deputed to look after the inspection arrangements of the Tribunal and its staff made a commendable work of it and we give our need of praise for the unobtrusive efficiency displayed by them.

We would be failing in sincerity, and no less in our duty if we fail to acknowledge our debt of gratitude for the active co-operation extended to us by the eminent counsel of the States and the assistance derived by them as also by us from their respective engineers, scientists and technicians. These experts had to put in hours of hard work and industry and we genuinely felt that sometimes we were a little too exacting in asking for details and technical information on special problems at a very short notice. Not once was their active support or co-operation withheld or delayed. The State Governments were equally keen to render the utmost assistance to the Tribunal in the expeditious disposal of its task in hand. The respective Governments placed the services of *two* Stenographers each at the disposal of the Tribunal during the period when the oral evidence was recorded and arguments heard. These officials did not take long to make themselves familiar with their work and became quite at ease in the shortest possible time with the scientific terms, phrases and formulae used by the witnesses. To them we owe a great deal for saving the time of the Tribunal and the maintenance of a satisfactory record by the Tribunal's officials.

We would add that without the active willingness of the State Governments and their specialist advisers, our task would have assumed stupendous proportions. The Tribunal was called upon to decide on questions involving technical and engineering matters of utmost complexity. At the very beginning we were asked by the counsel for the different States to get along with our work without the assessors whose technical assistance could be made available to us under the Inter-State River Disputes Act. We acceded to the request jointly made by the counsel for all the States. We can now say at the end of our labours that it would have been difficult to arrive at conclusive results unless the willingness of the State Governments, their

counsel and engineers to reach the maximum possible agreements on complex technical points of dispute, was readily forthcoming. We have already made reference to such matters in our report and need not advert to these again. We hope earnestly that the equally important task of implementation of the decisions at which we have reached would receive the ready support and co-operation by the concerned States. For reasons, which we have explained in our report, we are not immediately setting up an authority to maintain watch and supervision over the work of implementation. The amity and goodwill displayed

by the parties in the conduct of this long trial lead us to hope that our expectations will be amply fulfilled.

To our own staff, we are indebted for the unstinted efforts and the conscientious discharge of duties in performance of the Tribunal's work at all hours of the day. Mr. M. Prasad, the Secretary of the Tribunal, has been conspicuous in the discharge of his duties with zeal and devotion. It would be invidious to mention individuals from amongst members of the staff but it would be true to say that one and all they have done excellent work in which they evinced great interest and assiduity.

CHAPTER XVI

Final Order of the Tribunal.

The Tribunal hereby passes the following Order :—

Clause I

This Order shall come into operation on the date of the publication of the decision of this Tribunal in the official Gazette under Section 6 of the Inter-State Water Disputes Act, 1956.

Clause II

The Tribunal hereby declares that the States of Maharashtra, Karnataka and Andhra Pradesh will be free to make use of underground water within their respective State territories in the Krishna river basin.

This declaration shall not be taken to alter in any way the rights, if any, under the law for the time being in force of private individuals, bodies or authorities.

Use of underground water by any State shall not be reckoned as use of the water of the river Krishna.

Clause III

The Tribunal hereby determines that, for the purpose of this case, the 75 per cent dependable flow of the river Krishna up to Vijayawada is 2,060 T.M.C.

The Tribunal considers that the entire 2,060 T.M.C. is available for distribution between the States of Maharashtra, Karnataka and Andhra Pradesh.

The Tribunal further considers that additional quantities of water as mentioned in sub-clauses A(ii), A(iii), A(iv), B(ii), B(iii), B(iv), C(ii), C(iii) and C(iv) of Clause V will be added to the 75 per cent dependable flow of the river Krishna up to Vijayawada on account of return flows and will be available for distribution between the States of Maharashtra, Karnataka and Andhra Pradesh.

Clause IV

The Tribunal hereby orders that the waters of the river Krishna be allocated to the three States of Maharashtra, Karnataka and Andhra Pradesh for their beneficial use to the extent provided in Clause V and subject to such conditions and restrictions as are mentioned hereinafter.

Clause V

(A) The State of Maharashtra shall not use in any water year more than the quantity of water of the river Krishna specified hereunder :—

- (i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the official gazette up to the water year 1982-83

565 T.M.C.

- (ii) as from the water year 1983-84 up to the water year 1989-90

565 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iii) as from the water year 1990-91 up to the water year 1997-98

565 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iv) as from the water year 1998-99 onwards

565 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(B) The State of Karnataka shall not use in any water year more than the quantity of water of the river Krishna specified hereunder :—

- (i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the official gazette up to the water year 1982-83

695 T.M.C.

- (ii) as from the water year 1983-84 up to the water year 1989-90

695 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iii) as from the water year 1990-91 up to the water year 1997-98

695 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iv) as from the water year 1998-99 onwards

695 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(C) The State of Andhra Pradesh will be at liberty to use in any water year the remaining water that may be flowing in the river Krishna but thereby it shall not acquire any right whatsoever to use in any water year nor be deemed to have been allocated in any water year water of the river Krishna in excess of the quantity specified hereunder :—

- (i) as from the water year commencing on the 1st June next after the date of the publica-

tion of the decision of the Tribunal in the official gazette up to the water year 1982-83

800 T.M.C.

- (ii) as from the water year 1983-84 up to the water year 1989-90

80Q T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iii) as from the water year 1990-91 up to the water year 1997-98

800 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

- (iv) as from the water year 1998-99 onwards

800 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(D) For the limited purpose of this Clause, it is declared that:—

- (i) the utilisations for irrigation in the Krishna river basin in the water year 1968-65 from projects using 3 T.M.C. or more annually were as follows:—

From projects of the State of Maharashtra	61.45 T.M.C.
From projects of the State of Karnataka	176.05 T.M.C.
From projects of the State of Andhra Pradesh	170.00 T.M.C.

- (ii) annual utilisations for irrigation in the Krishna river basin in each water year after this Order comes into operation from the projects of any State using 3 T.M.C. or

more annually shall be computed on the basis of the records prepared and maintained by that State under Clause XIII.

Clause VI

Beneficial use shall include any use made by any State of the waters of the river Krishna for domestic, municipal, irrigation, industrial, production of power, navigation, pisciculture, wild life protection and recreation purposes.

Clause VII

(A) Except as provided hereunder a use shall be measured by the extent of depletion of the waters of the river Krishna in any manner whatsoever including losses of water by evaporation and other natural causes from man-made reservoirs and other works without deducting in the case of use for irrigation the quantity of water that may return after such use to the river.

The water stored in any reservoir across any stream of the Krishna river system shall not of itself be reckoned as depletion of the water of the stream except to the extent of the losses of water from evaporation and other natural causes from such reservoir. The water diverted from such reservoir by any State for its own use in any water year shall be reckoned as use by that State in that water year.

The uses mentioned in column No. 1 below shall be measured in the manner indicated in column No. 2.

Use	Measurement
Domestic and municipal water supply.	By 20 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.
Industrial use.	By 2.5 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal

(B) Diversion of the waters of the river Krishna by one State for the benefit of another State shall be treated as diversion by the State for whose benefit the diversion is made.

Clause VIII

(A) If in any water year any State is not able to use any portion of the water allocated to it during that year on account of the non-development of its projects or damage to any of its projects or does not

use it for any reason whatsoever, that State will not be entitled to claim the unutilised water in any subsequent water year.

(B) Failure of any State to make use of any portion of the water allocated to it during any water year shall not constitute forfeiture or abandonment of its share of water in any subsequent water year nor shall it increase the share of any other State in any subsequent water year even if such State may have used such water. —

Clause IX

As from the 1st June next after the date of the publication of the decision of the Tribunal in the official gazette.

(A) Out of the water allocated to it, the State of Maharashtra shall not use in any water year :—

(i) more than 7 T.M.C. from the Ghataprabha (K-3) sub-basin.

(ii) more than 90 T.M.C. from the main stream of the river Bhima.

(B) Out of the water allocated to it, the State of Karnataka shall not use in any water year—

(i) more than 295 T.M.C. from the Tungabhadra (K-8) sub-basin and more than 42 T.M.C. from the Vedavathi (K-9) sub-basin.

(ii) more than 15 T.M.C. from the main stream of the river Bhima.

(C) Out of the water allocated to it, the State of Andhra Pradesh shall not use in any water year—

(i) more than 127.5 T.M.C. from the Tungabhadra (K-8) sub-basin more than 12.5 T.M.C. from the Vedavathi (K-9) sub-basin.

(ii) more than 6 T.M.C. from the catchment of the river Kagna in the State of Andhra Pradesh.

(D) (i) The uses mentioned in sub-clauses (A), (B), and (C) aforesaid include evaporation losses.

(ii) The use mentioned in sub-clause (C) (i) does not include use of the water flowing from the Tungabhadra into the river Krishna.

Clause X -

(1) The State of Maharashtra shall not out of the water allocated to it divert or permit the diversion of more than 67.5 T.M.C. of water outside the

Krishna river basin in any water year from the river supplies in the Upper Krishna (K-1) sub-basin for the Koyna Hydel Project or any other project.

Provided that the State of Maharashtra will be at liberty to divert outside the Krishna river basin for the Koyna Hydel Project water to the extent of 97 T.M.C. annually during the period of 10 years commencing on the 1st June, 1974 and water to the extent of 87 T.M.C. annually during the next period of 5 years commencing on the 1st June, 1984 and water to the extent of 78 T.M.C. annually during the next succeeding period of 5 years commencing on the 1st June, 1989.

(2) The State of Maharashtra shall not out of the water allocated to it divert or permit diversion outside the Krishna river basin from the river supplies in Upper Bhima (K-5) sub-basin for the Projects collectively known as the Tata Hydel Works or any other project of more than 54.5 T.M.C. annually in any one water year and more than 212 T.M.C. in any period of five consecutive water years commencing on the 1st June, 1974.

(3) Except to the extent mentioned above the State of Maharashtra shall not divert or permit diversion of any water out of the Krishna river basin.

Clause XI

(A) This Order will supersede—

- (i) the agreement of 1892 between Madras and Mysore so far as it related to the Krishna system;
- (ii) the agreement of 1933 between Madras and Mysore so far as it related to the Krishna river system;
- (iii) the agreement of June, 1944 between Madras and Hyderabad;
- (iv) the agreement of July, 1944 between Madras and Mysore; in so far it related to the Krishna river system;
- (v) the supplemental agreement of December, 1945 among Madras, Mysore and Hyderabad;
- (vi) the supplemental agreement of 1946 among Madras, Mysore and Hyderabad.

Copies of the aforesaid agreements are appended to the report of the Tribunal.

(B) The regulations set forth in Annexure 'A' to this Order regarding protection to the irrigation works in the respective territories of the States of Karnataka and Andhra Pradesh in the Vedavathi sub-basin be observed and carried out.

(C) The benefits of utilisations under the Rajolimbunda Diversion Scheme be shared between the States of Karnataka and Andhra Pradesh as mentioned herein below:—

Karnataka	1.2 T.M.C.
Andhra Pradesh	15.9 T.M.C.

(D) The reservoir loss of Tungabhadra reservoir shall be shared equally by the works of the State of Karnataka on the left side and the works on the right side of the reservoir. The half share of the right side in the reservoir loss shall be shared by the States of Andhra Pradesh and Karnataka in the ratio of 5.5 to 3.5.

Clause XII

The regulations set forth in Annexure 'B' to this Order regarding gauging and gauging sites in the Krishna river system be observed and carried out.

Clause XIII

(A) Each State shall prepare and maintain annually for each water year complete detailed and accurate records of—

- (a) annual water diversions outside the Krishna river basin.
- (b) annual uses for irrigation from irrigation works using less than 1 T.M.C. annually.
- (c) annual uses for irrigation from all other projects and works.
- (d) annual uses for domestic and municipal water supply.
- (e) annual uses for industrial purposes.
- (f) annual uses for irrigation within the Krishna river basin from projects using 3 T.M.C. or more annually.
- (g) areas irrigated and duties adopted for irrigation from irrigation works using less than 1 T.M.C. annually.
- (h) estimated annual evaporation losses from reservoir and storages.
- (i) formulae used and co-efficient adopted for measuring discharges at project sites.

Each State shall send annually to the other States a summary abstract of the said records.

The said records shall be open to inspection of the other States through their accredited representatives at all reasonable times and at a reasonable place or places.

(B) The records of gaugings mentioned in Annexure 'B' to this Order shall be open to inspection of all the States through their accredited representatives at all reasonable times and at a reasonable place or places.

Clause XIV

(A) At any time after the 31st May, 2000, this Order may be reviewed or revised by a competent authority or Tribunal, but such review or revision shall not as far as possible disturb any utilisation that may have been undertaken by any State within the limits of the allocation made to it under the foregoing clauses.

(B) In the event of the augmentation of the waters of the river Krishna by the diversion of the waters of any other river, no State shall be debarred from claiming before the aforesaid reviewing authority or Tribunal that it is entitled to greater share in the waters of the river Krishna on account of such augmentation nor shall any State be debarred from disputing such claim.

Clause XV

Nothing in the Order of this Tribunal shall impair the right or power or authority of any State to regulate within its boundaries the use of water, or to enjoy the benefit of waters within that State in a manner not inconsistent with the Order of this Tribunal.

Clause XVI

this Order,

- (a) Use of the water of the river Krishna by any person or entity of any nature whatsoever within the territories of a State shall be reckoned as use by that State.
- (b) The expression "water year" shall mean the year commencing on 1st June and ending on 31st May.

(c) The expression "Krishna river" includes the main stream of the Krishna river, all its tributaries and all other streams contributing water directly or indirectly to the Krishna river.

(d) The expression "T.M.C." means thousand million cubic feet of water.

Clause XVII

Nothing contained herein shall prevent the alteration, amendment or modification of all or any of the foregoing clauses by agreement between the parties or by legislation by Parliament.

Clause XVIII

The Government of Maharashtra, Karnataka and Andhra Pradesh shall bear their own costs of appearing before the Tribunal. The expenses of the Tribunal shall be borne and paid by the aforesaid three States in equal shares.

ANNEXURE A

Regulations regarding protection to irrigation works in the respective territories of the States of Karnataka and Andhra Pradesh in Vedavathy sub-basin.

The State of Karnataka will not put up any new work on the streams mentioned in Schedule (1) within the limits shown in the said Schedule and marked in the map* appended herewith, without the previous consent" of Andhra Pradesh to protect the irrigation interests under the existing irrigation works in Andhra Pradesh and similarly the State of Andhra Pradesh will not put up any new work on the Streams mentioned in Schedule (2) within the limits shown in the said Schedule and marked in the map* appended herewith, without the previous consent of the State of Karnataka to protect the irrigation interests under the existing irrigation works in the State of Karnataka.

This State of Karnataka will not put up any new construction on Suvarnamukhi river so as to affect the supply of Agali tank in Andhra Pradesh for the irrigation of an ayacut of 884 acres, the supplies for which are drawn from the Agali Anicut in the State of Karnataka.

*See Map II in Volume IV of the Report.

SCHEDULE I

List of streams on which no new constructions should be undertaken by the State of Karnataka without the previous consent of Andhra Pradesh.

Sl. No.	Name of the Stream or Catchment	Location in the Map	Limits within which no new construction should be undertaken by Karnataka without the previous consent of Andhra Pradesh
1.	Hagari (Vedavathy)	A	From Vanivilas Sagar in Karnataka upto Bhairavanithippa Dam in Andhra Pradesh.
2.	Dodderi tank halla (Garanihalla)	B	4 1/2 miles upstream of confluence with Hagari.
3.	Talak tank halla (Garanihalla)	C	From the Salem-Bellary road bridge over this stream upto confluence with
4.	Chinnahagari	D	Upto 16 miles upstream from Karnataka-Andhra Pradesh boundary.
5.	Amarapuram tank catchment	E	Catchment of Amarapuram tank in the State of Karnataka.
6.	Virapasamudram tank catchment	F	Catchment of Virapasamudram tank in the State of Karnataka.
7.	Yeradkere tank catchment	G	Catchment of Yeradkere tank in the State of Karnataka.
8.	Rangasamudram tank catchment	H	Catchment of Rangasamudram tank in the State of Karnataka.
9.	Nagalapuram tank catchment	I	Catchment of Nagalapuram tank in the State of Karnataka.

SCHEDULE 2

List of streams on which no new constructions should be undertaken by the State of Andhra Pradesh, without the previous consent of Karnataka.

Sl. No.	Name of the Stream	Location in the Map	Limits within which no new construction should be undertaken by Andhra Pradesh without the previous consent of the State of Karnataka.
1	2	3	4
1.	Madalur Doddakere nala	J	Entire catchment of the nala in Andhra Pradesh.
2.	Madalur Gidagana-halli Kattenala	K	Entire catchment of the nala in Andhra Pradesh.
3.	Doddabanagere Doddakere nala	L	Entire catchment of the nala in Andhra Pradesh.
4.	Dharmapur tank nala	M	Entire catchment of the nala in Andhra Pradesh.

1	2	3	4
5.	Parasurampur Doddakere nala	N	Entire catchment of the nala in Andhra Pradesh.
6.	Kadehoda Achuvallikere nala	O	Entire catchment of the nala in Andhra Pradesh.
7.	Parasurampur a tank nala	P	Entire catchment of the nala in Andhra Pradesh.
8.	Gowripura Palydakere nala	Q	Entire catchment of the nala in Andhra Pradesh.
9.	Jajur tank nala	R	Entire catchment of the nala in Andhra Pradesh.
9.	Thippareddihally Kyatanakere nala	S	Entire catchment of the nala in Andhra Pradesh.
11.	Oblapur tank nala	T	Entire catchment of the nala in Andhra Pradesh.
16.	Hagari (Vedavathy)	U	Below Bhairavanithippa Dam up to Andhra Pradesh Karnataka border.
13.	Chinnahagari	V	From Karnataka-Andhra Pradesh border up to its confluence with Vedavathy (Hagari).

ANNEXURE B

Regulations regarding gaugings and gauging sites in the Krishna River System

The river Krishna and its tributaries should be gauged at the following sites:

1. *At all the dam and wier sites—existing, under construction and future projects—utilising annually 1 T.M.C. or more:*

At all such sites the following measurements will be made and recorded three times a day—6 A.M. in the morning, 12 Noon and 6 P.M. in the evening:—

- Diversions into canals, penstocks, tunnels etc.
- Water let down through the various sluices in the dam, weir or barrage.
- Overflow over waste weir or spillways.
- Estimated evaporation losses.
- Water lifted from the river or reservoirs for irrigation, water supply and for any other purpose. These measurements will be made by the States in which the dams and weirs are situated.

The cost of such measurements will be borne by the States concerned.

II. *Gauging on Inter-State Streams :*

Three times daily at 6 A.M., 12 Noon and 6 P.M.

A. Inter-State streams between Karnataka and Andhra Pradesh :

1. The Krishna River near		Deosugar (at present a CW& PC gauging site)
2. The Bhima River near	...	Yadgir (CW&PC gauging site).
3. The Tungabhadra River near		Madhwaram bridge site.
4. (a) The Vedavathy River near	..	Bhairvanithippa
(b) The Vedavathy River near	...	Rampur (at present a CW&PC site)
5. The Kagna River near	...	Jiwargi
6. The Chikkahagari River near		Amkundi Bridge or Aqueduct site on High Level Canal.

The location of these stations may be changed from time to time as the river channels and flow conditions of the rivers may require. The river gauging at Deosugar, Yadgir, and Rampur will be continued to be done by the CW&PC as at present, the States bearing the cost as being done now. The river gauging at Madhawaram, Bhairvanithippa, Jiwargi and Amkundi Bridge will be done jointly by the States of Karnataka and Andhra Pradesh or by the CW&PC if willing to do so, and the cost will be shared between all the three States equally.

B. Inter-State Streams between Maharashtra and Karnataka :

1. The Krishna river near		Shirti (at present a CW&PC gauging site)
2. The Bhima river near	...	Takali (do)
3. The Ghataprabha river near	...	Daddi
4. The Vedganga river near	...	Bastawad
5. The Dudhganga river near	...	Kagal at the bridge site on N. Highway.
6. The Panchaganga river near	...	Terwad (at present a CWP&PC gauging site)
7. The Agrani river near	...	Pendagaon
8. The Hiranyakeshi river near	...	Gotur weir
9. The Bornala river near	...	Konkangaon
10. The Borinala near	...	Diksanga site or Railway bridge near Rudewadi
11. The Doddahalla river near	...	Shivadhan
12. The Benithora river near	...	Diggi

The location of the said stations may be changed from time to time as the river channels and water flow conditions of the rivers may require.

The river gauging at Shirti, Takali and Terwad will be continued to be done by the CW&PC as at present the States bearing the cost as being done now. The river gauging at Daddi, Bastawad, Kagal, Pendagaon, Gotur, Konkangaon, Diksanga or Rudewadi, Shivadhan, and Diggi will be done jointly by the States of Maharashtra and Karnataka or the CW&PC if willing to do so, and the cost of gauging at these sites will be shared between all the three States equally.

C. CW&PC gauging sites :

In addition to the CW&PC gauging sites mentioned in A & B above, the CW&PC will continue to do the river gauging as at present at the following sites the cost being borne by the three States as at present.

(a) *On the Krishna river at*

- (1) Karad (in Maharashtra)
- (2) Almatti (in Karnataka)
- (3) Dhannur (in Karnataka)
- (4) Yaparla (in Andhra Pradesh)
- (5) Moravakonda (in Andhra Pradesh)
- (6) Srisailam (in Andhra Pradesh)
- (7) Damerapadu (in Andhra Pradesh)
- (8) Wadenpalli (in Andhra Pradesh)
- (9) Vijayawada (in Andhra Pradesh)

(b) *On the Koyna river at*

- (10) Koyna dam (Maharashtra)
- (11) Warunji (-do-)

(c) *On the Warna river at*

- (12) Samdoli (Maharashtra)

(d) *On the Dudhganga river at*

- (13) Sadalgi (Maharashtra)

(e) *On the Ghaatprabha river at*

- (14) Dhupdal weir (in Karnataka)
- (15) Bagalkot (-do-)

(f) *On the Malaprabha river at*

- (16) Huvanur (in Karnataka)

- (g) *On the Bhima river at*
 (17) Dhond (in Maharashtra)
 (18) Narsingpur (-do-)
- (h) *On the Nira river at*
 (19) Sarati (in Maharashtra)
- (i) *On the Sina river at*
 (20) Wadakbal (in Maharashtra)
- (j) *On the Tungabhadra river at*
 (21) Harlahalli (in Karnataka)
 (22) Manuru (-do-)
 (23) Mantralayam (-do-)
 (24) Bawapuram (in Andhra Pradesh)
- (k) *On the Tunga river at*
 (25) Shimoga (in Karnataka)
- (l) *On the Bhadra river at*
 (26) Lakkavali (in Karnataka)
- (m) *On the Varada river at*
 (27) Marol (in Karnataka)
- (n) *On the Musi river at*
 (28) Damercherla (in Andhra Pradesh)
- (o) *On the Pattern river at*
 (29) Palleru bridge (in Andhra Pradesh)
- (p) *On the Munneru river at*
 (30) Keesra (in Andhra Pradesh)



GOVERNMENT OF INDIA

KRISHNA WATER DISPUTES TRIBUNAL

THE REPORT
OF
THE KRISHNA WATER DISPUTES
TRIBUNAL
WITH THE DECISION
VOLUME III

NEW DELHI
1973

GOVERNMENT OF INDIA

KRISHNA WATER DISPUTES TRIBUNAL

THE REPORT
OF
THE KRISHNA WATER DISPUTES TRIBUNAL
WITH THE DECISION
IN THE MATTER OF WATER DISPUTES REGARDING
THE INTER-STATE RIVER KRISHNA AND
THE RIVER VALLEY THEREOF

BETWEEN

1. THE STATE OF MAHARASHTRA.
 2. THE STATE OF KARNATAKA.
 3. THE STATE OF ANDHRA PRADESH.
 4. THE STATE OF MADHYA PRADESH
 5. THE STATE OF ORISSA.
- Parties to
the dispute
until 19th
April, 1971.

VOLUME III

NEW DELHI
1973

APPENDIX A

CONVERSION TABLE

Derived from tables given in Indian Standard conversion factors and conversion tables IS ; 786-1967
(pp. 29, 44, 45, 52, 54, 56 & 57) All figures are corrected to four places of decimal.

1. Linear		1 Gallon	=	4.5461 litres
1 inch	= 25.40 millimetres	1 million gallons	=	160,544 cubic feet
			=	4,546.09 cubic metres
1 foot	= 12 inches	1 cubic metre	=	35.3147 cubic feet
	= 304.80 millimetres		=	219.969 gallons
1 mile	= 5,280 feet		=	1000 litres
	= 1.609.344 metres	1 million cubic metres	=	35.3147 million cubic feet
	= 1.6093 Kilometres.		=	810.71 acre-feet
100 millimetres	= 3.9370 inches	1 milliard cubic metres	=	0.8107 M.A.F.
1 metre	= 3.2808 feet	1 cubic metre per second	=	0.0864 million cubic metre
	= 1.0936 yards	for 1 day	=	70.0453 acre-feet
1 kilometre	= 0.6214 mile		=	3.0512 M. Cft.
2. Area		4. Rates of Flow		
1 acre	= 4840 square yards	1 cubic feet per second	=	1.9835 acre feet per day
	= 0.4047 hectare		=	0.028317 cubic metre
1 square mile	= 640 acres		=	per second
	= 258.999 hectares		=	28.3168 litres per second
			=	6.2288 gallons per second
			=	22,423.68 gallons per hour
			=	0.5382 million gallons per day
1 hectare 100 hectares	= 2.4711 acres	1 million gallons per day	=	1.8581 cusecs
	= 247.105 acres		=	0.0526 cubic metres per second
	= 0.3861 square mile	1 cubic metre per second	=	35.3147 cusecs
3. Volume			=	219.969 gallons per second
1 cubic foot	— 0.0283 cubic metre	1 milliard cubic metre per day	=	0.4087 million cusecs
	= 6.2288 gallons		=	0.8107 million acre-feet per day
1 million cubic feet	= 11.5741 cusec-days	1 litre per second	=	0.03531 cusecs
	= 22.9568 acre-feet		=	791.8892 gallons per hour
	= 28316.8 cubic metres	Milliard	=	1,000 million
	= 6.2288 million gallons		=	1,000,000,000
One thousand million cubic feet	= 28.3 168 million cubic metres	Sd/-	Sd/-	Sd/-
	= 22956.84 acre-feet	E.G. Saldahna	S.G. Balekundry	M. Sitarama Sastri
	= 6228.8 million gallons	30-4-73	30-4-73	30-4-73
1 million acre-feet	= 43.5600 T.M.C.	(Maharashtra)	(Mysore)	(Andhra Pradesh)
	= 1.2335 milliard cubic metres			
1 cusec-day	= 0.0864 million cubic feet			
	= 1.9835 acre-feet			
	= 2446.5715 cubic metres			
	= 0.5382 million gallons			

APPENDIX B

A B B R E V I A T I O N S

(I) Technical terms			<i>Certain volumes containing records of the Krishna case have been cited in an abbreviated form thus</i>	
I.M.C.	. thousand million cubic feet of water.			
M. Cft.	. million cubic feet	MRK		Volume containing the pleadings filed in the Krishna case by the State of Maharashtra.
Cft.	. cubic feet			
ft.	. foot or feet			
in	. inch			
L.F.	. load factor	APK		Volume containing the pleadings filed in the Krishna case by the State of Andhra Pradesh.
MkWh.	. million kilowatt hour			
KW	. kilowatt			
MW	. megawatt	MYK		Volume containing the pleadings filed in the Krishna case by the State of Mysore.
kV	. kilo volt			
C ⁰	. centigrade temperature	MPK		Volume containing the pleadings filed in the Krishna case by the State of Madhya Pradesh.
F ⁰	. Fahrenheit temperature			
hr.	. hour			
lat.	. latitude			
long.	. longitude . minimum	ORK		Volume containing the pleadings filed in the Krishna case by the State of Orissa.
M.D.D.L.	draw-down level			
M.D.S.S.	. Madras Detailed Standard Specifications	MRDK		Volume containing relevant documents filed in the Krishna case by the State of Maharashtra.
R.L.	. reduced level			
F.R.L.	full reservoir level			
mm	. millimetre	APDK		Volume containing relevant documents filed in the Krishna case by the State of Andhra Pradesh.
km	. kilometre			
U/S	. upstream			
(2) Other terms				
AP	. Andhra Pradesh	MYDK		Volume containing relevant documents filed in the Krishna case by the State of Mysore.
MR	. Maharashtra			
MY	. Mysore			
K	. Krishna	MRPK		Volume containing Projects Reports or Notes filed in the Krishna case by the State of Maharashtra.
G	. Godavari			
K-1 to K-12 .	. sub-basins of Krishna basin			
R.B.H.L.C. .	. Right Bank High Level	APPK		Volume containing Project Reports or Notes filed in the Krishna case by the State of Andhra Pradesh.
R.B.L.L.C. .	. Right Bank Low Level Canal			
K..C. Canal .	. Kurnool-Cuddapah Canal			
T.B.	. Tungabhadra			
C.W. & P.C.	. Central Water and Power Commission.	MYPK		Volume containing Project Reports or Notes filed in the Krishna case by the State of Mysore.
C.W.& P.R. S.	. Central Water and Power Research Station.			
pp.	. pages	CWPC(K) .		Volume containing relevant documents obtained in the Krishna case from the Central Water and Power Commission.
Ann.	. Annexure			
N	. National			
Ld.	. Edition	MIP(K)		Volume containing relevant documents obtained in the Krishna case from the Ministry of Irrigation and Power.
Art.	. Article			
U.N. .	. United Nations			
U.S.A.	. United States of America	SP		Volume containing Supplemental Pleadings.
COPP	. Committee on Plan Projects			
K.G.C.R.	. Krishna Godavari Commission Reports	PC(K)		Volume containing relevant documents obtained in the Krishna case from the Planning Commission.

APPENDIX C

Agreement of 1892 between Madras and Mysore

GOVERNMENT OF MADRAS

(Public Works Department)

IRRIGATION

G. O. No. 162, 1 18th Feb. 1892 Irrigation works—Mysore State—Restoration and Construction—certain rules and schedules. Read the following paper:—

From General Sir H.N.D. PRENDERGAST, R.E., KCB V.C., Officiating Resident in Mysore to the Chief Secretary to Government, dated Bangalore, the 15th January 1892, No. 144/346-90.

With reference to correspondence ending with your letter Political No. 636, dated 16th December, 1890. I have the honour to forward, for the formal acceptance of the Government of Madras, a copy of the rules and schedules regarding the restoration and construction of irrigation works in Mysore, prepared by the Mysore Darbar, which embody the arrangements which have been come to in an informal manner both by personal discussion and demi official correspondence between the Chief Engineer, Madras Irrigation Branch and the Chief Engineer in Mysore.

2. I shall be glad to be informed if the Madras Government agree with the rules proposed.

3. A copy of Colonel Bowen's letter on the subject is enclosed for information.

No. 3—1. dated the 4th January, 1892.

ENCLOSURES

From Colonel C. Bowen, R.E., Secretary to the Government of Mysore, Public Works Department to the Assistant to the Resident in Mysore, dated Bangalore, the 4th January, 1892—No. 3—1.

With his letter No. 1-A of 10th June 1890, the Diwan submitted to the Resident a memorandum on the subject of the restoration and construction of irrigation works in Mysore, the right to effect which without restriction had been disputed by the Madras Government. In that letter he urged the Resident to represent the matter in full to the Government of India, in view to a settlement of the Points at issue.

2. Colonel Sir Oliver St. John informed the Diwan in April last that the Government of India would prefer the matter to be settled, if possible, by some understanding between Madras and Mysore, and, before leaving Ootacamund, this year he, arranged for a conference between officers of the two Governments. Under such circumstances the Darbar again made endeavours, in conference with the Madras Government, to arrive at an amicable understanding regarding our future irrigation operations, so that controversy might be obviated in regard of individual works and a sphere of operations, declared in Mysore projects should be absolutely untrammelled. At the same time restrictions to be accepted by the Darbar on certain classes of work on certain rivers and in certain valleys which might affect prejudicially Madras works beyond the frontier.

3. The rules and schedules which I now forward embody the arrangements which have been come to in an informal manner by personal discussion or by demi-official communications, and I am desirous to request you will be good enough to move the Resident to now obtain from the Government of Madras their formal acceptance of the same. They will then be adopted by Mysore for future guidance of the irrigation officers.

4. Annexed to the final rules and schedules is printed the demi-official correspondence which led to the modification of the rules after they were first framed and discussed at Ootacamund in May last. These letters will show that the general terms of the settlement have, with one exception, been informally agreed to by both Governments.

5. The exception I allude to is that referred into in the secondary clause to rule V. The decision of the Government of India will be necessary on that point viz., the existence of a liability on the part of Mysore, on account of three large reservoirs now actually under construction, and if such liability exists, the extent of it; but the definite acceptance by Madras of the rules and schedules as now drawn up is desirable before the controverted cases are specially referred.

Transferred to the Public Works (Irrigation) Department 21st January, 1892.

J. F. PRICE
Chief Secretary

Order No. 162-1 (Public Works), dated 18th February, 1892. Ordered that the following letter be sent.

(True copy or extract.)

W. C. LEWIS,
Under Secretary to Government
P.W.D. (Irrigation Brandt).

To

The Chief Engineer for Irrigation, with copy of draft letter to the Resident.

"Political Department with draft letter to the Resident.

"Superintending Engineer, III Circle.

ANNEXURE TO G.O. No. 162-1

(PUBLIC WORKS), Dt. 18th Feb. 1892.

Rules defining the limits within which no new irrigation works are to be constructed by the Mysore State without previous reference to the Madras Government.

I. In these rules :—

- (1) "New irrigation reservoirs" shall mean and include such irrigation reservoirs or tanks as have not before existed, or, having once existed, have been abandoned and been in disuse for more than 30 years past.
- (2) A "new irrigation Reservoir" fed by an anicut across a stream shall be regarded as a "New Irrigation reservoir across" that stream
- (3) "Repair of irrigation Reservoirs" shall include (a) increase of the level of waste weirs and other improvements of existing irrigation reservoirs or tanks, provided that either the quantity of water to be impounded, or the area to be irrigated is not more than the quantity previously impounded, or the area previously irrigated, by them; and (b) the substitution of a new irrigation reservoir for and in supersession of an existing irrigation reservoir but in a different situation, or for

and in supersession of a group of existing irrigation reservoirs, provided that the new work either impounds not more than the total quantity of water previously impounded by the superseded works, or irrigates not more than the total area previously irrigated by the superseded works.

- (4) Any increase of capacity other than what falls under "Repair of irrigation Reservoirs" as defined above shall be regarded as a "New Irrigation Reservoir".

II. The Mysore Government, shall not without the previous consent of the Madras Government or before a decision under rule 4 below, build (a) any "New irrigation reservoirs", across any part of the fifteen main rivers named in the appended, Schedule A, or across any stream named in schedule B, below the point specified in column 5 of the said schedule B, or in any drainage area specified in the said schedule B or (b) any "New anicut" across the stream of Schedule A, Nos. 4 to 9 and 14 and 15, or across any of the streams of Schedule's, or across the following streams of Schedule A, lower than the points specified here under.

Across 1. Tungabhadra-Lower than the road crossing at Honahalli.

"10. Cauvery-lower than the Ramaswami anicut, and

"13. Kabani-Lower than the Rampur anicut,

III. When the Mysore Government desires to construct any "New Irrigation reservoir" or any new anicut requiring the previous consent of the Madras Government under the last proceeding rule, then full information regarding the proposed work shall be forwarded to the Madras Government and the consents of that Government shall be obtained previous to the actual commencement of work. The Madras Government shall be bound not to refuse such consent except for the protection of prescriptive right already acquired and actually existing, the existence, extent and nature of such right and the mode of exercising it being in every case determined in accordance with the law on the subject of prescriptive right to use of water and in accordance with what is fair and reasonable under all the circumstances of each individual case.

IV. Should there arise a difference of opinion between the Madras and Mysore Government in any case in which the consent of the former is applied for

under the last preceding rule, the same shall be referred to the final decision either of arbitrators appointed by both Governments or of the Government of India.

V. The consent of the Madras Government is given to new irrigation reservoirs specified in the appended Schedule C, with the exception of the Srinivasasagara new reservoir across the Pennar, the Ramasamudram" new reservoir across the Chitravati and the Venkatesasagara new reservoir across the Papaghni. Should, owing to the omission of the Mysore Government to make or maintain these works in a reasonable adequate standard of safety, irrigation works in Madras, themselves in a condition of reasonably adequate safety, be damaged, the Mysore Government shall pay to the Madras Government reasonable compensation for such damage.

As regards three new reservoirs excepted above the admissibility of any compensation from Mysore to Madras on account of loss occurring to Madras irrigation works from diminution of supply of water caused by the construction of the said works, will be referred to the Government of India whose decision will be accepted as final, and should such compensation be decided, to be admissible, the decision of the Government of India as to the amount thereof will be accepted, after submission to them of the claims of Madras which would be preferred in full detail within a period of five years after the completion of said works.

VI. The foregoing rules shall apply as far as may be to the Madras Government as regards streams flowing through British territory into Mysore.

SCHEDULE 'A'

Main Rivers	Remarks
1. Tungabhadra . . .	
2. Tunga . . .	Tributary of Tungabhadra.
3. Bhadra . . .	-do-
4. Hagari or Vedavati . . .	-do-
5. Pennar or Northern Pinakini . . .	
6. Chitravati . . .	Tributary of Pennar or Northern Pinakini.
7. Papaghni . . .	-do-
8. Palar . . .	
9. Pennar known as the 'Ponniar' in Madras or Southern Pinakini.	
10. Cauvery . . .	
11. Hemavati . . .	Tributary of the Cauvery.
12. Lakshmantirtha . . .	-do-
13. Kabani . . .	-do-
14. Honhole (or Suvarnavati)	-do-
15. Yagachi, upto the Belur Bridge	Tributary of the Hemavati.

SCHEDULE 'B'

A list of the Minor Streams and Catchments in Mysore Territory on which no new Irrigation Reservoirs are to be built within the limit specified without previous reference to the Madras Government.

Sl.No. in Schedule 'A'	Drainages	Sl. No. in map	Minor branches	Defined limit on a stream below which, or defined drainage area within which no new irrigation reservoirs are to be built without previous reference to Madras Government	Distance from frontier as measured up the stream (approximate)	Remarks
1	2	3	4	5	6	7
1.	Tungabhadra	l(a)	Charodi or Kumadvati	Upto the bridge on this river on Honnali-Shikarpur road	10 miles	
		1.	Sulikere-halla	The bund of Sulikere tank	46 miles	The Sulikere tank seldom discharges. This stream joins the Tungabhadra in Mysore territory.
		2.	Sagali-halla	Upto the boundary line of the Channagiri taluk.	40 miles	About this point there are numerous existing tanks, and the run-off from these smaller catchments are of no appreciable importance to floods in the Tungabhadra river.
		3.	Sarati-halla	As far as the boundary line of the Kakkargola, and Avar-gola villages	9 ½ miles	A stream of insignificant importance to floods in the Tungabhadra river. This stream joins the Tungabhadra river in Mysore territory.
		4.	Branch of Sarati-halla from east	Upto Kadaji tank bund	16 ½ miles	Catchment above the Kadaji tank, small and insignificant.
		5.	North Hagari	Upto boundary of Chitaldrug taluk	12 ½ miles	There are no existing Madras works on this branch of the Tungabhadra.
		6.	Branch of Hagari	Upto Anaji tank bund	10 miles	-do-
		7.	Sokke-halla	Upto the Hoskere tank bund	9 miles	No existing Madras works on this stream before it joins the North Hagari. Catchments above Kos-kere and Kyasenhalli tanks, very small and insignificant.
		8.	Branch of Sokke-halla	Upto the Kyasenhalli tank bund	9 miles	-do-
		9.	Jiganhalli tank (Madras) catchment	The whole of the out lying bit of Mysore territory which drains into the Madras tank.		This is an outlying bit of Mysore territory in latitude 14°-55' longitude 76°-38'.
IV	Vedavati or Hagari	10	Anantapur tank (Madras) catchment.	The whole of the area of the extreme northern portion of the Molakalmuru taluk in Mysore which drains northwards into the Anantapur (Madras) tank catchment.		There are existing Madras tanks below, and the whole area which drains into such tanks is included.
		11.	Chinna-Hagari	Upto where the stream crosses the frontier near Rangayan-droog.	16 miles	This stream joins the main river about 8 miles beyond the frontier.

1	2	3	4	5	6	7
V Pennar or Northern Pinakini		12. Sherikola-halla or Nagalapura tank (Madras) catchment	The whole catchment area in Mysore territory.		••	Affects the supply to Madras tank below.
		13. Rangasamudram tank (Madras) catchment	The whole area of catchment of the tank in Mysore territory.			The stream from this catchment leaves Mysore territory in latitude 14°-37'-30 and longitude 76°-48'-30.
		14. Yeradkere tank (Madras) catchment	-do-			The Yeradkere in Madras is on latitude 14°-30', longitude 76°-57'-30".
		15. Main stream of the taluk drainage	Upto the bridge over this stream on the Salem-Bellary road.	15 ½ miles		The road is a convenient point for a limit. This stream joins the Vedavati river within Mysore limits.
		16. Main stream of the Doderi drainage	Upto the boundary of the Hosahalli village.	17 ½ miles		Latitude 14°-21' ; longitude 76°-49'. This stream joins the Vedavati river within Mysore territory.
		17. Virappasamudram and Amarapur tank (Madras) catchment	The whole area of catchment of this series in Mysore territory.			This area represents a large proportion of the Pavagada taluk of Mysore.
		18. Mulkalkara tank (Madras) catchment	The whole area of catchment of this series in Mysore territory.			This Madras tank is situated in latitude 14°-8' ; longitude 77°-26'-20".
		19. Ruddam tank (Madras) catchment	-do-			A considerable area in the north of the Maddagiri taluk of Mysore is on this catchment.
		20. Virapasamudram tank (Mysore) catchment	-do-			This terminal tank is in S.F. corner of the Pavagada taluk of Mysore, but there are some Madras tanks above in the Madakasira Tahsil-dari. The catchment excluded from Mysore operations is chiefly in the north of the Maddagiri
		21. Purgitank (Madras) catchment	-do-			The catchment excluded from Mysore operations is in the north of the Maddagiri taluk.
		22. Jayamangali river	Upto its junction with the Garudachala stream.	28 miles		The river above this point is of minor importance to Madras.
		23. Suvarnamukhi branch of Jayamangali	Upto site of Rampur anicut.	25 miles		Joins the Jayamangali a few miles below this point.
		24. Kumadvati	Upto the site of anicut feeding the Kodagatur and Gundagal tanks in Mysore.	9 ½ miles		This stream joins the Pennar on the Mysore frontier.
		25. Chaulur tank (Madras) catchment	The whole direct catchment of this tank in Mysore territory.			This Madras tank is on the west bank of the Pennar just outside Mysore territory.
		26. Western or Thondebhavi branch of the Pennar or N. Pinakini	Upto its source.	27 to 30 miles		
		27. Central or Varvani branch of the Pennar or N. Pinakini	-do-	25 miles	-	

1	2	3	4	5	6	7
		28.	Hindupur tank (Madras) catchment	The whole area of catchment of this series in Mysore territory		An important and large area of the Goribidnur taluk is here excluded from Mysore operations in a part where water for irrigation is much appreciated.
VI. Chitravati		29.	Kushavati stream (Bukkapatna tank catchment in Madras)	Upto site of Daparti anicut	10 ½ miles	The large Gudibanda tank in Mysore and the 20 smaller tanks above impound a very large proportion of the Upper catchment already.
		30.	Chitravati catchment (Bukkapatna tank catchment)	The whole area to the North of the Chelur-Bagenhalli road		This portion of the Chitravati catchment being more hilly and barren, the runoff is greater than in the more cultivated and level catchment to the south of the Chelur-Bagen-halli Road.
VII. Papaghni river		31.	Vademan-halla	Upto Naremadipalli tank	9½ miles	No Madras works affected upto the junction of this stream with the Papaghni river.
		32.	Guntipalli tank (Madras) catchment	The whole area of catchment in Mysore territory		This Madras tank is situated just above the large Vyasa-samudram tank.
		33.	Sadam tank (Madras) catchment	The main stream up to its source	17 to 18 miles	This Madras tank, the water-spread of which is partly in Mysore territory drains into the Papaghni river just above the Vyasasamu-dram tank.
		34.	Kotagal branch of the Papaghni	Upto Kotagal tank	-do-	The catchment above Kotagal tank is comparatively small and unimportant with numerous small tanks already on it.-
		35.	Tippasamudram tank (Madras) catchment ^x	The Marasanappalli Digavakote stream upto Digavakote patha-cheruvu tank, and the Marasanappalli Gundedu stream upto Gundedu tank	9 ½ miles 13 miles	These are the only two important streams on this catchment, and above these terminal tanks there are a large number of small tanks on the small drainages. These terminal tanks are only situated from 4 to 5 miles from the water-shed of the Palar.
		36.	Rangasamudram tank (Madras) catchment	Adgal stream upto Adgal Vasantanayikankere tank.	6 ½ miles	The Adgal tank is situated 6 miles from the watershed, and there are numerous tanks in this distance.
				Kurigeipalli branch stream upto the Kurigeipalli tank	4 ½ miles	The Kurigeipalli tank is only 4 miles from the water-shed, and there are some 18 small tanks above it.
VIII. Palar River		37.	Nangli (Mysore) tank drainage	Main stream upto its source	17 ½ miles	There are 12 Mysore tanks situated on this main stream.
		38.	Shettikal (Mysore) tank drainage	-do-	10 miles	There are about 5 existing Mysore tanks and 1 breached tank on this main stream.
		39.	Malinayakanhalli (Mysore) drainage	-do-	6 1/2 miles	There are 4 existing Mysore tanks on this main stream.

1	2	3	4	5	6	7
		40.	Vegmadgu (Mysore) drainage	Main stream upto its source.	7 miles	There are 4 existing , Mysore tanks on this main stream.
		41.	Tailur tank (Mysore) drainage	-do-	23 miles	There are 10 Mysore tanks on this important branch of the Palar, the terminal tank being 12 1/2 miles from the frontier.
[X.	Pennar* or Pinakini	South 42.	Verushuvavati river	Main stream upto Koppa (or Kuppam tank).	16 miles	There are 76 tanks above the Koppa tank which is only some 12 miles from the water-shed.
		43.	Budikote stream	Main stream upto Thimmanayakanhalli tank.	21 miles	There are 146 tanks above this terminal tank which is only about 12 miles from the water-shed.
		44.	Masti catchment	The whole area of catchment in Mysore Territory.		About 45.40 sq. miles in area in which there are 63 tanks in existence.
		45.	Kadgodri drainage	Main stream upto its source.	36 miles	There are 10 Mysore tanks on this main stream now in use, most of them of large size.

*Known as the "Ponniar" in Madras.

SCHEDULE 'C'

A list of work already in progress, and which are to be allowed to be completed, although they would be barred by the proposed rules for restriction of Mysore operations

Sl. No. in Schedule A	Main river drainage	Sl. No. of stream or catchment in schedule	Name of work in progress	Date on which work was sanctioned	Amount of estimate in Rs.	Expenditure incurred to end of March, 1891	Descriptive remarks
1	2	3	4	5	6	7	8
I.	Tungabhadra						No works in progress on these catchments which are affected by the proposed rules submitted to Madras.
II.	Tunga						
III.	Bhadra						
IV.	Hagari or Vedawati	17	Restoration of the Arsikere-Hampaiyandurga tank	May, 1889	4,362		The estimate provides for raising the weirs by 2 feet and increasing capacity from 107 to 163 units. Work in abeyance owing to objection raised by Madras Government. But it is not intended to irrigate, more than the area of land (189 acres) assessed as wet by the revenue survey.
v		17	Restoration of the Arsikere-Gujjaranpankere Tank	-do-	3,582		The estimate provides for raising the weir by 1 foot and to increase the capacity from 149 to 186 units. The raising of the weirs by 1 foot will not do more than compensate for the silting up of the bed for years.
V.	Pennar or Northern Main Stream Pinakini		New reservoir (Srini- vasagars) across the river near Kotagara-halli.	July 1888	99,206	66,696	This new masonry dam with earthen, bund on flanks is two-thirds completed. No Madras works affected. The capacity of the tank will be 610 units and it is intended to irrigate 800 or more acres. This work is referred to by Colonel H. Smalley, R.E., in his No. 674, dated 10th June, 1890, to Chief Engineer for Irrigation, Madras.

1	2	3	4	5	6	7	8
		28	Restoration and improvement of Mayalya tank	Sept 1887 Dec. 1889	Original estimate 14,452 Revised estimate 17,168	13,130	The capacity was increased from 95 units to 318 units, and the work is nearing completion. This tank is on the Hindupur (Madras) tank catchment but only has a catchment of 38.80 sq. miles of its own.
		28	Raising the weirs of Mahamaleswara tank.	Sept. 1890	3,165	865	This is a small tank above the Myala noted above. The estimate provides for increasing the capacity of the tank from 62 to 102 units, the former capacity having proved insufficient to irrigate the 198 acres of assessed wet lands. No increased area of irrigation is provided for the total catchment above this tank is only 3 sq. miles.
		28	Restoring the Manivala tank	Feb. 1889	4,094	2,860	The tank weir is to be raised 2 feet, and capacity increased from 139 to 211 units, but only in order to impound sufficient water to irrigate the tanks original atchcut of 350 acres.
VI.	Chitravati	Main Stream	in New Reservoir (Ramasamudram) near periyasandra.	May , 1888	75,077	51,824	This reservoir is noticed by Colonel H. Smalley R.E. in his No. 674, dated 10th June 1890 to Chief Engineer for Irrigation. It is to have a capacity of 1,207 units to irrigate 1,207 acres. The catchment area above the tank is 47.61 sq. miles.
		30	Restoration of the Mal-sandra-Rachevar tank.	Dec. 1888	4,742	4,724	Weirs of the tank were raised 2 feet increasing the capacity from 105 units to 159 units It is not intended to increase the area originally irrigated, 258 acres. The capacity of the tank is even now insufficient unless the tank fills 1 ½ times in the year. Work is nearly completed.
VII.	Papagbni River	Main Stream	New reservoir (Venkatesagara) near Devaganhalli	June, 1888	60,985	28,423	This work is noticed by Colonel H. Smalley R.E. in his No. 674 dated 10th June 1890, to Chief Engineer for Irrigation, The tank will impound 517 units as designed, and will perhaps irrigate 750 acres if it fills 1 ½ times. The catchment above the tank is 61 sq. miles.

1	2	3	4	5	6	7	8
		Main Stream	Restoring the Buradagunte anicut, channel and tank.	Dec. 1888	25,575	17,350	This work consists in (1) building a masonry anicut with the usual earth Hank bunds across the main stream (2) restoring the old channel therefrom & (3) restoring the Buradagunte Timmasani tank and increasing its capacity from 111 units to 167 units. This project is also noticed by Colonel Smalley in his report No. 674 dated 10-6-1890.
			Restoring the Timmanayakanhalli Agrahar tank.	Aug. 1888	16,776	13,234	Noticed also in Colonel Smalley's letter above quoted. This is a restoration of an old breached tank 26 miles up the main stream and 2 miles above the Chintamani Bagenhalli road. The tank is to impound 240 units and irrigates 250 acres as against its original atchakat (irrigable area) of 330 acres as per revenue survey maps. Work is nearing completion.
		35	Restoring Kotekallur tank.	Apr. 1888	6,564	5,690	This project consists in the restoration of a tank which breached in 1874, and for increasing its capacity from 25 to 80 units. It is 6 miles from the frontier on the Tippasumudram (Madras) tank catchment.
VIII. Palar River		37	Restoring the Byatnurnagavara tank.	Sept. 1888	14,300	8,102	This is the terminal tank of the series. The capacity being increased from 152 to 320 units, it is only intended to irrigate the original area of 365 acres included in the atchakat.
		37	Restoring Marandhalli tank.	March, 1886 revised estimate in July, 1888	5,345	5,254	The project provides for raising the weirs 3 feet and increasing the capacity from 121 to 186 units, to irrigate, perhaps 250 acres. Work is nearing completion.
		41	Restoring Jagalkashtidodkere tank.	April, 1888 revised estimate in Jan. 1890	7,246	7,210	Project provides for raising the weirs 3 feet and increasing the capacity from 50 to 107 units. Work is nearly completed. No Madras works affected.

1	2	3	4	5	6	7	8
IX.	Pennar* or Southern Pinakini	Main	Restoring Bhadram tank	April, 1888	21,689	15,033	The project provides for raising the weirs of this tank by 3 feet and increasing the capacity from 701 units to 1,225 units. The work to the tank itself is nearly completed and only channels have now to be extended.
		44	Restoration of Santhalli tank.	Nov. 1889	7,480	4,076	This tank is in ,the Masti catchment. The weirs are to be raised 3 feet and capacity increased from 93 to 154 units. No Madras works are affected.

*Known as the "Ponniar" in Madras

APPENDIX D

Agreement of 1933 between Madras and Mysore

G.O.No.2796.I/Dated 28th Dec. 1933.

Appendix I

Agreement Reached at the Conference of Mysore and Madras held in the Secretariat at Bangalore on 4th and 5th September, 1933.

- (1) As regards repairs to Irrigation reservoirs falling within the definition in rule 1(3) of the Agreement of 1892—whether they involve the increase of the level of waste weirs the construction of new reservoirs in substitution of old ones—intimation will, as far as possible, be given by Mysore in future before the work is commenced with details of what is proposed to be done. The Madras Government will, as far as possible, give similar information in respect of similar works in the Madras presidency which may effect the prescriptive rights for which protection may be claimed under the rules in the Agreement of 1892.
- (2) By analogy, the construction of new anicuts in place of existing ones will be treated similarly, but Mysore and Madras Governments will, as far as possible, give similar intimation before work is commenced.
- (3) An anicut will include any construction of rough stone (dry) or masonry across a river either in part or fully and in any direction, which will have the effect of diverting water from the river, but the consent of the Madras Government will not be required under the Agreement of 1892 for the construction of any new anicut if there is to be no irrigation under it.

2. Construction of a new tank across the Bandihalla at Thippaganahalli, Goribidnur taluk—if the Mysore Government agree to reduce the maximum storage capacity of the Srinivasasagara by 200 units to 410 units and to reduce the maximum atchcut by 100 acres to between 700 and 800 acres, the Madras Government will consent to the proposal to construct the new tank with a storage capacity of about 450 units and an atchcut of 600 acres.

3. Rajavanti tank, Pavagada taluk—The recommendations made in the notes of joint inspection are accepted as equitable to both the Governments.

4. Distribution of water of the Swarnamukhi, tributary of the Hagari between the British Agali channel and the Mysore Kittagali channel—The Mysore Government agreed to the provision of shutters for the vents to be reopened in the anicut, provided that they are operated not necessarily after the Agala tank fills, but as soon as the flow in the Agali channel attains a certain height, which will be determined by agreement between the two Chief Engineers,

The draft agreement, already forwarded, may be concluded with this modification.

5. Diversion of water from the Handihalla stream into the supply channel to the Bodimaralur tank—As the Mysore Government have shown from records that the tank is an old one which existed at the time of the Agreement of 1892, and had then an irrigated area not less than it has now, the proposals of the Mysore Government will be accepted.

Note:—The Mysore Government will send a note on this subject. (This they have done.)

6. Distribution of waters between the Mysore village of Katamaguntapalli and the British village of Byrangi in Chittoor district—After examining the plans of the anicut and head works and the irrigation interests of the ryots of both parties, it was agreed that the two existing channels in the river bed leading to the respective vents in the anicut may be linked by Madras by means of a connecting channel parallel to the anicut somewhere above it, subject to the condition that the Mysore Jodidar shall have a right to put up a temporary cross-bund, not exceeding 18 inches above the cill level of the vents in the anicut across this connecting channel and also a temporary cross-bund across the Byrangi channel just below the existing regulator, in order to enable him to utilise the summer flow between 1st January and 30th April every year.

7. Groyne wall at the head of the Gangasandra feeder channel from the North Pennar—As the object of the feeder is to divert flood waters and not low supplies, Mysore has no objection to dismantling, if considered necessary, a portion of the groyne wall, retaining the remaining length so as to give an entrance to the channel during floods. In order to determine by mutual agreement what exactly this length should be, it was agreed to make a joint survey of the river at the feeder head.

8. Rampur anicut across the Jayamangali river—It is agreed to allow the anicut to remain as constructed, on the understanding that the size and the number of vents in it and the head sluice, of the channel will be altered by Mysore, if this is found necessary after an examination of the figures of irrigation under the anicut and lower down the river both in Mysore and British limits, which figures should be furnished as early as possible by either party to the other, the interests of the direct irrigation under the channel from the anicut being adequately safeguard.

9. Interception of the supplies to the British Manchnullu cheruvu of Kodikonda village in the Hindupur taluk—It is agreed that there is no objection to closing the vents in the anicut since they have been held to be vents left during the construction of the anicut.

10. Application of the definition of "Repairs to irrigation reservoirs" to "Repairs of anicuts" by analogy—This is agreed to [Vide Item 1 (2)]. It is also agreed that there should be no objection to Madras

carrying out simple or ordinary repairs to anicuts or other works of the Madras Government situated in Mysore territory. An intimation will be given to the Mysore Government of what is proposed to be done in such cases.

11. Deficient supplies in the Jayamangali river—The Mysore Government agree to supply to the Madras Government figures of storage and irrigation under the tanks and channels fed from the river in Mysore territory below its junction with the Garudachala river.

12. Deficient supplies in the Palar river—The Mysore Government agree to examine whether and to what extent, it is possible to supply the information asked for by the Madras Government, and if so, at what cost.

M. G. RANGIAH,

*Chief Engineer and Secretary to the
Government of Mysore*

Dated 5th September, 1933

N. GOPALASWAMI,

*Secretary to the Govt. of Madras,
Public Works and Labour Department*

Dated 5th September, 1933

APPENDIX E

Agreement of June 1944 between Madras and Hyderabad

Conclusion reached at the Conference held at Shah Munzil, Hyderabad, on the 24th, 25th and 26th June 1944 in regard to the Scheme for the Partial Utilisation of the Tungabhadra Waters.

Present:—

On the Madras side:

Mr. S. V. Ramamurthy, C.I.E., I.C.S., Fourth Advisor to His Excellency the Governor of Madras, Representative, Government of Madras.

Sri Rao Bahadur N. Govindaraja Ayyangar, B.A., B.E., Chief Engineer for Irrigation, Madras.

Sri A. R. Venkataraman, B.A., B.E., Deputy Chief Engineer for Irrigation, Madras.

On the Hyderabad side:

Nawab Ali Nawaz Jung Bahadur F.C.H., Consulting Engineer, Representative, His Exalted Highness the Nizam's Government.

Mr. Md. Anwarulla, B.Sc., Chief Engineer, P.W.D., Hyderabad.

Mr. C. C. Dalai, B.E., A.M.I.C.E., Superintending Engineer, Hyderabad.

Mr. Khaja Azeemuddin, B.Sc., A.C.G.I., Special Engineer, Hyderabad.

(Mr. Dalai was not present during the discussions on the 26th).

The Conference was without commitment on either side, i.e., the conclusions arrived at would not be binding unless and until they are ratified by the two Governments.

2. The object at present is to make it possible to start immediately a joint scheme between Hyderabad and Madras for a partial appropriation of the Tungabhadra waters at Mallapuram leaving all matters of absolute rights and claims and disputed points for future settlement.

3. It is agreed that this agreement will supersede the previous agreement of 7th November, 1938.

4. It is agreed that Madras and Hyderabad may each draw off 65 Thousand Million Cubic Feet (including evaporation losses) from the reservoir to be constructed across the river Tungabhadra at Mallapuram. The total abstraction of water from the reservoir for use under the Tungabhadra works will be 130,000 Million Cubic Feet and no more under the present arrangement. This will be open to consideration as in paragraph 5 below. This quantity will provide for the needs of all the irrigation under the Tungabhadra works i.e., the needs of the new and pre-Moghul irrigation and also the assistance to the Kurnool-Cuddapah Canal and the Rajulibanda canal proposed by Hyderabad, the latter being treated on an equal status with the former. This scheme of equal abstraction of water is not to be considered as any settlement of the rights in the waters of the Tungabhadra nor is it to serve as a basis for the building up of any rights of the Governments concerned.

5. Madras asked that the share of each Government in this partial allocation should be 75 Thousand Million Cubic Feet. Hyderabad could not see their way to agree to an allocation of more than 65 Thousand Million Cubic Feet immediately. It was agreed that the raising of the figure of 65 Thousand Million Cubic Feet will be examined after ten years from now or such later date as the two Governments may agree to, considering the needs of the projects.

6. Madras first claimed the low flows up to their requirements for the Tungabhadra and Kistna irrigation, but later agreed to forego this claim in the present arrangement, the needs of such irrigation being provided for by regulated supplies from the reservoir.

7. The contribution to the Kistna will be met by regulated supplies from the reservoir and such waters can be utilized to develop power both by Hyderabad and Madras but will not be debited to the 65 Thousand Million Cubic Feet mentioned in paragraph 4 above.

8. It will be left to the option of the respective Governments to supply through the existing head-sluites in the river or otherwise the pre-Moghul channels.

9. Natural flow in the river below the Mallapuram reservoir, i.e., floods from the reservoir, flow from intermediate catchment and separate into the Tunga-bhadra river, can be utilized by Madras and Hyderabad for pre-Moghul irrigation in Madras and Hyderabad and also for irrigation under the Rajulibanda canal of Hyderabad and the Kurnool-Cuddapah canal of Madras. These waters realized at the points of diversion will be drawn to the limit of their requirements in the pre-Moghul channels but at the point of diversion of the Rajulibanda canal the natural flow will be divided half and half between Madras and Hyderabad after making an extra allowance to the Rajulibanda canal equivalent to the additional draw-off by the Madras pre-Moghul channels over the draw-off of pre-Moghul channels of Hyderabad.

10. If either Government use the river for carrying water down to any lower point on the river, such Government shall retain their property rights in those waters.

11. Madras and Hyderabad are prepared to have the dam constructed to impound a sufficient quantity for a larger eventual utilisation than now agreed to, and to bear half the cost of such construction.

12. Madras and Hyderabad need not restrict their canal capacities to utilize their present share of 65 Thousand Million Cubic Feet each. In designing them for larger capacities each Government take their own risk.

13. So far as this Conference goes, it has been conducted in order to facilitate a joint partial scheme between Hyderabad and Madras without prejudice to the rights and interests of the other Governments concerned.

14. The following matters will be subject to examination by the Chief Engineers of Madras and Hyderabad who will arrive at a common settlement which will be subject to ratification by the two Governments:—

- (a) Whether it is necessary to provide one set or more of sluices on each side for the requirements of new irrigation, old irrigation and for contribution to the Kistna.

- (b) To fix the full reservoir level and sills of sluices and also the minimum level below which water may not be allowed to go down, no party being entitled to ask for a higher level to be maintained at any time, when once the minimum level is fixed.

- (c) To determine, the contribution to the Kistna and the period over which it is to be distributed keeping in view the requirements of irrigation and development of seasonal power for not less than six months.

- (d) To determine the apportionment between the two Governments, of the contribution to the Kistna to be drawn for power purposes, giving some weightage to Hyderabad for the reason that at present such water will be used only for power by Hyderabad and for power and irrigation by Madras. This weightage is to apply until a Kistna reservoir comes to function.

- (e) To examine and give their views as regards the estimate of the dependable supply at Mallapuram now put at 336 Thousand Million Cubic Feet.

- (f) To examine and give their views as regards the extra allowance to be given to the Rajulibanda canal from the natural flow of the river at Rajolibanda anicut as per paragraph 9 above fixing on a percentage basis the allocation of natural flow at Rajolibanda anicut between Madras and Hyderabad.

S. V. RAMAMURTHY,

Representative, Govt. of Madras

Dated 26th June, 1944

ALI NAWAZ JUNG,

*Representative, His Exalted Highness
the Nizam's Govt.*

Dated 26th June, 1944

APPENDIX F

July, 1944 agreement between Madras and Mysore in regard to sharing of Waters of Tungabhadra River

Agreement between the representatives of the Government of Madras and Mysore in regard to the sharing of the waters of the Tungabhadra.

Whereas the Government of Madras propose to construct a reservoir on the Tungabhadra beyond the territory of Mysore;

And whereas the Government of Mysore also propose to construct a reservoir at Lakkavalli or at any other place on the Bhadra (hereinafter referred to as the Lakkavalli Reservoir) a tributary of the Tungabhadra;

And whereas the Governments of Madras and Mysore consider it necessary and expedient to come to a settlement *inter-se* in regard to the sharing of the waters of the Tungabhadra Basin above Mallapuram;

And whereas the question of the sharing of the waters of the Tungabhadra Basin between the Governments of Madras and Mysore and the question relating to Sivasamudram royalty payable by the Government of Mysore to the Government of Madras were discussed by the Representatives of both the Governments at Fort St. George, Madras, on 3rd, 4th and 5th December, 1936;

And whereas the Governments of Mysore and Madras have come to a mutual settlement in regard to the sharing of the waters of the Tungabhadra Basin above Mallapuram and in regard to the amount of royalty-paid to the Government of Madras in respect of utilisation of their share of the waters in the Cauvery at Sivasamudram by the Government of Mysore for power purposes;

And whereas the waters of the Bhadra and Tungabhadra were jointly gauged by the Representatives of the Governments of Madras and Mysore at Lakkavalli, Mallapuram and Sunkesula anicut;

And whereas as a result of the said gauging and discussion, the net dependable flow at Mallapuram after meeting the requirements of existing irrigation above Mallapuram, was agreed to as 3,40,000 Million Cubic Feet.

Now these presents witness that His Excellency the Governor of Madras and the Government of Mysore do hereby agree and bind themselves, their successors and representatives as follows:—

PART I—Relating to "Sharing of the waters of the Tungabhadra."

1. From the total yearly flow of the Bhadra river at Lakkavalli, the Government of Mysore shall be entitled to draw off through sluices a quantity of water not exceeding 57,000 Million Cubic Feet, net for irrigation and power purposes from the Lakkavalli Reservoir. The Reservoir shall be of such capacity as may be agreed upon between the two Governments and as is necessary to enable the Government of Mysore to draw off annually through sluices 57,000 Million Cubic Feet, referred to herein and the additional quantity referred to in clause 6.

The Government of Mysore shall not be entitled to draw any supply for any purpose at any other point on the Bhadra river save and except the Government of Mysore may draw off water:—

- (a) For supply to factories and towns from the said river ;
- (b) at the existing Bhadra anicut for the irrigation of an area not exceeding 20,800 acres inclusive of the area now irrigated from the anicut.

Neither the existing Bhadra anicut nor its scouring sluices nor the head sluices for the right and left bank channels shall be altered in any manner save with the previous consent of the Government of Madras, which consent shall not be unreasonably withheld or refused.

Nothing in this clause shall be deemed to affect the rights of the riparian landowners to take water to which they may be entitled under the law.

2. The Government of Madras agree to the Government of Mysore increasing the capacity of the Lakkavalli reservoir beyond the limit permissible under the clause 1 in order to enable the Government of Mysore to have additional storage solely for power purposes, the supply required for such purposes being drawn off through the sluices, but such additional storage shall be returned without diminution (except diminution by reason of evaporation and percolation) within the same year to the river Bhadra above the existing Bhadra anicut through sluices or in such other manner as may be mutually agreed upon by the Governments of Madras and Mysore and in accordance with the working tables and rules of regulation approved by the Chief Engineers of the two Governments.

3. The Government of Mysore agree to furnish full details of the works proposed to be executed by them in pursuance of clauses 1 and 2 together with the rules of regulation proposed for the new Reservoir, to the Government of Madras, and obtain their specific consent of such execution and to those rules before starting such works and the said consent shall not be unreasonably withheld or refused.

4. The Government of Mysore also agree to prepare and furnish to the Government of Madras detailed working tables showing how the Government of Mysore propose to give effect to clauses 1 and 2 and the rules of regulation referred to in Clause 3. Separate working tables shall be prepared to show :—

- (a) the capacity of the reservoir required to ensure to the Government of Mysore the draw off of 57,000 Million Cubic Feet referred to in clause (1) and the additional quantity referred to in Clause 6 ; and
- (b) the capacity required in addition to ensure the Government of Mysore, their power requirements according to Clause 2.

If when working tables are drawn up it is found that the supplies to existing irrigation as it stood in 1936 below Lakkavalli reservoir would be adversely affected by the draw off for irrigation or power purposes under clause 1 or clause 2, the working tables and rules of regulation shall be so revised as to provide for passing such flow, limited to the natural flow, down the river as may be necessary to safeguard the interests of such existing irrigation as well as to ensure the draw off for the Lakkavalli reservoir as provided in this agreement.

The Chief Engineers of the Governments of Mysore and Madras will prepare the working tables after such examination as may be necessary and come to a common speedy settlement in the matter of proportion factors, rules of regulation, monthly limit flows, etc., which will be subject to ratification by the two Governments; and on such ratification such settlement shall be deemed to form part of this agreement.

5. The Government of Mysore further agree that immediately the draw off from the Lakkavalli reservoir mentioned in clause 1 begins, issues from the reservoir shall conform to the working tables mentioned in Clause 4.

6. The Government of Mysore shall also be permitted to draw off for all their new irrigation (including extension to existing irrigation) in the Tungabhadra Basin above Mallapuram besides the water which the Government of Mysore may draw off at the existing Bhadra anicut (under clause 1) a total quantity of water not exceeding 15,000 Million Cubic Feet, (Evaporation losses being included in this quantity only in the case of tank and reservoir schemes) in the aggregate in the year provided that such draw off shall be not taken place from the Bhadra. Nothing in this clause shall be deemed to effect the rights of the Government of Mysore to draw off water for factories and towns from the water-courses in the Tungabhadra Basin or the rights of the riparian land owners to take water to which they may be entitled under the law.

The Government of Madras note that the Government of Mysore have already prepared a scheme for utilizing not more than 11,500 Million Cubic Feet, from an anicut to be constructed across the Tunga near Sacrebyle. The Government of Mysore will be at liberty to proceed with this scheme and the quantity of water drawn off at the anicut shall count towards the 15,000 Million Cubic Feet, herein mentioned. In the event of the Government of Mysore not utilizing the 11,500 Million Cubic Feet for the above scheme, the Government of Mysore shall be at liberty to utilize the unutilized quantity for schemes in the minor valleys in the Tungabhadra Basin. Such unutilized quantities shall include evaporation losses.

Full details of every other scheme proposed to be executed by the Government of Mysore for the draw off the remaining quantity shall be furnished to the Government of Madras and their specific consent obtained before work is started on the scheme. In

framing such schemes the interests of all existing, irrigation in the respective valleys extending upto the Tungabhadra river shall be fully safeguarded.

In the event of the Government of Mysore being unable for any reason to frame such schemes for valleys other than the Bhadra valley in the Tungabhadra Basin above Mallapuram, or if the Government of Madras should withhold or refuse consent to any such scheme, the Government of Mysore shall be permitted to draw off from the Lakkavalli reservoir a quantity of water not exceeding 3,500 Million Cubic Feet, (including evaporation losses) out of the unutilized quantity of the said 15,000 Million Cubic Feet. This draw off shall be in addition to the 57,000 Million Cubic Feet, referred to in Clause 1.

7. The means and methods of measuring all in flows, issues draw off, and the like at any of the works authorised by the Clauses 1 and 2 or by clause 6 shall be settled by the Chief Engineers of the Governments of Madras and Mysore before such works are started.

8. For the purpose of this Agreement "the year" shall commence on such dates as may be fixed by mutual agreements between the Chief Engineers of the Governments of Madras and Mysore, after working tables for such years as may be agreed upon by the two Chief Engineers have been drawn up and approved by them.

9. After the draw off to which the Government of Mysore is entitled under clauses 1 and 6 and after making an allowance of 12,000 Million Cubic Feet, for miscellaneous irrigation above Mallapuram, there will be available at Mallapuram an estimated supply of 2,56,000 Million Cubic Feet in respect of which the Government of Mysore do not claim any share as against the Government of Madras.

10. The Governments of Mysore and Madras agree that so far as they are concerned, the foregoing clauses shall constitute a final settlement of the rights of the respective Governments in the waters of the Tungabhadra Basin above Mallapuram.

If at any time at the instance of any other party claiming a right to the waters of the Tungabhadra it becomes necessary to have recourse to arbitration in respect of the sharing of the Tungabhadra waters and if the arbitration tribunal were to award to the Governments of Mysore and Madras a quantity different from those referred to in clauses 1, 6 and 9 above, the two Governments hereby agree to abide by such award.

The Government of Madras agree that the Siva-Samudram royalty of Rs. 20,000 per annum now agree to—vide Part II of this agreement shall—not in any circumstances, be re-opened or revised.

11. Nothing contained in the foregoing clauses shall be deemed to qualify or limit in any manner the operation of the agreement, dated the 18th February, 1892, between the Governments of Madras and Mysore in regard to matters other than those to which this agreement relates.

12. The Government of Madras and Government of Mysore hereby agree that if at any time there should arise any dispute between them touching the interpretation or operation or carrying out of this agreement, such dispute shall be referred for settlement by the two Arbitrators, one to be appointed by each Government and in case of difference of opinion between the Arbitrators, the matter shall be referred to an Umpire appointed by both the Governments.

PART II—Relating to the Sivasamudram Royalty

13. In consideration of Government of Mysore agreeing to the foregoing clauses in Part I the Government of Madras agree, in modification of the terms accepted by the Government of Mysore in their letter No. 150-D.C., dated 26th May, 1900, regarding the royalty payable by the Government of Mysore for the utilization of the waters of the Cauvery Falls at Sivasamudram for the generation of electrical power, to accept (in lieu of the payment of Rs. 5 per electric horse power per annum for half the total water power utilized), a consolidated sum of Rs. 20,000 per annum with effect from the date of the expiry of the previous agreement.

Provided always that any water diverted from the river above the falls for the generation of power shall be returned to the river below the falls without being fouled or diminished in quantity as explained in letter No. 4221/302-94, dated 24th August 1900, from the First Assistant to the Hon'ble the Resident to the Diwan and that the other terms and conditions

of the previous agreement, namely, those contained in sub-paragraphs (iv) and (v) of paragraph 3 of the Government of Mysore's letter referred to above and herein reproduced below shall continue in full force.

OTHER TERMS AND CONDITIONS
REFERRED TO

"(iv) that a cessation on the part of the Darbar to utilize the water of the falls for the generation of electrical power for two years shall operate to terminate the agreement;

(v) that for purpose of power works the Darbar to be vested with the control over the discharge in the river and its branches at and above the falls and to be permitted to build two low dams, subject to the following stipulations:

(a) that the Darbar shall not restrict or interfere with the amount of water for irrigation or other purposes, to which amount the Jaghirdar of Sivasamudram may be legally entitled; and

(b) that the Darbar shall reimburse and make good to the Madras Government all loss or damage which under the decision of a competent civil court may secure in consequence of the Darbar's operation through the infringement of the legal rights of private persons."

N. MADHAVA RAO,

Representative, Govt. of Mysore.

G. W. PRIESTLEY,

Representative, Govt. of Madras.

Dated 24th July, 1944.

APPENDIX G

Supplement to 1944 Agreement executed in December 1945 by the representatives of Governments of Hyderabad, Mysore, Madras and India.

A. Mysore may proceed with the construction of the Sacrebyle anicut on the Tunga river subject to the condition that pending the construction of the Tungabhadra Dam. Mysore shall not extract supplies from the Tunga at the Sacrebyle anicut during low flow period when such extraction is likely to adversely affect the existing Pre-Moghul irrigation. To ensure that the spirit of this clause is complied with regulation rules in this respect shall be framed by the Chief Engineers of the three Governments.

B. With regard to allowance for the rights of the Government of Mysore to draw off water for factories and towns from the water course in the Tunga bhadra basin or the right of the riparian land owners to take water to which they may be entitled under the law or for the minor tanks in the Tungabhadra basin Hyderabad agrees to a specific figure limited to 4,000 M. Cft. of water.

C. Regarding the quantity of 57,000 M. Cft. Exclusive of evaporation losses at the Lakkavalli reservoir under Clause (1) of the Mysore-Madras Agreement, Hyderabad does not commit herself either way to its acceptance or otherwise and shall be free to act under Clause (10) sub para (2) of that Agreement. Subject to the above, Hyderabad does not object to the construction of the Lakkavalli reservoir.

D. The extension of irrigation from the existing Bhadra Anicut provided for under Clause (1) (b) of the Madras-Mysore Agreement, shall be permitted to subject to the same condition as laid down for the irrigation from the Sacrebyle scheme, mentioned under (A) above.

E. The Governments of Hyderabad, Madras and Mysore recognise the claims of Sangli, Bombay and any other riparian areas (excluding those of Mysore, Madras and Hyderabad which are already covered by the two Agreements between Madras and Hyderabad and Madras and Mysore) to an equitable share of waters which shall be decided by a tribunal set by the Government of India for the purpose of final apportionment of the Tungabhadra water between all the interested parties. Further the three Governments agree that the schemes under the two Agreements mentioned above are not intended to prejudice in any way the claims of Bombay, Sangli, etc.

F. In Clause (2) of Madras-Mysore Agreement substitute "Below" for "Above" in the sentence "...
.....river Bhadra above the existing
Bhadra Anicut "

Sd.
(Ali Nawaz Jung)

Sd.
(A. N. Khosla)
24-12-1945

Sd.
(H. Narasimhaiya)
27-12-1945
Chief Engineer for
Irrigation (Mysore).

Sd.
(S. M. Yunus)
24-12-1945

Sd.
(A. R. Vankatachari)
26-12-1945
Chief Engineer for
Irrigation (Madras).

APPENDIX H

Supplemental agreement of 1946 among Madras, Mysore and Hyderabad.

No. 15/2/45-G.G. (A)

SECRETARIAT OF THE GOVERNOR-
GENERAL (PUBLIC)

From

Rao Bahadur V. P. Menon, C.I.E.,

Secretary to the Governor General (Public).

To

The Secretary to the Government of Madras,

Public Works Department.

New Delhi 3, the 23rd April 1946.

Subject :—Agreement between the Madras, Hyderabad and Mysore Governments on the distribution of the waters of the Tungabhadra River.

Sir,

I am directed to invite a reference to your letter No. 495-D/45-9, dated the 31st January 1946 on the above subject, and to forward a copy of Supplements I and II to the Madras-Mysore and the Madras-Hyderabad Agreements which were agreed to by technical representatives of the three Governments in December last.

2. The following minor verbal changes were proposed by His Exalted Highness the Nizam's Government for incorporation in the Madras-Mysore Agreement, and are understood to have been accepted by the Governments of Madras and Mysore:—(1) In Sub-paragraph 2 of the preamble, the word "near" should be substituted for the word "at" before "Lakkavalli" and the words "or at any other place" should be deleted after "Lakkavalli"; and (2) in sub-paragraph 2 of clause 10 after the words "other party" the words "such as Hyderabad" should be inserted.

3. Attention is also invited to an alteration in clause (2) of the Madras-Mysore Agreement, which is understood to have been proposed by the Government of Madras and accepted by the Mysore Government, *viz.*, the substitution of the word "below" for the word "above" in the phrase reading "river Bhadra above the existing Bhadra anicut".

4. The Government of Bombay and the Sangli Durbar have also been consulted on the terms of the agreement, and their concurrence obtained.

5. I am now to invite the Government of Madras to ratify the agreement and to request that this ratification may kindly be communicated to me at a very early date. His Exalted Highness the Nizam's Government and the Government of Mysore are also being addressed with a view to their ratification being obtained.

I have the honour to be,

Sir,

Your most obedient servant,

Sd/- V. P. MENON,

Secretary to the Governor General (Public).

Supplement—I (Page 1)

A. Mysore may proceed with the construction of the Sacrabyle anicut on the Tunga river subject to the condition that pending the construction of the Tungabhadra Dam Mysore shall not extract supplies from the Tunga at the Sacrabyle anicut during low flow period when such extraction is likely to adversely affect the existing pre-Moghul irrigation. To ensure that the spirit of this clause is complied with regulation rules in this respect shall be framed by the Chief Engineers of the three Governments.

B. With regard to allowance for the rights of the Government of Mysore to draw off water for factories and towns from the water courses in the Tunga-

bhadra basin or the rights of the riparian land owners to take water to which they may be entitled under the law or for the minor tanks in the Tungabhadra basin, Hyderabad agrees to a specific figure limited to 4,000 M.C. ft. of water.

C. Regarding the quantity of 57,000 M.C. ft. exclusive of evaporation losses at the Lakkavalli Reservoir under clause (i) of the Mysore-Madras Agreement, Hyderabad does not commit herself either way to its acceptance or otherwise and shall be free to act under clause (10) sub-para (2) of that Agreement. Subject to the above, Hyderabad does not object to the construction of the Lakkavalli Reservoir.

D. The extension of irrigation from the existing Bhadra anicut provided for under clause (i) (b) of the Madras-Mysore Agreement, shall be permitted subject to the same condition as laid down for the irrigation from the Sacrabyle Scheme mentioned under (A) above.

E. The Governments of Hyderabad, Madras and Mysore recognise the claims of Sangli, Bombay and any other riparian areas (excluding those of Mysore, Madras and Hyderabad which are already covered by the two Agreements between Madras and Hyderabad and Madras and Mysore) to an equitable share of waters which shall be decided by a tribunal set up by the Government of India for the purpose of final apportionment of the Tungabhadra Waters between all the interested parties; further the three Governments agree that the schemes under the two Agreements, mentioned above are not intended to prejudice in any way the claims of Bombay, Sangli, etc.

F. In clause (2) of Madras-Mysore Agreement substitute "below" for "above" in the sentence "..... river Bhadra above the existing Bhadra anicut."

Sd/- ALI NAWAZ JUNG

Sd/- A. N. KHOSLA

24-12-45

Sd/- S. M. YUNUS

24-12-45

Sd/- A. R. VENKATACHARI

26-12-45

Chief Engineer for
Irrigation (Madras).

Sd/- M. NARASIMHAIA

27-12-45

Chief Engineer for
Irrigation (Mysore).

Supplement—I (page 3) Enclosure (i)
OFFICE OF THE CHIEF ENGINEER
(IRRIGATION) MYSORE

Camp : Erode. Dated
27th Dec., 1945

My dear Mr. Khosla,

With reference to the Memorandum of Six clauses jointly signed by Hyderabad, Madras and Mysore Chief Engineers and Technical Advisers, I would like to draw your specific attention to the question of setting up of a Tribunal by the Government of India under Cl. E. with a request that you will please have the point examined by the Political as well as the Legal experts in the Government of India to see that it does not conflict in any way with the provisions of the Government of India Act or the Treaty signed by the States.

At my end I will place this matter before the Dewan Saheb and communicate to you by telegram or express letter, his views if any on the matter.

This D.O. should be considered as an enclosure to the Memorandum referred to above.

Yours sincerely, Sd/- M.
NARASIMHAIA.

To

Rai Bahadur

A. N. Khosla, ISE,

Consulting Engineer to the Government of India,
W & I, New Delhi. (Camp : Erode).

M. Narasimhaiya,

Bangalore,

Chief Engineer for Irrigation.

Dated 29-12-1945.

Supplement-I (Page 4) Enclosure (ii)

SHARING OF THE TUNGABHADRA WATERS

My dear Mr. Khosla,

I submitted the papers to the Dewan and the Minister for Public Works.

The Dewan sees no personal objection, prima facie, to the proposals now made and awaits communication from the Government of India on receipt of

which the matter will be dealt with as promptly as possible by the Government of Mysore.

With high regards,

Yours sincerely,

Sd/- M. NARASIMHAIYA.

Supplement-II (Page-5)

Regarding the Madras-Hyderabad Agreement the question raised by Mysore in respect of safeguarding her irrigation interest in the Vedavati basin does not concern Hyderabad and should therefore be settled between Madras and Mysore.

Sd. ALI NAWAZ JUNG.

Sd. M. NARASIMHAIYA.

27-12-45

C.E. for Irrigation, Mysore.

Sd. A. N. KHOSLA.

24-12-45.

Sd. S. M. YUNUS

24-12-45

Sd. A. R. VENKATACHARI,

26-12-45

C.E. for Irrigation, Madras.

Enclosure to Supplement 1 and II (Page-6)

On the Memorandum of Hyderabad relating to Vedavati, Madras would agree to the following remark provided Mysore agrees too:—

The agreement between Madras and Hyderabad does not affect the rights of Mysore or Madras in regard to the utilization of the waters of the Vedavati.

On the main Memorandum of six paragraphs A to F it is provisionally agreed to and :—

We agree to the Memorandum subject to the remark that as regards paragraph F of the Memorandum, Madras would agree provided Mysore agrees to

let down the water into the river not lower than just below the Bhadra Anicut.

Sd. A. R. VENKATACHARI,

26-12-45

*Chief Engineer, Irrigation,
Madras.*

Sd. A. N. KHOSLA,

27-12-45

*Chief Engineer to
the Government of India.*

Sd. M. NARASIMHAIYA,

Chief Engineer for Irrigation,

Mysore. 27-12-45.

Sheet-III (Page 7)

With regard to the technical details for settlement provided under clause (14) of the Madras-Hyderabad Agreement, Hyderabad requests very early action with a view to settlement of these details without which there will be the possibility of delays at different stages of the Project.

Sd. ALI NAWAZ JUNG.

Sd. S. M. YUNUS

24-12-45

Sd. A. N. KHOSLA

24-12-45

SHEET IV (Page 8)

Hyderabad reiterates her request for the setting up of a tribunal for the final apportionment of the Tungabhadra waters and requests for a very early action in this respect.

Sd. ALI NAWAZ JUNG.

Sd. S. M. YUNUS.

24-12-45

Sd. A. N. KHOSLA.

24-12-45

APPENDIX I

Agreed statement of catchment areas at different points in Krishna basin

Item No.	Description	Areas in sq. miles			As agreed (on 31-3-71)
		Maharashtra	Mysore	Andhra Pradesh	
1	2	3	4	5	6
1	The Krishna upto Khodshi weir	1,322	1,322	1,322	1,322
2	The Krishna upto Junction with Koyna including the Koyna	2,081	2,062	2,141	2,081
3	The Krishna upto Maharashtra border (m Maharashtra)	6,939	6,581	6,939 (Entire K-1)	6,613
4	The Krishna from Maharashtra border upto Almatti dam including Ghataprabha (K-2 and K-3 full) & K-1 of Mysore	6,164	7,290	5,459 (excluding K-1 of Mysore)	6,273
5.	From Almatti dam to Narayanpur dam including the Malaprabha	5,628	4,604	5,568	5,589
6.	The Krishna from Narayanpur dam upto Mysore border (Part of K-2 sub basin including K-7 of Mysore)	2,825	3,761	3,521	3,761
7.	The Krishna from Mysore border to Srisaillam (excluding Bhima & Tungabhadra)	4,939	2,456	4,789	4,647
8.	The Krishna from Srisaillam to Nagarjunasagar (Part of K-7)	3,704	3,557	3,493	3,493
9.	The Krishna from Nagarjunasagar to Vijayawada (Areas of K-10, K-11, K-12 are according to Krishna-Godavari Commission's report given by all the States) and Part of K-7	13,879	15,522	14,044	14,044
10	The Bhima upto Ujjaini dam (Part of K-5)	5,736	5,736	5,736	5,736
11.	The Bhima from Ujjaini dam upto junction with Nira including the Nira (Part of K-5)	2,808	2,524	3,074	2,941
12.	The Bhima from the junction with the Nira upto mile 303 i.e. where com non Maharashtra-Mysore border along the river begins (Part K-5)	3,524	3,353	3,537	3,530
13.	The Bhima from mile 303 to mile 349 (where common Maharashtra-Mysore Border along the liver ends)	1,664	1,823	1,663	1,664
14.	The Sina upto Junction with the Bhima (Part K-5)	4,637	4,595	4,272	4,600
15.	The Bhima from mile 349 upto Mysore border (excluding Andhra Pradesh area Part K-6)	8,918 (including Andhra Pradesh area in K-6)	9,233	7,736	7,821
16.	The Ghataprabha upto Maharashtra border (Part K-3)	416	776	390	400
17.	The Ghataprabha from Maharashtra border upto junction with the Krishna excluding complete Hiranyakeshi catchment (Part K-3)	2,993 (including Hiranyakeshi)	2,633	2,695	2,633
18.	The Dudhganga upto Maharashtra border excluding Vedganga in Maharashtra territory	669 (including Vedganga)	279	304	290
19.	The Dudhganga from Maharashtra border upto junction with Krishna (Part K-1)	326	133	306	326
20	The Tungabhadra upto Tungabhadra Dam (Part K-8)	10,880	10,880	10,880	10,880

1	2	3	4	5	6
21.	Tungabhadra from Tungabhadra Dam to Rajolibunda (Part K-8 and entire K-9)	12,837	12,837	12,837	12,837
22.	Tungabhadra from Rajolibunda to Mysore border (Part K-8) including area in Andhra Pradesh	785	872	1,238	1,238
23.	The Tungabhadra from Mysore border upto junction with the Krishna (Part K-8 in Andhra Pradesh)	2,192	2,985	2,619	2,619
24.	Don upto Maharashtra border (Part K-2)	30	35	52	35
25.	Balance of Don upto its junction with the Krishna (Part K-2)	1,268	1,290	1,167	1,290
26.	Hiranyakeshi into Maharashtra Border (Part K-3)	324	376	300	352
27.	Markandeya upto Maharashtra border (Part K-3)	36	22	24	24
28.	Agrani upto Maharashtra border (Part K-2)	522	475	380	501
29.	Bori upto Maharashtra border (Part K-6)	710	760	705	710
30.	Bemthora upto Maharashtra border (Part K-6)	330	365	308	330
31.	Doddahilla (Nargel) upto Maharashtra border (Part K-5)	340	260	472	357
32.	Bor upto Maharashtra border (Part K-5)	340	448	372	340
33.	Amarja upto Maharashtra border (Part K-6)	30	69	99	69
34.	The Kagna upto Mysore border (K-6 in Andhra Pradesh)	972	827	1,246	972
35.	Chikka Hagari upto Mysore border (Part K-9)	1,107	1,190	798	1,150
36.	Vedavathi Entire Mysore area (K-9)	6,718	7,830	7,247	7,034
37.	Unnamed tributary No. 1 (Tributary joining Suvarnamukhi) (K-9 sub basin)	463	500	543	520
38.	Unnamed tributary No. 2 (Joining Vedavati below con- fluence of Suvarnamukhi)	176	317	276	296
39.	Unnamed tributary No. 3 (Joining Vedavati below con- fluence of Chikkahagari)	71	385	374	380
40.	Unnamed tributary No. 4 (Joining Tungabhadra below confluence of Vedavati and Tungabhadra)	308	276	292	292
41.	The entire catchment area of the Krishna basin in Maha- rashtra	26,805	26,805	26,805	26,805
42.	The entire catchment area of the Krishna basin in Mysore	43,734	43,734	43,734	43,734
43.	The entire catchment area of the Krishna basin in Andhra Pradesh upto Vijayawada	28,407	29,441 (upto sea)	28,719	28,719
	Total area in Krishna basin upto Vijayawada	98,946	99,980 (upto sea)	99,258	99,258
44.	Catchment area of Krishna below Vijayawada and upto sea	1,034	722	722	722

Sd/-

K. M. SEERVAI

for the State of Maharashtra
7-5-1971

Sd/-

P. RAMACHANDRA REDDI

for Andhra Pradesh 7-5-1971

Sd/-

T. KRISHNA RAO

for the State of Mysore
7-5-1971

APPENDIX J

Having regard to the fact that there is no available data relating to underground water which the parties can place before this Honourable Tribunal for the purpose of deciding the present dispute, the parties state, for the purpose of this dispute, as follows :—

1. The underground water resources of the States concerned will not be regarded as alternative means of satisfying their needs

Sd/-
P. RAMACHANDRA REDDI,
for Andhra Pradesh.
1-4-1971

Sd/-
T. KRISHNA RAO,
for Mysore State.
1-4-1971

Sd/-
H. M. SEERVAI,
for Maharashtra.
1-4-1971

and will not be taken into account for purposes of the equitable apportionment of the waters of the river Krishna and the physical basin (river-valley) thereof.

2. The States do not ask the Tribunal to put any restrictions on the use of underground water by the States.

APPENDIX K

Supplementary agreement

I. With reference to Annexure 'A' to the Order of the 1st April, 1971, the States of Andhra Pradesh, Maharashtra and Mysore are agreed that for clause 2 of the said Annexure 'A' the following clauses 2 and 3 be substituted:

"2. The States will be free to make use of underground water within their respective State territories.

3. This agreement will not be taken in any way to alter the rights, if any, under the law for the time being in force, of private individuals, bodies or authorities."

Sd/-
T. KRISHNA RAO
Counsel
for the State of Mysore
25-9-1972

Sd/-
P. RAMACHANDRA REDDI
Advocate General
for the State of Andhra Pradesh
25-9-1972

Sd/-
H. M. SEERVAI
Advocate General
for the State of Maharashtra
25-9-1972

APPENDIX L

The States of Maharashtra, Mysore and Andhra Pradesh agree as follows:—

The uses mentioned in column No. 1 below be measured in the manner indicated in column No. 2:—

Use	Measurement
Domestic and municipal water supply.	By 20 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.
Industrial use	By 2.5 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.

Sd/-
E. C. SALDANHA
20-8-73
Maharashtra

Sd/-
S. G. BALEKUNDRY
20-8-73
Mysore

Sd/-
G. K. S. IYENGAR
20-8-73
Andhra Pradesh

Sd/-
T. R. ANDHYARUJINA
Counsel
for State of Maharashtra
20-8-73

Sd/-
T. KRISHNA RAO
for State of Mysore
20-8-73

Sd/-
P. RAMACHANDRA REDDI
for the State of Andhra Pradesh
20-8-73

APPENDIX M

Agreement between the State of Mysore and the State of Andhra Pradesh regarding protection to irrigation works in their respective Territories in Vedavathy Sub-Basin

It is agreed between the State of Mysore and the State of Andhra Pradesh that the State of Mysore will not put up any new work on the streams mentioned in Schedule (1) within the limits shown in the said Schedule and marked in the map* appended herewith, without the previous consent of Andhra Pradesh to protect the irrigation interests under the existing irrigation works in Andhra Pradesh and similarly it is agreed that the State of Andhra Pradesh will not put up any new work on the streams mentioned in Schedule (2) within the limits shown in the said Schedule and marked in the map* appended herewith, without the previous consent of Mysore State

to protect the irrigation interests under the existing irrigation works in Mysore State.

It is further agreed between the State of Mysore and the State of Andhra Pradesh that the State of Mysore will not put up any new construction on Suvarnamukhi river so as to affect the supply of Agali tank in Andhra Pradesh for the irrigation of an ayacut of 884 acres, the supplies for which are drawn from the Agali Anicut in Mysore State.

Having regard to this concession the parties are agreed that the Tribunal need not decide issue No. IV.

Sd/-
T. KRISHNA RAO
Counsel
for the State of Mysore
2-9-71

Sd/-
P. RAMACHANDRA REDDI
Counsel
for the State of Andhra Pradesh
2-9-71

*See Map II in Volume IV of the Report.

SCHEDULE 1

List of streams on which no new constructions should be undertaken by the State of Mysore without the previous consent of Andhra Pradesh

Sl. No.	Name of the Stream or Catchment	Location in the Map	Limits within which no new construction should be undertaken by Mysore without the previous consent of Andhra Pradesh
1	2	3	4
1.	Hagari (Vedavathy)	A	From Vanivilas Sagar in Mysore upto Bhairavanithi-ppa Dam in Andhra Pradesh.
2.	Dodderi tank halla (Garanihalla)	B	4 ½ mites up-stream of confluence with Hagari.
3.	Talak tank halla (Garanihalla)	C	From the Salem-Bellary road bridge over this stream upto confluence with Hagari.
4.	Chinnahagari	D	Upto 16 miles upstream from Mysore-Andhra Pradesh boundary.
5.	Amarapuram tank catchment	E	Catchment of Amarapuram tank in Mysore State.
6.	Virapasamudram tank catchment	F	Catchment of Virapasamudram tank in Mysore State.
7.	Yeradkere tank catchment	G	Catchment of Yeradkere tank in Mysore State.
8.	Rangasamudram tank catchment	H	Catchment of Rangasamudram tank in Mysore State.
9.	Nagalapuram tank catchment	I	Catchment of Nagalapuram tank in Mysore State.

Sd/-
T. KRISHNA RAO
Counsel
for the State of Mysore
2-9-71

Sd/-
P. RAMACHANDRA REDDI
Counsel
for the State of Andhra Pradesh
2-9-71

SCHEDULE 2

List of streams on which no new constructions should be undertaken by the state of Andhra Pradesh without the previous consent of Mysore

Sl No	Name of the Stream	Location in the map	Limits within which no new construction should be undertaken by Andhra Pradesh without the previous consent of Mysore State
1	2	3	4
1	Madalur Doddakere nala	J	Entire catchment of the nala in Andhra Pradesh
2	Madalur Gidaganahalli Kattenala	K	Entire catchment of the nala in Andhra Pradesh
3	Doddabanagere Doddakere nala	L	Entire catchment of the nala in Andhra Pradesh
4	Dharmapur tank nala	M	Entire catchment of the nala in Andhra Pradesh
5	Parasurampur Doddakere nala	N	Entire catchment of the nala in Andhra Pradesh
6	Kadehoda Achuvalikere nala	O	Entire catchment of the nala in Andhra Pradesh
7	Parasurampura tank nala	P	Entire catchment of the nala in Andhra Pradesh
8	Gowripura Palayadakere nala	Q	Entire catchment of the nala in Andhra Pradesh
9	Jajur tank nala	R	Entire catchment of the nala in Andhra Pradesh
10	Thippareddihally Kyatanakere nala	S	Entire catchment of the nala in Andhra Pradesh
11	Oblapur tank nala	T	Entire catchment of the nala in Andhra Pradesh
12	Hagari (Vedavathi)	U	Below Bhairavanithippa Dam up to Andhra Pradesh Mysore border
13	Chinnahagari	V	From Mysore-Andhra Pradesh border upto its confluence with Vedavathy (Hagari)

Sd/
T. KRISHNA RAO
Counsel
for the State of Mysore
2-9-71

Sd/-
P RAMACHANDRA REDDI
Counsel
for the State of Andhra Pradesh
2-9-71

APPENDIX N

Supplementary Agreement regarding Gauging Sites in the Krishna River System

The Engineers for the States of Maharashtra, Mysore and Andhra Pradesh agree that the river Krishna and its tributaries should be gauged at the following sites :

I. At all the dam & weir sites—existing, under construction and future projects—utilising annually 1 T.M.C. or more :—

At all such sites the following measurements will be made and recorded three times a day—6 A.M. in the morning, 12 Noon and 6 P.M. in the evening.

- (a) Diversions into canals, penstocks, tunnels etc.
- (b) Water let down through the various sluices in the dam, weir or barrage.
- (c) Overflow over waste weir or spillways.
- (d) Estimated evaporation losses.
- (e) Water lifted from the river or reservoirs for irrigation, water supply and for any other purpose. These measurements will be made by the States in which the dams & weirs are situated.

The cost of such measurements will be borne by the States concerned.

II. Gauging on Inter-State Streams:—

Three times daily at 6 A.M., 12 Noon and 6 P.M.

A. Inter-State streams between Mysore and Andhra Pradesh :

1. The Krishna River near Deosugar (at present a CW&PC gauging site).
2. The Bhima River near Yadgir (CW&PC gauging site).
- 3 The Tungabhadra River Madhwaram bridge site.
near
4. (a) The Vedavathi River Bhairavanithippa.
near
(b) The Vedavathi River Rampur (at present a CW&PC
near site).
5. The Kagna river near Jiwargi.
6. The Chikkahagari river Amkundi Bridge or Aqueduct
near site on High Level Canal.

The location of these stations may be changed from time to time as the river channels and flow conditions of the rivers may require. The river gauging at Deosugar, Yadgir, and Rampur. will be continued to be done by the CW&PC as at present the State bearing the cost as being done now. The river gauging at Madhawaram, Bhairavanithippa, Jiwargi and Amkundi Bridge will be done jointly by the S/c CW&PC if willing to do so, and the cost will be shared between all the three States equally.

B. Inter-State Streams between Maharashtra and Mysore :

1. The Krishna river near Shirti (at present a CW&PC gauging site).
2. The Bhima river near Takali (-do-)
3. The Ghataprabha river Daddi.
near
4. The Vedganga river near Bastawad.
5. The Dudhganga river Kagal at the bridge site on N.
near Highway.
6. The Panchaganga river Terwad (at present a CW&PC
near gauging site).
7. The Agrani river near Pendagaon.
8. The Hiranyakeshi river Gotur weir.
near
9. The Bornala river near Konkangaon.
10. The Borinala near Diksanga site or Railway bridge
near Rudewadi.
11. The Doddahalla river Shivadhan.
near
12. The Benithora river near Diggi.

The location of the said stations may be changed from time to time as the river channels and water flow conditions of the rivers may require.

The river gauging at Shirti, Takali and Terward will be continued to be done by the CW&PC as at present the States bearing the cost as being done now. The river gauging at Daddi, Bastawad, Kagal, Pendagaon, Gotur, Konkangaon, Diksanga or Rudewadi, Shiradhan, and Diggi will be done jointly by the states of Maharashtra and Mysore or the CW&PC if willing to do so, and the cost of gauging at these sites will be shared between all the three States equally.

C. C.W. & P.C. gauging sites.

In addition to the CW&PC gauging sites mentioned in A & B above, the CW&PC will continue to do the river gauging as at present at the following sites the cost being borne by the three States as at present.

(a) *On the Krishna river at*

- (1) Karad (in Maharashtra)
- (2) Almatti (in Mysore)
- (3) Dhannur (in Mysore)
- (4) Yaparla (in Andhra Pradesh)
- (5) Moravakonda (in Andhra Pradesh)
- (6) Srisailam (in Andhra Pradesh)
- (7) Damerapadu (in Andhra Pradesh)
- (8) Wadenpalli (in Andhra Pradesh)
- (9) Vijayawada (in Andhra Pradesh)

(b) *on the Koyna river at*

- (10) Koyna dam (Maharashtra)
- (11) Warunji (Maharashtra)

(c) *on the Warna river at*

- (12) Samdoli (Maharashtra)

(d) *on the Dudhganga river at*

- (13) Sadalgi (Maharashtra)

(e) *on the Ghataprabha river of*

- (14) Dhupdal weir (in Mysore)
- (15) Bagalkot (in Mysore)

(f) *on the Malaprabha river at*

- (16) Huvanur (in Mysore)

(g) *on the Bhima river at*

- (17) Dhond (in Maharashtra)

- (18) Narsingpur (in Maharashtra)

(h) *on the Nira river at*

- (19) Sarati (in Maharashtra)

(i) *on the Sina river at*

- (20) Wadakbal (in Maharashtra)

(j) *on the Tungabhadra river at*

- (21) Harlahalli (in Mysore)

- (22) Manuru (in Mysore)

- (23) Mantralyam (in Mysore)

- (24) Bawapuram (in Andhra Pradesh)

(k) *on the Tunga river at*

- (25) Shimoga (in Mysore)

(l) *on the Bhadra river at*

- (26) Lakhavali (in Mysore)

(m) *on the Varada river at*

- (27) Marol (in Mysore)

(n) *on the Musi river at*

- (28) Damercherla (in Andhra Pradesh)

(o) *on the Pattern river at*

- (29) Palleru bridge (in Andhra Pradesh)

(p) *on the Munneru river at*

- (30) Keesra (in Andhra Pradesh)

Sd/-
E C. SALDANHA
20.8.73

Sd/-
T.R. ANDHYARUJINA
Counsel
for State of Maharashtra
20.8.73

Sd/-
S. G. BALEKUNDRY
20.8.73
(Mysore)

Sd/-
T. KRISHNA RAO
for the State of Mysore
20.8.73

Sd/-
G. K. S. IYENGAR
20.8.73
(Andhra Pradesh)

Sd/-
P. RAMACHANDRA REDDI
for the State of Andhra Pradesh
20.8.73

APPENDIX O

MAHARASHTRA "X"

Annual flow series at Vajayawada for the years 1894- 95 to 1971-72 filed by the State of Maharashtra

The parties requested the Tribunal that for the purposes of allocation of water the 75 per cent dependable flow of Krishna river upto Vijayawada be determined at this stage. With the able assistance of Counsel for the parties and after thorough examination of all the material on record and after careful consideration of the matter, the Tribunal directed that the flow series from 1894-95 to 1971-72 be prepared on the following lines : —

- (1) The Tribunal has come to the conclusion that for 1901-02 to 1950-51 the flows should be deemed to be modular on all the days except 116 days (vide pages 170 to 173 of C.W. & P.C. K-5).
- (2) The Tribunal is of the opinion that for the years 1929-30 to 1950-51 for which there is complete flow data the flows be calculated by applying the following equations as given in MRK-334 filed on 10-4-1973.

$$(a) Q = C_1 L [(H + h_a)^{3/2} - h_a^{3/2}] \dots (1)$$

$$(b) Q = 3.11 \left[(h_a + h_a)^{3/2} - h_a^{3/2} \right] + CLD / 2g(h + h_a)$$

for non-modular flows (2)
with the coefficient C1 as determined
by the Tribunal.

$$\text{and (c) } Q = 3.33 L x \left[(h_1 + h_a)^{3/2} - h_a^{3/2} \right] (3)$$

where h1 is the depth of flow over the top of standing shutters for flows over the standing shutters. In equation (2) above values of coefficients C for different values of 'd' are taken as given MRK-334. (3) The coefficients C1 as in equations 1, 2 and 3 in p. 2 above as determined by the Tribunal be adopted as under :

0' to 3'	.	.	.	.	2.60
3' to 6'	.	.	.	.	2.75
6' to 9'	.	.	.	.	3.00
9' to 11'	.	.	.	.	3.10
above 11'	.	.	.	.	3.20

- (4) The Tribunal accepts the contention of the State of Maharashtra in MR Note 1 that for the years 1925-26 to 1928-29 the flows be taken in the manner set forth in that note.
- (5) The Tribunal accepts the contention of Andhra Pradesh in para 9 of AP Note 10 that for the years 1901-02 to 1924-25 the flows be calculated as set forth in that note.

- (6) The Tribunal accepts the contention of Maharashtra as set forth in MR Note 2 that for the years 1951-52 to 1970-71 and in MR Note No. for the year 1971-72, the flows should be taken as set forth in those notes.
- (7) The Tribunal is of the opinion that for the years 1894-95 to 1900-1901 the recorded flows as mentioned in the Krishna Reservoir Project Report (Exh. APK 403) should be adopted.
- (8) So far as the upstream utilisations are concerned, for the period 1894-95 to 1900-1901, in the absence of data or agreed figures the same utilisations as for the year 1901-1902 be adopted. So far as the utilisations for the years 1901-1902 to 1955-56 are concerned, the utilisations as agreed to between the States be adopted (vide Tribunal's order dated 7th May 1972.)
- (9) For the years 1956-57 to 1968-69, the figures of upstream utilisations as agreed to by the States of Maharashtra and Mysore and as given in Maharashtra chart MRA-15 in MR Note 2 have been adopted. The figures of upstream utilisations according to the contention of A.P. for these years are given in brackets.
- (10) As the data of utilisations for the years 1969-70 to 1971-72 are not before the Tribunal, the same figures of utilisations as for the year 1968-69 be taken for these years disregarding higher utilisations, if any. The runoff series for 1894-95 to 1971-72 is annexed hereto as annexure I. Based on the above series the 75 per cent dependable flow comes to 2060 T.M.C. This series may be adopted for the purposes of this case, and the 75 per cent dependable flow may be held to be 2060 T.M.C.

Sd/-
H. M. SEERVAI
for the State of
Maharashtra
4-5-1973

ANNEXURE-I

Run-off series of Gross yields of Krishna at Vijayawada for the period 1894-95 to 1971-72

Sl. No	Year								Flow over anicut inclusive of flow through sluices TMC	Up-stream uses TMC	Gross yield TMC	Yields arranged in descending order		Dependability
												Year	Gross yield	
													TMC	
1	2								3	4	5	6	7	8
1	1894-95	.	.	.	.	.	.	.	1838.55	245.71	2084	1956-57	4166 (4165)	
2	1895-96	.	.	.	.	.	.	.	1937.00	245.71	2183	1961-62	3760 (3755)	
3	1896-97	.	.	.	.	.	.	.	2365.4	245.71	2611	1916-17	3721	
4	1897-98	.	.	.	.	.	.	.	2449.52	245.71	2695	1959-60	3482 (3477)	
5	1898-99	.	.	.	.	.	.	.	2342.02	245.71	2588	1964-65	3397 (3385)	
6	1899-1900	.	.	.	.	.	.	.	879.03	245.71	1125	1903-04	3160	
7	1900-01	.	.	.	.	.	.	.	2549.51	245.71	2795	1958-59	3116 (3113)	
8	1901-02	.	.	.	.	.	.	.	1811.60	245.71	2057	1962-63	3079 (3075)	
9	1902-03	.	.	.	.	.	.	.	1623.40	245.71	1869	1960-61	3069 (3060)	
10	1903-04	.	.	.	.	.	.	.	2914.50	245.71	3160	1914-15	3049	
11	1904-05	.	.	.	.	.	.	.	1524.30	245.71	1770	1917-18	3029	
12	1905-06	.	.	.	.	.	.	.	1026.00	246.71	1273	1955-56	2969	
13	1906-07	.	.	.	.	.	.	.	1641.40	248.71	1890	1933-34	2936	
14	1907-08	.	.	.	.	.	.	.	2026.40	249.71	2276	1953-54	2919	
15	1908-09	.	.	.	.	.	.	.	2222.20	249.71	2472	1931-32	2903	
16	1909-10	.	.	.	.	.	.	.	1893.00	250.71	2144	1946-47	2840	
17	1910-11	.	.	.	.	.	.	.	2171.0	250.71	2422	1900-01	2795	
18	1911-12	.	.	.	.	.	.	.	1199.70	251.71	1451	1963-64	2757 (2751)	
19	1912-13	.	.	.	.	.	.	.	1712.90	251.71	1965	1970-71 (1957-58)	2745 2730	
20	1913-14	.	.	.	.	.	.	.	1556.50	251.71	1808	1957-58 (1970-71)	2732 (2725)	
21	1914-15	.	.	.	.	.	.	.	2786.40	262.71	3049	1932-33	2703	
22	1915-16	.	.	.	.	.	.	.	2120.80	252.71	2374	1897-98	2695	
23	1916-17	.	.	.	.	.	.	.	3468.30	252.71	3721	1969-70	2685 (2665)	
24	1917-18	.	.	.	.	.	.	.	2775.90	252.71	3029	1950-51	2629	
25	1918-19	.	.	.	.	.	.	.	746.10	260.71	1007	1938-39	2613	
26	1919-20	.	.	.	.	.	.	.	2009.70	260.71	2270	1896-97	2611	

1	2	3	4	5	6	7	8
27.	1920-21 .		1429.70	260.71	1690	1898-99	2588
28.	1921-22 .		1903.60	260.71	2164	1949-50	2544
29.	1922-23 .		1791.40	271.71	2063	1967-68 (1947-48)	2538 (2525)
30.	1923-24 .		2199.70	271.71	2471	1947-48 (1967-68)	2525 (2519)
31.	1924-25 .		2052.20	271.71	2324	1908-09	2472
32.	1925-26 .		2014.80	265.93	2281	1923-24	2471
33.	1926-27 .		1910.74	266.29	2177	1954-55	2439
34.	1927-28 .		2028.29	276.94	2305	1910-11	2422
35.	1928-29 .		1935.16	276.86	2212	1915-16	2383
36.	1929-30 .		1615.42	302.44	1918	1943-44	2332
37.	1930-31 .		1889.68	306.45	2196	1924-25	2324
38.	1931-32 .		2593.43	309.45	2903	1948-49	2311
39.	1932-33 .		2390.71	312.42	2703	1927-28	2305
40.	1933-34 .		2620.96	315.41	2936	1940-41	2287
41.	1934-35 .		1766.21	318.39	2085	1925-26	2281
42.	1935-36 .		1605.56	321.36	1927	1907-08	2276
43.	1936-37 .		1666.27	324.03	1990	1919-20 1928-29	2270 2212
44.	1937-38 .		1718.19	327.25	2045	1930-31	2196
45.	1938-39 .		2284.83	327.83	2613	1939-40	2194
46.	1939-40 .		1865.41	328.41	2194	1895-96	2177
47.	1940-41 .		1957.86	328.73	2287	1926-27	2177
48.	1941-42 .		1358.64	356.20	1715	1942-43	2169
49.	1942-43 .		1833.87	335.30	2169	1921-22	2164
50.	1943-44 .		1982.69	350.55	2332	1971-72 (1909-10)	2157 (2144)
51.	1944-45 .		1790.60	338.64	2129	1909-10 (1971-72)	2144 (2137)
52.	1945-46 .		1628.60	331.88	1960	1968-69 (1944-45)	2136 (2129)
53.	1946-47 .		2500.40	339.78	2840	1944-45 (1968-69)	2129 (2116)
54.	1947-48 .		2196.40	329.06	2525		
55.	1948-49 .		1988.63	322.67	2311	1934-35	2085
56.	1949-50 .		2234.30	310.08	2544	1894-95	2084
57.	1950-51 .		2326.63	301.85	2628	1965-66	2074 (2063)
58.	1951-52 .		1533.00	387	1970	1922-23	2063 75 % dep.
59.	1952-53 .		1367.00	382	1749	1901-02	2057 2060 2060
60.	1953-54 .		2499.00	420	2919	1937-38	2045
61.	1954-55 .		2023.00	416	2439	1936-37	1991
62.	1955-56 .		2548.00	421	2969	1951-52	1970
63.	1956-57 .		3726.00	440 (439)	4166 (4165)	1912-13	1965
64.	1957-58 .		2265.00	467 (465)	2732 (2730)	1945-46	1960

1	2	3	4	5	6	7	8
65. 1958-59		2626.00	490 (487)	3116 (3113)	1966-67	1957 (1939)	
66. 1959-60		2969.00	513 (508)	3482 (3477)	1935-36	1927	
67. 1960-61		2528.00	541 (532)	3069 (3060)	1929-30	1918	
68. 1961-62		3168.00	592 (587)	3760 (3755)	1906-07	1890	
69. 1962-63		2481.00	598 (594)	3079 (3075)	1902-03	1869	
70. 1963-64		2099.00	658 (652)	2757 (2751)	1913-14	1808	
71. 1964-65		2736.00	661 (653)	3397 (3389)	1904-05	1770	
72. 1965-66		1378.00	696 (685)	2074 (2063)	1952-53	1749	
73. 1966-67		1181.00	776 (758)	1957 (1939)	1941-42	1715	
74. 1967-68		1621.00	917 (898)	2538 (2519)	1920-21	1690	
75. 1968-69		1140.00	996 (976)	2136 (2116)	1911-12	1451	
76. 1969-70		1689.00	996 (976)	2685 (2665)	1905-06	1273	
77. 1970-71		1749.00	996 (976)	2745 (2725)	1899-1900	1125	
78. 1971-72		1161.03	996 (976)	2157 (2137)	1918-19	1007	
TOTAL :				186622 (186451)			

(i) Average as per Maharashtra & Mysore figures : . 2393 T.M.C.

(ii) Average as per Andhra Pradesh figures : . 2390 T.M.C.

NOTE : Figures in Brackets arc with upstream utilisations according to Andhra Pradesh.

APPENDIX P

MYSORE "Y"

Annual flow series at Vijayawada for the years 1894-95 to 1971-72 filed by the State of Mysore

Parties requested the Tribunal that for purposes of allocation the dependable flow of Krishna river at Vijayawada be determined at 75 per cent dependability. With the able assistance of the Counsels for all the parties and after thorough examination of all material on record and after careful consideration of all the aspects of the matter the Tribunal directed that a flow series from 1894 to 1972 be prepared on the following lines :

- (1) The Tribunal has come to the conclusion that for the years 1901-02 to 1950-51 flows to be deemed as modular for all days except 116 days as mentioned in C.W. & P.C. (K)-Vol. 19. P. 73 to 79.
- (2) The Tribunal is of the opinion that for years 1925-26 to 1950-51 flows over the weir be calculated as per following equation :

$$Q = C_1 L \left[(H + h_a)^{3/2} - h_a^{3/2} \right]$$

(H = Head of flow over the anicut)

Non-Modular flow formula

$$Q = 3.1 L \left[(h_1 + h_a)^{3/2} - h_a^{3/2} \right] + 8CLD/\sqrt{h + h_a}$$

(h = difference between the upstream and downstream levels) with the coefficients as given by the Tribunal and formula $Q = 3.33 L \left[(h_1 + h_a)^{3/2} - h_a^{3/2} \right]$ for flow over the standing shutters

(h₁ = head of flow over the top of shutter)

Modular flow formula

- (3) The Tribunal accepts the contention of Maharashtra in Note No. 1 that for years 1925-26 to 1929-30 the flow may be taken in the manner set forth in that note.
- (4) The Tribunal accepts the contention of Andhra Pradesh in A.P. Note No. 10 (filed on 3-5-1973), para 9, that for the years 1901-02 to 1924-25 the flows to be calculated as per para 9.

- (5) The Tribunal accepts the contention of Maharashtra and Mysore that for the years 1951-52 to 1971-72 the flows as per recorded data may be adopted.
- (6) The Tribunal is of the opinion that for the years 1894 to 1901 the recorded flows as mentioned in Krishna Reservoir Project Vol. II may be adopted.
- (7) So far as upstream utilisations are concerned, Tribunal is of the opinion that the following shall be adopted :
 - (i) 1894 to 1901—same as for the year 1901-02 ;
 - (ii) 1901-02 to 1955-56—as per the agreed statement;
 - (iii) 1956-57 to 1968-69—figures given both by Andhra Pradesh on the one hand and Maharashtra and Mysore on the other should both be taken ;
 - (iv) 1969-70 to 1971-72 may be assumed as for the previous year 1968-69 as further details are not on record.

The parties are agreed that the series may be adopted for the purpose of estimating of yields in the present case. The parties submit/agree that the annual flow at Vijayawada including upstream utilisations as given in the series from 1894-95 to 1971-72 and the resultant 75 per cent dependable flow of 2060 T.M.C. may be adopted as a basis for the present allocations.

Sd/-
T. KRISHNA RAO
for the State of Mysore
4-5-1973

Yield Series of the River Krishna at Vijayawada Anicut for the Period 1894-95 to 1971-72

Sl. No.	Year									Flow at Vijayawada	Upstream uses	Gross yield at Vijayawada	Gross yield arranged in the descending order	
1.	2									3	4	5	6	7
1.	1894-95	.	.	.	.	.	.	.	.	1839	245	2084	1956-57	4166
2.	1895-96	.	.	.	.	.	.	.	.	1937	245	2182	1961-62	3760
3.	1896-97	.	.	.	.	.	.	.	.	2366	245	2611	1916-17	3722
4.	1897-98	.	.	.	.	.	.	.	.	2450	245	2695	1959-60	3482
5.	1898-99	.	.	.	.	.	.	.	.	2342	245	2587	1964-65	3397
6.	1899-1900	.	.	.	.	.	.	.	.	879	245	1124	1903-04	3160
7.	1900-01	.	.	.	.	.	.	.	.	2550	245	2795	1958-59	3116
8.	1901-02	.	.	.	.	.	.	.	.	1812	245	2057	1962-63	3079
9.	1902-03	.	.	.	.	.	.	.	.	1623	245	1868	1960-61	3069
10.	1903-04	.	.	.	.	.	.	.	.	2915	245	3160	1914-15	3048
11.	1904-05	.	.	.	.	.	.	.	.	1525	245	1770	1917-18	3029
12.	1905-06	.	.	.	.	.	.	.	.	1026	246	1272	1955-56	2969
13.	1906-07	.	.	.	.	.	.	.	.	1642	249	1891	1933-34	2936
14.	1907-08	.	.	.	.	.	.	.	.	2027	250	2277	1953-54	2919
15.	1908-09	.	.	.	.	.	.	.	.	1922	250	2472	1931-32	2903
16.	1909-10	.	.	.	.	.	.	.	.	1893	251	2144	1946-47	2840
17.	1910-11	.	.	.	.	.	.	.	.	2171	251	2422	1900-01	2795
18.	1911-12	.	.	.	.	.	.	.	.	1200	251	1451	1963-64	2757
19.	1912-13	.	.	.	.	.	.	.	.	1713	252	1965	1970-71	2745
20.	1913-14	.	.	.	.	.	.	.	.	1556	252	1808	1957-58	2732
21.	1914-15	.	.	.	.	.	.	.	.	2786	262	3048	1932-33	2703
22.	1915-16	.	.	.	.	.	.	.	.	2121	253	2374	1897-98	2695
23.	1916-17	.	.	.	.	.	.	.	.	3469	253	3722	1969-70	2685
24.	1917-18	.	.	.	.	.	.	.	.	2776	253	3029	1950-51	2628
25.	1918-19	.	.	.	.	.	.	.	.	748	261	1009	1938-39	2613
26.	1919-20	.	.	.	.	.	.	.	.	2009	261	2270	1896-97	2611
27.	1920-21	.	.	.	.	.	.	.	.	1429	261	1690	1898-99	2587
28.	1921-22	.	.	.	.	.	.	.	.	1903	261	2164	1949-50	2544
29.	1922-23	.	.	.	.	.	.	.	.	1792	271	2063	1967-68	2538
30.	1923-24	.	.	.	.	.	.	.	.	1200	271	2471	1947-48	2525
31.	1921-25	.	.	.	.	.	.	.	.	2052	272	2324	1908-09	2472
32.	1925-26	.	.	.	.	.	.	.	.	2009	272	2281	1923-24	2471
33.	1926-27	.	.	.	.	.	.	.	.	1905	272	2177	1954-55	2439
34.	1927-28	.	.	.	.	.	.	.	.	2022	283	2305	1910-11	2422
35.	1928-29	.	.	.	.	.	.	.	.	1929	283	2212	1915-16	2374

1	2										3	4	5	6	7
36	1929-10	.	.	.	.	.	.	.	.	.	1610	308	1918	1943-44	2333
37	1910-31	.	.	.	.	.	.	.	.	.	1884	312	2196	1924-25	2324
38	1931-32	.	.	.	.	.	.	.	.	.	2588	315	2903	1948-49	2311
39	1932-33	.	.	.	.	.	.	.	.	.	2385	318	2703	1927-28	2305
40	1933-34	.	.	.	.	.	.	.	.	.	2615	321	2936	1940-41	2287
41	1934-35	.	.	.	.	.	.	.	.	.	1761	324	2085	1925-26	2281
42	1935-36	.	.	.	.	.	.	.	.	.	1600	327	1927	1907-08	2277
43	1936-37	.	.	.	.	.	.	.	.	.	1660	330	1990	1919-20	2270
44	1937-38	.	.	.	.	.	.	.	.	.	1715	330	2045	1971-72	2231
45	1938-19	.	.	.	.	.	.	.	.	.	2280	333	2613	1928-29	2212
46	1939-40	.	.	.	.	.	.	.	.	.	1860	334	2194	1930-31	2196
47	1940-41	.	.	.	.	.	.	.	.	.	1953	334	2287	1939-40	2194
48	1941-42	.	.	.	.	.	.	.	.	.	1353	362	1715	1895-96	2182
49	1942-43	.	.	.	.	.	.	.	.	.	1828	341	2169	1926-27	2177
50	1941-44	.	.	.	.	.	.	.	.	.	1977	356	2333	1942-43	2169
51	1944-45	.	.	.	.	.	.	.	.	.	1785	344	2129	1921-22	2164
52	1945-46	.	.	.	.	.	.	.	.	.	1612	348	1960	1909-10	2144
53	1946-47	.	.	.	.	.	.	.	.	.	2494	346	2840	1968-69	2136
54	1947-48	.	.	.	.	.	.	.	.	.	2190	335	2525	1944-45	2129
55	1948-49	.	.	.	.	.	.	.	.	.	1983	328	2311	1934-35	2085
56	1949-50	.	.	.	.	.	.	.	.	.	2228	316	2544	1894-95	2084
57	1950-51	.	.	.	.	.	.	.	.	.	2320	308	2628	1965-66	2074
58	1951-52	.	.	.	.	.	.	.	.	.	1583	387	1970	1922-23	2063
59	1952-53	.	.	.	.	.	.	.	.	.	1357	392	1749	1901-02	2057
60	1953-54	.	.	.	.	.	.	.	.	.	2499	420	2919	1937-38	2045
61	1954-55	.	.	.	.	.	.	.	.	.	2023	416	2439	1936-37	1990
62	1955-56	.	.	.	.	.	.	.	.	.	2548	421	2969	1951-52	1970
63	1956-57	.	.	.	.	.	.	.	.	.	3726	440	4166	1912-13	1965
												(439)	(4165)		
64	1957-58	.	.	.	.	.	.	.	.	.	2285	467	2732	1945-46	1960
												(465)	(2730)		
65	1958-59	.	.	.	.	.	.	.	.	.	2626	490	3116	1966-67	1956
												(487)	(3113)		
66	1959-60	.	.	.	.	.	.	.	.	.	2969	513	3482	1935-36	1927
												(508)	(3477)		
67	1960-61	.	.	.	.	.	.	.	.	.	2528	541	3069	1929-30	1918
												(532)	(3060)		
68	1961-62	.	.	.	.	.	.	.	.	.	3168	592	3760	1906-07	1891
												(587)	(3755)		
69	1962-61	.	.	.	.	.	.	.	.	.	2481	598	3079	1902-03	1868
												(594)	(3075)		
70	1963-64	.	.	.	.	.	.	.	.	.	2099	658	2757	1913-14	1808
												(652)	(2751)		
71	1964-65	.	.	.	.	.	.	.	.	.	2736	661	3397	1904-05	1770
												(653)	(3389)		

1.	2	3	4	5	6	7
72	1965-66	1378	696 (689)	2074 (2063)	1952-53	1749
73	1966-67	1181	776 (758)	1957 (1939)	1941-42	1715
74	1967-68	1621	917 (898)	2538 (2519)	1920-21	1690
75	1968-69	1140	996 (976)	2136 (2116)	1911-12	1451
76	1969-70	1689	996 (976)	2685 (2665)	1905-06	1272
77	1970-71	1749	996 (976)	2745 (2725)	1899-1900	1124
78	1971-72	1235	996 (976)	2231 (2211)	1918-19	1009

Total 78 years

186695
(186524)

Average yield

2394
(2392)

75% dependable yield

2060

SOURCE: (A) 1894-95 to 1900-01

- (i) Gauged flow as per
APK-403.
(ii) Upstream utilisation
same as for 1901-02.

(E) 1971-72

- (i) Gauged flow as per CWPC
(K)-34.
(ii) Upstream utilisation
same in 1970-71.

(B) 1901-02 to 1924-25

- (i) Gauged flow as per AP
Note 10.
(ii) Upstream utilisation as
per MRDK-VIII (P.I & pp.
25 to 53) + 5.71 for
Vijayanagar channels.

(F)

- (iii) Upstream use of Vijaya-
wada 275 TMC same as
in 1968-69.

(C) 1925-26 to 1950-51

- Gauged flow and upstream
utilisation as per An-
nexure-A to KW DT's
order dated 10-4-1973.
(i) Gauged flow as per Chart
APA-118.

Figures given in bracket
are as per Andhra Pradesh.

(D) 1951-52 to 1970-71

- (ii) Upstream utilisation
from 1951-52 to 1960-61
as per MRA-15.
(iii) Upstream utilisation from
1961-62 to 1970-71 as
per MRA-17.

Sd/-
T. KRISHNA RAO,
Counsel for Mysore State.
4-5-1973.

APPENDIX Q

ANDHRA PRADESH "Z"

Annual flow series at Vijayawada for the years 1894-95 to 1971-72 filed by the of Andhra Pradesh

DEPENDABLE FLOW OF THE RIVER KRISHNA UPTO VIJAYAWADA

Parties requested the Hon'ble Tribunal that for the purposes of allocation of water to the parties, 75 per cent dependable flow of the Krishna river upto Vijayawada including upstream utilisations may be determined at this stage. With the able assistance of the counsel of the parties, after a thorough examination of the materials on record and after the careful consideration of all the aspects of the matter, the Hon'ble Tribunal directed that a flow series from 1894-95 to 1971-72 be prepared on the following lines:—

- (1) The Hon'ble Tribunal has come to the conclusion that during the period 1901-02 to 1950-51 the flows on all days are modular except on the 116 days given at pages 170 to 172 of CW.PC. (K)-5.
- (2) The Hon'ble Tribunal is of the opinion that for the period 1929-30 to 1950-51, for which the entire data is on record, the discharges are to be computed as per the following formulae:

- (a) For discharges, on modular days

$$Q = C_1 L \left[(H + h_a)^{3/2} - h_a^{3/2} \right]$$

Where (i) H represents the head of flow over the anicut taking into consideration the average of the weighted averages of Vijayawada and Sitanagaram gauge readings

(ii) $h_a = 0.003025 H^2$

(iii) values of C_1 for different ranges of head are

0'— 3'	—	2.60
3'— 6'	—	2.75
6'— 9'	—	3.00
9'— 11'	—	3.10
Above 11'		3.20

- (b) for discharges on non-modular days.

$$Q = 3.1 L \left[(h + h_a)^{3/2} - h_a^{3/2} \right] + 8 C L d \sqrt{h + h_a}$$

- (i) where h is the difference between the upstream and downstream water levels
- (ii) d is the depth of the downstream water level above the anicut.
- (iii) Values of c are as given at page (xvi) of K.G.C. Report Annexure-II.
- (iv) $h_a = 0.003625 (h + d)^2$
- (c) for discharge over shutters

$$Q = 3.33 L \left[(h_1 + h_a)^{3/2} - h_a^{3/2} \right]$$

where h_1 is the head of flow over the top of the standing shutters and $h_a = .003025 h_1^2$.

- (d) The annual flows for the period 1929-30 to 1950-51 calculated as above and agreed to by all the parties in Exhibit MRK 334 be adopted.
- (3) The Hon'ble Tribunal accepts the contention of Maharashtra as set out in their MR-Note 1 that for the period 1925-26 to 1928-29, the flow may be calculated in the same manner set forth in that note and the annual flows for that period, as agreed to by all the parties in Exhibit MRK 334 be adopted.
- (4) The Hon'ble Tribunal accepts the contention of the Andhra Pradesh in para 9 of A.P. Note 10 filed on 3-5-1973 that for the years 1901-02 to 1924-25 the flows over anicut should be calculated in the manner set forth in that note.
- (5) The Hon'ble Tribunal accepts the contention of Maharashtra and Mysore as given in MR Note 2 and MR Note. . . that for the years 1951-52 to 1971-72, the annual flows as per the figures set forth therein be adopted.

- (6) The Hon'ble Tribunal is of the opinion that for the years 1894-95 to 1900-01, the recorded flows given at page 10 of Krishna Reservoir Project Vol. II (Exhibit APK 403) be adopted.
- (7) The annual flows for the series 1894-95 to 1971-72 be arrived at taking the Upstream utilisation for different periods as indicated below :
- (i) So far as the upstream utilisations for the period 1894-95 to 1900-01 are concerned, the same upstream utilisations as for the year 1901-02 be adopted.
- (ii) The upstream utilisations for the period 1901-02 to 1955-56, as agreed to by all the parties be adopted.
- (in) For the period 1956-57 to 1968-69, the upstream utilisations as per Mysore and Maharashtra be taken and the annual flows taking the upstream utilisation as per Andhra Pradesh be also shown in brackets against each year.
- (iv) For the period 1969-70 to 1971-72, the same upstream utilisation as in 1968-69 be adopted, disregarding the extra utilisation if any, in these years. Parties agree that the flow series for the period 1894-95 to 1971-72 thus prepared be adopted for the purposes of determining 75 per cent dependable flow for the purposes of this case. The 75 per cent dependable flow as per the above series both as per Andhra Pradesh and also as per Mysore and Maharashtra is 2060 T.M.C.

Statement Showing the Gross Yields of the Krishna River upto Vijayawada from 1894-95 to 1971-72

(All Figures in T.M.C.)

Sl. No	Year	Gross Yield	Gross Yield in Descending Order			
			As per Maharashtra		As per Andhra Pradesh	
			Year of occurrence	Gross yield	Year of yield occurrence	Gross
1	2	3	4	5	6	7
1	1894-95	2084	1956-57	4166	1956-57	4165
2.	1895-96	2182	61-62	3760	61-62	3755
3.	1896-97	2611	16-17	3721	16-17	3721
4.	1897-98	2695	59-60	3482	59-60	3477
5.	1898-99	2587	64-65	3397	64-65	3389
6.	1899-1900	1124	03-04	3160	03-04	3160
7.	1900-01	2795	58-59	3116	58-59	3113
8.	1901-02	2057	62-63	3079	62-63	3075
9.	1902-03	1869	60-61	3069	60-61	3060
10.	1903-04	3160	14-15	3049	14-15	3049
11.	1904-05	1770	17-18	3029	17-18	3029
12.	1905-06	1272	55-56	2969	55-56	2969
13.	1906-07	1891	33-34	2936	33-34	2936
14.	1907-08	2276	53-54	2919	53-54	2919
15.	1908-09	2472	31-32	2903	31-32	2903
16.	1909-10	2144	46-47	2840	46-47	2840
17.	1910-11	2422	1900-01	2795	1900-01	2795
18.	1911-12	1451	63-64	2757	63-64	2751
19.	1912-13	1965	70-71	2745	57-58	2730
20.	1913-14	1809	57-58	2732	70-71	2725

1	2						3	4	5	6	7
21.	1914-15	.	.	.	.	.	3049	1932-33	2703	1932-33	2703
22.	1915-16	.	.	.	.	.	2374	1897-98	2695	1897-98	2695
23.	1916-17	.	.	.	.	.	3721	1969-70	2685	1969-70	2665
24.	1917-18	.	.	.	.	.	3029	50-51	2629	50-51	2629
25.	1918-19	.	.	.	.	.	1007	38-39	2613	38-39	2613
26.	1919-20	.	.	.	.	.	2270	1896-97	2611	1896-97	2611
27.	1920-21	.	.	.	.	.	1690	98-99	2587	98-99	2587
23.	1921-22	.	.	.	.	.	2164	1949-50	2544	1949-50	2544
29.	1922-23	.	.	.	.	.	2063	67-68	2538	47-48	2526
30.	1923-24	.	.	.	.	.	2471	47-48	2526	67-68	2519
31.	1924-25	.	.	.	.	.	2324	08-09	2472	08-09	2472
32.	1925-26	.	.	.	.	.	2281	23-24	2471	23-24	2471
33.	1926-27	.	.	.	.	.	2177	54-55	2439	54-55	2439
34.	1927-28	.	.	.	.	.	2305	10-11	2422	10-11	2422
35.	1928-29	.	.	.	.	.	2212	15-16	2374	15-16	2374
36.	1929-30	.	.	.	.	.	1918	43-44	2333	43-44	2333
37.	1930-31	.	.	.	.	.	2196	24-25	2324	24-25	2324
38.	1931-32	.	.	.	.	.	2903	48-49	2311	48-49	2311
39.	1932-33	.	.	.	.	.	2703	27-28	2305	27-28	2305
40.	1933-34	.	.	.	.	.	2936	40-41	2287	40-41	2287
41.	1934-35	.	.	.	.	.	2085	25-26	2281	25-26	2281
42.	1935-36	.	.	.	.	.	1927	07-08	2276	07-08	2276
43.	1936-37	.	.	.	.	.	1990	19-20	2270	19-20	2270
44.	1937-38	.	.	.	.	.	2046	28-29	2212	28-29	2212
45.	1938-39	.	.	.	.	.	2613	30-31	2196	30-31	2196
46.	1939-40	.	.	.	.	.	2194	39-40	2194	39-40	2194
47.	1940-41	.	.	.	.	.	2287	1895-96	2182	1895-96	2182
48.	1941-42	.	.	.	.	.	1715	1926-27	2177	1926-27	2177
49.	1942-43	.	.	.	.	.	2169	42-43	2169	42-43	2169
50.	1943-44	.	.	.	.	.	2333	21-22	2164	21-22	2164
51.	1944-45	.	.	.	.	.	2129	71-72	2157	09-10	2144
52.	1945-46	.	.	.	.	.	1960	09-10	2144	71-72	2137
53.	1946-47	.	.	.	.	.	2840	68-69	2136	44-45	2129
54.	1947-48	.	.	.	.	.	2526	44-45	2129	68-69	2116
55.	1948-49	.	.	.	.	.	2311	34-35	2085	34-35	2085
56.	1949-50	.	.	.	.	.	2544	1894-95	2084	1894-95	2084
57.	1950-51	.	.	.	.	.	2629	1965-66	2074	1922-23	2063
58.	1951-52	.	.	.	.	.	1970	22-23	2063	65-66	2063
59.	1952-53	.	.	.	.	.	1749	01-02	2057	01-02	2057
									75% depend- -able		75% depend- -able
60.	1953-54	.	.	.	.	.	2919	37-38	2046	37-38	2046
61.	1954-55	.	.	.	.	.	2439	36-37	1990	36-37	1990
62.	1955-56	.	.	.	.	.	2969	51-52	1970	51-52	1970
63.	1956-57	.	.	.	.	.	4166	12-13	1965	12-13	1965
							(4165)				

1	2							3	4	5	6	7
64.	1957-58	.	.	.	.	.	.	2732 (2730)	1945-46	1960	1945-46	1960
65.	1958-59	.	.	.	.	.	.	3116 (3113)	66-67	1957	66-67	1939
66.	1959-60	.	.	.	.	.	.	3482 (3477)	35-36	1927	35-36	1927
67.	1960-61	.	.	.	.	.	.	3069	29-30	1918	29-30	1918
68.	1961-62	.	.	.	.	.	.	3760 (3755)	06-07	1891	06-07	1891
69.	1962-63	.	.	.	.	.	.	3079 (3075)	02-03	1869	02-03	1869
70.	1963-64	.	.	.	.	.	.	2757 (2751)	13-14	1809	13-14	1809
71.	1964-65	.	.	.	.	.	.	3397 (3389)	04-05	1770	04-05	1770
72.	1965-66	.	.	.	.	.	.	2074 (2063)	52-53	1749	52-53	1749
73.	1966-67	.	.	.	.	.	.	1957 (1939)	41-42	1715	41-42	1715
74.	1967-68	.	.	.	.	.	.	2538 (2519)	20-21	1690	20-21	1690
75.	1968-69	.	.	.	.	.	.	2136 (2116)	11-12	1451	11-12	1451
76.	1969-70	.	.	.	.	.	.	2685 (2665)	05-06	1272	05-06	1272
77.	1970-71	.	.	.	.	.	.	2745 (2725)	1899-1900	1124	1899-1900	1124
78.	1971-72	.	.	.	.	.	.	2157 (2137)	1918-19	1007	1918-19	1007
								1,86,623				

	AS PER MAHARASHTRA	AS PER A.P.
Gross average annual yield	2393 TMC	2390 TMC
Gross 75% dependable yield	2060 TMC	2060 TMC

NOTE : Figures in Col. (3) for the period upto 1955-56 include upstream utilisations as agreed to by all the States. Figures in Col. (3) for the period 1956-57 onwards, include upstream utilisations as per Mysore & Maharashtra and those shown in Brackets include upstream utilisations as per Andhra Pradesh.

Sd/-
M. Sitarama Sastri 4-5-73
Andhra Pradesh

Sd/-
P. Ramachandra Reddi
Counsel for Andhra Pradesh 4-5-73

APPENDIX R

Common draft of Part II prepared by Counsel for the States of Maharashtra, Mysore and Andhra Pradesh on 26-7-1973

Clause XI (A) (i).—An inter-State administrative Authority, to be called the "Krishna Valley Authority", (hereinafter referred to as "the Authority") shall be established. The Authority shall consist of 6 members who are, or have been, high ranking engineers with experience in irrigation. The States of Andhra Pradesh, Mysore and Maharashtra shall each appoint one such member. The three States shall make a joint request to the Government of India to appoint three members. The persons so appointed shall be independent of and shall not in any way be connected, directly or indirectly with any of the three States. The Government of India shall appoint one of the 3 members to be a Chairman of the Authority. As far as practicable, the first appointment of 6 Members of the Authority shall be made within 3 months from the publication of the decision of the Tribunal in the official Gazette.

(ii) Each member of the Authority shall be a full time member and shall be appointed for a term not exceeding 5 years. Each of the three States - shall nominate an alternate member to act during the period of absence of an appointed member. Any vacancy occurring in the Authority shall be filled in by the State or by the Government of India as the case may be. If any member appointed by the Government of India or by any of the States is unable or is unwilling to discharge his function for any length of time the respective Governments shall appoint another member in his place for such time as the appointed member is absent from duty. During the time that an appointed member is on leave and the alternate member nominated by the State is not available to act in his place, the State Government shall appoint a person who is qualified to be appointed as a member of the Authority to act during the period of leave. If any member appointed by the Central Government is on leave, the Central Government shall appoint another person who is qualified to be appointed as a member of the Authority to act in his place during the period of his leave.

(iii) The Government of India have consented to the appointment of three members to be members of the Authority and to filling in the vacancies arising

among such members as provided in Sub-clauses (i) and (ii) above.

(B) Subject to the provisions of Clause (F) below, the Authority will dispose of any matter before it either by a circular or by holding a meeting. However, it will be open to any Member of the Authority to require that a meeting of the Authority shall be called or that a matter shall not be disposed of by a circular but at a meeting.

(C) The quorum for any meeting shall be 4 Members of the Authority and all decisions shall be taken by a majority of the votes cast by the Members present. If the Members are equally divided, the votes of the Members representing the States shall be ignored and the majority decision of the Members appointed by the Government of India shall prevail. If the Members appointed by the Government of India are equally divided, the matter shall be referred to the 3rd Member and shall be decided according to the majority vote of the three Members.

(D) The Authority shall from time to time prescribe by Rules of business, the class or classes of business which is of a formal or routine nature. The Authority shall not prescribe by Rules business to be of a formal or routine nature in which the interests of the States are conflicting.

(E) On any matter not being of a formal or routine nature where there is unanimity of 3 State Members on any matter, their decision shall be final and shall be implemented by the Authority. If, however, there is no unanimity among the three State Members, then the votes of the State Members shall be ignored and the matter shall be decided by a majority of the Members appointed by the Government of India.

(F) On the following matters the Authority shall record its decision by a resolution at a meeting in which all the three Members appointed by the Government of India are present:—

(i) Framing of Rules of Business.

- (ii) Delegation of powers to a Member or Secretary or any official of the Authority.
- (iii) Categorising a part of the business of the Authority as formal and routine.
- (iv) Transfer or release of water from one State to another.
- (v) Determination or adjustment of shares and/or uses of the parties in accordance with the orders of the Tribunal.
- (vi) Giving directions for the adjustment of water account of the parties.
- (vii) Any other matter which the three States unanimously agree that it shall be decided at a meeting where all the three Members appointed by the Government of India are present.

(G) Subject to the preceding sub-clauses, the Authority shall frame its own Rules for the conduct of its business.

Clause XIII (A)—It shall be the duty of the Krishna Valley Authority established under Clause XI (hereafter referred to as "the Authority") to ensure that waters of the river Krishna are stored, appropriated or used in the manner provided in the order of the Tribunal and for this purpose, it may do all things necessary, proper or convenient in the performance of its duties independently or in co-operation with the Governmental agencies of the three States and of the Government of India.

(B) For the effective discharge of the duties of the Authority, the Authority is empowered to do all or any of the following things :—

- (i) The Authority shall determine the volume of water flowing in the river Krishna and its tributaries by such methods or devices as it thinks fit; it may utilise the information available from any existing gauge station or it may establish any gauge station anywhere in the territory of the three States.
- (ii) The Authority shall determine the use of water made by any State at any place or any area at any time and for that purpose it may take note of all diversions, or extractions whether natural or artificial, or partly natural and partly artificial from the river Krishna and its tributaries and measure such use by any method as it deems fit.
- (iii) The Authority shall estimate the uses made for minor irrigation i.e., works utilising less than 1 T.M.C. each on the basis of the areas irrigated in each year and on the basis of the duties agreed upon by the three States in the agreement dated 26-8-1971 until another method or other duties are adopted by the Krishna Valley Authority either *suo motu* or on the application of any State to the Authority that the method and duties adopted in the agreement dated 26-8-1971 should be altered.
- (iv) The Authority shall determine from time to time the water which has been stored by each State in any reservoirs, or any other storage. For the purpose of measuring of the water so stored, it may adopt any device or any method.
- (v) In case of any doubt as regards storages, diversions or extractions on any project, the Authority shall exercise necessary check measurements to ascertain the correct figures of use on that project. Suitable check may also be exercised by that Authority on use made by the States on minor irrigation works.
- (vi) The Authority shall employ a Secretary who shall be an Engineer and is not connected in any way with the three States. The Secretary shall not be a member of the Authority.
- (vii) The Authority may request the State Governments to depute the services of the persons employed in State Government for part-time or whole-time employment with the Authority or for the performance of any work or services for the Authority.
- (viii) The Authority shall employ such Engineering, Clerical and other personnel as it may consider necessary for the performance of its functions under the orders of the Tribunal as far as possible equally from the three States. The staff so employed shall be under the control of the Authority. The staff so employed shall be paid by and be responsible to and be under the control of the

Authority. The staff which is on deputation to the Authority shall be governed by the service regulations of the relevant State.

- (ix) The Authority shall establish, maintain and operate such stream and other gauging stations, evaporation stations, telecommunications or other system of communication.
- (x) The Authority shall determine necessary sluicing capacities required for the releases from reservoirs (existing as well as new) for the purpose of proper regulation and ensure that necessary works for the same are carried out immediately.
- (xi) The Authority shall collect all facts and data requisite for determining that the provisions of the Tribunal's orders are at all times being complied with.
- (xii) The Authority shall observe the operation of all developments in the Krishna basin and system.
- (xiii) The Authority shall collect data from State Governments, on the area irrigated from each irrigation work using more than 1 T.M.C. power generation from each Hydro-electric Station, quantity drawn for domestic, municipal and industrial purposes.
- (xiv) The Authority shall make and transmit to each of the States as early as possible and in any case before the end of the next water year a report covering the activities of the Authority for the preceding year and to make available to each State on its request any information within its possession any time and always provide access to its record to the States or their representatives.
- (xv) The Authority shall keep a record of all meetings and proceedings, and maintain regular accounts, and shall maintain a suitable office where documents, records and accounts shall be kept open to inspection by the States or their representatives at such times and under such regulations as the Authority shall determine.
- (xvi) The Authority shall enter into such contracts and agreements as may be necessary and essential to the full and complete performance of the powers and duties hereby conferred or imposed upon it.
- (xvii) The Authority or any member duly authorised or a representative shall have power to enter upon any lands and property upon which any project or development of any project, or any work or gauging stations have been or are being constructed, operated or maintained by the States. Each State through its appropriate departments shall co-operate with the Authority in all matters which may be necessary to enable such Authority to exercise its powers and duties.
- (xviii) The Authority shall publish annually and make available to the three State—
 - (1) water account of each water year;
 - (2) data of river discharges and gauges at all the gauging stations approved by it and at project sites (using more than 1 T.M.C- annually) during the water year;
 - (3) data of withdrawals for various uses at the project sites during the water year;
 - (4) estimated evaporation losses in storages during the water year;
 - (5) the data of water diversions out side the basin during the water year;
 - (6) the data of water wasted to sea below Vijayawada, if any during the water year;
 - (7) data of storage levels and capacities of the storages at regular intervals during the water year;
 - (8) methods of gauging adopted, formulae used and coefficients adopted at the various gauging sites and project sites ;
 - (9) data of area and crops irrigated during different seasons by the projects including minor irrigation schemes in the three States;
 - (10) duties adopted in working out utilisation on minor irrigation schemes; and
 - (11) data of units of power generated.
- (C) The decision of the Authority on matters in sub-clauses (A) and (B) shall be final and binding on

the parties. However, the Authority may review its own decision either *suo motu* or on the application of any party.

(D) All the expenses incurred by the Krishna Valley Authority including the salaries or remuneration of the 3 Members appointed by the Central Government in the discharge of their work in operating this decree shall be borne by the three States equally.

(E) The Authority shall in the month of January of each year prepare detailed estimate for the amount of money required during the 12 months from the 1st day of April of the ensuing year showing the manner in which it is proposed to expend such money. A copy of the detailed estimate of this amount of money required for the working of the Authority shall be forwarded to each of the State Governments and the State Governments shall provide the amount of money so required.

(F) The Krishna Valley Authority shall decide the location of its central, regional and sub-regional offices.

Tentative Draft subject to approval of the State Governments.

Sd/-

P. RAMACHANDRA REDDI,

26-7-73

Advocate General, Andhra Pradesh,

Sd/-

T. KRISHNA RAO,

26-7-73

Counsel for the State of Mysore.

Sd/-

T. R. ANDHYARUJINA,

26-7-73

Counsel for the State of Maharashtra.

APPENDIX S

Agreed data regarding forests, minerals, industries and communications in the Krishna basin and a brief description of the population, topography, etc. of the State of Maharashtra, Mysore and Andhra Pradesh.

Forests : In the Krishna basin, forests extend over nearly 3 million hectares. Forestry is an important industry.

In Maharashtra, the sub-tropical broad leafed hill forests of Mahabaleswar, Panchgani and Bhimashankar have luxuriant growths with evergreens predominating. Semi-evergreens and deciduous trees make their appearance on the slopes. The tropical moist and dry deciduous forests of the plains supply valuable timber, fuel and forest products.

Mysore has enormous forest wealth. The evergreen wet forests of the Western Ghats consist of huge trees set in thick masses of almost impenetrable vegetation, and interlaced with tufted bamboos with ground cover of bushes and profusion of climbers. The forests are rich in teak, ebony, cedar and blackwood. The rain-shadow belt of deciduous forests supply valuable timber and bamboo. The eastern districts are covered with deciduous and scrub forests with leak occurring at intervals. The northern parts have extensive grasslands.

In Andhra Pradesh, the principal forest areas are situated in Telengana and in the Nallamalai hills of Kurnool. They contain kosum, toon, teak, rosewood, and other varieties of useful timber and enormous quantities of bamboo.

In the forests of all the three States, a rich variety of medicinal herbs and forest produce are found.

Minerals : The Krishna basin is endowed with a variety of minerals. The minerals are being extensively exploited.

In Maharashtra, deposits of limestone occur in Sangli and Satara districts. Bauxite is found extensively in Kolhapur and Sangli districts. Basalt, granite and laterite furnish building material

Mysore has vast mineral resources. There are extensive and rich deposits of iron and Manganese ore in Bellary, Chikamagalur, Dharwar, Shimoga, Belgaum, Bijapur and Chitradurga districts. Bauxite deposits occur extensively in Belgaum district. There are deposits of chromite, copper, lead and tin. Non-metallic minerals such as feldspar, kaolin, limestone, kyanite, quartz, soapstone, ochre, granite, gneisses and marbles are found extensively. There are also deposits of asbestos, corundum, graphite and fireclay.

In Andhra Pradesh there are huge resources of coal in Khammam district. Iron ore is found in Khammam, Krishna, Anantpur, Cuddapah and Kurnool districts. There are extensive deposits of limestone in Hyderabad, Nalgonda, Mahbubnagar, Cuddapah, Kurnool and Guntur districts. Barytes occur in Anantpur, Kurnool, Khammam, Krishna and Cuddapah districts, while asbestos occurs in Cuddapah, Kurnool and Anantpur districts. Large deposits of talc are found in Anantpur, Kurnool and Mahbubnagar districts. Graphite is found in Khammam district and quartz in and around Hyderabad. Slate occurs in Kurnool district. Copper and Lead are found in sizeable quantities in Guntur district.

Industries : Since Independence, the Krishna basin has made rapid headway in industrialisation. Hyderabad and Poona are the two largest cities in the basin.

In Maharashtra, factory industries are highly diversified. Greater Poona, Bombay-Poona Road, Poona-Ahmednagar Road and Poona-Sholapur Road are becoming vast industrial complexes of diversified engineering, paper and other industries. Sholapur is an important centre of textile industry. The Krishna-Panchganga basin, including Kolhapur and Sangli are developing important textiles, sugar and engineering industries. Sugar factories are located in the sugar belt of the Nira valley and also in the Krishna,

Warna and Panchganga valleys. Small Scale agro-based industries, bidi making, metal products, printing, chemicals, woodwork and textile units are widely dispersed.

In Mysore, Bhadravathi is an important centre of iron and steel, cement and paper production. There are textile and spinning mills in Bijapur, Belgaum, Chitradurga, Gulbarga and Raichur districts. A large aluminium and steel industrial complex is coming up in Belgaum and Bellary districts. There are sugar industries in Tungabhadra, Chataprabha, Malaprabha and Middle Krishna valleys. Cement factories exist in Bijapur and Gulbarga districts.

In Andhra Pradesh, Hyderabad and its environs have a vast industrial complex of heavy electricals, machine tools, synthetic drugs, detonators, textiles, aeronautics, electronics and other industries. There are factories for manufacture of sugar, cement, power, alcohol, paper, textiles and miscellaneous products in other industrial centres. Hyderabad is famous for its handicrafts. Guntur-Vijayawada region is a growing industrial zone with factories manufacturing cement, scooters, tyres and tubes, rice mills and tobacco processing factories. In Anantpur and Kurnool districts there are major textile and oil mills.

In all the three States, rural and small scale industries are being carefully fostered. Traditional handicrafts and household industries play an important part in the village economy. Animal husbandry and transport are important industries.

Communications: The basin is served by the Central, Southern and South Central Railways. The main line connecting Bombay and Madras passes through it in its upper reaches. The main Madras-Calcutta line passes through the basin just above the

delta. The main line between Delhi and Vijayawada passes through the lower Krishna basin between Kazipet and Vijayawada. There are some branch lines, partly, or wholly in the basin, namely, Secunderabad-Wadi line, Poona-Bangalore line, Kazipet-Hyderabad line, Secunderabad—Dronachalam Guntakal-Bangalore line, Masulipatnam-Vijayawada - Guntur - Guntakal - Bellary - Hospet-Hubli-Masomagao line, Guntur-Macherla line. Dornakal - Yellandu (Singareni Collieries) line, Miraj-Kurudwadi-Lature line, Dhond-Manmad line, Birur-Talaguppa line and Godog-Sholapur line. These lines serve some of the prominent towns like Hyderabad, Secunderabad, Guntur, Vijayawada, Masulipatnam, etc., in Andhra Pradesh, Poona, Satara, Sangli, Miraj. Sholapur, Kothapur, Ahmednagar in Maharashtra and Belgaum, Hubli-Dharwar, Raichur, Davangere, Bhadravathi, Shimoga, Gulbarga and Bijapur etc. in Mysore.

National Highways connecting Bombay with Vijayawada, Hyderabad with Nagpur, Madras with Calcutta, Poona with Bangalore, Chitradurga with Sholapur, Bangalore with Hyderabad, Hyderabad with Sholapur traverse the Krishna basin. Besides these, there is a network of State Highways, district and village roads connecting important towns and villages.

Population of States : The total areas of the States of Maharashtra, Mysore and Andhra Pradesh are respectively 1,18,200 ; 74,210 ; 1,06,052 sq. miles and their respective population according to the Census of India 1971 final figures are 50,412,235; 29,299,014; and 43,502,708 respectively.

The following table prepared from the provisional population totals of the Census of India 1971 gives the distribution of working population by agricultural and other workers:—

State/Distt.	Total workers	Cultivators	Agricultural labourers	Workers other than cultivators and agricultural labourers.
1	2	3	4	5
Maharashtra	18,732,169	6,572,447	5,429,631	6,730,091
Mysore	10,291,184	4,088,722	2,647,851	3,554,611
Andhra Pradesh	18,086,588	5,829,356	6,763,494	5,493,738

It will be seen that the percentage of total number of cultivators and agricultural labourers to total workers is 64.07 per cent in Maharashtra, 65.46 per cent in Mysore and 69.63 per cent in Andhra Pradesh.

Brief description of the States

ANDHRA PRADESH :

Andhra Pradesh is the fifth largest State in India with an area of 276,754 sq. km. (106,855 sq. miles) and a population (1971) of 43.503 million people which makes it the fifth most populous State of the country.

Topographically, there are four major divisions in the State—(i) the coastal belt, (ii) the Deccan Plateau south of the Krishna, (iii) the Deccan Plateau north of the Krishna and (iv) Eastern Ghats Region.

The coastal belt lies in eight coastal districts of Srikakulam, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Prakashamm and Nellore. The belt is 80 km. wide and 965 km. long and the area has an average rainfall of 1015 mm. The alluvial deltas of the Godavari, the Krishna and the Pennar rivers lie in the coastal belt.

The Deccan plateau south of the Krishna comprises the upland taluks of the coastal districts of Guntur, Prakashamm and Nellore and the four Rayalaseema districts of Kurnool, Cuddapah, Anantpur and Chittoor. It lies at an altitude of 15 to 610 m above sea level and has scanty rainfall of 508 to 635 mm.

The Deccan plateau north of the Krishna is an extensive Plateau with an average elevation of 366 m above mean sea level comprising, in addition to the upland taluks of the coastal districts of Krishna and West Godavari, the Telangana districts of Hyderabad, Nizamabad, Adilabad, Medak, Warangal, Khammam, Nalgonda, Karimnagar and Mahbubnagar. The average rainfall is about 762 mm.

The Eastern Ghats Region consists of thickly forested hills climbing to an altitude of 1,067 m above sea level comprising the districts of Srikakulam, Visakhapatnam and East Godavari. It has heavy rainfall ranging from 1,778 mm. to 2,540 mm.

About 79 per cent of the cultivated area of the State is under food crops. Because of the extent of fertile delta and coastal areas, paddy is the predominant crop and covers 23 per cent of the cropped area. Other important food crops are jowar, bajra and ragi. Among commercial crops, the most important are tobacco, castor, sugarcane, groundnut, cotton and chillies.

MAHARASHTRA :

50.412 million people live in the 308,000 sq. km. of Maharashtra.

The State can be divided into three natural regions: (i) the Konkan coast; (ii) the basins of the Krishna and Godavari, and (iii) the basins of the Tapi and the Narmada.

The Konkan coastal strip is separated from the rest of the State by the Sahyadri range which throws out numerous low spurs towards the east and west. Between these spurs, the valleys are drained by streams running from the east almost due west into the Arabian Sea.

The basins of the Krishna and the Godavari vary in height from about 610 m. in the west to about 152 m. in the east. Summer temperatures in the West are lower than in the east.

The Krishna basin includes the Bhima sub-basin which lines between the Mahadeo range and the Balaghat range. The Krishna basin proper extends from the Mahadeo range to the southern boundary of the State, but much of it lies outside the State. With the exception of a strip spreading 40 to 56 km. from the western edge, the basin consists of the undulating plateau lands of the deccan.

Broadly speaking, the western part of the State, from the sea to a line about 65 km to the east of the Sahyadri range, is hilly and undulating. Elsewhere, the undulation is less marked and depends very largely on how close the area is to one or other of the watersheds between the several basins and sub-basins.

The prevalent climate is of the tropical monsoon type, though the plateaus and hill areas of the State have lower temperatures and less humidity than the coastal strip.

The average rainfall of the State is about 1,070 mm though there are wide variations in precipitation. The heaviest precipitation during the south-west monsoon is on the Sahyadri run of the plateau and in the Maval area to the east, up to a distance of 15-25 km. At the rim, the rainfall is very heavy and exceeds 6,500 mm at places like Mahabaleshwar. It decreases rapidly westwards towards the coast, where it is about 3,200 mm in the south and about 2,000 mm in the north.

East of the Sahyadri, the decrease is very marked and in areas 15 km from the ridge the precipitation drops to about 1,250 mm. In a strip about 30-50 km wide east of Maval and running parallel to the Sahyadri range, the average rainfall is less than 650 mm

and at places below 500 mm. Further east it gradually increases, till it averages 1,250 mm in the most eastern districts.

Geologically, major portion of the State is underlain by Deccan trap of volcanic origin and of more or less uniform composition. The entire Krishna drainage basin in Maharashtra is underlain by Deccan trap. The main districts with trap formations are Ratnagiri, Kolhapur, Satara and Poona. The eastern districts are underlain by granites, gneisses and other mixed rock formations.

The most important food crops are jowar, bajra, paddy and wheat. Among the cash crops, the most important are cotton, groundnut and sugarcane.

MYSORE :

With an area of 1,91,773 sq- km. and a population (1971) of 29.299 million, Mysore is the sixth largest State in the country in size and the eighth in population.

The State consists of four distinct regions: (i) the coastal belt lying between the Western Ghats and the Arabian Sea ; (ii) Malnad to the east of the Western Ghats; (iii) the northern plateau and (iv) southern plateau.

Mysore's 320 km. long coastal strip is only 32 km. in width. It has heavy and sustained rainfall during the south-west monsoon season.

The land-locked Malnad area adjoining the coastal belt to the east runs north to south for about 644 km. with a width of 48 to 65 km. It is an area of forests and hills with a rugged topography, characterised by deep ravines and steep hills rising to heights of 1,250 to 1,890 m. which are the source of all the east and west flowing rivers of the State. Malnad

gets heavy and assured rainfall, ranging from an average of 254 cm with peaks of 635 cm in the hills to 105 cm in the east towards the plains. The mean monthly temperatures range between 18°C and 24°C which are normally lower than those on the coast. On terraced fields, paddy is the major crop followed by garden crops like coffee, arecanut and coconut.

The Northern plateau drained by the Krishna, the Bhima and the Tungabhadra rivers is an extensive plateau with an average elevation of 610 m above mean sea level. It has an average rainfall of only 61 cm or less. The western region has between 58 and 91 cm of rain while other areas get 40.6 to 91 cm. It is a region of hot summers and warm winters, where the winter temperatures range between 22°C and 25°C and summer temperatures go up to 43°C. The landscape is monotonous, with vast areas of treeless fields and black cotton soils on which jowar, wheat and cotton are grown.

The Southern plateau has a rolling topography with predominantly red soils intermixed with black soils. The rainfall is variable but not heavy, increasing from east to west. Irrigation is from a large number of tanks dotted all over the plateau and the crops grown are rice and sugarcane. The bulk of the dry land is under jowar, bajra, ragi, castor and pulses. In the valleys, there are plantations of coconut and arecanut. Temperatures in the southern plateau are lower than those in the north.

The seasons are clearly marked ; a short (January-February) cold weather is followed by three months (March to May) of hot weather. The south-west monsoon prevails from June to September and the north-east monsoon which sets in October continues till December.

APPENDIX T

Particulars of Visits by the Krishna Water Disputes Tribunal to Various Works and Sites in the Krishna Basin in the States of Maharashtra, Andhra Pradesh and Mysore.

		Distance travelled (by road) K.M.		
October, 1971				
3rd to 4th				Assembled at Bombay.
5th	Bombay to Khopoli	115		Visit to Tata Hydel works.
5th	Khopoli to Poona	83		Halt overnight.
6th	Halt at Poona	93		Inspection of 3-D model of Old Krishna Anicut at Central Water & Power Research Station, Poona; visit to Khadakwasla Dam and Panchet Dam.
7th	Halt at Poona	315		Visit to Bhima Irrigation Project site and works under construction.
8th	Poona to Mahabaleshwar	144		Visit to Bhatgarh Dam en route.
9th	Mahabaleshwar to Koynanagar.	200		Visit to Mahabaleshwar temple, the traditional source of the river Krishna.
		Distance travelled (by road) K.M.		
October, 1971				
10th	Halt at Koynanagar	76		Visit to Model Room and inspection of the models of Koyna Dam, underground works, intake tower, surge tank, penstocks, etc.; visit to Koyna Dam, Navaja Intake Tower and other works; visit to Pophali Power House.
11th	Koynanagar to Poona	205		Inspection of Lift Irrigation Schemes en route
11th	Poona to Hyderabad			By Secunderabad Express.
12th	Halt at Hyderabad			General review of the tour in Maharashtra.
13th	Halt at Hyderabad	70		Visit to Andhra Pradesh Engineering Research Laboratories and inspection of Demonstration Model, Landscape Model 2-D Model, etc. ; visit to Himayatsagar and Mir Alam Tank.
		Distance travelled. (by road) K.M.		
October, 1971				
14th	Hyderabad to Nagarjunasagar Dam.	255		Inspection of areas of Nalgonda district en route; visit to Nagarjunasagar Dam; inspection of Right Bank Canal upto tunnel and Left Bank Canal Head Regulator.
15th	Nagarjunasagar Dam to Vijayawada.	223		Inspection of Nagarjunasagar Right Bank Canal and its command areas en route; visit to Model Room. Inspection of Prakasam Barrage, Old Krishna anicut site, plough and plough tracks.
16th	Vijayawada to Nagarjunasagar Dam.	260		Inspection of Prakasam Barrage, old ploughs, Sitanagaram and Vijayawada gauges and portion of Krishna Delta canal at Vijayawada.
				Inspection of command area of Nagarjunasagar Left Bank Canal, sub-basins

		Disnce travelled (by road) K.M.		
October, 1971				
17th	Nagarjunasagar Dam to Srisailam	245	of Muneru, Paleru, Musi, Regulator at M. 72/0 of Nagarjunasagar Left Bank Canal en route.	
18th	Halt at Srisailam	15	Halt overnight.	
19th	Srisailam to Kurnool	238	Inspection of Srisailam Project site and works under construction.	
20th	Halt at Kurnool	152	Inspection of Mittakondala Ridge, Kurnool-Cuddpah Canal and ayacut en route; inspection of Sunkesula anicut.	
21st	Kurnool to Tungabhadra Dam	432	Inspection of site of proposed Jurala Project and areas in Gadwal and Alampur Taluks.	
			Inspection of South Gadwal Branch canal alignment ; entry into Mysore territory near Yargera; inspection of Rajolibunda Diversion Headworks; Mysore's Lift Irrigation Schemes en Rajolibunda main canal, command areas of Tungabhadra Left Bank Canal.	

		Distance travelled (by road) K. M.			
October, 1971					
22nd	Halt at Tungabhadra Dam.	.	.	127	Visit to Munirabad Power House, Tungabhadra Dam, Headworks of Left Bank Low Level and High Level Canals, Raya & Basavanna Channels, Headworks of Right Bank Power Canal and High Level Canal; Right Bank Power House and Hampi Power House.
	23rd Halt at Tungabhadra Dam	.	.	223	Inspection of command areas of Tungabhadra Left Bank Canal, Sanapur Anicut, Anigundi Channel and Relief Model of Tungabhadra Dam.
24th	Tungabhadra Dam to Bagalkot	.	.	318	Inspection of Gundlakeri Regulator, Tungabhadra Right Bank Low Level Canal Head Sluices, Turtha Channel, Head Sluices, from Gundlakeri Vank into Turtha Channel, command areas of Malaprabha Right Bank Canal and Ghataprabha Right Bank Canal, site of Ramthal Lift Irrigation Scheme.

		Distance travelled (by road) K. M.		
October 1971				
25th	Bagalkot to Narayanpur Dam	191		Inspection of Almatti Dam works, Narayanpur Dam work and Left Bank Canal work under construction.
26th	Narayanpur Dam to Bijapur	279		Inspection of command area of Left Bank Canal of Upper Krishna Project.
27th	Bijapur to Belgaum	246		Inspection of Command areas of Ghata- prabha Left Bank and Right Bank Canals, Gokak Falls, Dhupdal Weir, Headworks of Gokak Canal and Hidkal Dam and works under construction.
28th	Belgaum to Jog Falls	337		Inspection of Malaprabha Dam site and Right Bank Canal and works under construction.

October 1971**Distance travelled (by
road)
K. M.**

29th	Jog Falls to Bhadravathi .	252	Inspection of Tunga Anicut.
30th	Halt at Bhadravathi	316	Visit to confluence of the Tunga and the Bhadra Rivers; inspection of command area of Upper Bhadra Project.
31st	Bhadravathi to Hassan .	211	Visit to Bhadra Dam and inspection of command area of Bhadra Project.

**Distance travelled
(by road)****November, 1971****K. M.**

1st	Hassan to Mysore .	188	Journey.
2nd to 3rd	Halt at Mysore . .		General review of the entire tour.
4th	Mysore to Delhi via Bangalore.		

Sd/-
K.S. SHANKER RAO
7-11-73
Maharashtra

Sd/-
H.S.S. IYENGAR
7-11-73
Karnataka

Sd/-
G.K.S. IYENGAR
7-11-73
Andhra Pradesh

APPENDIX U

Orders of the Tribunal dated the 19th April, 1971 and the 27th July, 1971.

KRISHNA : 19th April, 1971.

BEFORE THE KRISHNA WATER DISPUTES TRIBUNAL

IN THE MATTER OF A WATER DISPUTE AND
CONNECTED MATTERS REGARDING THE
INTER-STATE RIVER KRISHNA AND THE
RIVER VALLEY THEREOF—

ORDER

The parties have jointly handed over agreed minutes of the order (Annexure A) signed by Counsel for the States of Andhra Pradesh, Maharashtra, Mysore, Madhya Pradesh and Orissa. There will be an order in terms of the agreed minutes.

Sd/-

(R. S. BACHAWAT)
Chairman

Sd/-

(SHAMSHER BAHADUR)
Member

Sd/-

(D. M. BHANDARI)
Member

NEW DELHI :

Dated : April 19, 1971.

ANNEXURE 'A'

IN THE KRISHNA RIVER DISPUTE

1. Parties have agreed that each of the States concerned will be at liberty to divert any part of the share of the Godavari waters allocated to it by the Godavari Tribunal from the Godavari basin to any other basin.
2. In view of the pleadings and the statements of the States concerned, none of the States asks for a mandatory order for diversion of the Godavari waters into the Krishna basin.

3. All the other contentions of the parties are reserved and will be decided in the Krishna case.

4. The Krishna case will be decided separately from the Godavari case.

5. The States of Madhya Pradesh and Orissa are ordered to be discharged from the record of this case and will no longer be parties to this case.

6. The States of Madhya Pradesh and Orissa will bear and pay their own costs.

Sd/—P. Rama Chandra Reddy, Advocate General, Andhra Pradesh.

Sd/—H. M. Seervai, Advocate General, Maharashtra.

Sd/—T. Krishna Rao, Advocate, Mysore.

Sd/—K. A. Chitale, Advocate General, Madhya Pradesh.

Sd/—L. M. Singhvi, Senior Advocate, Orissa.

27th July, 1971.

KRISHNA :

BEFORE THE KRISHNA WATER DISPUTES TRIBUNAL

In the matter of a water dispute and connected matters
regarding the inter-state river Krishna and the river
valley thereof.

ORDER

There will be an order in terms of the agreed minutes (Annexure 'A') which have been signed by Counsel for all the parties and have been jointly handed over to the Tribunal.

Sd/-

(R. S. BACHAWAT)
Chairman

Sd/-

(SHAMSHER BAHADUR)
Member

Sd/-

(D. M. BHANDARI)
Member

NEW DELHI :

Dated : July 27, 1971.

ANNEXURE 'A'

KRISHNA WATER DISPUTES TRIBUNAL

By consent of the parties Clause (1) of Annexure 'A' to the Order dated 19th April, 1971, is amended by inserting the words "which may be" between the word 'waters' and the word 'allocated' so that the amended Clause (1) will now read as follows :—

- (1) Parties have agreed that each of the States concerned will be at liberty to divert any part of the share of the Godavari waters which may be allocated to it by the Goda-

vari Tribunal from the Godavari basin to any other basin.

Sd/- P. Rama Chandra Reddy, Advocate General, Andhra Pradesh.

Sd/-H. M. Seervai, Advocate General, Maharashtra.

Sd/- T. Krishna Rao, Advocate, Mysore.

Sd/- K. A. Chitale, Advocate General, Madhya Pradesh.

Sd/-Santosh Chatterjee, Advocate for the State of Orissa.

Dated : 27th July, 1971.

GOVERNMENT OF INDIA
KRISHNA WATER DISPUTES TRIBUNAL

FURTHER REPORT
OF
THE KRISHNA WATER DISPUTES TRIBUNAL

NEW DELHI
1976

GOVERNMENT OF INDIA
KRISHNA WATER DISPUTES TRIBUNAL

FURTHER REPORT
OF
THE KRISHNA WATER DISPUTES TRIBUNAL
UNDER SECTION 5(3) OF THE INTER-STATE
WATER DISPUTES ACT, 1956.

NEW DELHI
1976

COMPOSITION OF THE KRISHNA WATER DISPUTES TRIBUNAL

(During the hearing of the References under section 5 (3) of the Inter-State Water Disputes Act, 1956).

Chairman

Shri R. S. Bachawat.

Members

Shri Shamsheer Bahadur (Up to 21-7-1975).

Shri D. M. Bhandari.

Shri D. M. Sen (Judge of the Gauhati High Court until 5th February, 1976).
(From 20-9-1975).

Secretary

Shri R. P. Marwaha.

GOVERNMENT OF INDIA

KRISHNA WATER DISPUTES TRIBUNAL

D-27, New Delhi South Extension, Part-II, New Delhi.

No. 18 (1)/76-KWDT.

Dated the 27th May, 1976.

To

The Secretary to the Government of India, Ministry of Agriculture and
Irrigation, (Department of Irrigation), NEW DELHI.

Sir,

The Krishna Water Disputes Tribunal investigated the matters referred to it under section 5(1) of the Inter-State Water Disputes Act, 1956 and forwarded its unanimous Report and decision under section 5 (2) of the said Act to the Government of India on the 24th December, 1973.

Within three months of the aforesaid decision, the Government of India and the States of Andhra Pradesh, Karnataka and Maharashtra filed four separate references before the Tribunal under section 5(3) of the said Act.

Vacancy in the office of a Member of the Tribunal was filled by fresh appointment made by the Government of India vide Notification No. S.O. 518(E), dated the 16th September, 1975.

The Tribunal has prepared its further Report giving such explanations or guidance as it has deemed fit on the matters referred to it under section 5(3) of the said Act.

The unanimous further Report of the Tribunal is forwarded herewith.

Yours faithfully,

(R. S. BACHAWAT).

Chairman.

(D. M. BHANDARI),

Member.

(D. M. SEN).

Member.

End : Report as above.

REPRESENTATIVES OF THE GOVERNMENT OF INDIA AND THE STATE iii
GOVERNMENTS BEFORE THE KRISHNA WATER DISPUTES TRIBUNAL AT
THE HEARING OF THE REFERENCES UNDER SECTION 5 (3) OF THE
INTER-STATE WATER DISPUTES ACT, 1956.

I. For the Government of India

Advocates

1. Dr. V. A. Seyid Muhammad, Senior Advocate (from 20-7-1974) to 24-12-1975).
3. Smt. Shyamala Pappu, Senior, Advocate (from 21-1-1976).
3. Shri O. N. Mahindroo, Advocate (from 30-5-1974 to 2-1-1976).
4. Shri V. P. Nanda, Advocate - (from 27-1-1976).

II. For the State of Maharashtra

Advocates

1. Shri H. M. Seervai, Advocate General (up to 3-9-1974).
2. Shri T. R. Andhyarujina, Advocate.
3. Shri K. J. Chokshi, Solicitor.

Other representatives

1. Shri B. A. Kulkarni, Secretary.
2. Shri E. C. Saldanha, Chief Engineer and Joint Secretary.
3. Shri M. G. Padhye, Chief Engineer and Joint Secretary.
4. Shri K. S. Shankar Rao, Deputy Secretary.
5. Shri N. M. Jog, Under Secretary.
6. Shri S. G. Joshi, Special Officer.

III. For the State of Karnataka

i

v Advocates

1. Shri R. N. Byra Reddy, Advocate General (up to 19-1-1975).
2. Shri Sachindra Chaudhuri, Senior Advocate (from 10-3-1975).
3. Shri M. P. Chandrakanth Raj Urs, Government Advocate (from 20-1-1975).
4. Shri S. S. Javali, Advocate.

Other representatives

1. Shri S. G. Balekundry, Cheif Engineer (up to 9-3-1975).
2. Shri S. P. Bhat, Chief Engineer (from 10-3-1975).
3. Shri B. Subramanyam, Superintending Engineer.
4. Shri G. M. Shivashankar, Executive Engineer.

IV. For the State of Andhra Pradesh

Advocates

1. Shri P. Ramachandra Reddy, Advocate General.
2. Shri Anwarulla Pasha, Advocate.
3. Shri D. V. Sastri, Advocate.

Other representatives

1. Shri B. Gopalakrishna Murthy, Special Officer..
2. Shri G. K. S. lyengar, Superintending Engineer.
3. Shri K. Gunda Rao, Superintending Engineer (from 18-11-1974).
4. Shri Y. Suryaprakasha Rao, Deputy Director (from 18-11-1974).
- v 5. Shri M. Seetharama Sastri, Special Officer and Chief Engineer (Retired),
Technical Adviser.
6. Shri Mir Jaffer Ali, Chief Engineer (Retired), Technical Adviser (from
18-11-1974).

CHAPTER I

PRELIMINARY CHAPTER

Reference No. I of 1974 by the Government of India.

Reference No. II of 1974 by the State of Andhra Pradesh.

Reference No. III of 1974 by the State of Karnataka.

Reference No. IV of 1974 by the State of Maharashtra. In this Report, unless otherwise mentioned :—

(a) The expression " Report", " Original Report " or " our Report" means the Report of this Tribunal under section 5 (2) of the Inter-State Water Disputes Act, 1956;

(b) The expression " This Report" or " This further Report" means the Report of this Tribunal under section 5 (3) of the said Act;

(c) The expressions " MR Note ", " MY Note " and " AP Note " mean notes filed by the States of Maharashtra, Mysore (Karnataka) and Andhra Pradesh respectively in the references under section 5(1);

(d) The expressions " MR Reference Note", " KR Reference Note" and " AP Reference Note " mean notes filed by the States of Maharashtra, Karnataka and Andhra Pradesh respectively in the references under section 5 (3).

The Krishna Water Disputes Tribunal investigated the matters referred to it under section 5 (1) of the Inter-State Water Disputes Act, 1956 and forwarded its unanimous decision and Report to the Government of India on the 24th December, 1973. The Government of India and the States of Andhra Pradesh, Karnataka and Maharashtra filed References Nos. I, II, III and IV of 1974 respectively under section 5 (3) of the said Act by the 23rd March, 1974. The replies to the references were filed by the 31st May, 1974. The hearing of the references started on the 23rd July, 1974 and continued till the 27th August, 1974, but the arguments could not be concluded as Counsel for one of the parties could not be present. After repeated adjournments, fresh arguments of all the parties were heard in the references from the 20th March, 1975 up to the 8th May, 1975. Before the Report under section 5(3) could be finalised, one of the members of the Tribunal suddenly died on the 21st July, 1975. The vacancy in the office of the member was filled on the 20th September, 1975. After several adjournments, fresh arguments of the parties in the references were heard from the 7th January up to 11th March, 1976. The delay in the disposal of the references was due to circumstances beyond our control.

Elaborate arguments were addressed to us by Counsel for the parties regarding the ambit of the powers of the Tribunal under section 5 (3) of the Inter-State Water Disputes Act, 1956.

3 The contention of the Advocate General of the State of Karnataka is that (a) when the Tribunal forwarded its Report and decision under section 5 (2) of the Act, the Tribunal did not render a decision which acquired the character of finality and became operative and binding on the parties and the Tribunal retains full powers over the case until its dissolution under section 12, (b) when the matter is referred again to the Tribunal under section 5 (3) for further consideration, the Tribunal has seism of the matter all over again and it may give such explanation or guidance as it deems fit without any limitation on its powers to do so, (c) the decision of the Tribunal under section 5 (2) is in the nature of a preliminary decision furnishing the parties a basis for seeking under section 5 (3) in their own right explanations on things contained in the decision and guidance on points not originally referred to the Tribunal and the entire matter requires fresh investigation and reconsideration by the Tribunal under section 5 (3), (d) the word " explanation " used in section 5 (3) should not be construed narrowly , and (e) under section 5 (3), the Tribunal can correct clerical errors or errors arising from any accidental slip or omission and any error of law or fact apparent on the face of record or any error in the decision by reason of its being inconsistent or incompatible with any material on record and any error arising from omission to consider any relevant matter or to decide any question arising for decision

4 Learned Advocate General of Maharashtra has argued that (a) once a report setting out facts found by the Tribunal and giving its decision on the matters referred to it has been forwarded to the Central Government under section 5 (2) of the Act, the decision of the Tribunal cannot be altered or modified, except as provided under section 5(3), (b) the power of the Tribunal is limited to giving explanation and guidance on the matters which have been referred to it under section 5 (3), (c) in giving explanation or guidance under section 5 (3), the Tribunal cannot assume the power to review its decision and reconsider the matter afresh , (d) the Tribunal can give explanations by supplying details or by making the decision plain or intelligible, or by removing any inconsistency in the decision or by clearing any obstruction or difficulty arising out of it but the Tribunal cannot go beyond giving an explanation as understood either in law or in common parlance , (e) the Tribunal does not possess any inherent power or any power of amending, altering or modifying its decision apart from section 5 (3), and (f) only the matters referred to the Tribunal under section 5 (3) can be the subject matter on which explanation or guidance can be given and such explanation or guidance cannot be given on any other matter

5 Learned Advocate General of the State of Andhra Pradesh has made his valuable contribution to the arguments but they are on the lines of the arguments urged on behalf of the State of Maharashtra and need not be reiterated After a careful consideration of the matter we give our findings

An ordinary Civil Court cannot alter a signed judgment pronounced in open Court save as provided by section 152 or on review, see Order 20 Rule 3 of the Code of Civil Procedure but (a) it may correct clerical or arithmetical mistakes in judgments, decrees or orders or errors arising therein from any accidental slip or omission under section 152 of the Code (b) it may review its judgment under section 114 read with Order 47 Rule 1 of the Code and (c) its inherent power to do justice is preserved by section 151 of the Code, see *janakiram Iyer v. P M*

Nilakantha Iyer (1962) Supp (1) S.C.R. 206. 229-231; Shivdeo Singh v. The State of Punjab AIR 1963 S.C. 1909, 1911 ; Mulla's Code of Civil Procedure 13th Edition, page 587.

But a Tribunal constituted under a special statute has no common law or inherent power, see *Kamaraja Nadar v. Kunju Thevar* (1959) S.C.R. 583, 596 (Election Tribunal). However, if authorised by the statute by which it was constituted, it may review its decision, see *Sree Meenakshi Mills Ltd. v. Their Workmen* (1958) S.C.R. 878, 888 (Labour Appellate Tribunal under the Industrial Disputes Act, 1947); Mulla's Code of Civil Procedure 13th Edition, page 1669 ; and may correct an accidental omission, see *Tulsipur Sugar Company Ltd v. State of U.P.* (1970) 1 S.C.R. 35, 37, 41-45 (Labour Court under U.P. Industrial Disputes Act, 1947). 6

This Tribunal is set up under the Inter-State Water Disputes Act, 1956. Its powers are circumscribed by the provisions of that Act. It has no inherent powers. It has some trappings of a Court. Section 9 of the Act gives the Tribunal some powers of a Civil Court and also enables it to regulate its practice and procedure. But the powers under section 151, 152 or under section 114 or Order 47 Rule 1 of the Code of Civil Procedure have not been conferred on it. Section 5(1) of the Act provides for reference of a water dispute and any matter appearing to be connected with or relevant to the water dispute to the Tribunal for adjudication. Section 5 (2) directs the Tribunal to investigate the matters referred to it and forward to the Central Government a report setting out the facts as found by it and giving its decision on the matters referred to it.

At pages 512 to 513 of Vol. II of the Report we have pointed out that a Tribunal appointed under the Inter-State Water Disputes Act, 1956 is not a permanent body and it cannot retain jurisdiction to modify its decision, apart from its statutory power to do so upon a reference made to it under section 5 (3) of the Act within three months of the decision.

Section 5 (3) of the Act provides :—

" If, upon consideration of the decision of the Tribunal, the Central Government or any State Government is of opinion that anything therein contained requires explanation or that guidance is needed upon any point not originally referred to the Tribunal, the Central Government or the State Government, as the case may be, may, within three months from the date of the decision, again refer the matter to the Tribunal for further consideration ; and on such reference, the Tribunal may forward to the Central Government a further report giving such explanation or guidance as it deems fit and in such a case, the decision of the Tribunal shall be deemed to be modified accordingly." 7

If there is anything contained in the decision of the Tribunal given under section 5 (2) which in the opinion of either the Central Government or any State Government requires explanation or if in the opinion of any of them guidance is needed upon any point not originally referred to the Tribunal, the matter may again be referred to the Tribunal by the Central Government or a State Government under section 5 (3) for further consideration. On such a reference, the Tribunal has seisin over the original decision and may make a further report

giving such "explanation" or "guidance" as it thinks fit. If it gives any explanation or guidance, the decision of the Tribunal is deemed to be modified accordingly.

8 The dictionary meaning of the word "explain" is (1) to make plain or intelligible; to clear of obscurity or difficulty; (2) to assign a meaning to, state the meaning or import of; to interpret; (3) to make clear the cause, origin or reason of; to account for; see Murray's Oxford English Dictionary; (4) (a) to say in explanation that (b) to speak one's mind against, upon, see The Shorter Oxford English Dictionary, 3rd Edition, page 657. The word "explanation" means (1) the act of explaining, expounding, or interpreting; exposition; illustration; interpretation; the act of clearing from obscurity and making intelligible; (2) the process of adjusting a misunderstanding by explaining the circumstances; reconciliation; see Webster's New Twentieth Century Dictionary, 2nd Edition, page 646; (3) explaining, esp. with view to mutual understanding or reconciliation; statement, circumstance, that explains, see The Concise Oxford Dictionary, 5th Edition, page 426; (4) that which explains, makes clear, or accounts for; a method of explaining, see The Shorter Oxford English Dictionary, 3rd Edition, page 657; (5) something that explains or that results from the act or process of explaining, see Webster's Third New International Dictionary Vol. I (1966) page 801.

The word "guide" means (1) to point out the way for; direct on a course; conduct; lead; (2) to direct (the policies, action, etc.) of; manage; regulate; govern. The word "guidance" means the act of guiding, or leading; direction, see Webster's New Twentieth Century Dictionary, 2nd Edition, Vol. I page 808.

In interpreting section 5(3) we must bear in mind that the jurisdiction of all Courts is barred in respect of any water dispute which has been referred to the Tribunal and that on publication in the Official Gazette, the decision of the Tribunal will be final and binding on the parties to the dispute. In this background, section 5 (3) should be construed liberally and the amplitude of the powers given by it should not be cut down by a narrow interpretation of the words "explanation" and "guidance".

10 The matters arising for consideration under section 5(3) in these references are of such a varied nature that instead of giving a rigid and exhaustive definition of the word "explanation" used in section 5(3) we prefer to enumerate some of the explanations that may be given with regard to things contained in the original decision. For example, explanations may be necessary (1) to make the original decision intelligible by correcting arithmetical or clerical mistakes or errors arising from accidental slips or omissions, (2) to correct mistakes arising from allowance of water in respect of any claim more than once by inadvertance, (3) to make explicit the meaning and intention of any direction or observation in the original Report, (4) to interpret or give the meaning of any word or technical term. An omission to give necessary directions or to consider and take into account relevant material or relevant factors in arriving at any conclusion on any particular point or any lacuna in the decision may require explanation. For example, an explanation may be necessary in respect of (1) the omission to consider whether the restrictions on the uses of any State in any area require revision as and when return flows become progressively available for its use and to consider the effect of any

revision of such restrictions on the uses of other States, (2) the omission to provide guidelines for the operation of the Tungabhadra Reservoir which is the common source of supply for several projects of the States of Karnataka and Andhra Pradesh, (3) the omission to take into consideration the effect of prolonged and continuous irrigation on return flow and on the quantum of dependable flow available for distribution among the parties, (4) the omission to consider relevant matters in respect of Clause XIV(B) of the Final Order.

If the Tribunal gives any explanation, the Tribunal may also give all consequential directions and reliefs arising out of such explanation.

The illustrations given above are not exhaustive. For purposes of this case, it is not necessary to define exhaustively the ambit of our powers under section 5(3) of the Act and it is sufficient to say that all the explanations and directions given by us in this Report are within the ambit of our powers under section 5(3).

However, we may point out that we have examined on merits all the contentions raised by the Government of India and the States of Maharashtra, Karnataka and Andhra Pradesh in these references and even on such examination we find that there are no merits in those contentions except as mentioned in this Report

11

Directions for costs with regard to the reference under section 5(1) of the Inter-State Water Disputes Act, 1956 were given at pages 771 and 791 of Vol. II of the original Report. We propose to give similar directions for costs with regard to the references under section 5(3) of the said Act. For this purpose, we direct that in Clause XVIII of the Final Order at page 791 of Vol. II of the Report.

(a) " (A)." be added at the beginning of the 1st line of Clause XVIII so that the existing Clause XVIII will become sub-clause (A) of Clause XVIII.

(b) at the end of sub-Clause (A) of Clause XVIII, the following sentence be added :—" These directions relate to the reference under section 5(1) of the Inter-State Water Disputes Act, 1956."

(c) After sub-Clause (A) of Clause XVIII, the following sub-Clause (B) be added :—" (B). The Government of India and the Governments of Maharashtra, Karnataka and Andhra Pradesh shall bear their own costs of appearing before the Tribunal in the references under section 5(3) of the said Act. The expenses of the Tribunal in respect of the aforesaid references shall be borne and paid by the Governments of Maharashtra, Karnataka and Andhra Pradesh in equal shares."

12

To bring the directions for costs in Clause XVIII (A) in conformity with the language of section 9(3) of the Inter-State Water Disputes Act, 1956 and Clause XVIII(B), we direct that the words " Governments of Maharashtra, Karnataka and Andhra Pradesh" be substituted for " aforesaid three States" in Clause XVIII(A) at page 791 of Vol. II of the Report.

CHAPTER II

Reference No. I of 1974 by the Government of India

This reference bears No. 5/18/74-WD, Government of India, Ministry of Irrigation and Power. In this reference, the Government of India seeks explanation and guidance on the points mentioned and dealt with below :

Clarification No. I(a)

The Government of India submitted as follows :—

" Considerable quantities of water are required for cooling and other purposes in thermal and nuclear power plants. The Tribunal may kindly consider as to whether such use should be included in the " industrial" use in Clause VI of their final order or elsewhere, and specify the percentage thereof which should be considered as consumptive use."

On the 7th May, 1975, Dr. V. A. Seyid Muhammad, Counsel for the Government of India, stated that he was confining his clarification No. I only to the water required for cooling and other purposes in thermal power plants and that he was not pressing the clarification in so far as it related to the quantity of water required for cooling and other purposes in nuclear power plants.

14 The State of Maharashtra contends that the use of water for cooling and other purposes in thermal power plants is industrial use within the meaning of Clauses VI and VII of our Final Order. The State of Andhra Pradesh at first contended that such use was not industrial use, but on the 7th May, 1975, Counsel for the State of Andhra Pradesh stated that such use was industrial use.

The State of Karnataka relying on Clause VI of the Final Order contends that the use of water for thermal power plants is use for production of power and is not industrial use as contemplated by Clause VI of the Final Order. It argues that consequently the use of water for thermal power plants is not industrial use as envisaged by the third paragraph of Clause VII of the Final Order and that accordingly such use should be measured by the actual depletion of the waters of the river Krishna in accordance with the first paragraph of Clause VII.

Clause VI of the Final Order provides that beneficial use includes use for production of power and industrial purposes. The expression " production of power " in Clause VI refers to use of water for production of hydro-power and not to use of water for thermal power plants.

15 The provision for measurement of industrial use in the third paragraph of Clause VII(A) of the Final Order is based on the agreed statement of the three

States made on the 20th August, 1973, see Report Vol. III page 62, Vol. I page 290. In our opinion the expression " industrial use " in the aforesaid paragraph includes use of water required for cooling and other purposes in thermal power plants.

Clarification No. 1(b)

16

The Government of India has submitted as follows:-

" While the Tribunal have laid down restrictions on the use of water in certain sub-basins as well as the total use by each State, there may be locations where hydro power generation (within the basin) may be feasible at exclusively hydro sites or at sites for multi-purpose projects. At such sites, part of the waters allocated to the States, as also water which is to flow down to other States could be used for power generation either at a single power station or in a series of power stations. The Tribunal may kindly give guidance as to whether such use of water for power generation within the Krishna basin is permitted even though such use may exceed the limits of consumptive use specified by the Tribunal for each State or sub-basin or reach, and, if so, under what conditions and safeguards."

At page 447 of Vol. II of the Report we have observed that where the tail-race water after generation of electricity is returned to the river, the hydro-electric use is non-consumptive, except for losses in the water conductor system and storages.

All beneficial uses of water including uses for production of hydro-power are permitted to the extent specified in Clause V and subject to the conditions and restrictions mentioned in the Final Order. No State is entitled to use water in excess of the limits specified in the Final Order. Consequently the explanation asked for in this clarification does not arise.

In A.P. Reference Notes Nos. 9 and 10 and M.R. Reference Note No. 9, the question was raised whether any limitation should be placed on the storages of the upper States constructed for production of hydropower and for other purposes but on 8th March, 1976, the States of Andhra Pradesh and Maharashtra withdrew the aforesaid Notes. The State of Karnataka also does not want any clarification on the subject of storages. Accordingly we find no ground for any further clarification.

Clarification No. 2(a)

18

The Government of India has submitted with reference to Clause V(A) of the Final Order as follows :—

" It is not clear whether in computing the 7 1/2 per cent figure the average annual utilisation should include evaporation losses from projects using 3 T.M.C. or more; or whether the evaporation losses from such projects should be excluded. Clarification and guidance is requested from the Tribunal on this point."

All the three States have conceded before us that for the limited purpose of Clause V of the Final Order, evaporation losses from reservoirs of projects using

3 T.M.C. or more annually shall be excluded in computing the 7 1/2 per cent figure of the average annual utilisations mentioned in sub-Clause A(ii), A(iii), A(iv), B(ii), B(iii), B(iv), C(ii), C(iii) and C(iv) of Clause V. For reasons given in this Report we have increased the aforesaid figure of 7 1/2 per cent to 10 per cent.

For purposes of clarification, we direct that the following sub-Clause V (D)(iii) be added after Clause V(D)(ii) after deleting the full stop at the end :—

(iii) evaporation losses from reservoirs of projects using 3 T.M.C. or more annually shall be excluded in computing the 10 per cent figure of the average annual utilisations mentioned in sub-Clauses A(ii), A(iii), A(iv), B(ii), B(iii), B(iv), C(ii), C(iii) and C(iv) of this Clause."

19 Clarification No. 2(b)

The Government of India has submitted as follows :—

" The Tribunal have in Clause IX of their final order laid down certain restrictions on various States with regard to use of waters in particular sub-basins and rivers. It has also been stated that these restrictions come into effect from 1st June after the publication of their decision. Guidance may kindly be given by the Tribunal whether, after a period of years when return flows from the irrigated areas would progressively become available, the ceilings specified by the Tribunal require any corresponding revision."

This clarification is considered and disposed of under clarifications Nos. XV, XVI, XVII and XIX in Reference No. III of 1974.

20 Clarification No. 2(c)

The Government of India has submitted with reference to sub-Clause (D) (i) of Clause V of the Final Order as follows :—

" The Tribunal have, in sub-Clause (D) (i) of Clause V of the final order declared the utilisations for irrigation in the Krishna basin in the water year 1968-69 from projects using 3 T.M.C. or more annually in the three States. As details of these figures would be necessary in regulating the sanction of the future projects as well as uses, the Tribunal are requested to give the break-up of these figures projectwise."

The figures of utilisations for irrigation in the Krishna river basin in the year 1968-69 from projects of the three States using 3 T.M.C. or more annually and mentioned in Clause V(D)(i) of the Final Order were fixed by agreement between the parties, see Report Vol. I, pages 277-278, 288, Vol. II, page 782.

It is not possible to give the break-up of these figures as the details have not been supplied by all the three party States.

21 Clarification No. 2(d)

The Government of India has submitted as follows :—

" Some of the projects of the States presently irrigate or may in future irrigate some areas outside the Krishna basin and regeneration from these areas

would not be available lower down in the Krishna basin itself. In such cases, the Tribunal may kindly give guidance whether the average annual utilisations for irrigation at such subsequent point or points of time should be computed by considering only such utilisations as are made only in areas lying physically within the Krishna basin ; or whether the total use of Krishna water from such projects should be considered, irrespective of whether such utilisation for irrigation is made in the Krishna basin or elsewhere. In the former case, the Tribunal may kindly specify the method by which account should be kept of such utilisations by the States in terms of Clause XIII of their final order."

Clause V of the Final Order clearly provided that the annual utilisations for irrigation within the Krishna river basin only from projects using 3 T.M.C. or more annually shall be taken into account for computing the 7 ½ per cent figure.

Clause XIII(A) (a) and (f) provides that each State shall prepare and maintain annually for each water year, complete detailed and accurate records of (i) annual water diversions outside the Krishna river basin and (ii) annual uses for irrigation within the Krishna river basin from projects using 3 T.M.C. or more annually. 22

We see no ground for any further clarification.

Clarification No. 3

23

The Government of India has submitted as follows:—

" The Tribunal have advised in Chapter V of their Report that until another control body is established, the Tungabhadra Board should control the maintenance and operation of the entire Tungabhadra Dam and reservoir and spillway gates on the left and the right sides; and that the existing practice with regard to the preparation of the working tables of the Tungabhadra reservoir by the Tungabhadra Board and regulation of discharges from the reservoir in accordance with such working tables should be continued. The Tribunal may kindly clarify that the Tungabhadra Board is to be assigned the task of controlling and regulating the water in all the canals, both on the left and the right sides."

We have found that there is no ground for taking away the administration and control of the Tungabhadra Left Bank Canals and their headworks from the Karnataka Government and vesting them in the Tungabhadra Board or any other joint control body, see Report Vol. I page 166. In view of this finding, the task of controlling and regulating the water in the canals on the left side could not be assigned to the Tungabhadra Board.

At page 166 of Vol. I of the Report, after stating that the control over the maintenance of the entire Tungabhadra Dam and reservoir and spillway gates on the left and right sides should be vested in a single control body but that this may be done by suitable legislation we said that " until another control body is established **such control** may be vested in the Tungabhadra Board ". We must point out that our intention was to say that until another control body is established, such control as is already vested in the Tungabhadra Board may continue to be vested in the Tungabhadra Board. 24

With a view to make plain our intention we direct that:—

(a) the following sentence in lines 16 and 17 at page 166 of Vol. I of the Report be deleted :—

" Until another control body is established, such control may be vested in the Tungabhadra Board " ; and

(b) the following sentence be added after the words " if necessary " in line 22 at page 166 of Vol. I of the Report:—

" Until another control body is established, such control as is already vested in the Tungabhadra Board may continue to be vested in the Tungabhadra Board."

25 Our attention is drawn to the fact that the statement " The arrangement suggested in this working table is purely ad hoc and without prejudice to the rights, claims and apportionment of Tungabhadra waters or of the regulation of Tungabhadra Reservoir in future years " appearing at the foot of the working tables prepared by the Tungabhadra Board and mentioned in lines 11 to 15 at page 167 of our Report Vol. I will be inappropriate in a working table prepared after our Report.

We direct that the statement " The arrangement in future years" mentioned above be not added in the working tables prepared hereafter by the Tungabhadra Board or any other authority established in its place.

We direct that the preceding paragraph be added at the end of page 167 of Vol. I of the Report.

26 Clarification No. 4

The Government of India has submitted as follows :—

" In Clause IX of the final order, the Tribunal have laid down the restrictions on the use in any water yer in the Tungabhadra sub-basin by the States of Karnataka and Andhra Pradesh.

It is not inconceivable that in some years, the Tungabhadra reservoir may be low and the inflows into the reservoir in pre-monsoon and early monsoon or in other periods may not be adequate to meet the requirements of both Karnataka and Andhra Pradesh from the Tungabhadra river/reservoir and/or to build up the storage.

It is not clear whether the States concerned in the Tungabhadra Project are entitled to proportionate share of water during each crop season and according to the water requirements of crops for their areas depending on the Tungabhadra reservoir, which is to be operated by a Central agency, viz., the Tungabhadra Board. There should be no occasion for any State to utilise the inflows into the reservoir during the months of June, July or August (to quote an instance) exclusively for its own irrigation or for building up the storage on the ground that the State would still be within the limits set by the Tribunal both in respect of Krishna River system and the Tungabhadra sub-basin. Clarification and guidance of the Tribunal are requested in this matter."

This clarification is considered and disposed of under clarifications Nos. XV, XVI, XVII and XIX in Reference No. III of 1974.

Clarification No. 5

27

The Government of India has submitted as follows :—

" There are several diversion schemes on the Tungabhadra river below the Tungabhadra Reservoir. They are Vijayanagar Channels, Rajolibunda Diversion Scheme and the Kurnool-Cuddapah Canal. There are no storage at the head-works of these schemes, and regulated releases from the Tungabhadra reservoir are necessary for the irrigation thereunder during Kharif as well as Rabi season, to supplement the inflows between the reservoir and the headworks of these schemes. At present, these requirements are being met from the releases into the river from the reservoir.

While dealing with the issue relating to the releases for Rajolibunda Diversion Scheme and Kurnool Cuddapah Canal at page 602 of the Report, the Tribunal have observed as follows :

' With regard to issue No. IV(B)(a) we may mention that we have divided only dependable flow of the river Krishna between the States of Maharashtra, Mysore and Andhra Pradesh and we have also placed restrictions on the use of water by the States of Mysore and Andhra Pradesh in the Tungabhadra sub-basin (K-8) as mentioned hereinbefore. In our opinion no further directions are necessary for the release of the waters from the Tungabhadra dam :

- (i) for the benefit of the Kurnool Cuddapah Canal;
- (ii) for the benefit of the Rajolibunda Diversion Scheme ; and
- (iii) by way of contribution to the Krishna river.

Issue No. IV(B)(a) is decided accordingly.'

At page 371 of the Report, while dealing with Rajolibunda Diversion Scheme, the Tribunal have however observed ' We think that the requirement of the Project can be met fully from the intermediate yield below Tungabhadra dam and regulated releases from the dam. Moreover, in allocating the Krishna waters, we have, as far as possible, taken into account the return flow from irrigation.'

Explanation and guidance is requested from the Tribunal whether, in view of the finding at page 371 of the Report, the Tungabhadra reservoir working tables should be prepared by the Tungabhadra Board to release, whenever necessary, water from the Tungabhadra reservoir for the diversion works to supplement the intermediate flows for ensuring the utilisation on these diversion works to the extent they have been accepted by the Tribunal."

28

This clarification is considered and disposed of under clarifications No. XV, XVI, XVII and XIX in Reference No. III of 1974.

Clarification No. 6

29

The Government of India has submitted as follows :—

" In Scheme A, which has been ordered for implementation, the Tribunal have made **en bloc** allocations of water for consumptive use in a 75 per cent dependable year to various States. However, in a lean year, the flows would be less than the aggregate of the quanta of water which have been allocated to the various States. The Tribunal have indicated at page 542—
Volume II of the

Report—that they have not expressly provided for the sharing of deficiency. It, however, needs to be pointed out that the acuteness of shortages would vary depending upon the percentage dependability of the flow which occurs in any particular year and conflicts could be avoided if the Tribunal kindly consider the matter further and indicate some **modus operandi** to ensure that shortages are shared in a fair and equitable manner. The Tribunal may also kindly consider giving directions on provisions of adequate river sluices or other arrangements for releasing waters from reservoirs in the lower reaches of the rivers in the Krishna basin,"

30

The question of sharing of shortages has been dealt with in the original Report submitted under section 5(2) of the Inter-State Water Disputes Act, 1956, and elsewhere in this Report. Scheme ' B ' which provides for sharing of both surplus and deficiency in the entire Krishna river basin could not be implemented for reasons given in the Report and on account of the opposition by Andhra Pradesh, In the scheme of allocation embodied in the Final Order, Andhra Pradesh will be at liberty to use the excess flow in surplus years and at the same time will have to bear the burden of the deficiency in lean years save as indicated in this Report. We see no ground for further clarification in the matter of sharing the deficiency.

31

The question of providing adequate river sluices in the dams of the upper States was mooted in the supplementary pleadings of the parties, see SP-IV pages 15-17, 20, 29-31, 47-48. Andhra Pradesh asked for directions for adequate river sluices in the dams of the upper States to provide timely supplies for irrigation in Andhra Pradesh having regard to the fact that there were no river sluices in the dams of Tata Hydrel Works at Khopoli and Walwan and in Ujjani and Hidkal Dams, that adequate river sluices were not provided in the Koyna Dam, Bhadra Reservoir and the dam of the proposed Malaprabha Project and that it was doubtful if they would be provided in the Narayanpur and Almatti dams of Upper Krishna Project. Karnataka contended that the requirement of irrigation in Andhra Pradesh would have to be regulated by it from reservoirs available in its own State, that water may be released from a reservoir nor only from river sluices but also from canals, power turbines and spillways and that only such directions might be given as would be necessary to ensure the proper working of the allocations to be made by the Tribunal. Maharashtra submitted that the question of providing sluices in Tata Hydrel Works which were constructed long ago did not arise, that Ujjani dam was cleared by the Planning Commission without any provision for river sluices, that Koyna Project was cleared without providing larger number of river sluices, that the question of provision of sluices in all dams and anicuts was a question of fact and evidence in each case, that some of the questions to be considered were (a) the cost of providing river sluices, (b) the safety of the dam and (c) whether river sluices would in any manner secure any reasonable or substantial benefit and that in the absence of particulars or evidences, the prayer of Andhra Pradesh should be rejected.

The common draft of Part II of Scheme ' B ' provided that the Krishna Valley Authority should determine necessary sluicing capacities required for the releases from reservoirs (existing as well as new) for the purpose of proper regulation and should ensure that necessary works for the same be carried out immediately.

As Scheme 'B' could not be implemented, it was realised that in the absence of any particulars or evidence, no direction could be given regarding river sluices and other arrangements for release of water from reservoirs of upper States. Consequently we did not give any direction in our Final Order regarding this matter.

However, the three party States made further submissions in their replies filed in this reference. Andhra Pradesh sought the clarification that while giving technical clearance, the Central Water and Power Commission might fix provision for adequate sluices in dams keeping in view the requirements of the projects and the necessity for letting down the waters for downstream projects after obtaining the views of the lower States and that the upper States should construct their dams strictly in accordance with Central Water and Power Commission specifications. Karnataka reiterated the submission made in SP-IV pages 47-48. Maharashtra submitted that in the scheme of allocation embodied in the Final Order, there was no question of providing any river sluices or other arrangement for releasing water for reservoirs of the lower States. 32

We are aware of the necessity for provision of river sluices and/or other arrangements for release of water from dams. It is to be observed that the Central Electricity Authority and Central Water Commission are expert technical bodies and are fully competent to advise on the question of the adequacy of river sluices. We trust that they will give particular attention to the matter and while giving technical clearance to projects give suitable directions for the provision of river sluices and/or such other arrangements for release of water from the dams of such projects as may be necessary for the safety of these dams as also for the benefit of downstream projects. 33

CHAPTER III

REFERENCE No. II OF 1974 BY THE STATE OF ANDHRA PRADESH

In this reference, the State of Andhra Pradesh seeks clarification, explanation and guidance on the points mentioned and dealt with below :—

Clarification No. 1

The State of Andhra Pradesh submitted as follows :—

" In Clause 5 (c) of the final order of this Honourable Tribunal the State of Andhra Pradesh was given the liberty to use in any water year the water remaining after meeting the specific allocations to Maharashtra and Karnataka under sub-clause (a) and (b) of Clause 5. -

This general scheme may not obviously apply as far as the allocations under the Tungabhadra Sub-basin are concerned for the following reasons :

(a) The benefits under Tungabhadra Right Bank High Level and Low Level Canals and the Rajolibunda Diversion Scheme have to be shared in the particular proportions as were agreed to between the States of Karnataka and Andhra Pradesh (vide pages 155 and 156 and 170 and 171 of the Report).

(b) Under Clause 9(b)(i) and (c)(i) the quantities that can be utilised from K-8 and K-9 Sub-basins by Karnataka and Andhra Pradesh are also fixed. Under Clause 9(d)(ii) it was clarified that the restrictions under Clause c(i) do not apply to the water flowing from Tungabhadra into River Krishna.

35 In view of the above express provision in Clause 9 (page 785 of the Report) and the agreements referred to above, it may be explained and clarified that all the projects of either State in the Tungabhadra and Vedavathi Sub-basins should rank equally and share the water available in proportion to the quantities fixed therefor under the decision of this Honourable Tribunal, subject to the restrictions indicated in Clause 9."

This clarification is considered and disposed of under clarifications Nos. XV, XVI, XVII and XIX in Reference No. III of 1974.

36 Clarification No. 2

The State of Andhra Pradesh has submitted as follows :—

" On the Tungabhadra river there are the following diversion schemes below the Tungabhadra Dam :

(i) Vijayanagar Channels of both Karnataka and Andhra Pradesh (**Vide** page 366 of the Report).

(ii) Rajolibunda Diversion Scheme jointly for Karnataka and Andhra Pradesh.

(iii) K. C. Canal—Andhra Pradesh.

The utilisations under these schemes are protected by this Honourable Tribunal (**vide** pages 389 to 392 of the Report). There are no storages at the headworks of these diversion schemes and for the protected irrigation thereunder during kharif as well as rabi seasons, regulated releases from the reservoir are necessary to supplement inflows between the reservoir and the headworks of these schemes. The need for such regulated releases and assistance from the reservoir was recognised by the concerned States and was mentioned in the 1944 Agreement between the Hyderabad and Madras States (**vide** page 161 of the Report), and was also agreed to in principle in the meeting of the Chief Engineers of the States of Karnataka and Andhra Pradesh (**vide** page 163 of the Report).

While dealing with the specific issue regarding directions for the releases for K. C. Canal and Rajolibunda diversion scheme, this Honourable Tribunal was pleased to state as follows :

' With regard to Issue No. IV(B)(a) we may mention that we have divided only the dependable flow of the river Krishna between the States of Maharashtra, Mysore and Andhra Pradesh and we have also placed restrictions on the use of water by the States of Mysore and Andhra Pradesh in the Tungabhadra sub-basin (K-8) as mentioned herein before. In our opinion no further directions are necessary for the release of the waters from the Tungabhadra Dam.

37

(i) for the benefit of the Kurnool-Cuddapah Canal;

(ii) for the benefit of the Rajolibunda Diversion Scheme;' (**vide** page 602 of the Report).

While dealing with Rajolibunda Diversion Scheme this Honourable Tribunal was pleased to observe at page 371 of the Report:

' We think that the requirement of the project can be met fully from the intermediate yield below Tungabhadra dam and regulated releases from the dam. Moreover, in allocating the Krishna waters we have, as far the possible, taken into account the return flow from irrigation.'

At present the releases needed for these works are being met from the releases into the river from the reservoir by the Tungabhadra Board. The State of Andhra Pradesh submits that this Honourable Tribunal may be pleased to explain and clarify that the finding given on issue IV(B)(a) does not amount to denial of the right to regulated releases for the said diversion schemes from the Tungabhadra Reservoir to supplement the Intermediate flows for ensuring the utilisation thereunder with the quantities sanctioned for these projects by this Honourable Tribunal."

This clarification is considered and disposed of under clarifications Nos. XV, XVI, XVII and XIX in Reference No. III of 1974.

38 Clarification No. 3

Andhra Pradesh contended that as the total allocation in Tungabhadra (K-8 sub-basin) to Karnataka is 289.87 T.M.C., Clause IX(B) should have restrained the State of Karnataka from using more than 290 T.M.C. in any water year and that the figure 290 T.M.C. be substituted for 295 T.M.C. in Clause IX(B)(i) of the Final Order.

On the 23rd August, 1974, the learned Advocate General of Andhra Pradesh stated that the Tribunal need not deal with this clarification and that the clarification was not pressed by him for the reason that the ceiling of 295 T.M.C. was fixed taking into consideration the total requirements of the State as assessed from the demands which have been protected or which have been held as worth consideration including also their share in the return flow.

Therefore, there is no need for any further clarification.

39 Clarification No. 4

Andhra Pradesh contended that there was overlapping allocation of 1.865 T.M.C. for bandharas (Item No. I(j)(iii) of MRPK-XXXI) under the Koyna-Krishna Lift Irrigation Scheme at page 643 of the Report and under bandharas at page 702 of the Report. Andhra Pradesh submitted that the allocation of Maharashtra be reduced by 1.865 T.M.C. and this quantity of water be allocated to the State of Andhra Pradesh.

On the 5th March 1976, the learned Advocate General of the State of Andhra Pradesh made the following statement:—

" In view of the contention of the State of Andhra Pradesh concerning the scope of section 5(3) of the Inter-State Water Disputes Act, 1956, and that the allocations are **en bloc**, the State of Andhra Pradesh is not pressing clarification No. 4 of Andhra Pradesh Reference No. II/1974."

Therefore, there is no need for any further clarification.

40 Clarification No. 5

The State of Andhra Pradesh submitted that the maximum quantity that could be utilised in K-5 and K-6 sub-basins of the States of Maharashtra and Karnataka should be specified without reference to specific utilisations on any particular tributary in the said sub-basins and that the maximum quantity that could be utilised for minor irrigation in K-5 and K-6 sub-basins may be indicated.

On the 23rd August, 1974 the learned Advocate General of Andhra Pradesh stated that he did not press this clarification as there was no material on record on which he could substantiate it.

Therefore, there is no need for any further clarification.

Clarification No. 6

41

The State of Andhra Pradesh prays that the Tribunal should declare that preferred uses are entitled to priority over contemplated uses. On the 23rd August, 1974, the learned Advocate General of Andhra Pradesh stated that the point raised in this clarification was covered by the finding of the Tribunal at page 322 of the Report and it was, therefore, not pressed by him.

Therefore, there is no need for any further clarification.

Clarification No. 7

42

Andhra Pradesh rightly points out that the four works mentioned at the bottom of page 384 of Vol. I of the Report, though committed as on September 1960, came into operation subsequently. We direct that lines 1 to 4 at page 385 of Vol. I of the Report be deleted and in their place the following passage be substituted :—

" The above mentioned four works were under construction in September, 1960 and as they came into operation subsequently, their utilisations are not reflected in the figure of utilisations under minor irrigation works in Krishna basin in Mysore State for the decade 1951-52 to 1960-61. However, as these works were committed as on September, 1960, their utilisations also may be protected. Adding the utilisations for the above works, 'the sub-basin wise utilisations under minor irrigation works in Krishna basin in Mysore State committed as on September, 1960 were as follows:—"

Andhra Pradesh suggests corrections of certain clerical errors. We find that there are several other typographical and/or clerical errors in the original Report. We direct that all the typographical and/or clerical errors set forth in Appendix B of Chapter VI of this Report be corrected.

CHAPTER IV

REFERENCE No. III OF 1974 BY THE STATE OF KARNATAKA

Learned Counsel for the State of Karnataka stated that the Tribunal has correctly laid down the principles for resolving water disputes under the Inter-State Water Disputes Act, but he contended that the Tribunal had erred in the application of those principles. In this reference, the State of Karnataka seeks clarification, explanation and guidance on the points mentioned and dealt with below.

Clarification No. I

Karnataka seeks clarification whether the Tribunal may be pleased—

(i) to provide for a machinery for the determination of the realistic 75 per cent dependable flows ; and

(ii) to allocate the 75 per cent dependable flows, if any, in excess of 2060 T. M. C. in such proportion as the Tribunal may be pleased to decide.

44

The parties agreed that the 75 per cent dependable flow be adopted as 2060 T.M.C. Accordingly the Tribunal has determined that the 75 per cent dependable flow of the river Krishna up to Vijayawada is 2060 T.M.C., see Report Vol. I pages 260-262, Vol. II page 776. Our estimate of the dependable flow may need revision in the light of the flow data that may be available in future, see Report Vol. II page 509. The necessity for such revision is one of the reasons for providing review by a competent authority or Tribunal under Clause XIV of the Final Order, see Report Vol. II pages 513, 790. The determination and allocation of the dependable flow at a future date can be done by this Tribunal or by-another Tribunal appointed under the Inter-State Water Disputes Act, 1956. We cannot delegate this power to any other authority appointed by us as suggested by Karnataka (KR Reference Note No. I).

In our Report, we have held that the 75 per cent dependable flow 2060 T.M.C. will be augmented by return flow from time to time and by Clause V of our Final Order we have provided for distribution of such additional dependable flow. Counsel for the State of Karnataka has contended that (a) the Tribunal has estimated that 7 ½ per cent of the excess utilisation for irrigation after 1968-69 from projects using 3 T.M.C. or more annually will be the additional 75 per cent dependable flow due to return flow available for distribution from time to time but in making this estimate the Tribunal has omitted to consider the effect of continuous and prolonged irrigation before and after 1968-69 on the magnitude of return flow and (b) on a consideration of all relevant materials, the Tribunal should have found that more than 7 ½ per cent of the excess utilisations would be added to the 75 per cent dependable flow from time to time and should have

made the allocations accordingly. Learned Counsel for the State of Andhra Pradesh has submitted that (a) in the reference application of the State of Karnataka, it is not alleged that the estimate of the Tribunal regarding the additional dependable flow by reason of return flow is erroneous, (b) the Tribunal had no power to modify its estimate of the return flow and (c) the State of Andhra Pradesh will suffer if too high an estimate of return flow is made. Learned Counsel for the State of Maharashtra has submitted that under section 5(3) of the Inter-State Water Disputes Act, 1956, the Tribunal may not revise its estimate of return flow. We give below our findings. 45

At pages 48-49 of its Reference application, the State of Karnataka asks for determination and allocation of the 75 per cent dependable flow in future in excess of the agreed quantity of 2060 T.M.C. For establishing that the omission by the Tribunal to take into consideration relevant materials has resulted in too low an estimate of the additional dependable flow arising from return flow, the State of Karnataka has relied on the materials on the record of this case. We are satisfied that the aforesaid contentions of Karnataka are not outside the scope of its reference application and we must examine them on their merits.

The parties agreed that a percentage of the excess utilisation for irrigation in the Krishna basin from projects using 3 T.M.C. or more would appear as return flow and would augment the 75 per cent dependable flow of 2060 T.M.C. We found that this return flow could safely be taken to be 7 ½ per cent of the excess utilisation after 1968-69, see Report Vol. I pages 275-280. We may point out how we came to make this estimate. 46

At pages 275-276 of Vol. I of the Report, we observed that the 75 per cent dependable flow was determined to be 2060 T.M.C. after taking into account the flow series from 1894-95 to 1971-72 in which flow series the upstream utilisations for the years 1969-70 to 1971-72 were assumed to be the same as in 1968-69 disregarding the extra utilisations, if any, after 1968-69. We then pointed out that after 1968-69 there would be gradually increasing utilisations for irrigation in the Krishna basin and the excess utilisation for irrigation after 1968-69 would yield substantial return flow no part of which was reflected in the dependable flow of 2060 T.M.C. and we found that this return flow could be safely taken to be 7 ½ per cent of the excess utilisation for irrigation after 1968-69. In making this estimate, we took into account the return flow appearing within five years of the diversions for new irrigation after 1968-69. But we omitted to take into account the unimpeachable and uncontradicted evidence on the record that return flow on reaching full magnitude after 10 to 30 years from the beginning of irrigation would be much more than the return flow appearing within five years, see Report Vol. I page 268 and the authorities cited in Footnote (14) at that page, Framji's evidence pages 322-323, 338-339, 450. 47

It is to be observed that new irrigation from projects such as the Ghod Dam and Radhanagari Projects of Maharashtra, Ghataprabha Project Stage I, Bhadra Reservoir, Bhadra Anicut, Tunga Anicut, Tungabhadra Project Left Bank Low Level Canal, Tungabhadra Project Right Bank Low Level and High Level Canals

of Karnataka and Tungabhadra Project Right Bank Low Level and Rajolibunda Diversion Scheme of Andhra Pradesh was gradually increasing between 1951 and 1968-69, see MRDK-VIII pages 1 to 24 and return flow from a large part of such new irrigation had not reached their full magnitude by 1968-69. As a matter of fact, the utilisation for irrigation in the Krishna basin from projects using 3 T.M.C. or more annually had increased from 163.83 T.M.C. in 1964-65 to 407.50 T.M.C. in 1968-69 (see Report Vol. I pages 277-278) and return flow from the new irrigation since 1964-65 could not have been stabilised in 1968-69. We omitted to take into account the fact that the entire return flow from new irrigation before 1968-69 was not reflected in the dependable flow of 2060 T.M.C. and that a large part of return flow from the diversions for irrigation before 1968-69 would increase the dependable flow of 2060 T.M.C. after 1968-69. Moreover there will be new irrigation from many projects after 1968-69. By May, 2000, a large part of this new irrigation would be continued for 10, 20 or 25 years and return flow from a part of this new irrigation would reach full magnitude. In estimating the return flow as 7 ½ per cent of the excess irrigation after 1968-69, we omitted to take into account the effect of this continuous and prolonged irrigation on the magnitude of the return flow.

Maharashtra's expert witness Mr. K. K. Framji has pointed out that in U.S.A., the ultimate stabilised return flow varies from 1/3 to 2/3 of annual diversions and was much larger than the return flow appearing within five years of the new irrigation but taking into account the differences in conditions in U.S.A. and Krishna basin. 10 per cent of annual diversions appearing within five years from the beginning of irrigation may be taken to be the reasonably minimum allowance for return flow which would be added to the dependable flow available for distribution in the Krishna basin, see Framji's evidence pages 451-452, 458-459, 1649-1650, Report Vol. I pages 273-274. This part of the evidence of Mr. Framji was not shaken in cross-examination nor is there any rebutting evidence on the record. In estimating the return flow as 7 ½ per cent and not 10 per cent of the excess utilisation for irrigation after 1968-69, we omitted to take into account the effect of prolonged and continuous irrigation in the Krishna basin from projects using 3 T.M.C. or more annually since 1951 up to 1968-69 and after 1968-69. Had we considered this aspect of the matter we would have estimated the return flow as 10 per cent of the excess utilisations after 1968-69. On consideration of all relevant materials we hold that on a safe and conservative estimate 10 per cent of the utilisations for irrigation in the Krishna basin after 1968-69 from projects using 3 T.M.C. or more annually over the utilisations for such irrigation in 1968-69 from such projects will appear as return flow in the Krishna basin and will augment the 75 per cent dependable flow of 2060 T.M.C. of the river Krishna up to Vijayawada. We also hold that the allocations to the parties under Clause V of the Final Order should be increased accordingly.

Accordingly we direct that the figure " 10 " be substituted for the figure "7 ½" in line 2 at page 280, lines 17 and 27 at page 283, line 10 at page 284, line 4, 15 and 25 at page 285, line 24 at page 286, lines 9 and 20 at page 287 of Vol. I of the Report.

We also direct that the figure " 10 " be substituted for the figure " 7 ½" in our final Order in lines 4, 14 and 23 at page 778, lines 15 and 25 at page 779, line 8 at page 780 and lines 4, 14 and 23 at page 781 of Vol. II of the Report. 50

After hearing arguments, we are of the opinion that by the water year 1998-99, if full utilisations for irrigation in the Krishna river basin from projects using 3 T. M. C. or more annually as mentioned in the original Report and this Report are made by Maharashtra and Karnataka and if full utilisation for irrigation of the ayacut of the Projects of Andhra Pradesh using 3 T.M.C. or more annually within the Krishna river basin as given by Andhra Pradesh is made by it, the return flow within the Krishna river basin from the utilisations of Maharashtra, Karnataka and Andhra Pradesh would be near about 25 T.M.C., 34 T.M.C. and 11 T.M.C. respectively and the total allocations to them respectively would then be near about 585 (560+25) T.M.C., 734 (700+34) T.M.C. and 811 (800 +11) T.M.C. respectively under Clause V of the Final Order modified as a result of the explanations given in this Report under section 5(3) of the Inter-state Water Disputes Act, 1956.

Clarification No. II

51

Karnataka prays that this Tribunal may be pleased to clarify its decision having regard to the terms of reference and to direct the implementation of Scheme 'B' irrespective of the consent of parties, subject to the clarifications sought in clarification No. III.

On behalf of the State of Karnataka it is submitted that the dependable flow of the river Krishna as well as the surplus flow in excess of dependable flow should be divided between the parties and that the allocation of waters at 75 per cent dependability only between the riparian States is not an adjudication in terms of the Inter-State Water Disputes Act, 1956, particularly in view of the pleadings of all the three States, their complaints to the Government of India and the Reference made by the Central Government to the Tribunal. The omission to divide all the waters, it is submitted, is an error apparent on the face of the record and should be corrected by allocating all the available waters of the river Krishna between the three States.

It is further submitted that Scheme 'B', subject to such modifications as the State of Karnataka has suggested, has the advantage of dividing the entire utilisable water of the river Krishna every year. The Tribunal had declined to implement Scheme 'B' and to constitute the Krishna Valley Authority on ground of propriety rather than on grounds of legality. The contention of the State of Karnataka is that the Tribunal should have by its order constituted an authority to implement Scheme ' B' without the consent of the parties. 52

In our original Report we have discussed Scheme ' B ' and have pointed out that Scheme ' B ' provides for the fuller utilisation of the waters of the river Krishna and for the sharing of the surplus and the deficiency in every water year by all the three States. For the successful implementation of Scheme 'B', if is essential that the Krishna Valley Authority should be established and should function harmoniously. On the 26th July, 1973, Counsel for the States prepared,

53 subject to approval of the State Governments, a common draft of Part II of Scheme 'B' laying down the manner in which the Krishna Valley Authority would be constituted and the powers of the said Authority, see Report Vol III, pages 99—110 Appendix 'R' It was considered that agreement between the parties on Part II of Scheme 'B' as drafted by them giving the constitution and powers of the Krishna Valley Authority was necessary and essential for the implementation of Scheme 'B' However, one of the States did not agree to Part II of the Scheme, see Report Vol II pages 521-522 We have pointed out that it, is unwise and impractical to impose an administrative authority by a judicial decree without the unanimous consent and approval of the parties, see Report Vol II page 539 Even to day, the State of Andhra Pradesh is opposed to the implementation of Scheme 'B' and to the constitution of Krishna Valley Authority Consequently the Krishna Valley Authority which includes a nominee of Andhra Pradesh as envisaged by the common draft of Part II of Scheme 'B' cannot be constituted Unless the Krishna Valley Authority is constituted, Scheme 'B' cannot implemented

54 The best method of creating an administrative authority for regulating the distribution of the waters of an inter-State river and river valley including the waters available for use from inter-State projects is by agreement between the interested States or by a law made by Parliament The Government of India has promoted agreements between the States concerned for setting up the Bhakra, Chambal, Gandak, Mahi, Bansagar and other Control Boards for the efficient execution of specific joint projects, see Government of India, Ministry of litigation and Power Resolutions No DW II-22(3), dated 25-9-1950, No F 11(2) 54-DWI, dated 14-4-1955, No DWI-25(1)/60, dated 8-8-1961, No DWI/72(1)/71, dated 27-11-1971 and No 8/17/74-DW-II, dated 30-1-1974 The Control Boards were set up with the active participation of the States concerned and consisted of nominees of the State Governments and the Government of India. In U S A , administrative authorities for the implementation of inter-state compacts regarding the use, control and distribution of the waters of the whole or part of inter-State rivers and river valleys have been set up by compacts between the interested States, see the Arkansas River Compact 1948, the Arkansas River Basin Compact 1965, the Bear River Compact 1955, the Canadian River Compact 1948, the Costilla Creek Compact 1963, the Delaware Basin River Compact 1948, the pecos River Compact 1948, the Red River of the North Compact 1948, the Rio Grande Compact 1948, the Upper Colorado River Compact 1948, and the Yellowstone River Compact 1950 In the present case, we have been unable to secure an agreement between the three riparian States for the establishment of the Krishna Valley Authority

55 Administrative authorities for the development of inter-State river valleys and for completion, maintenance and operation of inter-State projects have been constituted by or under the authority of Central Acts The Damodar Valley Corporation for the development of the inter-State Damodar Valley was constituted by the Damodar Valley Corporation Act, 1948 The Tunga-bhadra Board was constituted by directions issued by the President in the exercise of his powers under sub-section (4) of section 66 of the Andhra State

Act, 1953 for the completion, operation and maintenance of the inter-State Tungabhadra Project defined in sub-section (5) of section 66. The Bhakra. Management Board was constituted by the Central Government under section 79 of the Punjab Re-organisation Act, 1966 for the administration, maintenance and operation of the inter-State Bhakra-Nangal Project. But no administrative authority has been constituted as yet by any Act for the development and regulation of the inter-State Krishna river and river valley.

The administrative authority envisaged by Scheme 'B' should have jurisdiction over the water resources of the entire Krishna river and river valley. At present the Tungabhadra Board constituted by the President under section 66 of the Andhra State Act, 1953 exercises jurisdiction over the water resources concerning the Tungabhadra Project mentioned above. This tribunal has no power to abolish the Tungabhadra Board. "

In these circumstances, we do not think it proper that Scheme 'B' should be implemented by our order.

We cannot agree with Karnataka's contention that the scheme of allocation called Scheme 'A' as embodied in the Final Order is not a scheme for the division of water in accordance with the provisions of the Inter-State Water Disputes Act, 1956. The Act nowhere requires that the dispute referred to it should be decided in a particular manner. The Tribunal has been given ample powers to decide the dispute in any manner it deems fit. Scheme 'A' embodied in our Final Order is a recognised mode of division of the dependable supply of water in an inter-State river water dispute, see *Wyoming V Colorado* 259 U.S. 419-496 (1922). 56

Counsel for the State of Karnataka argued that it was the duty of the Tribunal under the Inter-State Water Disputes Act, 1956 to divide not only the 75 per cent dependable flow of the river Krishna but also the excess supply in surplus years. We cannot accept this argument. The average river flow is the theoretical upper limit of the utilisable river supply that can be developed by storage and regulation, see the National Water Resources Washington 1968 pages 3-2-5, First Five Year Plan pages 335-338. Without further study it is not possible to say that water can be impounded in storages to such an extent that river flow of 50 per cent dependability can or should be distributed, see Report Vol. II page 503. The average flow of the river Krishna is of the order of 2390 to 2394 T.M.C, see Report Vol. III pages 80, 88, 98 But until a chain of reservoirs having sufficient carry-over storages is constructed in the Krishna basin, it is not possible to utilise or distribute the river flow to the full extent. Nor is it possible to provide for the sharing of the surplus or deficiency in the absence of a regulating authority. We have pointed out why we could not appoint such an authority. In these circumstances Clause V of our Final Order provides for distribution of 75 per cent dependable flow of 2060 T.M.C. and the estimated augmentation of the dependable flow by reason of return flow from time to time. 57

Under the present circumstances, the criterion of 75 per cent dependability of river flow is the most suitable for irrigation projects in the Krishna basin and has been adopted by us for purposes of allocation for the reasons given

58 at pages 235 to 238 of Vol. I of the Report. The parties including the State of Karnataka have themselves agreed to the figure of 2060 T.M.C. on the basis of 75 per cent dependability. The argument that the method of allocation adopted by us is improper or illegal has no force. The apportionment of water of the inter-State river Krishna must be adapted to the peculiar characteristics of the river system, see Report Vol. I pages 305-306. We may also point out that until 1971-72 less than 1000 T.M.C. was utilised in the entire Krishna basin, see MRDK-VIII pages 1 to 24 and until the entire dependable supply of 2060 T.M.C. is fully utilised, the complaint regarding the apportionment of the remaining water is unrealistic.

All the three States are bound by the decision of the Tribunal and it is not expected that they will do anything in breach thereof. If there is goodwill and spirit of co-operation among the three States, there will be no difficulty in implementing the decision of the Tribunal. If necessary, in order to advise the States concerning the regulation and development of the inter-State Krishna river and river valley and in relation to the co-ordination of their activities with a view to resolve conflicts among them, the Central Government may establish a River Board under the River Boards Act, 1956 charged with the responsibility of advising the States on the implementation of the Tribunal's decision. It is expected that such advice will be followed by all the States. If any dispute arises among the State Governments concerned with respect to any advice tendered by the Board, the dispute may be resolved by arbitration under section 22 of the Act.

59 **Clarification No. III**

(a) Karnataka seeks clarification and/or explanation that this Tribunal may be pleased to give directions as to the modifications necessary to be effected in the clauses of the Final Order, for the implementation of Scheme ' B'.

(b) Karnataka seeks clarification and/or explanation—

(i) that the provision for equal distribution of surplus waters under Scheme ' B ' is liable to be modified, providing for the equitable allocation of the said waters consistent with the findings relating to the needs and resources within the Krishna basin in respect of each State;

(ii) that the shares of Andhra Pradesh and Maharashtra as provided in Scheme ' B ' are liable to be reduced accordingly consistent with the findings recorded by this Tribunal; and

(iii) that consequently the allocation to Karnataka from the surplus waters under Scheme ' B ' are liable to be raised.

Paragraph 2 of Scheme ' B ' at pages 604-605 of Vol. II of the Report provides for division of water in excess of 2060 T.M.C. between the three States equally. Considering that in the Original Report Scheme ' B ' was intended to remain in operation for the period up to the 31st May, 2000, when it will be subject to review by a competent authority or Tribunal and in view of the fact that up to the year 1971, only 996 T.M.C. was utilised by all the three States

and it was unlikely that more than 2060 T.M.C. will be utilised by them before the 31st May, 2000. we stated that the excess over 2060 T.M.C. should be shared by the three States equally. However, now we have omitted the provision relating to review in respect of Scheme ' B ' and consequently it has now become necessary to modify the provisions in scheme ' B ' with regard to sharing of the excess over 2060 T.M.C. 60

Alter hearing full arguments on the question of distribution of water in excess of 2060 T.M.C. under Scheme 'B' and on a consideration of all the relevant circumstances, we direct that:

(a) the words "T.M.C. " in lines 22, 23 and 24 at page 604 of Vol. II of the Report be deleted; and

(b) sub-paragraph (B) of paragraph 2 in lines 25 to 28 at page 604 and lines 1 to 4 at page 605 of Vol. II of the Report be deleted and in its place the following sub-paragraph (B) of paragraph 2 be substituted :—

" (B) If the total quantity of water used by all the three States in a water year is more than 2060 T.M.C., the States of Maharashtra, Mysore and Andhra Pradesh shall share the water in that water year as mentioned below :— 61

(i) Up to 2060 T.M.C. as stated in paragraph 2(A) above and excess up to 2130 T.M.C. as follows:—

State of Maharashtra	..	35% of such excess.
State of Mysore	..	50% of such excess.
State of Andhra Pradesh	..	15% of such excess.

(ii) Up to 2130 T.M.C. as stated in paragraph 2(B)(i) above and excess over 2130 T.M.C. as follows:—

State of Maharashtra	..	25% of such excess.
State of Mysore	..	50% of such excess.
State of Andhra Pradesh	..	25% of such excess."

While fixing the shares of the three States in the waters used in excess of 2060 T.M.C. under Scheme ' B ', we have taken into account the following matters :—

(a) the share of each State should be fair and equitable;

(b) under Scheme ' B ' all the States would share the surplus as well as the deficiency; and

(c) as far as possible, the shares of the States under Scheme ' B ' should be in consonance with their shares under Scheme ' A ' and water for irrigation should be provided in the first instance for all areas within the Krishna river basin.

After hearing full arguments, we have thought it proper to make certain other changes in Scheme ' B '. We direct that the following corrections regarding Scheme ' B ' in the body of the Report be made:— 62

(a) " (A)" in line 17 at page 606 and the whole of sub-paragraph (B) of paragraph 7 at lines 1 to 5 from bottom at page 606 and lines 1 to 5 at page 607 of Vol. II of the Report be deleted.

(b) The words " and as often as the Krishna Valley Authority thinks fit" be inserted after the words " last week of May" and before the words " the Krishna Valley Authority" in paragraph 8 in lines 6 and 7 at page 607 of Vol. II of the Report.

(c) The word " May" in paragraph 9(A) (ii) in line 22 at page 607 of Vol. II of the Report be deleted and in its place the word " July " be substituted.

(d) In line 23 at page 616 of Vol. II of the Report at the end of the paragraph beginning with the words " In the first case the State of Andhra Pradesh ", the words " share equally" be deleted and in their place the words " share equitably" be substituted.

63 Having given the broad outlines of Scheme ' B ' at pages 604 to 609, we have mentioned at the end of paragraph 11 at page 608 of Vol. II of the Report that Clauses II, VI, VII. IX, X, XI, XIV, XV, XVI and XVII of Scheme ' A ' with such modifications as may be deemed necessary may form part of Scheme ' B '.

The words " with such modifications as may be deemed necessary" were used because some changes would be necessary in several Clauses of Scheme 'A' if they are to form part of Scheme ' B '. The State of Karnataka has submitted that the necessary modifications should be indicated by the Tribunal.

On the 8th May, 1975, Dr. Seyid Muhammad, Counsel for the Government of India, made the following statement before this Tribunal:—

" The Government of India have examined both Schemes ' B ' and ' A '. They feel that Scheme ' B ' is better and easier to implement than Scheme ' A '. If Scheme ' B ' comes as part of the final order of this Hon'ble Tribunal, the Government of India will take necessary steps for putting it into operation. Scheme ' B ' may be put as part of the final order in the manner as the Hon'ble Tribunal feels fit. We would like to have a complete scheme formulated by this Hon'ble Tribunal."

64 As mentioned in our Report, Scheme ' B ' provides for a fuller and better utilisation of the waters of the river Krishna. But we cannot make Scheme 'B' part of our Final Order as requested by learned Counsel for the Government of India, because the Final Order should contain only such provisions as may be implemented independently of any agreement or law made by Parliament. After hearing the parties, we have drawn up a complete Part I of Scheme ' B ' with all necessary modifications.

The complete Scheme ' B ' drawn up by us is given below :

Part I of the Scheme

Clause I.—This Scheme shall come into operation on.....

Clause II.—On the coming into operation of this Scheme, an Inter-State Administrative Authority to be called " The Krishna Valley Authority " shall be established having the constitution as laid down in Part II of this Scheme and having the powers and duties as mentioned in Parts I and II of this Scheme.

Clause III.—As from the water year following the date on which the Krishna Valley Authority is established, the waters of the river Krishna shall be divided between the States of Maharashtra, Karnataka and Andhra Pradesh for their beneficial use as mentioned hereinafter :

(A) In case the total quantity of water used by all the three States in any water year is not more than 2060 T.M.C., the States of Maharashtra, Karnataka and Andhra Pradesh shall share the water in that water year in the following proportions :—

State of Maharashtra	..	560
State of Karnataka	..	700
State of Andhra Pradesh	..	800

65

(B) If the total quantity of water used by all the three States in a water year is more than 2060 T.M.C., the States of Maharashtra, Karnataka and Andhra Pradesh shall share the water in that water year as mentioned below :

(i) Up to 2060 T.M.C. as stated in Clause III(A) above and excess up to 2130 T.M.C. as follows:—

State of Maharashtra—35 per cent of such excess.

State of Karnataka—50 per cent of such excess.

State of Andhra Pradesh—15 per cent of such excess.

(ii) Up to 2130 T.M.C. as stated in Clause III (B) (i) above and excess over 2130 T.M.C. as follows :—

State of Maharashtra—25 per cent of such excess.

State of Karnataka—50 per cent of such excess.

State of Andhra Pradesh—25 per cent of such excess.

Clause IV.—Beneficial use shall include any use made by any State of the waters of the river Krishna for domestic, municipal, irrigation, industrial, production of power, navigation, pisciculture, wild life protection and recreation purposes.

Clause V.—The Krishna Valley Authority is charged with the duties of ensuring that from time to time the waters of the river Krishna are made available for the beneficial use of the States of Maharashtra, Karnataka and Andhra Pradesh in accordance with the provisions contained in these Clauses and of maintaining the account of the use made by each State in each water year.

66

Clause VI.—It is hereby declared that the States of Maharashtra, Karnataka and Andhra Pradesh will be free to make use of underground water within their respective State territories in the Krishna river basin.

This declaration shall not be taken to alter in any way the rights, if any, under the law for the time being in force of private individuals, bodies or authorities.

Use of underground water by any State shall not be reckoned as use of the water of the river Krishna.

Clause VII.—(A) If, in any water year, any State is not able to use any portion of the water allocated to it under Clause III during that year on account of the non-development of its projects, or damage to any of its projects or does not use it for any reason whatsoever :—

(i) that State will not be entitled to claim the unutilised water in any subsequent water year; and

67 (ii) any other State may make use of the unutilised water, and such use shall not be charged to the share of that other State, but thereby it shall not acquire any right whatsoever in any such use.

(B) Failure of any State to make use of any portion of the water allocated to it during any water year shall not constitute forfeiture or abandonment of its share of water in any subsequent water year nor shall it increase the share of any other State in any subsequent water year even if such State may have used such water.

Clause VIII.—(A) Except as provided hereunder a use shall be measured by the extent of depletion of the waters of the river Krishna in any manner whatsoever including losses of water by evaporation and other natural causes from man made reservoirs and other works without deducting in the case of use for irrigation the quantity of water that may return after such use to the river.

The uses mentioned in column No. 1 below shall be measured in the manner indicated in column No. 2.

Use	Measurement
Domestic and municipal water supply.	By 20 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.
Industrial use.	By 2.5 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.

68

The water stored in any reservoir, across any stream of the Krishna river system shall not of itself be reckoned as depletion of the water of the stream except to the extent of the losses of water from evaporation and other natural causes from such reservoir. The water diverted from such reservoir by any State for its own use in any water year shall be reckoned as use by that State in that water year.

(B) Diversion of the waters of the river Krishna by one State for the benefit of another State shall be treated as diversion by the State for whose benefit the diversion is made.

Clause IX.—Unless otherwise directed by the Krishna Valley Authority the provisions of Clause IX of the Final Order of the Tribunal set forth in this Report shall be observed.

Clause X.—(1) The State of Maharashtra shall not out of the water allocated to it divert or permit the diversion of more than 67.5 T.M.C. of water outside the Krishna river basin in any water year from the river supplies in the Upper Krishna (K-1) sub-basin for the Koyna Hydel Project or any other project.

Provided that the State of Maharashtra will be at liberty to divert outside the Krishna river basin for the Koyna Hydel Project water to the extent of 97 T.M.C. annually during the period of 10 years commencing on the 1st June, 1974 and water to the extent of 87 T.M.C. annually during the next period of 5 years commencing on the 1st June, 1984 and water to the extent of 78 T.M.C. annually during the next succeeding period of 5 years commencing on the 1st June, 1989. **69**

(2) The State of Maharashtra shall not out of the water allocated to it divert or permit diversion outside the Krishna river basin from the river supplies in the Upper Bhima (K-5) sub-basin for the Projects collectively known as the Tata Hydel Works or any other project of more than 54.5 T.M.C. annually in any one water year and more than 213 T.M.C. in any period of five consecutive water years commencing on the 1st June, 1974.

(3) Except to the extent mentioned above the State of Maharashtra shall not divert or permit diversion of any water out of the Krishna river basin.

Clause XI.—(A) This Scheme will supersede—

(i) the agreement of 1892 between Madras and Mysore so far as it related to the Krishna system ; **70**

(ii) the agreement of 1933 between Madras and Mysore so far as it related to the Krishna river system;

(iii) the agreement of June, 1944 between Madras and Hyderabad ;

(iv) the agreement of July, 1944 between Madras and Mysore, so far as it related to the Krishna river system;

(v) the supplemental agreement of December, 1945 among Madras, Mysore and Hyderabad ;

(vi) the supplemental agreement of 1946 among Madras, Mysore and Hyderabad.

(B) The regulations set forth in Annexure 'A' (i) to this Scheme regarding protection to the irrigation works in the respective territories of the State of Karnataka and Andhra Pradesh in the Vedavathi sub-basin be observed and carried out.

(C) The benefits of utilisations under the Rajolibunda Diversion Scheme be shared between the States of Karnataka and Andhra Pradesh as mentioned herein below :—

Karnataka	..	..	1.2 T.M.C.
Andhra Pradesh	..	..	15.9 T.M.C.

(1) Annexure 'A' to the Scheme is the same as Annexure 'A' to the Final Order.

71 **Clause XII.**—For the fuller utilisation of the waters of the river Krishna, the States of Maharashtra, Karnataka and Andhra Pradesh may construct such storages and at such places as may be determined by Krishna Valley Authority for impounding water which would otherwise go waste to the sea.

Clause XIII.—The Krishna Valley Authority shall collect the details of the uses made by each State from time to time and after such scrutiny as it deems proper it shall, subject to the provisions contained in Clause VII, charge each State with the use made by it.

Clause XIV.—In every water year in the second week of October, last week of December and last week of May and as often as the Krishna Valley Authority thinks fit, the Krishna Valley Authority shall determine tentatively the quantity of water which is likely to fall to the share of each State in accordance with the aforesaid Clauses and adjust the uses of the parties in such a manner that by the end of the water year each State is enabled, as far as practicable, to make use of the water according to its share.

72 **Clause XV.**—For giving effect to the aforesaid provisions, the Krishna Valley Authority may from time to time direct the transfer of water from the project of an upper State to the project of a lower State and may take any other steps for ensuring that each State may use in each water year, the quantity of water allocated to it in that water year.

During the period 1st of July to 30th of September in any water year the Krishna Valley Authority shall not direct transfer of water from any project in any upper State, except in times of acute water shortage and for urgent need of water by a lower State, but it shall take care that thereby the project of the upper State from which water is directed to be transferred is not placed in worse position than the project of the lower State to be benefited by such transfer.

When directing the transfer of water the Krishna Valley Authority may give appropriate directions regarding the manner in which the water so transferred shall be used by the State receiving the water.

73 **Clause XVI.**—If it is found on final accounting at the end of the water year that the water used in the water year by any State is in excess of or less than its share as determined under Class III, the said Authority may, subject to the provisions of Clause VII. take such steps as it deems necessary to adjust the water accounts of the parties by regulating the extent of the use of water to be made by each State in succeeding years.

Clause XVII.—If the water stored in one State is released for use of any other State by the directions of the Krishna Valley Authority, the State using the water shall be charged with the losses due to evaporation after it has received the water in its storage, but the losses incidental to the diversion, impounding or conveyance of water in one State for use in another State shall be deducted from the total water available for distribution.

Clause XVIII.—Nothing in this Scheme shall impair the right or power or authority of any State to regulate within its boundaries the use of water, or to

enjoy the benefit of waters within that State in a manner not inconsistent with this Scheme.

Clause XIX.—In this Scheme,

(a) Use of the water of the river Krishna by any person or entity of any nature whatsoever within the territories of a State shall be reckoned as use by that State. 74

(b) The expression " water year " shall mean the year commencing on 1st June and ending on 31st May.

(c) The expression " Krishna river " includes the main stream of the Krishna river, all its tributaries and all other streams contributing water directly or indirectly to the Krishna river.

(d) The expression "T.M.C. " means thousand million cubic feet of water.

Clause XX.—Nothing contained herein shall prevent the alteration, amendment or modification of all or any of the foregoing Clauses by agreement between the parties.

Clause XXI.—Upon the establishment of the Krishna Valley Authority this Scheme shall supersede the Final Order of the Tribunal except Clause XVIII thereof.

The common draft of Part II of Scheme ' B' giving the constitution and powers of the Krishna Valley Authority prepared by Counsel for the States of Maharashtra, Karnataka and Andhra Pradesh will be found at pages 99 to 110 of Vol. III of the Report. At the concluding stages of the arguments in this Reference, it was suggested that the Krishna Valley Authority should be vested by law with the power to hold property and to sue or be sued in its own name. It will be for the parties to consider whether the Krishna Valley Authority should be vested with such power.

Clarification No. IV

75

Karnataka prays that this Tribunal may be pleased to clarify and/or explain—

(i) that the allocation of 50.84 T.M.C. made to Andhra Pradesh towards contemplated uses is inconsistent with the findings recorded by this Tribunal;

(ii) that the said quantity of 50.84 T.M.C. is liable to be deducted from the allocations made to Andhra Pradesh as being inconsistent with the findings recorded by this Tribunal ; and

(iii) that the said quantity of 50.84 T.M.C. is liable to be allocated to the State of Karnataka consistent with the findings recorded by this Tribunal.

We have pointed out that although Andhra Pradesh has already appropriated large quantities of water, the door should not be entirely closed to it for allotment of some water out of the dependable flow, see Report Vol. II page 570. We have allocated 749.16 T.M.C. to Andhra Pradesh for its protected uses, see Report Vol. I page 392. Karnataka submits that we should not have allocated an additional 50.84 T.M.C. to Andhra Pradesh comprising 33 T.M.C. for Srisailem Hydro-Electric Project and 17.84 T.M.C. for Jurala Project. These two allo-

76 cations are the subject matter of clarifications Nos. XIV and XXII and will be considered under those clarifications.

Clarification No. V

77 Karnataka prays that this Tribunal may be pleased to clarify and/or explain—

(i) that a quantity of about 34 T.M.C. being 7 1/2 per cent of 110 T.M.C. of westward diversion by Maharashtra and 350 T.M.C. diverted or likely to be diverted outside the basin by Andhra Pradesh, is liable to be deducted out of the allocations made to Maharashtra and Andhra Pradesh by reason of their permanent loss to the river system and the basin ;

(ii) that the aforesaid quantity of 34 T.M.C. is liable to be considered for allocation to Karnataka in order to compensate the denial of allocations, to the extent possible ;

(iii) that the quantity of return flows from the utilisations made by Andhra Pradesh within the Krishna basin from out of the remaining waters in excess of its allocation under Clause V (C) may be directed to be assessed and determined ; and

(iv) that Andhra Pradesh is not liable to acquire any right to the return flows by utilisations of the remaining waters in excess of its allocation in Clause V (C) from projects utilising 3 T.M.C. or more.

78 All the parties agreed to the protection of west ward diversions of 67.5 T.M.C. from the Koyna Project and 42.6 T.M.C. from the Tata Hydrel Works by Maharashtra without stipulating that Maharashtra should bear the loss of return flow in respect of such diversions, see Report Vol. I page 330, Vol. II page 413. In answer to the objections raised in AP Note 7 para 5 and MY Note 8 para 13, Maharashtra stated in MR Note 13 para 11 and MR Note 14 para 2 with reference to its claims for westward diversion in excess of 119.6 T.M.C. that it was agreeable to be debited with the regenerated water lost by such diversion. However, Maharashtra was not allowed to divert westward water in excess of 119.6 T.M.C.

79 All the parties agreed that certain utilisations from the Guntur Channel and Tungabhadra Project Right Bank High Level Canal Stages I and II should be protected without stipulating that Andhra Pradesh should be debited with the return flow from the out-of-basin diversions from these projects, see Report Vol. I page 332. There would be diversions outside the basin also from Krishna Delta Canals, Nagarjunasagar Right Bank Canal and K.C. Canal (see Report Vol. II page 409), but we have made the allocations bearing in mind the fact that water diverted to another water-shed is wholly lost to the basin and no part of it appears as return flow in the basin, see Report Vol. II page 402, Vol. I page 270. Moreover, under Clause V of the Final Order, each State gets the benefit of the additional 75 per cent dependable flow on account of return flow from the utilisations for irrigation within the Krishna basin from its own projects using 3 T.M.C. or more annually, see Report Vol. I page 281, Vol. II pages 777-782. There is no need for any further clarification on paragraphs (i) and (ii) of clarification No. V.

We see no reason for clarifying our decision with regard to return flow arising from use of water by Andhra Pradesh in excess of 800 T.M.C. as asked for under clarification No. V (iii) and (iv). In this connection, reference may be

made to the following statement of the learned Advocate General of Maharashtra recorded in the order dated the 19th August, 1974 :—

"In connection with the clarification No. V(iii) and (iv) sought by the State of Karnataka in its Reference to this Tribunal, the Advocate General of Maharashtra States that the right, if any, which may be acquired by the State of Andhra Pradesh in the additional 75 per cent dependable flow on account of the return flows until the Tribunal's order is reviewed by a competent authority at any time after May 31, 2000 arising from the use of water in excess of 800 T.M.C. allotted to the State of Andhra Pradesh by the Tribunal, will be unsubstantial in view of the following considerations :—

- (1) the cost of constructing projects utilising 3 T.M.C. and more of water;
- (2) the time likely to be taken in constructing such projects and the development of irrigation;
- (3) that the right to return flows is restricted to the use of water for irrigation in excess of 170 T.M.C. of water used by Andhra Pradesh for the water year commencing from June 1, 1968 and ending on May 31, 1969; and
- (4) that the right to return flows is restricted to return flows from the use of the water for irrigation inside the basin."

We are in substantial agreement with this statement.

Clarification No. VI

The State of Karnataka seeks clarification as to—

80

- (i) whether Clause XIV (B) should be amended providing for review or revision of allocations immediately after the Krishna waters are augmented; and
- (ii) whether the Tribunal may be pleased to decide the contentions of Karnataka as to the adjustment of equities and for additional allocations in the event of augmentation of the Krishna waters, on the basis of proportionate allocations.

Karnataka seeks adjustment of equities and additional allocations of water in the event of augmentation of the Krishna waters by diversion of waters of any other river. In our opinion, readjustment of the shares of the three States in the Krishna Waters in the event of its augmentation by diversion of the waters of any other river can be made only upon such diversion when the quantity of the diverted water and the place where such water can be utilised will be known.

The question whether there is surplus water in the river Godavari available for diversion into the Krishna after meeting the needs of all the five riparian States interested in the waters of the Godavari and, if so, how much of such water can be usefully diverted for augmenting the waters of the Krishna can be decided only by the Godavari Water Disputes Tribunal after full investigation in the presence of the five riparian States of Maharashtra, Andhra Pradesh, Madhya Pradesh, Orissa and Karnataka. It is not possible to determine these questions in the Krishna case on the basis of the materials on the records of this case. On the 19th April, 1971, all the States agreed that the Krishna case should be decided separately from the Godavari case and by consent of the parties, the States of Madhya Pradesh and Orissa were discharged from the records of the

81

Krishna case. With the consent of the parties, the Krishna Water Disputes Tribunal decided the Krishna case before the decision of the Godavari case by the Godavari Water Disputes Tribunal. Obviously in the absence of Madhya Pradesh and Orissa, it is not possible to determine in the Krishna case whether any surplus water is available for diversion from the river Godavari into the Krishna, see S.P. II pages 53, 71, 79-82.

The question of readjustment of the shares of the three States in the Krishna waters in the event of its augmentation by diversion of the waters of another river will require examination if and when such diversion is made. However, Clause XIV(B) of the Final Order read with our observations at page 226 of Vol. I and pages 514 and 790 of Vol. II of the Report appear to give the parties liberty to urge their respective claims and contentions in respect of such augmentation of the Krishna waters after the 31st May, 2000, but not earlier.

82 The State of Karnataka submits that the augmentation of the Krishna waters by diversion of the waters of the Godavari is likely to take place before the 31st May, 2000 and if it is not allowed to agitate! its claim to a share in the diverted waters as soon as the diversion takes place, the State of Andhra Pradesh may utilise such waters before the 31st May, 2000 and claim protection for its utilisations and thus gravely prejudice the claims of the other States. The State of Andhra Pradesh contended that the parties should not be given liberty to re-open the allocations immediately upon such augmentation as there should be a quietus at least for 25 years. The State of Maharashtra submits that Clause XIV (B) of the Final Order should not be amended as the Final Order was passed after hearing the parties.

83 While referring to the provisions of Clause XIV (B) of the Final Order at pages 226 and 514 of our Report, this Tribunal omitted to consider whether there were sufficient grounds for debarring the parties from agitating their claims and contentions before the 31st May, 2000, even if the diversion might take place earlier. It now appears that construction of suitable storages upstream of Polavaram enabling diversion of the Godavari waters into the river Krishna from Polavaram may be possible before the 31st May, 2000. We find that there can be no serious objection to re-allocation of the Krishna waters as soon as there is augmentation of the waters of the river Krishna by diversion of the surplus waters, if any, of the Godavari which is not part of the equitable share of any State in the Godavari waters. On a consideration of all relevant materials and the contentions of the parties, we think it just and proper that the parties should be at liberty to agitate their respective claims and contentions in respect of the augmentation of the Krishna waters by diversion of the waters of another river if and as soon as the diversion is made, even if such diversion takes place before the 31st May, 2000.

In the circumstances, we direct that the following Clause XIV(B) be substituted for the original Clause XIV(B) of our Final Order at page 790 of Vol. II of the Report:—

" In the event of the augmentation of the waters of the river Krishna by the diversion of the waters of any other river, no State shall be debarred from claiming before any authority or Tribunal even before the 31st May, 2000 that

it is entitled to a greater share in the waters of the river Krishna on account of such augmentation nor shall any State be debarred from disputing such claim ".

We also direct that the words " We are providing for review disputing such claim." appearing in lines 5 to 21 at page 226 of Vol. I of the Report be deleted and in their place the following words be substituted :—

"In respect of this matter we propose to give suitable directions in Clause XIV(B) of the Final Order."

We further direct that the words " before the aforesaid reviewing authority or Tribunal" appearing in lines 19 and 20 at page 514 of Vol. II of the Report be deleted and in their place the following words be substituted :—

" before any authority or Tribunal even before the 31st May 2000."

Clarification No. VII

84

Karnataka prays that this Tribunal may be pleased to clarify and/or explain—

(i) that the liberty given to Andhra Pradesh to use the remaining water in excess of allocations made to it under Clause V(C) is limited to the existing carryover capacity as found by this Tribunal to meet the deficiency in deficit years;

(ii) that the liberty given to Andhra Pradesh to utilise surplus waters be restricted to utilisation within the basin; and

(iii) that the liberty given to Andhra Pradesh for the utilisation of surplus waters does not confer rights on Andhra Pradesh either to divert waters outside the basin in excess of its allocations or to construct new works for utilisation outside the basin, except with prior consent of the upper States.

There is no ground for limiting the use of the remaining water by Andhra Pradesh to its existing carry-over capacity. If the remaining water is not used by Andhra Pradesh, it will be wasted to the sea.

At pages 409-411 of Vol. II of the Report, we have given full reasons for not imposing restrictions on Andhra Pradesh regarding diversion of water outside the Krishna basin. We see no ground for further clarifying this matter.

Clarification No. VIII

85

Karnataka seeks clarification—

(i) whether this Tribunal may be pleased to modify Clause V(B) of the Final Order providing for additional allocations to Karnataka and imposing restrictions on the utilisation of Andhra Pradesh in areas other than in Krishna basin and imposing restrictions on the utilisation of surplus waters by Andhra Pradesh; and

(ii) whether provisions similar to those contained in Clause V (C) enabling Andhra Pradesh to utilise waters which flow down unutilised from out of shares of the upper States, be provided to enable similar utilisations by Karnataka.

We have already considered Karnataka's contention regarding restrictions on utilisations by Andhra Pradesh in areas outside the Krishna basin.

We see no ground for making additional allocations to Karnataka save as mentioned in this Report.

Under the scheme of allocation embodied in our Final Order and in the absence of a regulating body, it is not possible to provide that Karnataka will be at liberty to use the waters which flow down unutilised. Save as mentioned in this Report, we see no ground for clarifying our decision with regard to use of surplus water by Andhra Pradesh.

86 Clause V(C) of the Final Order provides that by reason of the liberty given to Andhra Pradesh to use in any water year the remaining water that may be flowing in the river Krishna, Andhra Pradesh "shall not acquire any right whatsoever to use in any water year nor be deemed to have been allocated in any water year water of the river Krishna in excess of the quantity specified " therein.

We make it clear that by reason of the liberty given to Andhra Pradesh under Clause V(C) of the Final Order to use the remaining water that may be flowing in the river Krishna, Andhra Pradesh shall not acquire any right whatsoever to the remaining water in excess of the quantity specified in Clause V(C) including any right to the continued use of such water because communities have grown up relying on such permitted use, and all such water shall be available for allocation to the parties.

87 Clarification No. IX

(a) The State of Karnataka seeks clarification—

(i) whether the quantity of 1865 Mcft in respect of the item I (j) (iii) (MRPK-31) is liable to be deducted from the quantity of 17.8 T.M.C. allocated to Maharashtra under bandharas, weirs and lift irrigation schemes.

(ii) that the said quantity of 1865 Mcft is liable to be allocated to Karnataka to compensate, at least partly, the denial of their just share in the 75 per cent dependable flows.

(b) The State of Karnataka seeks clarification—

(i) whether the quantity of 720 Mcft is liable to be deducted from the quantity of 17.8 T.M.C. allocated to Maharashtra under bandharas, weirs and lift irrigation schemes and also deducted from the quantity of 23.4 T.M.C. allocated to Koyna-Krishna Lift Scheme; and

(ii) that the said quantity of 1440 Mcft (720 Mcft deducted twice) is liable to be allocated to Karnataka to compensate, at least partly, the denial of their just share in the 75 per cent dependable flows.

(c) The State of Karnataka seeks clarification—

(i) whether the quantity of 1570 Mcft allocated to Urmodi and Tarali bandharas is liable to be deducted from the quantity of 17.8 T.M.C. allocated to Maharashtra under " bandharas, weirs and lift schemes "; and

(ii) that the said quantity of 1570 Mcft is liable to be allocated to Karnataka to compensate, at least partly, the denial of their just share in the 75 per cent dependable flows.

88 (d) The State of Karnataka seeks clarification—

(i) whether the quantity of 747 Mcft allocated to Maharashtra under bandharas, weirs and lift irrigation schemes for the work "lift irrigation on the left bank of the river Krishna up to Mysore State border", is liable to be deducted from the quantity of 17.8 T.M.C. allocated to Maharashtra under bandharas,

weirs and lift irrigation schemes and also deducted from the quantity of 23.4 T.M.C. allocated to Maharashtra for Koyna-Krishna Lift Scheme; and

(ii) that the said quantity of 1494 Mcft (747 Mcft deducted twice) is liable to be allocated to Karnataka to compensate, at least partly, the denial of their just share in the 75 per cent dependable flows.

(e) The State of Karnataka seeks clarification—

(i) whether the quantity of 1234 Mcft allocated to Maharashtra under bandharas, weirs and lift schemes for the work "lift irrigation in rest of the area under the right bank of the Krishna river upto Mysore State border" is liable to be deducted from the quantity of 17.8 T.M.C. allocated to Maharashtra, under bandharas, weirs and lift irrigation schemes and also deducted from the quantity of 23.4 T.M.C. allocated for the Koyna-Krishna lift scheme; and

(ii) that the said quantity of 2468 Mcft (1234 Mcft deducted twice) is liable to be allocated to Karnataka to compensate, at least partly, the denial of their just share in the 75 per cent dependable flows.

To appreciate properly the contentions of Karnataka in respect of these clarifications, we may mention at this stage the following facts. Annexure II of the Master Plan of the State of Maharashtra in MRK-II pages 51-60 sets out its water requirements for its cleared and planned major and medium projects and minor irrigation works. On the 16th August, 1973, Maharashtra filed MR Note No. 30 showing its sub-basin wise demands under the Master Plan, the protected utilisation, its balance demand under the Master Plan and its future demands from 75 per cent dependable flow on the assumption that further westward diversion would not be permitted. A summary of these demands is set out at pages 624-627 of the Report Vol. II. A summary of the sub-basin wise demands of Maharashtra for its works using less than 1 T.M.C. annually given in MR Note No. 30 and classified as minor irrigation are separately shown at pages 703-704 of the Report Vol. II. In MRK-II pages 51-60, projects were classified as major, medium and minor according to their cost, whereas in the Report they were so classified according to the quantum of their annual utilisation. The criteria of classification of projects and works as major, medium and minor are given at page 70 of Vol. I of the Report. 89

Earlier, on the 20th April, 1971, Maharashtra had filed **MRPK-XXXI** giving details of its bandharas and lift irrigation schemes both existing and under construction and stating that some of them were not shown separately in the Master Plan on the presumption that the areas irrigated therefrom would be served by certain projects mentioned in the Master Plan. The water requirements of bandharas and lift irrigation schemes mentioned in **MRPK-XXXI** are summarised and discussed at pages 699-702 of our Report Vol. II. 90

We allowed 17.8 T.M.C. of water in respect of bandharas and lift irrigation scheme including works referred to in Serial Nos. I(j)(iii), I(j)(ii), I(a), I(j)(iv) and I(j)(viii) of **MRPK-XXXI**. Under clarification No. IX(a), (b), (c), (d) and (e), Karnataka contends that there are duplicate or triplicate allocations in respect of the aforesaid items. The following chart will show the serial numbers of the works, their locations, demands and relevant remarks in **MRPK-XXXI** as also the relevant clarification numbers and Karnataka's contentions with regard to these works.

Clarification No.	Sl. No. in MRPK XXXI	location of Scheme as given in MRPK XXXI	Demand in Mct.	Remarks in MRPK XXXI	Contentions of Karnataka
X(a)	I (j) (iii)	n the Left Bank of the river Krishna in the command of the proposed Koyna-Krishna Lift Scheme.	1865	556 acres of cane and 7722 acres of seasonal crops are being grown under Lift irrigation. This will be merged in the command of the proposed Koyna-Krishna Lift Scheme (cl. No. 10, page 53, MRK-II).	<i>Duplicate allocation</i> —(1) Once under bandharas, weirs and lift irrigation Schemes. (2) Second time under Koyna-Krishna Lift Scheme.
IX (b)	I(j)(ii)	n the Left Bank of the river Krishna in the command of proposed extension of Krishna Canal from Khodshi.	720	186 acres of cane and 4200 acres of Kharif and Rabi seasonals are being grown under lift irrigation in this command. This irrigation will be merged in the command of the proposed project for extension of Krishna Canal (Sl. No. 6, page 52, MRK-II).	<i>Triplicate allocation</i> —(1) Once under bandharas, wiers and lift irrigation Schemes. (2) Second time under Krishna Canal extension under Khodshi Weir (5.7 T.M.C. from dependable flows and 2.5 T.M.C. from regeneration). (3) Third time under Koyna-Krishna Lift Scheme.
IX (c)	I (a)	Up to Khodshi Weir	1570	is withdrawal under existing bandharas in Urmodi and Tarali basins has already been included under Sl. No. 5 of Master Plan, MRK-II, Page 52.	<i>Duplicate allocation</i> —(1) Once under bandharas, wiers and lift irrigation Schemes. (2) Second time under minor irrigation.
IX(d)	I(j)(iv)	n the Left Bank of the river Krishna in, rest of the area up to Mysore State border.	747	285 acres of cane and 4080 acres of seasonal crops are being grown under lift irrigation in this reach. This will be met out of proposed minor irrigation, requirements under Sl. Nos. 22, 24 and 26 pages 53-54, MRK-II.	<i>Triplicate allocation</i> —(1) Once under bandharas, weirs and lift irrigation Schemes. (2) Second time under minor irrigation. (3) Third time under Koyna-Krishna Lift Scheme.
IX(e)	I(j) (viii)	n rest of the area under the Right Bank of the Krishna River up to Mysore State border.	1234	2019 acres of cane and 7254 acres of seasonal crops is the Lift irrigation in this reach. This will be met out of the provision made for proposed minor irrigation works under Sl. No. 22, page 53, MRK-II.	<i>Triplicate allocation</i> —(1) Once under bandharas, weirs and lift irrigation Schemes. (2) Second time under minor irrigation. (3) Third time under Koyna-Krishna Lift Scheme.

Mr. T. R. Andhyarujina, Counsel for the State of Maharashtra addressed a general argument with regard to all the matters under clarification No. IX. He argued that the mass allocation of water to Maharashtra, Karnataka and Andhra Pradesh respectively cannot be vitiated by errors in assessment of their needs as the Tribunal intended to award en bloc 565 T.M.C., 695 T.M.C. and 800 T.M.C. to them respectively independently of such assessment. We are unable to accept this argument. Pages 582, 595-597 of our Report Vol. II clearly show that the figures of 565, 695 and 800 were arrived at after totalling the demands of the three States held by us as worth consideration at pages 570-582 and 619-770 of our Report Vol. II. As stated in our Report Vol. I pages 321-322 and Vol. II page 599, the allocations of water to the three States were not tied to any specific project or projects, but if it is found that in assessing their needs we have by inadvertence allowed any demand more than once, we are bound to correct the mistake and give consequential reliefs. We must, therefore, examine the merits of clarification No. IX. 93

Clarification No. IX(a)

94

While allowing the demand for 23.4 T.M.C. in respect of the Koyna-Krishna Lift Irrigation Scheme, we observed at page 643 of our Report Vol. II that " This will cover the demand for bandharas (item No. I(j)(iii) MRPK-31)". But at pages 699-702 of Vol. II of the Report, we found that Maharashtra's balance demand for bandharas, weirs and lifts was 17,812 Mcft without deducting therefrom by inadvertence the demand of 1865 Mcft for item I(j)(iii) of MRPK-XXXI. We should have made this deduction as the aforesaid demand of 1865 Mcft would merge in the Koyna-Krishna Lift Scheme. Had we made this deduction we would have found that the balance demand for bandharas and lift irrigation schemes was 15,947 (17,812-1865) Mcft and we would have allowed 15.95 T.M.C. instead of 17.80 T.M.C. in respect of bandharas, weirs and lift irrigation schemes. We thus find that there was excessive allocation of 1.85 (17.80-15.95) T.M.C. to Maharashtra in respect of bandharas, weirs and lift irrigation schemes.

Maharashtra argued that the word " not" was omitted by clerical mistake at page 643 of Vol. II of the Report and that the allowance of 23.4 T.M.C. was not intended to cover item No. I(j)(iii) of MRPK-XXXI in view of the fact that Maharashtra had made an additional demand of 32.5 T.M.C. for the Koyna-Krishna Lift Irrigation Scheme to irrigate additional areas in the Yerala Valley in the Talukas of Waive, Tasgaon and Kavathe-Mahankal in Sangli District (MR Note No. 26 Statement III Sl. Nos. 8 and 10). We cannot accept this argument. We allowed the demand for 23.4 T.M.C. required for irrigating scarcity areas in Tasgaon and Miraj Talukas as shown in the Project Report (MRPK-XXVIII pages 13-15). Part of the ayacut proposed under this Scheme is being irrigated from bandharas for which 1865 Mcft was claimed under item I(j)(iii) of MRPK-XXXI. At page 642 of Volume II of the Report we noted the demand of 32.5 T.M.C. for irrigating areas in the Yerala Valley in Waive, Tasgaon and Kavathe-Mahankal Talukas but we did not allow this demand. 95

Clarification No. IX(b)

In MRPK-XXVIII page 3, Maharashtra demanded 5.7 T.M.C. for the cleared portion of the Krishna Canal ex-Khodshi Weir Project to irrigate 25,500 acres out 96

of which 2.70 T.M.C. was protected and while allowing the demand for the balance 3 T.M.C. out of 75 per cent dependable flow as claimed by Maharashtra in MR Note No. 30 Sl. No. 4, we observed that this would cover the demand of 2.47 T.M.C. for lift irrigation under item I(j)(i) of MRPK-XXXI, see Report Vol. II pages 636-637, Vol. I page 330. In MRPK-XXVIII page 3, Maharashtra also claimed 2.5 T.M.C. for the proposed extension of Krishna Canal out of regeneration flow so that the total irrigation under the Project could be extended to 36,300 acres, see also MRK-II page 52 Sl. No. 6. Had this demand for 2.5 T.M.C. been allowed, it would have covered item I(j)(ii) of MRPK-XXXI but we did not allow this demand. Consequently we reject the argument of Karnataka (KR Reference Note No. VIII) that the demand for 720 Mcft under item I(j)(ii) of MRPK-XXXI is merged in the allocation of 3 T.M.C. for the cleared portion of the Krishna Canal.

97 We do not also accept the argument of Karnataka that the map annexed to the Project note of Koyna-Krishna Lift Scheme (MRPK-XXVIII page 24) shows that the area irrigated with the aforesaid 720 Mcft. lies in the command of Koyna-Krishna Lift Scheme for which we have allowed 23.4 T.M.C. We are not satisfied that this map supports Karnataka's contention. The index map of Krishna basin major and medium irrigation and power projects in Maharashtra State in MRK-II shows that the area irrigated under item I(j)(ii) of MRPK-XXXI is in the command of the proposed extension of Krishna Canal beyond the Yerala river for which we have not allowed any water and that it is not in the command of Koyna-Krishna Lift Irrigation Scheme in respect of which 23.4 T.M.C. was allowed. If we had allowed 54.1 T.M.C. in respect of the Koyna-Krishna Lift Scheme, the area irrigated by the enlarged scheme utilising 54.1 T.M.C. would have included the area irrigated by lift irrigation under item I(j)(ii) of MRPK-XXXI (see MR Note No. 26 Statement III items 8, 10 and 71) but we have not allowed 54.1 T.M.C. for this Scheme. We are satisfied that there is no duplicate or triplicate allocation of 720 Mcft and that there is no ground for deducting any water allocated to Maharashtra in respect of this item.

98 Clarifications Nos. IX(c), (d) and (e)

MRPK-XXXI shows that (1) the demand for 1570 Mcft under item I(a) of MRPK-XXXI for existing bandharas in the Urmodi and Tarali basins is included in serial No. 5 of MRK-II page 52, (2) the demand for 747 Mcft. under item I(j)(iv) of MRPK-XXXI for lift irrigation in the rest of the area on the left bank of the Krishna up to Mysore State border will be met out of the proposed minor irrigation requirements under serial Nos. 22, 24 and 26 of MRK-II pages 53-54 and (3) the demand for 1234 Mcft. under item I(j) (viii) of MRPK-XXXI for lift irrigation in the rest of the area under the right bank of the Krishna up to Mysore State border will be met out of the provision made for the proposed minor irrigation works under serial No. 22 of MRK-II page 53. The total demand for items I(a), I(j) (iv), I(j) (viii) amounts to $1570+747+1234=3551$ Mcft. These demands were included in Maharashtra's claim for bandharas and lift irrigation schemes at pages 699-702 of Vol. II of the Report and were allowed by us in full.

However, in MR Note No. 30, Maharashtra demanded 47.2 T.M.C. for minor irrigation works including the works under serial Nos. 5, 22, 24 and 26 of MRK-II

(see serial Nos. 30, 33, 34 and 36 of MR Note No. 30). Out of this demand of 47.2 T.M.C., we found at pages 703-704 of Vol. II of the Report that in addition to 4.1 T.M.C., the demand to the extent of 22.37 T.M.C. in respect of minor irrigation was 99 worth consideration. Now this quantity of 22.37 T.M.C. taken as worth consideration included the demands of 1570 Mcft. 747 Mcft. and 1234 Mcft. aggregating to 3551 Mcft. under items I(a), I(j) (iv) and I (j) (viii) of MRPK-XXXI which we had allowed under bandharas, weirs and lift irrigation schemes at pages 699-702 of Vol. II of the Report. On deducting 3551 Mcft. from 22.37 T.M.C. and adding 4.1 T.M.C. we should have found that 22.919 or say 22.90 T.M.C. in respect of minor irrigation was worth consideration. Instead of doing so we found that the demand of 26.47 T.M.C. was worth consideration. Thus there is excessive allocation of 3.57 (26.47-22.90) T.M.C. to Maharashtra in respect of minor irrigation.

Karnataka also argued that the area irrigated under items I (j) (iv) and I (j) (viii) fell within the command of the Koyna-Krishna Lift Irrigation Scheme for which we have allowed 23.4 T.M.C. We cannot accept this argument. Item I(j) (iv) read with item I (j) (iii) shows that the demand under items I (j) (iv) for 747 Mcft. is for lift irrigation in areas outside the command of the Koyna-Krishna Lift Scheme. Item I(j) (viii) is for lift irrigation on the right bank of the Krishna, whereas the proposed Koyna-Krishna Lift Scheme is for irrigation on the left bank of the river, see MRPK-XXVIII page 13 and map facing page 24. We are satisfied that the demand under items I(j) (iv) and I(j) (viii) of MRPK-XXXI is not covered by the allocation of 23.4 T.M.C. for the Koyna-Krishna 100 Left Irrigation Scheme.

Clarification No. IX(f)

This clarification is with regard to the following six projects of the State of 101 Maharashtra :—

	Sub-basin	Name of Project	Utilisation in T.M.C.
1.	K—1	Nehr Tank	0.5
2.	K—5	Budihal Tank	0.9
3	K—5	Mehekari Project	0.7
4.	K—5	Kada Project	0.5
5.	K—5	Chandani Project	0.9
6.	K—6	Harni Project	0.6
			4.1 T.M.C.

The case of the State of Karnataka is that there has been triplicate allocation by this Tribunal with respect to these six minor irrigation works.

We reject the argument of the State of Karnataka that there was duplicate allocation for the aforesaid six minor irrigation works as allocation had been made for them under other minor irrigation works also. It is clear from what is stated at page 704 of Vol. II of the Report that we have allowed 4.1 T.M.C. for the aforesaid six minor irrigation works and 22.37 T.M.C. for other minor irrigation works.

Nor do we accept the argument of the State of Karnataka that the demand for 4.1 T.M.C. in respect of the aforesaid six Projects is included in the allocation

102 of 16.65 T.M.C. in respect of protected minor works of Maharashtra committed up to September, 1960 at pages 383, 388 of Vol. I of the Report.

On the 16th July, 1973, the parties came to know of the projects and their utilisations which the Tribunal proposed to protect. On the 18th July, 1973, the learned Advocate General of Maharashtra started his arguments with regard to Maharashtra's demand of water in respect of the aforesaid six minor works. He asked for allocation of water in respect of the six projects and argued that their utilisations should be protected. Later on the same date, he stated as follows :—

" As Maharashtra is going to get allocation of waters for these six projects, he is not asking for any special protection or preference over contemplated uses regarding these projects."

103 The stand taken by the learned Advocate General of Maharashtra was that the aforesaid six projects should have been but were not included in the protected projects but it did not matter as the State of Maharashtra would be getting water for them from the general allocation of the remaining water. This was the stand taken by the State of Maharashtra throughout the proceedings. On the 25th July, 1973, the State of Maharashtra filed MR Note No. 26 claiming water for the aforesaid six projects and stating that though Nehr Tank and Budihal Project were in operation since prior to September, 1960 and though Mehekari, Kada, Chandani and Harni Projects were under construction prior to September, 1960, they had not been included under preferred to protected uses. At no stage of the proceedings either on the 18th July, 1973 or subsequently, the States of Karnataka and Andhra Pradesh disputed the State of Maharashtra's claim of 4.1 T.M.C. for the aforesaid six projects or contended that this claim should not be allowed because it was included in Maharashtra's demand of 16.65 T.M.C. for minor irrigation which would be protected and allowed by the Tribunal.

Moreover, Mehekari, Kada, Chandani and Harni Projects though sanctioned and committed before September, 1960 came into operation after September, 1960, (see KGCR Annexure X pages 43, 39, 47 and 51 and MR Note No. 30 Sl. Nos. 62, 63, 69 and 87) and consequently their utilisations were not included in the utilisation of Maharashtra's minor irrigation works up to September, 1960 for which we allowed 16.65 T.M.C. Our finding at page 388 of Vol. I of the Report shows that We protected 0.11 T.M.C. only for Maharashtra's Minor irrigation works in K-6 sub-basin and this protection could not have possibly covered the demand for 0.6 T.M.C. for Harni Project in K-6 sub-basin.

104 Nehr Tank was in operation since 1881-1882, see KGCR Ann. VIII page 53, Budihal Project began to operate in 1957-58 but its full operation began after September, 1960, see KGCR Ann. IX page 51. Maharashtra contends that all the six projects including Nehr Tank and Budihal Project are Government canals and on that ground their utilisations were not taken into account in computing the protected utilisation of minor irrigation works. There is no evidence on the record showing whether or not these projects are Government canals but it is quite clear that Maharashtra claimed water for them from the general allocation and Maharashtra's claim for such allowance was not disputed by the other States. This being the position, we do not find any force in Karnataka's contention that

they were included in Maharashtra's demands in respect of minor irrigation works for which protection had been granted.

It may, however, be mentioned that at page 20 of Maharashtra's reply in this Reference, Maharashtra incorrectly stated that the aforesaid Mehekari, Kada, Chandani and Harni Projects were in existence and operation prior to September, 1960. This statement purports to be based on the remarks at Sl. Nos. 62, 63, 69 and 87 of MR Note No. 30 but is not actually supported by those remarks. Part of this incorrect statement at page 20 of Maharashtra's reply was repeated in lines 2-4 at page 704 of Vol. II of the Report. In the circumstances, We direct that the following words in lines 2 to 4 at page 704 of Vol. II of the Report be deleted : 105

" which according to the State of Maharashtra Were in existence even before 1960".

In the result, we find that there is excessive allocation to Maharashtra of 1.85 T.M.C. in respect of bandharas, weirs and lift irrigation schemes and 3.57 T.M.C. in respect of minor irrigation works. Thus, the total excessive allocation made to the State of Maharashtra by inadvertence amounts to $1.85+3.57=5.42$ T.M.C. If this 5.42 T.M.C. were not allocated to Maharashtra by inadvertence in our original Report, we would have then, on a consideration of all relevant factors, (a) allowed an additional demand of Karnataka in respect of its Upper Krishna Project to the extent of 5 T.M.C. in addition to 52 T.M.C. allowed at page 719 of Vol. II of the Report, and (b) allowed an additional demand of Maharashtra in respect of Dudhganga Project to the extent of .42 T.M.C. in addition to 14 T.M.C. allowed to it in respect of this Project at page 666 of Vol. II of the Report.

Accordingly the award of 695 T.M.C. to Karnataka is increased to 700 T.M.C. by adding 5 T.M.C. mentioned above and the award of 565 T.M.C. to Maharashtra is decreased to 560 T.M.C. by deducting the aforesaid 5 T.M.C.

We direct that in our Final Order at pages 777 to 780 of the Report, the following modifications be made :— 106

In line 27 at page 777 and in lines 3, 13 and 22 at page 778 the figure " 560 " be substituted for the figure " 565 ".

In lines 11, 14 and 24 at page 779 and in line 7 at page 780 the figure " 700 " be substituted for the figure " 695 ".

The explanations given above necessitate certain other modifications in the body of the Report. These modifications are set forth in Appendix ' C ' of Chapter VI of this Report.

Clarification No. X

107

The State of Karnataka prays that this Tribunal may be pleased to clarify—

(i) that the extra quantity of 37.09 T.M.C. is liable to be met out of the share in surplus flows due to Andhra Pradesh, and is liable to be deducted from the allocation made to Andhra Pradesh from the 75 per cent dependable flows ; and

(ii) that the said 37.09 T.M.C. of 75 per cent dependable flows should be allocated to the State of Karnataka to compensate, at least partly, the denial of their just share in the 75 per cent dependable flows.

Karnataka contends that instead of allowing 116.25 T.M.C. we should have allowed only the dependable utilisation of 79.164 T.M.C. to Andhra Pradesh in respect of its minor irrigation works and that the excess 37.09 T.M.C. should be met out of surplus flows (KR Reference Note No. IX). We cannot accept this contention.

The utilisation for 1st and 2nd crops under major, medium and minor projects committed up to September, 1960 was protected and provision was made for such utilisation out of the 75 per cent dependable yield of 2060 T.M.C.

108 The average utilisation for minor irrigation during the decade 1951-52 to 1960-61 was 116.25 T.M.C. for Andhra Pradesh, 16.65 T.M.C. for Maharashtra and 92.198 T.M.C. for Karnataka, see MRDK-VIII pages 69 to 79. Adding the utilisations of certain minor irrigation works of Karnataka under construction in September 1960, we found that the average decade utilisation for minor irrigation committed up to September 1960 was 16.65 T.M.C. for Maharashtra, 94.34 T.M.C. for Karnataka and 116.25 T.M.C. for Andhra Pradesh, see Report Vol. I pages 382 to 384, 388. Karnataka argues that in the case of minor irrigation works the utilisation for 20 years from 1941-42 to 1960-61 should be arranged in descending order and the 75 per cent dependable utilisation i.e. the utilisation in the 75th year in a series of 100 years should be protected, see MY Note No. 14 pages 5, 7-9. It is not disputed that for major and medium projects not covered by specific sanctions of particular utilisations, the average utilisation during the decade 1951-52 to 1960-61 should be taken to be the utilisation committed up to September, 1960. We see no reason why the average utilisation during this decade for minor irrigation also should not be taken to be the utilisation committed up to September, 1960 as in the case of major and medium projects. We may mention that the average decade utilisation for minor irrigation was taken into account for computing the upstream utilisation for minor irrigation every year and fixing the flow series from which the dependable flow of 2060 T.M.C. was ascertained.

109 The utilisation for irrigation depends upon the yield available at the site. The agreed data of utilisation for minor works given in MRDK-VIII pages 69 to 79 show that the yield required for irrigation every year during the period 1941-42 to 1966-67 was available and was actually utilised. In view of the agreed data given in MRDK-VIII pages 69 to 79, much reliance cannot be placed on the estimates of yields and utilisations for groups of minor irrigation projects given in APPK-XXXV. The utilisation for minor irrigation is the largest in Andhra Pradesh because of its flat terrain, but this is no ground for cutting down its allocation.

The data supplied by Maharashtra in MR Note No. 23 and by Karnataka in MY Note No. 14 show variations in utilisation for first crop and much larger variations in utilisation for second crop under minor works. One of the reasons for the large variation in second crop irrigation under minor irrigation is that the second crop is more dependent on the comparatively uncertain north-east monsoon. Most of the area under minor irrigation is irrigated from tanks. The observations at page 159 of the Krishna Godavari Commission Report show that the yield from the north-east monsoon and any yield from the south-west monsoon left in the tanks at the end of the Khariff season are used for growing second crop. We are

not satisfied that the average decade utilisations for first and second crops under minor irrigation should not be protected because of the wide variations in such utilisations.

In its answer to Reference No. III of 1974 Maharashtra submitted that the second paragraph at page 387 of Vol. I of the Report is not a correct summing up of the case of the parties on minor irrigation. But on the 8th August, 1974, the learned Advocate General of Maharashtra withdrew the submission and stated that— 110

" In the reply filed by the State of Maharashtra to the Clarification No. X sought by the State of Karnataka in its Reference to the Tribunal, the State of Maharashtra set out a passage from the Report of the Tribunal at page 23 of its reply and slated that is was not a correct summing up, inter alia, of Maharashtra's case and the State of Maharashtra asked that the matter should be clarified. I, on behalf of the State of Maharashtra, withdraw the above submission for clarification as far as the State of Maharashtra is concerned ".

However, for the sake of clarification, we direct that the words " It is common case before us that" in the 11th line at page 387 of Vol. I of the Report be deleted and in their place the words " In our opinion " be substituted.

Clarification No. XI

111

Karnataka prays that this Tribunal may be pleased to clarify and/or explain—

(i) that the quantity of 17 T.M.C. is liable to be deducted from the allocations made to Andhra Pradesh for the Nagarjunasagar Project and Krishna Delta as being inconsistent with the findings recorded by this Tribunal; and

(ii) that the said quantity of 17 T.M.C. is liable to be allocated to Karnataka to compensate, at least partly, the denial of their just share in the 75 per cent dependable flows.

Mr. Sachindra Chaudhuri, Counsel for the State of Karnataka, did not press this clarification.

We protected the utilisation of 281 T.M.C. (inclusive of evaporation losses) under the Nagarjunasagar Project and 181.20 T.M.C. under Krishna Delta of Andhra Pradesh, see Report Vol. I pages 351, 359 and 391. There are obvious clerical mistakes at page 578 of Vol. II of the Report and the figure and words "281 T.M.C. inclusive of evaporation losses" should be substituted for the figure and words "264 T.M.C." in lines 3 and 10 at page 578 and the figure "462.20" should be substituted for the figure "445.20" in line 14 at page 578 of Vol. II of the Report. We direct that the original Report be corrected accordingly. We reject the argument of Karnataka that 17 T.M.C. is liable to be deducted from the allocation made to Andhra Pradesh for Nagarjunasagar Project (KR Reference Note No V).

112 Clarification No. XII

The State of Karnataka prays that this Tribunal may be pleased to clarify—

(i) that the quantity of 4 T.M.C. towards evaporation loss is not liable to be protected, having not been established by Andhra Pradesh;

(ii) that the quantity of 4 T.M.C. allocated to Andhra Pradesh as evaporation loss in the Krishna Delta is liable to be deducted from the allocations made to Andhra Pradesh from out of the 75 per cent dependable flows; and

(iii) that the said 4 T.M.C. is liable to be allocated to Karnataka to compensate, at least partly, the denial of their just share in the 75 per cent dependable flows.

Andhra Pradesh claimed protection for annual utilisation of 214 T.M.C. and evaporation loss of 4 T.M.C. under the Krishna Delta Canal System, see MRDK-VIII page 64. On a consideration of all relevant materials, we allowed the demand for annual utilisation of 177.20 T.M.C. and pond loss of 4 T.M.C. in respect of the Krishna Delta Canal System, see Report Vol. I pages 356, 359, 391, Vol. II pages 577-578. Mr. Sachindra Chaudhuri argued that we should not have allowed the demand for evaporation loss in respect of the Krishna Delta as (1) no water was claimed and allowed for weirs or anicuts such as the Krishna Canal ex-Khodshi Weir, the Tunga Anicut, the Bhadra Anicut and the Rajolibunda Diversion Scheme and (2) there is absence of sufficient evidence for allowing 4 T.M.C. in respect of evaporation loss of the Krishna Delta. We are unable to accept this argument.

None of the parties claimed water for pond loss at Krishna Canal ex-Khodshi Weir and other weirs but the reason may be that the pond loss at such weirs is not substantial. Pond loss of 4 T. M. C. at the Krishna Barrage at Vijayawada was claimed by Andhra Pradesh and allowed by us. The Krishna Barrage consists of a regulator-cum-bridge. The floor of the regulator is at an elevation of 40.05 feet. Built on the floor of the regulator, there is a bodywall 5 feet high having crest at 45.05 feet and fitted with gates 12 feet high. The purpose of the newly constructed barrage at Vijayawada is to maintain higher water level in the canals so as to facilitate supply of water to high level lands, see APPK-XVII page 37. For drawing full supply into the canals, it is necessary to raise the pond level of the Barrage, see Jaffer Ali's evidence pages 66-67. As a result of raising the pond level there is substantial water-spread area at the barrage site because of the flat slope of the river at the site. It is, therefore, necessary to make an allocation in respect of the evaporation loss from this large water-spread.

Maharashtra's expert witness Mr. Framji stated that the claim of 4 T.M.C. by the State of Andhra Pradesh for evaporation loss at the Krishna Barrage indicated a large pondage with a large water-spread. He calculated the pondage loss at the Krishna Barrage to be 6 T.M.C. for a water-spread at full reservoir level at the top of the barrage gates (57.05), but as the water-spread would be less at the barrage crest level (R.L. 45.05) he conservatively assumed that the pondage loss at the Krishna Barrage would be 4 T.M.C., see Mr. Framji's evidence pages 543, 545, 1258, 1262-1263. Mr. Framji was not cross-examined by Counsel for the State of Mysore. In these circumstances we found that there

was evaporation loss of about 4 T.M.C. from the pondage at the Krishna Barrage and we allowed this 4 T.M.C. as part of the total water requirement of 181.20 T.M.C. for the Krishna Delta, see Report Vol. I pages 356, 358, 391, Vol. II page 547. We see no ground for disturbing this finding.

Karnataka argued that if the evaporation loss of 4 T.M.C. were included in the flow series, the 75 per cent dependable flow would be increased to 2064 T.M.C. The argument has no substance. The Barrage was completed in or about 1966. It is not contended that the addition of 4 T.M.C. in the flow data from 1967-68 to 1971-72 will increase the 75 per cent dependable yield.

We reject the argument of Karnataka that 4 T.M.C. of water allowed in respect of the pondage loss at Krishna Barrage is liable to be deducted from the allocation to Andhra Pradesh (Karnataka Reference Notes No. VI, VI-A).

Clarification No. XIII

115

Karnataka prays that this Tribunal may be pleased to clarify and/or explain—

(i) that Andhra Pradesh is not entitled to an allocation to waters in excess of 14 T.M.C. towards evaporation loss at Nagarjunasagar from out of the 75 per cent dependable flows ;

(ii) that the allocation of 3 T.M.C. from out of the 75 per cent dependable flows towards (over) evaporation loss having reference to the carry-over storage between FRL+546 and FRL+590 in respect of which no right has been conferred on Andhra Pradesh is liable to be deducted from the allocations made to Andhra Pradesh , and

(iii) that the said excess quantity of 3 T.M.C. is liable to be allocated to Karnataka in order to compensate partly the denial of their just share in the 75 per cent dependable flows.

On installation of crest gates, the F.R.L. of the Nagarjunasagar Reservoir is +590. The annual evaporation loss of the reservoir at F.R.L. 590 is about 17 T.M.C. We allowed 17 T.M.C. in respect of this evaporation loss as Andhra Pradesh was permitted to raise the full reservoir level to + 590 by installing crest gates to store water in the Nagarjunasagar Dam to the extent and in the manner it would be feasible to do so and to utilise the water so impounded in the storage in any manner it would deem proper and in lieu thereof no deduction was made from the dependable flow on account of inevitable waste to the sea of a part of the flow of the river Krishna between the Nagarjunasagar Dam and Vijayawada and in this manner the entire dependable flow of 2060 T.M.C. was made available for distribution, see Report Vol. II pages 560-561. Vol. I pages 348 349. The observation at page 560 of Vol. II of the Report that the permission is " till our decision is reviewed " was made to indicate that our decision is liable to be reviewed at the appropriate time and must not be taken to indicate that the crest gates allowed to be installed in the Nagarjunsagar Dam are temporary structures

116

In these circumstances there is no reason why the evaporation loss of 3 T.M.C. should be met out of excess flows and not out of 75 per cent dependable flows. We reject the argument of Karnataka that the allocation of 3 T.M.C. in respect of evaporation loss at Nagarjunasagar is liable to be deducted from the share of Andhra Pradesh (KR Reference Note No. VII).

117 Clarification No. XIV

Karnataka prays that this Tribunal may be pleased to clarify and/or explain—

(i) that the evaporation loss at Srisailem Project is liable to be adjusted in the liberty given to Andhra Pradesh for the utilisation of surplus waters ;

(ii) that the allocation of 33 T.M.C. is liable to be deducted from the allocations made to Andhra Pradesh from the 75 per cent dependable flows ; and

(iii) that the said quantity of 33 T.M.C. is liable to be allocated to Karnataka to compensate, at least partly, the denial of their just and lawful share in the 75 per cent dependable flows of Krishna.

Regarding Srisailem Hydro-Electric Project, Counsel for the State of Karnataka argued that the allowance of 33 T.M.C. in respect of its evaporation loss is erroneous in view of (1) the large appropriations of water already made by Andhra Pradesh and (2) the priority of irrigation over power use and the fact that the Srisailem Project is purely a power project. Counsel argued that the project's usefulness as a carry-over storage is no ground for allowing water for it out of 75 per cent dependable flows. Counsel submitted that the evaporation loss at Srisailem Dam or in any event the evaporation loss attributable to its carry-over storage should be met out of flows in excess of 75 per cent dependable flow and if the evaporation loss could not be met in some lean years out of the surplus flows stored in the reservoir, the deficiency should be provided by Andhra Pradesh out of its share of 75 per cent dependable flow. We are unable to accept these arguments.

We have given full reasons for allocation of 33 T.M.C. of water to Andhra Pradesh in respect of the evaporation loss of Srisailem Project inspite of the fact that 749.16 T.M.C. has been allowed for its protected uses, see Report Vol. II pages 574-576, 561-570.

We held that there is a clear conflict of interest between claims of downstream irrigation and power development by westward diversion of water outside the Krishna basin and at present priority should be given to irrigation use of the Krishna waters over hydro-electric use requiring westward diversion of water in excess of certain quantities permitted by us for certain hydro-electric projects, see Report Vol. II pages 435, 475. At the same time we have found that there is no substantial conflict of interest between irrigation use and hydro-electric use at Srisailem Project from which water would be released for downstream irrigation and other uses, see Report Vol. II pages 459, 446-447.

As Srisailem Project is a hydro-electric project for generating power without diverting water to another watershed, it does not involve consumptive use of water except for evaporation loss, see Report Vol. I pages 338-339. The Srisailem project has no irrigation component. Apart from its use as hydro-electric project we have found that it will provide valuable carry-over storage and conserve water

119

which would otherwise be wasted to the sea, see Report Vol. II pages 459, 558-560, 576.

We have allowed Andhra Pradesh to store water in the Srisaïlam Dam after its completion to the extent and in the manner it would be feasible for it to do so and to utilise the water impounded in the storage in any manner it deems proper and in lieu thereof no deduction has been made from the 75 per cent dependable flow on account of the inevitable waste to the sea of a part of the flow between Nagarjunasagar Dam and Vijayawada, see Report Vol. II pages 560-561. In this manner the entire dependable flow of 2060 T.M.C. has been made available for distribution between the three party States. In these circumstances, we have held that the entire evaporation loss for storage of water in the Srisaïlam Dam should be provided out of 75 per cent dependable flow. The observation that the permission given by us is "till our decision is reviewed" was made to indicate that our decision is liable to be reviewed at the appropriate time, and it must not be taken to mean that the Srisaïlam Dam would be a temporary structure. In our Report Vol. II page 576, we have pointed out that the carry-over reservoir under construction at Srisaïlam should not be allowed to go in ruin. One of the reasons for allowing the demand for evaporation loss at Srisaïlam Dam including its carry-over storage out of the dependable flow was that Andhra Pradesh was foregoing its claim for deduction of the inevitable wastage of water out of its equitable share and was thus increasing the dependable flow available for distribution. We have pointed out that in all carry-over reservoirs, there would be evaporation loss, but their usefulness from the point of view of irrigation and other purposes would be immense, see Report Vol. II page 576. In these circumstances and considering that Srisaïlam Dam is not a temporary structure and Andhra Pradesh has no vested right to surplus flows, it is just and equitable that provision should be made for the evaporation loss at Srisaïlam reservoir including the loss attributable to its carry-over storage out of 75 per cent dependable flows and not out of surplus flows.

120

Counsel for the State of Karnataka argued that the statement laid on the Table of the Lok Sabha by the Union Minister for Irrigation and Power on March 23, 1963 (MYDK-I pages 156, 165), the salient features of the Project given in MRK-II pages 312-323 and the correspondence regarding the sanction of the Project, (APDK-VIII pages 1-18, MRK-II pages 310-311, PCK-I pages 138-140) show that the sanction of the Project was contingent on the diversion of the Godavari waters into the river Krishna. We are unable to accept this argument. At pages 222-223 of Vol. I of the Report we have pointed out that the sanction of the Project by the Planning Commission was on the basis of ultimate water release of 180 T.M.C. from Srisaïlam and even on the assumption that the Godavari diversion would materialise, it could be safely assumed that the minimum annual release from Srisaïlam would be 180 T.M.C. If and so long as there is no diversion of the Godavari waters into the river Krishna, it would be necessary to release more than 180 T.M.C. annually from Srisaïlam. We have, therefore, found that the sanctioned Srisaïlam Project is not dependent or conditioned on the availability of additional supplies in the Krishna from Godavari diversion. We see no ground for modifying our decision regarding Srisaïlam Project.

121

122

Mr. Sachindra Chaudhuri, Counsel for the State of Karnataka, argued that no allowance in respect of the evaporation loss of Srisaïlam Dam should be made until construction of the dam is completed. This argument has no substance. In assessing the needs of all the States, We have taken into account the evaporation loss from reservoirs of projects which are still under construction or under contemplation such as the Bhima, Krishna and Warna Projects and Koyna-Krishna Lift Scheme of Maharashtra and the Upper Krishna, Malaprabha and Ghataprabha Projects of Karnataka.

123

Mr. Sachindra Chaudhuri argued that not more than 23 T.M.C. should be allowed in respect of the annual evaporation loss of Srisaïlam Project, even assuming that no deduction is allowed in respect of the loss attributable to carry-over storage. The State of Andhra Pradesh claimed an allocation of 33 T.M.C. of water in respect of this evaporation loss, see APK-I page 124, MRDK-VIII page 64 and we allowed this demand, see Report Vol. I page 339, Vol. II pages 574-576. The point that the evaporation loss of Srisaïlam reservoir would be less than 33 T.M.C. was not taken at any time during the hearing of the original reference. In support of his present argument, Mr. Sachindra Chaudhuri relied on the working tables and the statements annexed to the note of the Chief Engineer Electrical, Andhra Pradesh Government dated 22-4-1963 (see PCK-I pages 71-74, 75, 80, 81, 86 and 87). These documents state that the depth of evaporation at Srisaïlam Dam site would be 54 inches and on this footing the annual evaporation loss in Srisaïlam Dam would be about 23 T.M.C. It is also assumed in Table IX at page 46 of the Report of the Krishna Godavari Commission that the annual evaporation at Srisaïlam is 54 inches and on this basis KGC Report page 196 and KGCR Annexure XI page 9 state that the annual reservoir loss would be 23 T.M.C. However, pages 41, 45-47 of the same K.G.C. Report and KGCR Annexure-I pages 40-41 show that (1) the data of evaporation at Srisaïlam Dam site assumed in Table IX are based on ad-hoc observations for two years from land pans of which the diameter is not known and (2) the evaporation losses mentioned in Table IX are less than those indicated by the general meteorological conditions at the sites. Srisaïlam Dam site is situated inside a gorge. The drawing S.R. No. 4/59 of the Srisaïlam water-spread given in APPK-VI shows that the reservoir water-spread extends up to Kurnool, where evaporation is one of the highest in the Krishna basin, see KGC Report page 42 and Plate V of K.G.C. Report.

The Srisaïlam Hydro-Electric Project Report shows that the depth of evaporation per annum at Srisaïlam Dam site is 82 inches, see APPK-V page 61, and the accuracy of this statement is accepted by both Mr. Framji and Mr. Jaffar Ali, see Framji's evidence page 538, Jaffer Ali's evidence page 100.

The annual evaporation loss of the reservoir is worked out by multiplying the depth of evaporation per annum by the average water-spread. As the water-spread varies from time to time, the working tables of the Srisaïlam Reservoir give different lake losses for different years, see APPK-V pages 61-64, COPP Report on Nagarjunasagar page 30, Framji's evidence pages 545-554, Jaffer Ali's evidence pages 100 and 102.

The COPP Report on Nagarjunasagar of July 1960 page 45 stated that the evaporation loss for Srisaïlam Reservoir would be 33 T.M.C. Though the letter of sanction of the Project (MRK-II, page 310) did not specifically mention the quantum of evaporation loss, the Government of India stated in a list of sanctioned projects given to all the party States in 1967 that the sanctioned evaporation loss of Srisaïlam Project would be 33 T.M.C., see MYDK-I pages 214, 215, MRDK-II pages 114, 117. In its statement of case filed before this Tribunal, the State of Maharashtra stated that the Srisaïlam Project had been cleared for 33 T.M.C., see MRK-I page 121. In January 1962, the Government of Mysore in its application to the Government of India for reference of the water dispute to the Tribunal stated that the Srisaïlam Project would be evaporating about 33 T.M.C. of water. On a consideration of all relevant materials at present on the record, we are not inclined to hold that the allocation of 33 T.M.C. in respect of Srisaïlam Project should be cut down.

124

However, there may be some force in Karnataka's contention that there may be less wind velocity and less evaporation loss from the waterspread at Srisaïlam Dam site which is inside the gorge. We think that accurate observations of the evaporation loss of Srisaïlam Reservoir should be made so that fresh data of the evaporation loss may be available to the reviewing authority. Such observations should be made by the State of Andhra Pradesh. The States of Karnataka and Maharashtra will also be at liberty to make such observations and they should be given all facilities by the State of Andhra Pradesh in order to enable them to make the observations. Full record of the data of the evaporation loss, the inflow into the reservoir, the M.D.D.L. and the method employed for the observations should be kept by the State making the observations.

125

It may be mentioned that in the present reference both Karnataka and Maharashtra opposed the allocation of 33 T.M.C. of water for the Srisaïlam Project. But on the 8th August, 1974, the learned Advocate General of Maharashtra withdrew the opposition of Maharashtra whose interest is identical with that of Karnataka in this respect. He made the following statement on the 8th August, 1974 :—

" In its Reference to this Tribunal, the State of Karnataka has in clarification XIV sought clarification as to the allocation by the Tribunal of 33 T.M.C. of water in respect of Srisaïlam Project. After considering the matter, I, on behalf of the State of Maharashtra, withdraw the submission made in Maharashtra's reply to the said clarification XIV that the decision of the Tribunal relating to the allocation of 33T.M.C. of water to Srisaïlam Project requires explanation."

Clarifications Nos. XV, XVI, XVII and XIX of Reference No. III of 1974 of the State of Karnataka.

126

All these clarifications are connected with clarifications Nos. 2(b), 4 and 5 of Reference No. I of 1974 of the Government of India and clarifications Nos. 1 and 2 of Reference No. II of 1974 of the State of Andhra Pradesh which are set out in full under those References. It is desirable that we should consider and decide them together.

Clarification No. XV

Karnataka seeks clarification—

(i) whether this Tribunal may be pleased to determine the yield of the river Tungabhadra on the basis of the two estimates placed by Andhra Pradesh on the one hand and Maharashtra and Karnataka on the other, without prejudice to the further studies ; and

(ii) whether Clause IX can be amended accordingly and provide for further allocation to Karnataka.

Clarification No. XVI

Karnataka seeks clarification—

(i) whether Tribunal may be pleased to prescribe the authority for making further studies of the available waters in the Tungabhadra and Vedavathi sub-basins ; and

(ii) whether Clause V (B) may be made subject to the proviso for allocation of additional waters determined under (i) above, to Karnataka.

Clarification No. XVII

Karnataka seeks clarification—

127

whether this Tribunal may be pleased to provide for additional allocation to the Tungabhadra sub-basin of Karnataka and/or modify the restrictions on the use of water therefrom to redress denial of development for all times in 50 per cent of the areas in the Krishna basin of Karnataka.

Clarification No. XIX

Karnataka seeks clarification—

that this Tribunal may be pleased to reconsider the finding that all the three sources should "remain open" to satisfy the allocations made to Andhra Pradesh; and that the restrictions imposed on utilisations by Karnataka from the Tungabhadra and Vedavathi sub-basins under Clause IX of the Final Order are liable to be modified.

All these points of clarification raised by the State of Karnataka seek to obtain more water for the projects of Karnataka in the Tungabhadra (K-8) and the Vedavathi (K-9) sub-basins on various grounds. The contentions of the State of Karnataka under these clarifications may be summarised as follows :—

(1) more water should have been allocated for utilisation to the State of Karnataka in the Tungabhadra (K-8) and the Vedavathi (K-9) sub-basins as there is enough water available in the rivers Tungabhadra and Vedavathi for that purpose ;

(2) in any event the Tribunal should prescribe an authority for making further studies of the available waters in the Tungabhadra and the Vedavathi sub-basins and Clause V(B) of the Final Order should be made subject to the proviso for allocation of additional waters determined by such authority to the State of Karnataka;

(3) the restrictions placed on the use of waters by the State of Karnataka under Clause IX(B) of the Final Order should be modified.

128

Closely connected with these clarifications is clarification No. 2(b) of Reference No. I under which the Government of India has submitted that:

" Guidance may be given by the Tribunal whether after a period of years when the return flows from the irrigated areas would progressively become available, the ceiling specified by the Tribunal with regard to the use of water in particular sub-basins and rivers would require any revision."

The State of Andhra Pradesh has submitted under clarification No. 1 of Reference No. II that:

" it may be explained and clarified that all the projects of either State in the Tungabhadra and Vedavathi Sub-basins should rank equally and share the water available in proportion to the quantities fixed therefore under the decision of this Tribunal, subject to the restrictions indicated in Clause IX."

On the 1st May, 1975, the learned Advocate General of Andhra Pradesh has stated that the State of Andhra Pradesh is now confining the relief claimed under clarification No. 1 of Reference No. II to the joint projects in the Tungabhadra (K-8) sub-basin only.

Closely connected with that clarification is clarification No. 4 of Reference No. I of 1974 under which the Government of India seeks clarification and guidance of the Tribunal on the following matters :—

(1) whether the States concerned in the Tungabhadra Project are entitled to proportionate share of water during each crop season and according to the water requirements of crops for their areas depending on the Tungabhadra Reservoir, which is to be operated by a Central agency, viz., the Tungabhadra Board ; and

129

(2) whether there should be no occasion for any State to utilise the inflows into the reservoir during the months of June, July or August (to quote an instance) exclusively for its own irrigation or for building up the storage on the ground that the State would still be within the limits set by the Tribunal both in respect of Krishna river system and the Tungabhadra sub-basin.

Under clarification No. 2 of Reference No. II of 1974 the State of Andhra Pradesh has submitted that the Tribunal may be pleased to explain and clarify that the finding given on issue No. IV (B) (a) does not amount to denial of the right to regulated releases for the Kurnool-Cuddapah Canal and the Rajolibunda Diversion Scheme from the Tungabhadra Reservoir, to supplement the intermediate flows for ensuring the utilisations thereunder with the quantities sanctioned for these projects by the Tribunal.

Closely connected with this clarification is clarification No. 5 of Reference No I of 1974 under which the Government of India has sought the following explanation and guidance :—

130

" whether, in view of the findings at page 371 of the Report the Tungabhadra reservoir working tables should be prepared by the Tungabhadra

Board to release, whenever necessary, water from the Tungabhadra reservoir for the diversion works to supplement the intermediate flows for ensuring the utilisations on these diversion works to the extent they have been accepted by the Tribunal."

131 On the subject of availability of water in the Tungabhadra (K-8) and the Vedavathi (K-9) sub-basins, learned Counsel for the State of Karnataka has submitted that the Tribunal has not allowed water to the State of Karnataka in respect of its Upper Bhadra, Upper Tunga, Feeder Channel to Ranikere and Jinigehalla Projects taking the view that a very limited quantity of water is available for allocation in the Tungabhadra (K-8) and the Vedavathi (K-9) sub-basins until further studies give a different picture, but as a matter of fact sufficient water is available in the said sub-basins. It is submitted that the Tribunal has determined the average yield of the Vedavathi (K-9) sub-basin by taking the average of the estimates of its yield submitted by the State of Karnataka and given in the Report of the Krishna Godavari Commission and that by application of the same principle the Tribunal ought to have determined the yield of the Tungabhadra (K-8) sub-basin by taking the average of the estimates of its yield submitted by the two States.

We find that the State of Karnataka has erroneously assumed that we have determined the yield of Vedavathi (K-9) sub-basin by taking the average of the two estimates referred to at page 592 of the Report Vol. II. At that page the reference is to the estimates made by the Krishna Godavari Commission on the one hand and the States of Maharashtra and Mysore on the other. But our observations at page 592 that " the average annual yield may be taken to be between the two estimates ", cannot be construed as a finding determining the annual yield of the River Vedavathi as an average of the two estimates referred to at page 592 of the Report Vol. II.

132 The State of Karnataka has made an alternative suggestion that the Tribunal may be pleased to prescribe the authority for making further studies of the available waters in the Tungabhadra and the Vedavathi sub-basins and for allocation of additional waters determined on the basis of such studies. In our opinion, it is not possible for us to delegate the function of determining the yield of the river Tungabhadra to any authority constituted under our order as suggested by the State of Karnataka. Such a determination can be made only by a competent tribunal or authority constituted under the Inter-State Water Disputes Act, 1956. Clause XII read with Annexure ' B' to the Final Order provides for the gauging of the flows of various rivers, at different sites. The fresh data of the river flows may enable the reviewing authority or tribunal to determine accurately the available water in the Tungabhadra and the Vedavathi sub-basins.

Now we come to the subject of restrictions imposed by Clause IX(B) of the Final Order. These restrictions are the subject matter of clarifications Nos. XVII and XIX of Reference No. III of 1974. Clause IX of the Final Order places restrictions on the use of water from certain parts of the Krishna basin for the reasons given at pages 586-593 and 600 of Vol. II of the Report. However, in fixing the ceilings on uses we did not take into account the fact that the 75 per cent dependable flow of 2060 T.M.C. would increase progressively on account of return flows. Though we made allocations to the parties in respect of this

increase in the dependable flow, yet we did not provide for upward revision of the ceilings on uses as and when there will be increase in the dependable flow on account of return flows. The Government of India has sought guidance from us under clarification No. 2(b) of Reference No. I of 1974 whether the ceilings specified by us under Clause IX require revision as return flows from the irrigated areas would progressively become available. There is an obvious lacuna on this point in the Report which must be rectified. We are thankful to the Government of India for having drawn our attention to this aspect of the matter.

133

In reply to the reference of the Government of India on this point, the States of Karnataka and Maharashtra have submitted that the restrictions imposed by Clause IX require upward revision as and when additional water on account of return flows would become available. The State of Andhra Pradesh has opposed any upward revision.

Under Clause IX(B) we placed the following restrictions on the State of Karnataka :

" Out of the water allocated to it, the State of Karnataka shall not use in any water year—

(i) more than 295 T.M.C. from the Tungabhadra (K-8) sub-basin and more than 42 T.M.C. from the Vedavathi (K-9) sub-basin.

(ii) more than 15 T.M.C. from the main stream of the river Bhima."

Considering all the material circumstances including the progressive increase of return flow from the river Bhima, the necessity of restrictions on the uses from the main stream of the river Bhima and the respective needs of the States, we are not inclined to raise upwards the limit placed on the utilisations of water by the State of Karnataka from the main stream of the river Bhima.

134

On the subject of restrictions on the use of water by the State of Karnataka from the Tungabhadra (K-8) sub-basin, Counsel for the State of Karnataka has submitted that the ceiling of 295 T.M.C. on the use of water by the State of Karnataka has resulted in the denial of use of additional water for future works for all times in the Karnataka areas in the said sub-basin and is inconsistent with the finding of the Tribunal that drought and scarcity conditions have frequently occurred in extensive areas in the Districts of Dharwar, Bellary, Chitradurga and Tumkur. Likewise the ceiling of 42 T.M.C. on the use of water from the Vedavathi (K-9) sub-basin has resulted in the denial of water for drought affected areas in that sub-basin. He has submitted that it is very necessary for the State of Karnataka to provide irrigation facilities in at least the following drought stricken areas :—

135

a. In Tungabhadra (K-8) sub-basin —

1.	Further allocation under Tungabhadra Project Left Bank Low Level Canal	9.3 T.M.C.
2.	Upper Bhadra	10.0 T.M.C.
3.	Upper Tunga	20.0 T.M.C.
4.	Gondi Left Bank Canal Extension	2.0 T.M.C.
5.	Minor Irrigation	12.0 T.M.C.
Total		53.3 T.M.C.

b. In Vedavathi (K-9) sub-basin —		
1.	Jinigehalla	1.0 T.M.C.
2.	Feeder Channel to Ranikere	1.0 T.M.C.
		1.0 T.M.C.
3.	Minor Irrigation Total	3.0 T.M.C.

136

So far as the restrictions on the use of water by the State of Karnataka from the Vedavathi (K-9) sub-basin are concerned, we are not inclined to raise the limit of 42 T.M.C. The protected utilisations of the States of Karnataka and Andhra Pradesh in this sub-basin are already of the order of 50.54 T.M.C. The two projects viz. Feeder Channel to Ranikere and Jinigehalla each requiring 1 T.M.C. were held by us to be not worth consideration in the Vedavathi sub-basin on the ground that further study was necessary of the water available in the river Vedavathi. We adhere to this view. If the State of Karnataka can minimise the use of water elsewhere in this sub-basin it may use water for these two projects and for additional minor irrigation within the limit of 42 T.M.C.

We shall now deal with the restrictions on the State of Karnataka regarding its use from the Tungabhadra (K-8) sub-basin.

According to the State of Karnataka, the Upper Bhadra Project, as conceived in the Project Note MYPK-VIII, pages 104-113, requires 36 T.M.C. to provide irrigation facilities to the drought affected areas of Chitradurga and Bellary Districts which are worst affected areas in the Tungabhadra sub-basin. A dam is to be constructed near Mahagundi Village. The catchment area of the Bhadra at the proposed dam site is 214.72 square miles. The 75 per cent dependable yield computed on the basis of available rainfall records is stated to be 36 T.M.C and the entire 36 T.M.C. is sought to be utilised for this project. It is stated in the Project Note at page 106 that:

" This project will not affect the existing Bhadra Project. The utilisation of all the (existing and proposed) projects upto Bhadra Darn (inclusive) is 98 T.M.C., whereas the 75 per cent available yield at the dam site is 81 T.M.C. The deficit of 17 T.M.C. is proposed to be made good by diverting waters from the Tunga by means of a storage across the Tunga river above Sringeri".

137

However in MY Note No. 17 Appendix III at pages 13-14, the State of Karnataka has stated that only 10 T.M.C. is proposed to be utilised out of the 75 per cent dependable flow (of 2060 T.M.C.) and another 15 T.M.C. will be utilised from surplus flows Presumably this has been done to avoid diversion of the water of the river Tunga to the river Bhadra above the Bhadra Reservoir. The demand for the Project was not held by us to be not worth consideration (see pages 762-763 of Vol. II of the Report).

Similarly in MY Note No. 17 Appendix III pages 12-13 the State of Karnataka claimed 40 T.M.C. (proposing to meet only 20 T.M.C. out of 75 per cent dependable flow and the balance coming out of surplus flows) for the Upper Tunga Project which was proposed to provide irrigation facilities for Ranebennur, Haveri, Shirhatti and Mundargi Taluks of Dharwar District of ex-Bombay State and Koppal Taluk of Raichur District. The Taluks of Mundargi, Ranebennur and Koppal were identified as drought-affected by the Irrigation Commission, vide

Report of Irrigation Commission, 1972, Volume I, page 423. We considered this Project at pages 760-761 of the Report Volume II. Taking the view that unless further study was made of the available water of the river Tungabhadra, the demand for this Project was held as not worth consideration for the present.

The State of Karnataka has put forward before the Tribunal a demand of 101.3 T.M.C. for Tungabhadra Left Bank Low Level Canal (including the Tungabhadra Left Bank High Level Canal). This project has been protected to the extent of 92 T.M.C. gross (including 9 T.M.C. for evaporation losses). We had rejected the claim of the State of Karnataka for an additional 9.3 T.M.C. of water for this project.

138

In all the three cases, the main reason for not allowing the additional utilisations to the State of Karnataka was that in our opinion the river Tungabhadra should continue to make significant, in other words substantial, contribution to the river Krishna. But the picture changes when due to return flow more water will be available in the river Krishna for use by the State of Karnataka.

The State of Andhra Pradesh has submitted as follows in reply to clarification No. 2(b) raised by the Government of India :—

" Regarding the restrictions under Clause IX the ceilings mentioned therein are inclusive of the additional quantity that will be available by way of regeneration. In fact a higher quantity is mentioned while fixing the ceilings on the utilisation in the various sub-basins, presumably to cover the additional utilisation from out of the regenerated water."

It is to be observed that the ceiling of 295 T.M.C. on the use by the State of Karnataka from the Tungabhadra (K-8) sub-basin was fixed after taking into account the fact that about 290 T.M.C. would be required for the following projects which had been protected or were held worth consideration by us :—

139

Sl. No.	Name of Project	Allocation in T.M.C.
1.	Bhadra Anicut	3.10
2.	Tunga Anicut	11.50
3.	Ambligola	1.40
4.	Anjanapur	2.50
5.	Dharma Canal and Dharma Project	2.20
6.	Tungabhadra Project Right Bank Low Level Canal.	22.50
7.	Tungabhadra Project Right Bank High Level Canal, Stages I and II.	17.50
8.	Tungabhadra Project Left Bank Low Level Canal (including Left Bank High Level Canal).	92.00
9.	Hagari Bommanahalli	2.00
10.	Bhadra Reservoir	61.70
11.	Vijayanagar Channels (5.71+6.35 T.M.C.)	12.06
12.	Rajolibunda Diversion	1.20
13.	Minor Irrigation (49.04+11.17 T.M.C.)	60.21
		289.87
	say	290 T.M.C.

140

We may point out that in fixing the ceiling on the uses, we have not taken into account the additional dependable flow that will be available on account of return flow. The reason for making the upper limit on the uses a little higher than the actual requirements of the projects, which were held by us to be worth consideration, was to give to the States concerned some flexibility in the uses on which we were imposing the restrictions.

The State of Karnataka has submitted that upon full utilisation of 695 T.M.C. allocated to it, more water will be progressively available for its use on account of its share of the additional dependable flow by reason of return flow from its utilisations in the entire Krishna river basin under Clause V(B)(ii), (iii) and (iv) of the Final Order and if it is permitted to utilise this additional water from the Tungabhadra (K-8) sub-basin it may satisfy its urgent and pressing needs at least in areas which may be irrigated by the Upper Bhadra and Upper Tunga Projects and Tungabhadra Left Bank Canals and though the river Tungabhadra may then contribute less water to the river Krishna, the State of Andhra Pradesh will not suffer any disadvantage as correspondingly the river Krishna will receive more water from other areas which will be available for the use of the State of Andhra Pradesh.

The State of Andhra Pradesh has submitted that only 3 to 4 T.M.C. will be available to the State of Karnataka on account of return flow from its utilisations in the Tungabhadra sub-basin and the rest of the return flow will be available for its use in other sub-basins and as only 290 T.M.C. is required for its projects in the Tungabhadra sub-basin which are protected or held worth consideration, the ceiling of 295 T.M.C. on its uses from the said sub-basin should not be raised.

141

We are of the opinion that the State of Karnataka should not be placed in such a situation that it may not be able to utilise water from the Tungabhadra (K-8) sub-basin for projects for which there is grave necessity simply because there will be somewhat lesser contribution by the river Tungabhadra to the river Krishna.

If the State of Karnataka uses more water from the Tungabhadra (K-8) sub-basin it will have to use correspondingly less water in other sub-basins in order to keep its total uses within the limit of its allocation. Consequently this upward revision of the ceiling of 295 T.M.C. will not reduce the quantity of water available for use by the State of Andhra Pradesh in other sub-basins. In order that the projects of the State of Andhra Pradesh in the Tungabhadra (K-8) sub-basin may not suffer, we have given specific directions for the use of the water available in the Tungabhadra Dam which will be discussed hereinafter.

Accordingly we direct that Clause IX(B) of the Final Order be deleted and in its place the following Clause IX(B) be substituted :—

142

" Out of the water allocated to it the State of Karnataka shall not use in any water year—

(i) more than the quantity of water specified hereunder from the Tungabhadra (K-8) sub-basin

(a) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the Official Gazette up to the water year 1982-83. 295 T.M.C.

(b) as from the water year 1983-84 up to the water year 1989-90 295 T.M.C. plus a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water, years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations from such irrigation in the water year 1968-69 from such projects.

(c) as from the water year 1990-91 up to the water year 1997-98 295 T.M.C. plus a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations from such irrigation in the water year 1968-69 from such projects. 143

(d) as from the water year 1998-99 onwards 295 T.M.C. plus a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

For the limited purpose of this sub-clause, it is declared that—

the utilisations for irrigation in the Krishna river basin in the water year 1968-69 from projects of the State of Karnataka using 3 T.M.C. or more annually shall be taken to be 176.05 T.M.C. 144

annual utilisations for irrigation in the Krishna river basin in each water year after this Order comes into operation from the projects of the State of Karnataka using 3 T.M.C. or more annually shall be computed on the basis of the records prepared and maintained by that State under Clause XIII.

evaporation losses from reservoirs of projects using 3 T.M.C. or more annually shall be excluded in computing the 7 ½ per cent figure of the average annual utilisations mentioned above.

(ii) more than 42 T.M.C. from the Vedavathi (K-9) sub-basin and

(iii) more than 15 T.M.C. from the main stream of the river Bhima. " In Clause IX(A) of the Final Order we placed the following restrictions on the State of Maharashtra :

" Out of the water allocated to it, the State of Maharashtra shall not use in any water year—

(i) more than 7 T.M.C. from the Ghataprabha (K-3) sub-basin.

(ii) more than 90 T.M.C. from the main stream of the river Bhima."

145 Counsel for the State of Maharashtra has submitted that the utilisations by the State of Maharashtra in the Ghataprabha (K-3) sub-basin will generate 0.52 T.M.C. of return flow and that we should cut down an excess allocation of 1.7 T.M.C. to the State of Karnataka in respect of the Gokak Canal. It is, therefore, submitted that the limit of restriction on the use of water by the State of Maharashtra in this sub-basin should be raised to 9 T.M.C. or in any event to 7.5 T.M.C. We cannot accept this argument. There is no excess allocation in respect of the Gokak Canal. The return flow from the projects of the State of Maharashtra using 3 T.M.C. or more would be very meagre. Considering all the relevant circumstances, we see no ground for revising the limit of the restriction placed on the use by the State of Maharashtra from the Ghataprabha (K-3) sub-basin.

146 In MR Reference Note No. 8 the State of Maharashtra has submitted the following details of return flow (calculating it at 7 ½ per cent) likely to become available to the State of Maharashtra for its use upon full utilisation of 195.6 T.M.C. by its projects using 3 T.M.C. or more of water in Bhima sub-basin :—

	T.M.C.
Mutha System	30.9
Ghod Dam	8.4
Kukadi	36.0
Bhima	70.0
Nira System	32.3
Vir Dam	14.4
Sina at Kolegaon	3.6
	195.6
Deduct utilisation for irrigation in Bhima basin in water year 1968-69 from projects using 3 T.M.C. or more (61.45—12.70=48.75 say 48)	48.0
	147.6 X 7.5
	----- = 11.07
	100
	say 11 T.M.C.

147 The State of Maharashtra submits that if the restrictions on its use of water from the river Bhima is revised upwards and the limit of such restrictions is raised to 101 T.M.C., the State of Maharashtra will be able to undertake the Chaskaman Project for which it needs 10 T.M.C. to serve scarcity areas. We may point out that in fixing the limit of 90 T.M.C. the State of Maharashtra has been given a margin of 5 T.M.C. We are of the opinion that in order to enable it to utilise 10 T.M.C. for the Chaskaman Project the limit of the restriction on its use of water from the river Bhima be raised upwards to 95 T.M.C. as from the water year 1990-91 when more than 5 T.M.C. is likely to appear as return flow in the Upper Bhima (K-5) sub-basin. If the limit is

so raised, the river Bhima will continue to make the same contribution to the river Krishna and the States of Karnataka and Andhra Pradesh will not suffer any injury. We direct that Clause IX(A) of the Final Order be deleted and in its place the following Clause IX(A) be substituted :

" Out of the water allocated to it, the State of Maharashtra shall not use in any water year—

(i) more than 7 T.M.C. from the Ghataprabha (K-3) sub-basin

(ii) more than the quantity of water specified hereunder from the main stream of the river, Bhima

(a) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the Official Gazette up to the water year 1989-90 90 T.M.C.

(b) as from the water year 1990-91 95 T.M.C."

Now we shall take up clarifications Nos. 1 and 2 of Reference No. II of 1974 of the State of Andhra Pradesh and clarifications Nos. 4 and 5 of Reference No. I of the Government of India.

The case of the State of Andhra Pradesh under clarification No. 1 of Reference No. II of 1974 is that under sub-Clause (C) of Clause V of the Final Order, the State of Andhra Pradesh was given the liberty to use, in any water year, the water remaining after meeting the specific allocations made to the States of Maharashtra and Karnataka under sub-Clauses (A) and (B) of Clause V, but this general scheme may not obviously apply as far as the joint projects in the Tungabhadra (K-8) sub-basin are concerned for the reason that the benefits under the Tungabhadra Right Bank High Level and Low Level Canals and the Rajolibunda Diversion Scheme have to be shared in the proportions as agreed between the States of Karnataka and Andhra Pradesh vide pages 155, 156, 170 and 171 of Vol. I of the Report and Clause XI(C) of the Final Order at page 788 of the Report Vol. II. 148

The State of Karnataka has strongly opposed this contention of the State of Andhra Pradesh. It has submitted that the scheme of allocation contained in Clause V of the Final Order governs the distribution of the waters of the Krishna river system including the Tungabhadra (K-8) sub-basin and the question that all the joint projects of the two States in this sub-basin should rank equally does not arise. It is further submitted that the agreed statements filed by the States of Andhra Pradesh and Karnataka (pages 155, 156 and 170-171 of Vol. I of the Report) disclose only the specific quantities of utilisations in the Tungabhadra Right Bank Low Level Canal, Tungabhadra Right Bank High Level Canal and the Rajolibunda Diversion Scheme but no particular proportion for sharing the water has been agreed to by the States of Andhra Pradesh and Karnataka. 149

In support of its case, the State of Andhra Pradesh also relied on Clause IX(D)(ii) of the Final Order, but it is quite clear that this Clause does not support its case.

Clarification No. 2 sought by the State of Andhra Pradesh in Reference No. II of 1974 raises questions of regulated releases from the Tungabhadra Dam for the assistance of the protected utilisations under the following diversion schemes below the Tungabhadra Dam: (1) Rajolibunda Diversion Scheme jointly of Karnataka and Andhra Pradesh; and (2) Kurnool-Cuddapah Canal of Andhra Pradesh.

150 It is submitted that the need for such regulated releases and assistance from the Tungabhadra Reservoir was recognised by the concerned States and was mentioned in the 1944 agreement between the Hyderabad and Madras States. It was also agreed in principle at the meeting of the Chief Engineers of the States of Karnataka and Andhra Pradesh in 1959 that some assistance should be given to these diversion schemes from the Tungabhadra Reservoir as mentioned at pages 162-163 of Vol. I of the Report.

The reply of the State of Karnataka to these contentions is that the State of Andhra Pradesh cannot place reliance on the 1944 agreement which has been expressly superseded by the Final Order of the Tribunal. No reference to the meeting of the Chief Engineers of the States of Karnataka and Andhra Pradesh can also be made in view of the fact that no final agreement was reached between the two States. It is submitted that having regard to the scheme of allocation incorporated in the Final Order and the findings recorded by the Tribunal, no provision can be made for regulated releases from the Tungabhadra Dam for the projects mentioned in Issue IV(B)(a). The decision of the Tribunal enables the State of Karnataka to utilise the waters allocated to it in any manner it considers proper. The Tungabhadra Board is required to function strictly in accordance with the Final Order of the Tribunal.

151 We have carefully considered the contentions of the parties. We think that the dispute regarding the use of the waters of the Tungabhadra (K-8) sub-basin cannot be resolved by an academic interpretation of Clause V of the Final Order and of the agreements mentioned above. The real solution to the problem lies in giving specific directions regarding the utilisation of the water of the Tungabhadra Dam by the projects of the two States which depend on it for the supply of water. This aspect of the matter assumes special importance in view of the fact that we have progressively raised the limit of utilisations of the State of Karnataka in the Tungabhadra sub-basin from 295 T.M.C. and the State of Karnataka will be in a position to utilise and store more water above the Tungabhadra Dam.

It may be mentioned that so far as the State of Maharashtra is concerned, it is not affected if specific directions are given regarding the utilisation of waters of the Tungabhadra Dam by the States of Karnataka and Andhra Pradesh or directions are given regarding the release of water from the Tungabhadra Dam for the projects below that dam or if the limit of the utilisations of the State of Karnataka in the Tungabhadra sub-basin is raised.

152 So far as the States of Karnataka and Andhra Pradesh are concerned, both of them submit that certain changes should be made in the Report with regard to the utilisation of the water available in the Tungabhadra sub-basin. The

nature of the changes advocated by each State is different. But the changes advocated by one State interact on the changes advocated by this other. For example, if the limit of utilisations of the State of Karnataka from the Tungabhadra sub-basin is raised, lesser water may be available to the State of Andhra Pradesh for its projects drawing water from the Tungabhadra Dam and lesser water may flow below the dam for utilisation by the projects of the State of Andhra Pradesh. Similarly if some water is reserved for the projects of Andhra Pradesh below the Tungabhadra Dam or if it is given proportionate share in the utilisations of the water of the Tungabhadra Dam for its canals on the right flank, there is no reason why the State of Karnataka should not have the advantage of utilising more water in the Tungabhadra sub-basin above or at the Tungabhadra Dam. For these reasons this matter cannot be disposed of in an academic manner on the interpretation of Clause V of the Final Order but there must be a realistic approach to the entire problem.

In order to give necessary directions for the utilisation of the waters of the Tungabhadra Dam, it is necessary to bear in mind that some projects take water from the dam from production of power and for irrigation use and some projects below the Tungabhadra Dam require assistance by way of regulated releases of water from the dam. 153

The following projects take water from the Tungabhadra Dam:

1. Tungabhadra Project Left Bank Low Level Canal including Left Bank High Level Canal. This Project takes water from the left side of the dam for irrigation in the State of Karnataka. Its utilisation (including evaporation losses) to the extent of 92 T.M.C. has been protected. The State of Karnataka seeks to utilise another 9.3 say 10 T.M.C. under this Project.

2. Tungabhadra Project Right Bank Low Level Canal. This Project takes water from the right side of the dam for irrigation in the States of Karnataka and Andhra Pradesh. It has been granted protection to the extent of 52 T.M.C. out of which 22.50 T.M.C. is to be utilised by the State of Karnataka and 29.50 T.M.C. by the State of Andhra Pradesh.

3. Tungabhadra Project Right Bank High Level Canal—Stages I and II. This Project takes water from the right side of the dam for irrigation in the States of Karnataka and Andhra Pradesh. It has been protected to the extent of 50 T.M.C., out of which 17.50 T.M.C. is for use in the State of Karnataka and 32.50 T.M.C. is for use in the State of Andhra Pradesh.

4. Raya Channel and Basavanna Channel both of which take water directly from the Tungabhadra Dam on the right side. 12.06 T.M.C. of water (out of which 5.71 T.M.C. is protected and 6.35 T.M.C. is held as worth consideration by the Tribunal) has been allocated in respect of all the Vijayanagar Channels of the State of Karnataka including Raya and Basavanna Channels. We are informed by learned Counsel for the State of Karnataka that of late the State of Karnataka has been utilising about 7 T.M.C. for Raya and Basavanna Channels directly from the dam. 154

Following are the Projects downstream of the Tungabhadra Dam about which there is dispute between the parties for giving assistance from the waters of the said dam :

1. Vijayanagar Channels of the State of Karnataka excluding Raya and Basavanna Channels.

2. Rajolibunda Diversion Scheme the benefits of which are shared by the States of Karnataka and Andhra Pradesh. This Project diverts water of the river, Tungabhadra from the anicut at Rajolibunda village in Raichur District. Counsel for the States of Karnataka and Andhra Pradesh made the following joint statement before the Tribunal on the 25th January, 1971):

155 " The States of Mysore and Andhra Pradesh state that the benefits of utilisations under the existing Rajolibunda Diversion Scheme are shared between the two States as mentioned herein below :—

Mysore	..	1.2 T.M.C.
Andhra Pradesh	..	15.9 T.M.C."

Clause XI (C) of the Final Order is on the lines of this joint statement.

3. Kurnool—Cuddapah Canal of Andhra Pradesh. While granting protection for the utilisation of Kurnool—Cuddapah Canal to the extent of 39.9 T.M.C. the Tribunal took notice of the fact that before the Krishna Godavari Commission, the Andhra Pradesh Government had proposed the annual utilisation of 39.87 T.M.C. for, irrigating. 2,78,000 acres, the monthly demands being as given below :

	T.M.C.
June	5.81
July	5.97
August	6.07
September	6.60
October	6.50
November	1.27
December	1.88
January	1.36
February	1.35
March	1.45
April	0.93
May	0.68
Total	39.87 T.M.C. (see page

378 of Vol. I of
the Report).

156 We first take up the question as to what extent assistance is to be given, if at all, for the projects below the Tungabhadra Dam mentioned hereinbefore.

So far as the Vijayanagar Channels of the State of Karnataka, excluding the Raya and Basavanna Channels are concerned, they draw water from the flow of the river Tungabhadra and we think that 2 T.M.C. of water should be released as assistance! to them by way of regulated releases from the Tungabhadra Dam in a water year.

With regard to regulated releases from the Tungabhadra Dam for the assistance of the Rajolibunda Diversion Scheme and the Kurnool—Cuddapah Canal, the case of the State of Andhra Pradesh is that (a) there are no storages at the headworks of these diversion schemes for the protected irrigation thereunder during Kharif as well as Rabi seasons and regulated releases from the Tungabhadra Dam are necessary to supplement inflows between the reservoir and the headworks of these schemes, see page 161 of Vol. I of the Report; (b) the need for such regulated release and assistance from the dam was recognised by the concerned States and was mentioned in the 1944 agreement between the States of Hyderabad and Madras ; (c) at the meeting of the Chief Engineers of the States of Mysore and Andhra Pradesh in 1959 it was agreed in principle that some assistance should be given to these schemes from the Tungabhadra Dam and while the Andhra Pradesh Chief Engineer was of the view that assistance to the extent of 18 T.M.C. and 8.5 T.M.C. should be given to the Kurnool—Cuddapah Canal and the Rajolibunda Diversion Scheme respectively, the Mysore Chief Engineer stated that assistance to a limited extent should be given (see pages 162-163 of Vol. I of the Report); (d) without regulated releases from the Tungabhadra Dam, the protected utilisations under these projects cannot be met as the water available at the sites of the diversion works will be flood water overflowing the dam and the flow from the intermediate catchment during the monsoon period and only a portion of this flow can be diverted into the canals at the diversion points in the form of anicuts, the rest overflowing the anicuts ; and (e) Vijayanagar Channels of the State of Karnataka being in the upper reaches and being open-head channels will intercept the meagre low flows in the intermediate catchment between the Tungabhadra Dam and the Sankesula Anicut and these flows would not reach the Rajolibunda Diversion Scheme and the Kurnool-Cuddapah Canal. 157

The reply of the State of Karnataka to these contentions is that (a) the State of Andhra Pradesh cannot place reliance on the 1944 agreement which has been expressly superseded by the Final Order of the Tribunal; (b) no reference to the meeting of the Chief Engineers of the States of Mysore and Andhra Pradesh can be made in view of the fact that no final agreement was reached between the two States at the inter-State meeting ; (c) having regard to the scheme of allocation incorporated in the Final Order and the findings recorded by the Tribunal, no provision can be made for regulated releases from the Tungabhadra Dam for the projects mentioned in Issue No. IV(B)(a); (d) the decision of the Tribunal on Issue No. IV (B)(a) that no specific directions are necessary for the release of water from the Tungabhadra Dam for the benefit of the Rajolibunda Diversion Scheme and the Kurnool-Cuddapah Canal is contact and binding; and (e) there will be water flowing over the Tungabhadra Dam, water flowing from the Vedavathi river which has been permitted to be utilised at 75 per cent dependability only and also water of the intermediate catchment between the Tungabhadra Dam and the Sankesula Anicut and all this water will be sufficient to meet the needs of the Projects below the Tungabhadra Dam. It is further submitted that so far as Kharif crops are concerned, no assistance is needed at all for any of the projects and so far as Rabi crops are concerned only a limited quantity of water will be required as there will be water flowing in the river Tungabhadra during Rabi Reason which can be diverted for use in these Projects. During the course of arguments, Counsel for the State of Karnataka submitted and relied, in support 158

159 of this contention, upon the following table prepared by the representatives of the State of Karnataka :—

Requirement of Vijayanagar Channels of Karnataka downstream of Tungabhadra Dam, Rajolibunda Diversion Scheme and Kurnool—Cuddapah Canal—during January to May.

(All figures in T. M.C.)

<i>Month</i>	<i>Vijayanagar Channels downstream of Tungabhadra Dam in Karnataka</i>	<i>Rajolibunda Diversion Scheme</i>	<i>K.C. Canal</i>	<i>Total</i>	<i>Inflow from intermediate catchment 50% of figs, in col. (5)</i>	<i>Balance requirement</i>
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
January	0.35	1.23	1.36	2.94	1.47	1.47
February	0.35	1.01	1.35	2.71	1.35	1.36
March	0.25	1.38	1.45	3.08	1.54	1.54
April	0.20	1.16	0.93	2.29	1.14	1.14
May	0.10	0.29	0.68	1.07	0.54	0.54
Total	1.25	5.07	5.77	12.09	6.04	6.05

Source . — Figures in (1) Col. 3 are from page 28 of KGC Annexure IX.
 (2) Col. 4 are from page 19 of KGC Annexure VIII.
 (3) Col. 6 are assumed to be available from the intermediate flow on account of natural flow, return flow, seepage, wastage.

We have carefully examined these contentions.

160 The authorities cited at pages 161-163 of Vol. I of the Report clearly recognize the necessity of assistance to the Rajolibunda Diversion Scheme and the Kurnool—Cuddapah Canal by way of regulated releases from the Tungabhadra Dam.

So far as the Rajolibunda Diversion Scheme is concerned while deciding the question of protection to be granted for this Project, the following observation has been made by the Tribunal at page 71 of Vol. I of the Report :

" We think that the requirement of the Project can be met fully from the intermediate yield below Tungabhadra Dam and regulated releases from the dam."

Our observation at page 602 of Vol. II of the Report while deciding Issue No. IV (B) (a) that no further directions are necessary for release of water from the Tungabhadra Dam for the benefit of the Rajolibunda Diversion Scheme, should be read subject to what has been observed at page 371 of Vol. I of the Report.

At the Chief Engineers' Conference in 1959, the State of Andhra Pradesh had claimed that assistance to the extent of 8.5 T.M.C. was necessary for the Rajolibunda Diversion Scheme from the waters of the Tungabhadra Dam.

The Chief Engineer of the State of Mysore had not agreed to this figure. The table submitted by the State of Karnataka shows that admittedly some assistance will be necessary for this Project during the months of January to May. We are of the opinion that sufficient assistance should be granted to the Rajolibunda Diversion Scheme during the months of November to May for its Rabi crops and some assistance may be given for other months. We hold that assistance to the extent of 7 T.M.C. should be given by way of regulated discharges from the Tungabhadra Dam in a water year for the benefit of the Rajolibunda Diversion Scheme of both the States.

161

So far as the Kurnool—Cuddapah canal is concerned, in view of the fact that the raising of the limit of 295 T.M.C. will increase the utilisation of the State of Karnataka up to and at the Tungabhadra Dam and decrease the flow of the river below the dam, we think that assistance should be given to the Kurnool—Cuddapah Canal. The State of Andhra Pradesh has stated in A.P. Reference Note No. 1 paragraph 22 that the monthly demands of water for this Canal for June and November to May workout to 14.73 T.M.C. (as detailed at page 378 of Vol. I of the Report quoted above) and as this water has necessarily to come out of the Tungabhadra Dam there, is no reason why this water should not be released from the dam by way of assistance for the Kurnool—Cuddapah Canal. The assistance for this Project during the months of November to May works out to 8.92 T.M.C. from the figures given at page 378 of Vol. I of the Report and making allowance for the little water that may be available for diversion from the river flow during the lean season, we think that assistance of 8 T.M.C. may be given during the months of November to May. Further assistance to the extent of 2 T.M.C. may be given in other months. Taking all these circumstances into consideration, we are of the opinion that assistance to the extent of 10 T.M.C. should be given to the Kurnool—Cuddapah Canal from the Tungabhadra Dam by way of regulated discharges during a water year.

162

Now We deal with the projects which will be drawing water from the Tungabhadra Dam. Of late, the State of Karnataka has started utilising about 7 T.M.C. in the Raya and Basavanna Channels. We do not think that there is any reason for not permitting it to utilise 7 T.M.C. by these Channels within the limit imposed by us on the total utilisations by that State from the Tungabhadra (K-8) sub-basin.

The question is how the water available in the Tungabhadra Dam is to be divided between the two States for the Projects drawing water from the dam. We have carefully considered all aspects of this question. There is need for giving specific directions regarding the utilisation of the water available at the Tungabhadra Dam by the Projects of the two States which have a common source of supply. It may be mentioned that the headworks of the Projects on the right side are common to both the States.

Without giving specific directions as detailed below, it may be well-nigh impossible to utilise the water available in the Tungabhadra Dam in a satisfactory manner. Each State will insist on utilising as much water from the Dam as it can with the result that there will be wasteful use of water and endless disputes. The States should not be left to compete with each other in such a vital matter.

163

The need for specific directions assumes special importance in view of the fact that we have raised the limit of the utilisations of the State of Karnataka from the Tungabhadra (K-8) sub-basin from 295 T.M.C. and the State of Karnataka may be constructing projects above the Tungabhadra Dam and making more utilisations above that dam, thus reducing the inflow of water in the Tungabhadra Dam. It may also be using more water at the Dam. All this may marginally reduce the chances of the State of Andhra Pradesh to get water for Tungabhadra Right Bank Low Level and High Level Canals to irrigate areas in its territories in some years as compared with the situation when the limit of 295 T.M.C. is not raised upwards.

We, therefore, propose to give specific directions for utilising the water of the Tungabhadra Dam which will be just and equitable to both the parties in the circumstances of the case. We direct that the following sub-clause (E) which incorporates and gives effect to our proposed directions be added after sub-Clause (D) of Clause IX of the Final Order at page 785 of Vol. II of the Report:

- 164 "(E) (1) The following directions shall be observed for, use of the water available for utilisation in the Tungabhadra Dam in a water year—
- (a) The water available for utilisation in a water year in the Tungabhadra Dam shall be so utilised that the demands of water for the following Projects to extent mentioned below may be met:—
- | | | |
|----------|---|---------------|
| 0) | Tungabhadra Right Bank Low Level Canal
Water available for Tungabhadra Right Bank Low Level Canal shall be shared by the States of Karnataka and Andhra Pradesh in the following proportion : State of Karnataka— 22.50 State of Andhra Pradesh— 29.50 | 52.00 T.M.C. |
| (ii) | Tungabhadra Right Bank High Level Canal — Stages I & II. Water available for Tungabhadra Right Bank High Level Canal shall be shared by the States of Karnataka and Andhra Pradesh in the following proportion : State of Karnataka— 17.50 State of Andhra Pradesh— 32.50 | 50.00 T.M.C. |
| (iii) | Tungabhadra Left Bank Low Level and High Level Canals. | 102.00 T.M.C. |
| 165 (iv) | Raya and Basavanna Channels of the State of Karnataka. | 7.00 T.M.C. |
| (v) | Assistance by way of regulated discharges to Vijayanagar Channels other than Raya and Basavanna Channels of the State of Karnataka. | 2.00 T.M.C. |
| (vi) | Assistance by way of regulated discharges to the Rajolibunda Diversion Scheme for use by the States of Karnataka and Andhra Pradesh in the proportion mentioned in Clause XI(C) | 7.00 T.M.C. |

- (vii) Assistance by way of regulated discharges to the Kurnool — Cuddapah Canal of the State of Andhra Pradesh. 10.00 T.M.C.

230.00 T.M.C.

The utilisations of the Projects mentioned in sub-Clauses (a) (i), (ii) and (iii) above include the evaporation losses in the Tungabhadra Dam which will be shared in accordance with Clause XI (D).

(b) If, in any water year, water available for utilisation in the Tungabhadra Dam is less than the total quantity of water required for all the Projects as mentioned above, the deficiency shall be shared by all the Projects proportionately. The proportions shall be worked out after excluding the evaporation losses.

(c) If, in any water year, water available for utilisation is more than the total quantity of water required *tot* all the Projects as mentioned above, the requirements for all the Projects for the month of June in the succeeding water year as estimated by the Tungabhadra Board or any authority established in its place shall be kept in reserve and the State of Karnataka shall have the right to utilise the remaining water in excess of such reserve in the Tungabhadra Dam for its Projects mentioned in sub-Clauses (a) (i), (ii) and (iii) above drawing water from that dam even though thereby it may cross in any water year the limit on the utilisation of water from Tungabhadra (K-8) sub-basin placed under Clause IX(B) of the Final Order but in no case such utilisation shall exceed 320 T.M.C.

166

(d) The balance water, if any, shall be kept stored in the dam for use in the next year.

(2) The working tables for the utilisation of the water in the Tungabhdara Dam shall be prepared as hithertofore by the Tungabhadra Board or any other authority established in its place so as to enable the States of Karnataka and Andhra Pradesh to utilise the water available for utilisation in the Tungabhadra Dam as aforesaid.

(3) If, in any water year, either of the two States of Karnataka and Andhra Pradesh finds it expedient to divert the water available to it in the Tungabhadra Dam for any one of its Projects to any other of its Project or Projects mentioned above for use therein, it may give notice thereof to the Tungabhadra Board or any other authority established in its place and the said Board or authority may, if it is feasible to do so, prepare or modify the working table accordingly.

167

(4) The States of Karnataka and Andhra Pradesh may use the water available in the Thugabhadra Dam in accordance with the aforesaid provisions and nothing contained in Clause V shall be construed as over-riding the provisions of Clause IX (E) in the matter of utilisation of the water available in the Tungabhadra Dam nor shall anything contained in Clause IX(E) be construed as enlarging the total allocation to the State of Karnataka or as enlarging the limit of acquisition of any right by the State of Andhra Pradesh in the waters of the river Krishna.

(5) The States of Karnataka and Andhra Pradesh may by agreement, without reference to the State of Maharashtra, alter or modify any of the provisions for the utilisation of the water available in the Tungabhadra Dam mentioned above in any manner."

We further direct that after the last sentence at page 167 of Vol. I of the Report beginning with the words " We consider that the existing practice" and ending with the words " until another control body is established." the following sentence be added :—

" On a careful consideration of the matter, we have given suitable directions for the preparation of working tables of the Tungabhadra Dam in Clause IX (E) of the Final Order."

168 We also direct that the following sentences be added at page 600 of the Report Vol. II at the end of paragraph dealing with Clause IX of the Final Order :—

" We have placed the restrictions in Clause IX on a consideration of all relevant materials including the progressive increase of return flow. In Clause IX(E), we have given directions as to how the water in the Tungabhadra Dam is to be utilised. "

We also direct that in the paragraph dealing with Issue No. IV(B) (a) at page 602 of Vol. II of the Report after the sentence beginning with the words " With regard to Issue No. IV(B) (a)" and ending with the words " as mentioned hereinbefore.", the following sentence be added :—

" Whatever directions are necessary have been given in Clause IX(E) of the Final Order."

169 What we have provided is a just and fair solution to the problems raised by the States of Karnataka and Andhra Pradesh and the Government of India. The approach that we have adopted is not academic but is practical and is beneficial to both the States. As already mentioned, the State of Karnataka shall be able to use progressively some more water in the Tungabhadra (K-8) sub-basin thereby making it possible for it to construct Upper Bhadra Project and/or any other project above the Tungabhadra Dam and to meet its demand to utilise 10 T.M.C. more i.e., to utilise 102 T.M.C. on the left bank of the Tungabhadra Dam. At the same time, we have ensured that the projects of the State of Andhra Pradesh are not adversely affected. Provision has been made under this arrangement for regulated discharges to the extent found by us to be necessary for the Kurnool-Cuddapah Canal and the Rajolibunda Diversion Scheme as also for the Vijayanagar Channels. As a result of this arrangement Kurnool-Cuddapah Canal will divert the water from the flow of the river Tungabhadra and also get assistance by way of regulated discharges from the Tungabhadra Dam to the extent mentioned in Clause IX(E). So also Rajolibunda Diversion Scheme will divert water from the flow of the river Tungabhadra and also get assistance by way of regulated discharges as mentioned in Clause IX(E). In the Rajolibunda Diversion Scheme, the water diverted from the flow of the river Tungabhadra as also the water available by way of discharges from the Tungabhadra Dam will be shared by the States of Karnataka and Andhra Pradesh in the proportion

mentioned in Clause XI(C) of the Final Order. The withdrawal of water by the State of Karnataka on the left bank of the dam has been restricted to 102 T.M.C. when the total quantity of water available for utilisation from the dam is sufficient only to meet the demands of water of the two States up to 230 T.M.C. The projects on the right bank are placed at par with the projects on the left bank and in case of deficiency all the projects have to suffer the deficiency as mentioned in Clause IX(E)(I)(b). If the" total quantity of water available for utilisation is more than what is required by the projects of the two States, the State of Karnataka has been given the right to utilise excess water after keeping in reserve the water required for the month of June in the succeeding year. We find no reason to tie down the State of Karnataka to limit its use by its projects drawing water from the Tungabhadra Dam up to the limit mentioned in Clause IX(B) of the Final Order even when more water is available in any year in the dam and which will otherwise remain stored in the dam in that year. But the total utilisation by the State of Karnataka from the Tungabhadra sub-basin shall in no case exceed 320 T.M.C. which limit is likely to be reached when full utilisations have been made by the State of Karnataka of the water allocated to it. We may add that all the uses allowed under the arrangement mentioned above are subject to the overall limit of allocation under Clause V of the Final Order.

170

With regard to use of waters in the Tungabhadra Dam for production of power, we may mention that on the left side of the dam, the water drawn through penstocks after generating power in the Munirabad power house is let into the Left Bank Main Canal for irrigation in the State of Karnataka, the excess being surplussed to the river through river outfall sluices. On the right side of the dam, the water drawn through penstocks after generating power in the dam power house is let into the power canal for generating power at the power house at Hampi, a portion being surplussed into the river through river outfall sluices. After generating power at the Hampi power house, most of the tail-race water is let into the Right Bank Low Level Canal for irrigation in the States of Karnataka and Andhra Pradesh, a small portion being discharged into the river through a tail-race pond formed across the natural stream known as the Gundakeri Vanka, see Report Vol. I pages 152-153. As the use for production of power at these power houses is non-consumptive except for evaporation losses in the water conductor system and the Tungabhadra Reservoir (see Report Vol. II page 447) and as provision has already been made for the sharing of the entire reservoir loss (see Report Vol. I pages 156, 157-159, Vol. II page 788), no separate directions are necessary with regard to the water used for production of power at the aforesaid power houses.

171

This discussion covers all the questions raised in clarifications Nos. XV, XVI, XVII and XIX of Reference No. III of 1974 of the State of Karnataka, clarifications Nos. 1 and 2 of Reference No. II of 1974 of the State of Andhra Pradesh and clarifications Nos. 2(b), 4 and 5 of Reference No. I of 1974 of the Government of India. They are decided and disposed of accordingly. No further explanation or clarification is necessary.

Clarification No. XVIII

- 172 Karnataka seeks clarification that the direction for sharing of evaporation loss in the Tungabhadra Reservoir is liable to be modified so as to be in proportion to the utilisation on either side and that the allocations of evaporation loss are liable to be adjusted accordingly.

At pages 157 to 159 of Vol. I and page 788 of Vol. II of the Report, we have given reasons for our direction regarding the sharing of the reservoir loss of Tungabhadra Reservoir. We find no ground for modifying this direction.

Clarification No. XX

- 173 Karnataka seeks clarification whether this Tribunal may be pleased to re-allocate the balance waters to Maharashtra and Karnataka based on common and equitable yardsticks, in regard to the extent of areas to be irrigated under future projects.

The law relating to equitable apportionment of the benefits of an inter-State river and the guidelines for equitable apportionment have been clearly stated at pages 302—317 of Vol. I of the Report. The law so laid down has not been challenged by any of the parties.

Karnataka contends (KR Reference Note No. XII) that the balance water left after providing for protected uses should be distributed between Karnataka and Maharashtra in proportion to the irrigable areas under the contemplated projects of the two States. Reliance is placed on the following passage in the report of the Anderson Committee Vol. I, para 42 page 24 :—

" VII. Basis for Allocating of Irrigation Water "—

" 42. The Committee consider that the fundamental basis for the distribution of water for projects prepared in the future must be the culturable irrigable area as defined in the Glossary, Part I of this Report....".

- 174 It must be borne in mind that the above observations were made by the Anderson Committee with regard to distribution of water from projects and not for division of the waters of an inter-State river or river valley. Moreover, the Report of the Anderson Committee was made when the Government of India Act, 1915 as amended by the Government of India Act, 1919 was in force. We have pointed out at pages 315-317 of Vol. I of the Report that the Government of India then used to decided disputed relating to distribution of water upon administrative or political considerations.

In allocating the waters of the inter-State river Krishna between the three States we have taken into account all the relevant factors for such allocation including those mentioned at pages 302-311 of Vol. I of the Report and the contentions of parties set out at pages 487-498, 561-570 and 582-584 of Vol. II of the Report and after full consideration of the needs and requirements of the States which are reflected in the Krishna case in their projects, see Report Vol. II page 585.

Division of the remaining water left after providing for Andhra Pradesh between the States of Maharashtra and Karnataka in proportion to the total irrigable area under their remaining projects cannot form a sound basis of our decision without examining how far it is possible to satisfy their reasonable needs, see Report Vol. II pages 584-585. No State has proprietary interest in any particular volume of water of an inter-State river on the basis of its irrigable area or contribution, see Report Vol. I page 308. 175

In allocating the available supply, we have not applied different standards for different States or treated them unequally as suggested by Karnataka (KR Reference Note No. XII). We have carefully scrutinized the projects of each State in order to assess their reasonable demands (see page 585 of Vol. II of the Report) and we have made allocations after balancing the conflicting demands of the States.

Clarification No. XXI 176

Karnataka prays that this Tribunal may be pleased to clarify and/or explain—

(i) that the Upper Krishna Project of Karnataka is entitled to allocation of waters, **inter alia**, for the reasonable intensification of crops on the Narayanpur Left Bank Canal Stage I, for the Lift Irrigation of 5.24 lakh acres including Hippargi Barrage Scheme and for irrigation of 1.20 lakh acres under the Right and Left Bank Canals from the Almatti Reservoir;

(ii) that the Bhima Lift Irrigation Project of Karnataka and such other projects are entitled to allocation of water on the same principle as applied in the allocation of waters to the Gudavale Lift and the Koyna—Krishna Lift in Maharashtra ; and

(iii) that the allocations made by this Tribunal are liable to re-adjustment accordingly.

In MR Note No. 30, MY Note No. 17 and AP Note No. 14, the States of Maharashtra, Karnataka and Andhra Pradesh set forth their revised claims for allocation of water out of the water left after providing for all the protected utilizations. We assessed the needs of the three States after considering their revised demands. We have allowed the demands for Gudavale Lift Scheme and Koyna-Krishna Lift Irrigation Scheme of Maharashtra and also for lift irrigation under Malaprabha Project for the reasons given at pages 638-643, 674-675 and 731-733 of Volume II of the Report. The reasons for not allowing the demand for Bhima Lift Irrigation Project are given at pages 737-738 of Vol. II of the Report. We have considered the Upper Krishna Project at pages 714-719 of Vol. II of the Report. The parties agreed to protect the utilisation of 103 T.M.C. for the Project. We allowed the additional demand for this Project to the extent mentioned in the Report after taking into account the available water supply and the needs of the other States. Subject to our observations made elsewhere in this Report, regarding the Upper Krishna Project, we see no ground for any further clarification. 177

However, we may add that this Project is to be executed by stages and if it is found in future that more water is available for distribution between the

three States, the claim of Karnataka for allocating more, water for this Project may receive favourable consideration at the hands of the Tribunal or authority, reviewing the matter. Almatti Dam is under construction and may serve as carry-over reservoir.

178 Clarification No. XXII

Karnataka prays that this Tribunal may be pleased to clarify and explain—

(i) that the quantity of 17.84 T.M.C. is liable to be deducted from the allocations made to Andhra Pradesh in the event of its inability to put up any project for irrigating the areas in Gadwal and Alampur talukas ; and

(ii) that the scarcity areas in Bijapur district of Karnataka are entitled to allocations by reasons of similar " special considerations " applied to the areas of Gadwal and Alampur in Andhra Pradesh.

We have given full reasons for allowing the demand for 17.84 T.M.C. in respect of the Jurala Project, see Report Vol. II pages 579-582. It is necessary to correct the imbalance in the use of water for irrigation between the Andhra and Telengana regions of Andhra Pradesh and we have said that if the Jurala Irrigation Project is not a practical proposition, the water allocated in respect of this Project should be utilised elsewhere in the Telengana region. Areas in Bijapur district will be irrigated from Ghataprabha Project, Malaprabha Project, Ramthal Lift Irrigation Scheme, Upper Krishna Project and minor irrigation works. We see no ground for any further clarification.

179 Clarification No. XXIII

Karnataka prays that the following observation at page 190 of Vol. I of the Report be expunged :—

" but instead of co-operative approach and mutual agreement, there is vigorous opposition to all such extension schemes by the State of Mysore ".

The other parties do not oppose the deletion of the above observation. We direct that the aforesaid observation be deleted from page 190 of Vol. I of the Report.

180 Clarification No. XXIV

Karnataka seeks clarification and/or explanation—

(i) that the existing utilisation entitled to protection under the Tungabhadra Left Bank Low Level Canal was 101.3 T.M.C. (including evaporation loss of 9 T.M.C.);

(ii) that the allocations to Karnataka should consequently be increased by a quantity of 9.3 T.M.C.

The relevant facts relating to the Tungabhadra Project Left Bank Low Level Canal are stated at pages 362-365, 186-190 and 153-154 of Vol. I of the Report. For establishing the claim of the State of Karnataka to 101.3 T.M.C. for this Project, Counsel for the State of Karnataka referred to the following materials (1) the Tungabhadra Project Report (Ex. MYK-270) published by P.W.D. of

the Government of Hyderabad, (2) the Project Report of 1950 and the sanction of the Hyderabad Government to the Project (MYDK-VIII pages 1 to 34), (3) 1951 note of the Hyderabad Government regarding utilisation of supplies in the Krishna river (APK-III pages 246-267), (4) the proceedings of the inter-State Conference in July, 1951, (5) the Lower Krishna Project Report of 1952, (6) letter of Chief Secretary to the Hyderabad Government dated 25th July 1953 (SP-III pages 186-188). (7) inter-departmental correspondence of the Government of Hyderabad (APDK-X pages 128-133), (8) the revised cropping pattern sanctioned by the Hyderabad Government in March 1955 (APDK-X page 134), (9) letter of the Secretary to the Government P.W.D. Andhra Pradesh, Hyderabad dated 29th August 1959 (SP-III pages 119, 120) and (10) the minutes of the proceedings of the conference of the Secretaries to the Governments of Andhra Pradesh and Mysore on 24th and 25th October, 1959 (SP-III pages 86, 88-93). 181

The Tungabhadra Project Report (Ex. MYK-270) published by P.W.D. of the Government of Hyderabad, pages 9 and 28 contained a cropping scheme for irrigating 4,50,000 acres besides areas of double cropping and 1,35,000 acres of fuel and pasture in the Karnataka region up to mile 141 and a demand table of 92.05 T.M.C. for this cropping scheme. Ex. MYK-270 is referred to as the Tungabhadra Project Report 1947 in our Report Vol. I pages 363 and 186. It appears that Ex. MYK-270 does not give the date of its publication. There is now some dispute about this date. According to the State of Andhra Pradesh, Ex. MYK-270 was printed after 26th January 1950, whereas according to the State of Karnataka, it was printed either in 1947 or 1951. On the basis of the materials on the record, it is not possible to give a definite finding with regard to this date. Assuming that Ex. MYK-270 was published after 26th January 1950, the fact remains that Ex. MYK-270 contained a demand table of 92.05 T.M.C. of a cropping scheme for 4,50,000 acres besides areas of double cropping and 1,35,000 acres of pasture and fuel in the Karnataka region. 182

On or about 19-12-1950, the Government of Hyderabad sanctioned the estimate of costs of a modified report of the Tungabhadra Project, see MYDK-VIII pages 9-11. This modified report stated that the Project proposed to irrigate 4,50,000 acres (or adding the area of double cropping, of catch crops and pasture and fuel lands a total cropped area of 8,67,840 acres) on the assumption that the final apportionment of waters would be decided by 1958 when the Project was expected to be completed, see MYDK-VIII page 19. No estimate of water demand and no demand table for the cropping pattern envisaged in the modified report was given in the report.

In its note on utilisation of supplies prepared in connection with the inter-State conference in July, 1951, the Hyderabad Government claimed 100 T.M.C. for the Tungabhadra Project under construction and 35 T.M.C. for the Tungabhadra Canal extension, see APK-III pages 246, 251, and Madras claimed 65 T.M.C. for the Tungabhadra Project. In this background, the C.W. & P.C. note prepared for the conference referred to 65 T.M.C. required for the Tungabhadra Project of Hyderabad then under construction and this demand for 65 T.M.C. was allowed by the agreement of 1951 with the consent of the Hyderabad 183

184 Government, see Report Vol. I pages 119, 130. Hyderabad had also demanded 585 T.M.C. of water for its contemplated projects including 35 T.M.C. for extension of irrigation on the Tungabhadra and against this demand of 585 T.M.C., Hyderabad was allotted 280 T.M.C. only out of the dependable flow of 1715 T.M.C, see Report Vol. I pages 120, 130. Hyderabad was also allotted 30 per cent of the balance flows in excess of the agreed dependable flow. The Lower Krishna Project Report of 1952 (APPK-X pages 14-16) stated that in view of the 1951 allocation, Hyderabad Government had revised its proposed projects and in addition to 65 T.M.C., an extra 20 T.M.C. from dependable flows and another 15 T.M.C. from the excess flows would be utilised for the Tungabhadra Project. On the 25th July, 1953, the Chief Secretary to the Hyderabad Government wrote to the Secretary to the Government of Madras, P.W.D., that in the allocation of waters of the Krishna basin at the conference of July, 1951, the share of Hyderabad in the Krishna system for works existing and under construction included 65 T.M.C. for the Tungabhadra Project and that Hyderabad had also asked for and obtained 35 T.M.C. for extension of irrigation under the Tungabhadra Project. He added that the Tungabhadra Project on the Hyderabad side for eventual utilisation of 100 T.M.C. had been fully investigated, estimated and approved by the Government of Hyderabad and the work was proceeding accordingly, see SP-III pages 186-188.

In 1954, it was proposed that there would be an irrigable area of 5,70,000 acres plus 10,000 acres Tabi besides 85,000 acres of pasture and fuel up to mile 141 of the Canal in the Karnataka region, that out of 100 T.M.C. the balance water available after finalising the cropping scheme up to mile 141 would be utilised beyond mile 141 in the Telengana region for heavy irrigation and that until the cropping scheme beyond mile 141 was finalised it was not possible to give details of the draw-offs for the extension of irrigation under the Project, see APDK-X pages 128-133. In March, 1955, the Hyderabad Government finally approved of a cropping scheme for 5,80,000 acres in the Karnataka region up to mile 141.

185 A copy of the letter, dated the 31st March, 1955 from the Assistant Secretary, Community Projects, Government of Hyderabad to the Secretary, Board of Revenue, Hyderabad Division giving details of the approved cropping scheme was sent to the Secretary, P.W.D., Hyderabad and the Chief Engineer, I.P. Hyderabad for information and necessary action, see APDK-X page 134.

The cropping scheme approved by the Hyderabad Government in March 1955 was as follows :—

1. Abi	50,000 acres
2. Cane	15,000 acres
3. Kharif	200,000 acres
4. Rabi cotton	75,000 acres
5. Garden	30,000 acres
6. Rabi Jowar etc.	200,000 acres
7. Tabi	10,000 acres
	5,80,000 acres

No demand table for this approved cropping scheme was prepared at the meeting of the Council of Ministers of the Hyderabad Government in March, 1955 when they approved the scheme. It was, therefore, necessary to prepare a demand table for the scheme.

On the 12th September, 1956, the Chief Engineer, P.W.D., Tungabhadra Project, Hyderabad Division, wrote to the Chief Engineer, P.W.D., Andhra State, stating that for the cropping scheme approved by the Hyderabad Government for 5,80,000 acres including 10,000 acres of second crop paddy up to mile 141 in the Karnataka region the total quantity of utilisable water was estimated to be about 82 T.M.C. out of 100 T.M.C. allotted to Hyderabad in 1951. He added that it had been further decided that the available quantity of water beyond mile 141 should be utilised in the lower reaches lying in the Telengana region, see SP-III page 95. On the 14th September, 1956 the Chief Engineer, Tungabhadra Project, Hyderabad Division wrote to the Chief Engineer (Electrical), Hydro Branch, P.W.D. 259, Hyderabad Division enclosing a demand table of 82.007 T.M.C. prepared by the Divisional Engineer, P.W.D., Central Construction Division No. 5 T.B.P. for the approved cropping scheme and for an additional 85,000 acres of pasture and fuel, see SP-III pages 96-97. In October, 1956, the Superintending Engineer, Tungabhadra Project Reservoir Circle, Munirabad, prepared a demand table of 72.5 T.M.C. for the approved cropping scheme; see SP-III pages 98-101. 186

On the 29th August, 1959, the Secretary to Government, P.W.D, Andhra Pradesh wrote to the Secretary to Government of Mysore, P.W. & Electricity Department that out of 280 T.M.C. allotted from the dependable flow to Hyderabad State for future utilisation by the Planning Commission award of 1951, a quantity of 27 T.M.C. had already been committed by the Hyderabad State for the Tungabhadra Project, see SP-III pages 119, 120. At the Conference of the Secretaries to the Government of Andhra Pradesh and Madras held at Hyderabad in October, 1959, the Mysore representative stated that the requirement of water for the irrigable area of 5,80,000 acres had not been worked out at the time of the States Reorganisation, that its requirement had been put down at 92 T.M.C. when the Project was sanctioned, that the subsequent changes in the cropping pattern did not justify any reduction in the quantity of water required, that a number of alternatives and demand tables were prepared from time to time and the letters said to have been sent by the Chief Engineer, Irrigation Projects, Hyderabad in October, 1956 (even if considered to be authoritative) could not be deemed to represent the final decision in the matter. He stated that the requirement of the area of 5,80,000 acres and that of 1,35,000 acres of pastures and fuel would have to be worked out on the basis of reasonable duties and that even adopting the duties followed under the Right Bank Low Level Canal which were themselves high, the requirement of water for the irrigable area of 5,80,000 acres would amount to 100 T.M.C. and those of the area under fuel and pasture would be about 5.4 T.M.C., see SP-III pages 88-93. 187

But the letters of September, 1956 from the Chief Engineer, Tungabhadra Project, Hyderabad Division, together with the demand table prepared in September, 1956 show that 82.007 T.M.C. was sufficient for the reasonable

188 requirements of the approved cropping scheme for 5,80,000 acres up to mile 141 in the Karnataka region and for an additional 85,000 acres of pasture and fuel. This estimate of the water requirement of the approved cropping scheme was made for implementing the decision of the Hyderabad Government in March, 1955 and not with a view to override it. We are not satisfied that the demand table of 82.007 T.M.C. was prepared on the basis of unreasonable duties or that the water requirement of the approved cropping scheme for 5,80,000 acres and for an additional 85,000 acres of pasture and fuel would be more than 82 T.M.C. adopting the duties followed under the Tungabhadra Right Bank Low Level Canal, (see KGCR Annexure-IX page 23) as claimed by the Mysore representative in the 1959 Conference.

189 Considering all the materials on the record, we found that 82 T.M.C. was the reasonable requirement of the Tungabhadra Left Bank Low Level Canal for the cropping scheme for 5,80,000 acres in the Karnataka region. This cropping scheme was finally approved in 1955 by the Hyderabad Government and continued to hold the field until September, 1960. We allowed the demand for annual utilisation of 82 T.M.C. under the Tungabhadra Left Bank Low Level Canal and 1 T.M.C. under the Tungabhadra Left Bank High Level Canal besides 9 T.M.C. on account of evaporation losses. The equal sharing of the reservoir loss of the Tungabhadra Reservoir by the works on its left and right-sides does not necessarily mean equal utilisation by the works on each side. For the reasons given at pages 754-755 of Vol. II of the Report we did not allow the additional demand of 9.3 T.M.C. for Karnataka's Tungabhadra Left Rank Low Level Canal. We have considered elsewhere whether we should give further directions enabling the State of Karnataka to use within the limits of its allocation an additional 9.3 T.M.C. of water for the aforesaid Canal,

With a view to clarify the matter we direct that the following corrections be made at page 364 of Vol. I of the Report:—

- (1) in line 6 the figure " 1955 " be substituted for " 1954 ".
- (2) in line 14 the words " We find that " be substituted for the words "Since 1956 up to September 1960".
- (3) in line 15 the word " considered " be deleted and the word " reasonable " be added before the word " requirement".

We also direct that :

- (1) the figure " 1947" appearing in line 16 at page 363 of Vol. I of the Report be deleted.
- (2) the words "In 1947, the" appearing in the 23rd line at page 186 of Vol. I of the Report be deleted and in their place the word " The " be substituted.

190 The contentions of the State of Karnataka regarding Mutha System Ex-Khadakwasla and the contentions of the State of Maharashtra regarding (1) Gokak Canal, (2) Upper Krishna Project and (3) Kolchi Weir and Malaprabha Project raised in course of arguments in Reference No. III of 1974 are dealt with hereafter.

Mutha System Ex-Khadakwasla

In KR Reference Note No. XII page 6, Karnataka submitted that there was excessive allocation of 4 T.M.C. in respect of Mutha System Ex-Khadakwasla Project, though this point was not taken in Reference No. III of 1974. We are unable to accept this contention. The Project proposes to utilise 33.1 T.M.C. out of which 25.9 T.M.C. is for irrigation of 1,28,000 acres, 5.0 T.M.C. is for water supply requirement and 2.2 T.M.C. represents laks losses, see MRPK-XXVIII pages 137, 139. The Project as cleared by the Planning Commission contemplated the total utilisation of 23.5 T.M.C. including 3.1 T.M.C. for water supply to Poona and Kirkee and an irrigation of 77,000 acres, see MRPK-XXVIII pages 143-144, Report Vol. II page 676. The parties agreed that 23.5 T.M.C. required for the cleared project should be protected and we allowed the balance demand of 9.6 T.M.C, see Report Vol. I page 330, Vol. II pages 676-678. Clause VII of our Final Order provides that use for domestic and municipal water supply shall be measured by 20 per cent of the quantity of water diverted. This provision is based on the agreed statement filed by the parties on the 20th August, 1973, see Report Vol. I page 290, Vol. III page 62. In view of this provision, Karnataka contends that 20 per cent of 5 T.M.C. i.e. 1 T.M.C. only should have been allowed for the water supply requirement and consequently an excess quantity of 4 T.M.C. has been allowed to Maharashtra for the Project. We are unable to accept this contention. On the 7th May, 1971, the parties agreed to protect the utilisation of 23.5 T.M.C. under this Project, knowing fully well that out of 23.5 T.M.C. a quantity of 3.1 T.M.C. would be used for water supply. Presumably because the return flow from the water supply would be used for irrigation, the entire water required for the water supply was allowed by consent of the parties. The Khadakwasla Project Report 1957 (MRPK-XVI page 38) shows that even in 1957, some crops were being grown with effluent water. It may be noted that on the 7th May, 1971, the parties also agreed to protect the consumptive use of 0.3 T.M.C. being 20 percent of the total withdrawal of 1.6 T.M.C. for Sholapur City Water Supply Scheme presumably because the water would not be used for irrigation. On the same day, the parties agreed to protect the utilisation of 3.9 T.M.C. for water supply to the twin city of Hyderabad and Secunderabad representing 3.1 T.M.C. for evaporation, 0.52 T.M.C. being 20 percent of water supply use and 0.30 T.M.C. for sewage farm, see MRDK-VIII, pages 61-63.

In addition to the protected utilisation of 23.5 T.M.C., Maharashtra asked for an additional 9.6 T.M.C. for irrigating an additional area of 51,000 acres (the corresponding additional cropped area being 58,140 acres) and for supplying additional drinking water and we allowed this demand for 9.6 T.M.C. as it would irrigate an extra 51,000 acres in scarcity areas, see Report Vol. II pages 676-678, MRPK-XXVIII pages 137-142. It may be noted that part of this water may first be used for drinking water supply and then used for irrigation. We see no ground for reducing the allocation of either 23.5 T.M.C. or 9.6 T.M.C. in respect of Mutha System Ex-Khadakwasla.

In this connection we may record the following statement made by the learned Advocate-General of Maharashtra on the 14th August, 1974 with regard to Mutha System Ex-Khadakwasla Project:—

193 " At page 330 of the Tribunal's Report under Serial No. 10 which refers to the Project Re : Mutha System Ex-Khadakwasla, the agreed quantum of water which is protected is shown as 23.5 T.M.C. In the Project Note relating to Khadakwasla, MRPK-28 at page 137, para 3.1, a quantity of 5 T.M.C. is shown as required for the water supply of Poona City, National Defence Academy, etc. On behalf of the State of Maharashtra, the Advocate-General of Maharashtra States that if 5 T.M.C. of water, or any other quantity of water, out of the aforesaid 23.5 T.M.C. of water and the additional 9.6 T.M.C. of water allotted by the Tribunal for the said Project, as stated at page 678 of its Report, is used for domestic and/or municipal purposes, the State of Maharashtra will not contend that such user is to be computed at 20 per cent of the quantity so used and will proceed on the basis that the entire user of the said Project will be measured by 100 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoirs, storage or canal."

Learned Counsel for the State of Maharashtra drew our attention to the fact that a portion of the water allowed in respect of Gandhorinala and Malaprabha Projects of Karnataka may be used for water supply to towns, see Report Vol. II page 746, MYPK-XIV pages 6, 7, 10 and MYPK-II page 13. These projects are primarily irrigation projects and the fact that a portion of the water allowed in respect of these projects may be used for water supply to towns is no ground for cutting down the allocations to the State of Karnataka.

GOKAK CANAL

194 In view of the new point raised by the State of Karnataka during argument with regard to Mutha System Ex-Khadakwasla Project, the learned Advocate General of Maharashtra submitted that though he did not ask for any modification of the Report in this behalf, he would like to point out that the allocation of 1.4 T.M.C. in respect of Gokak Canal at page 724 of Vol. II of the Report was an excess allocation to the State of Karnataka in as much as this allocation was inconsistent with our finding at pages 337-338 of Vol. I of the Report that no separate provision for Gokak Canal was necessary and its water requirement would be met from the water provided for the Ghataprabha Left Bank Canal. Mr. Andhyarujina, learned Counsel for the State of Maharashtra also advanced the same argument, see MR Reference Note No. 11. We do not accept this argument.

195 MYPK-XIII page 9 shows that the total demand for Ghataprabha Project Stages I, II, III & IV was 120 T.M.C. comprising 48 T.M.C. for Stages I&II (Ghataprabha Left Bank Canal), 48 T.M.C. for Stage III and 24 T.M.C. for Stage IV. At pages 9-14 of MYPK-XIII, Karnataka stated that if the storage at Ajra on the Hiranyakeshi river were not available, 94.30 T.M.C. would be required to provide irrigation facilities under the four stages of the Project, see also Report Vol. I page 709, KR Reference Note No. XV. At pages 720-726 of Vol. II of the Report we found that the actual requirement of the entire project was 91.30 T.M.C. out of which 36.6 T.M.C. was protected and the balance requirement was 54.7 say 55 T.M.C. We allowed this additional

demand for 55 T.M.C. in respect of the entire Project in all its stages including 1.4 T.M.C. for the Gokak Canal. Obviously, this demand of 1.4 T.M.C. was allowed as part of the total water requirement of the entire Ghataprabha Project Stages I, II, III and IV including that of Gokak Canal.

UPPER KRISHNA PROJECT

196

Mr. Andhyarujina drew our attention to the following observations at page 719 of Vol. II of the Report:

" In our opinion water may be provided to irrigate an area of 4.3 lakh acres by the Narayanapur Right Bank Canal, as contemplated under the sanctioned Project. The demand for the Right Bank Canal is 52 T.M.C. The demand of the State of Mysore to the extent of 52 T.M.C. for this project is worth consideration."

Mr. Andhyarujina argued that under the sanctioned Upper Krishna Project only 3.20 lakh acres were to be irrigated from the Narayanpur Left Bank Canal for which only 47.69 T.M.C. was required, and consequently the allowance of the demand for 52 T.M.C. to irrigate 4.3 lakh acres from the Narayanpur Right Bank Canal under the sanctioned Project has resulted in excess allocation to Karnataka. We cannot accept this argument. At pages 716, 717 and 719 of our Report Vol. II, we have pointed out that the protected utilisation for the Project is 103 T.M.C., that the Project is not being executed according to the sanction given by the Planning Commission and that Karnataka proposes to utilise the entire 103 T.M.C. for the Narayanpur Left Bank Canal and wants an additional 52 T.M.C. for the Right Bank Canal to irrigate 4.3 lakh acres under the modified Project as envisaged in MYPK-III. We allowed this additional demand of 52 T.M.C. for the modified Project. We may also point out that the utilisation for the Right Bank Canal including evaporation losses as envisaged by the sanctioned Project was 52 T.M.C. and not 47.69 T.M.C., see MYPK-I pages 35, 109 and 112. However to avoid any misunderstanding, we have directed that the following words in lines 3 and 4 from the bottom at page 719 of Vol. II of the Report be deleted :—

197

", as contemplated under the sanctioned Project".

Mr. Andhyarujina also argued that the statement at page 717 of Vol. II of the Report that the Left and Right Bank Canals from Almatti Reservoir were to irrigate 1.20 lakh acres is incorrect. We are unable to accept this argument. The above statement is a summary of the modified Project envisaged in MYPK-III page 13. We may also point out that we did not allow any demand for water in respect of the Almatti Canals,

KOLCHI WEIR AND MALAPRABHA PROJECT

198

Mr. Andhyarujina argued that there was excessive allocation of 0.53 T.M.C. to Karnataka in respect of Kolchi Weir as its utilisation was included in the demand for 37.20 T.M.C. in respect of the Malaprabha Project allowed by us.

We are unable to accept this argument. This demand for 37.20 T.M.C. included the demand for 1.95 T.M.C. for the Kolchi Weir extension to irrigate an additional area of 20,000 acres, see MYPK-V pages 3, 9, 15, 25, 27, 47, but it did not include the demand of water for the existing Kolchi Weir. Karnataka demanded 0.53 T.M.C. separately for the Kolchi Weir (see MYK-I page 97) and this demand was allowed at pages 384—385 of Vol. I of the Report.

199 Mr. Andhyarujina also argued that there was excessive allocation of 0.2 T.M.C. for the Malaprabha Project because Karnataka demanded 44 T.M.C. only in respect of this project whereas the Tribunal has allowed 44.2 (37.2+7) T.M.C. for it. We are unable to accept this argument. Karnataka had demanded 49 T.M.C. for the Malaprabha and Upper Malaprabha Projects (see Report Vol. II page 709, MYPK-V page 15, MYPK-VIII page 57) out of which 37.20 T.M.C. and 9 T.M.C. aggregating to 46.20 T.M.C. only was allowed by us, see Report Vol. I page 330, Vol. II pages 731-735, 769. We are satisfied that, there is! no excessive allocation to Karnataka in respect of Kolchi Weir or in respect of Malaprabha Project.

CHAPTER V

Reference No. IV of 1974 by the State of Maharashtra

200

In this Reference, the State of Maharashtra seeks clarification, explanation and guidance on the points mentioned and dealt with below:

Clarification No. (a)

Maharashtra points out that the protected annual westward diversion from the Tata Hydel Projects is 42.6 T.M.C. excluding evaporation losses (see Report Vol. I page 330, Vol. II page 413), that 5 times 42.6 is 213 and not 212 and yet due to arithmetical or clerical mistake, we have stated in Clause X (2) of our Final Order that Maharashtra shall not divert more than 212 T.M.C in any period of five consecutive years. Maharashtra prays that this mistake be corrected.

We agree with Maharashtra's contention. We direct that the figure " 213 " be substituted for the figure " 212 " appearing at page 786 line 19 in Clause X(2) of the Final Order, and at page 476 line 13 and page 484 line 4 of Vol. II of the Report.

Clarification No. (b)

201

Maharashtra submits that the requirement of Clause XIII (A) (h) of the Final Order to prepare and maintain records of "estimated annual evaporation losses from reservoirs and storages " does not apply to tanks and storages utilising less than 1 T.M.C. of water annually as irrigation works using less than 1 T.M.C. annually are dealt with specifically in Clause XIII(A) (b) and (g). Maharashtra prays that the Tribunal should supply the necessary explanation.

It is not disputed by any party that sub-Clause (h) of Clause XIII (A) at page 789 of Vol. II of the Report was not intended to apply to reservoirs and storages using less than 1 T.M.C. each annually.

We direct that the words "using 1 T.M.C. or more annually" be added at the end of sub-Clause (h) at page 789 of Vol. II of the Report and that the word " reservoirs" be substituted for the word " reservoir" in the aforesaid sub-Clause (h) so that the amended sub-Clause (h) of Clause XIII (A) at page 789 of Vol. II of the Report will read as follows :—

"estimated annual evaporation losses from reservoirs and storages using 1 T.M.C. or more annually. "

ACKNOWLEDGEMENT

We must acknowledge our indebtedness to learned Counsel for the Governments of India and States and their representatives for the help they have

202

rendered to us in formulating our views on the important and intricate problems referred to us for decision in the References filed by the Government of India and party-States under section 5(3) of the Inter-State Water Disputes Act, 1956. Learned Counsel for all the States appearing before us argued their respective points of view with conspicuous ability and remarkable clarity and thoroughness. We were indeed fortunate to work in an atmosphere where it was possible for us with the help of the learned Counsel of all the party-States to examine and adjudicate on the references in a calm and dispassionate manner.

We must also acknowledge the valuable assistance given to us by our staff in the course of hearing of this case. In particular, we desire to place on record that although Shri R. P. Marwaha joined as Secretary of the Tribunal in December, 1973, after submission of our Original Report, he acquainted himself fully with the voluminous records of this case in a remarkably short time and worked with praiseworthy earnestness and commendable devotion to duty.

The modifications made in the Report of the Tribunal (except in the Final Order) forwarded under section 5(2) of the Inter-State Water Disputes Act, 1956 as a result of the explanations given by the Tribunal under section 5(3) of the said Act are set forth in Appendices A, B and C to this Chapter.

The modifications made in the Final Order as a result of the explanations given by the Tribunal under section 5(3) of the said Act have been mentioned in the preceding Chapters. The following typographical and/or clerical errors in the Final Order be also corrected :

- (1) In the Final Order set forth in Vol. II of the Report, substitute "Official Gazette" for "official gazette" wherever those words occur.
- (2) In Clause XI (A) (iv) of the Final Order at page 787 of Vol. II of the Report, substitute " so far as " for " ; in so far ".
- (3) In Clause XVIII of the Final Order at page 791 of Vol. II of the Report, substitute " Governments " for " Government ".

The Final Order modified as a result of the explanations given by the Tribunal under section 5(3) of the said Act and as mentioned above is set forth in Chapter VII.

APPENDIX-A

204

The following modifications in the Original Report as mentioned in this Report be made:—

(1) (a) the following sentence in lines 16 and 17 at page 166 of Vol. I of the Report be deleted :—

" Until another control body is established, such control may be vested in the Tungabhadra Board." ; and

(b) the following sentence be added after the words " if necessary "*" in line 22 at page 166 of Vol. I of the Report :—

"Until another control body is established, such control as is already vested in the Tungabhadra Board may continue to be vested in the Tungabhadra Board. "

(2) after the last sentence at page 167 of Vol. I of the Report beginning with the words " We consider that the existing practice " and ending with the words " until another control body is established " the following sentence be added :—

" On a careful consideration of the matter, we have given suitable directions for the preparation of working tables of the Tungabhadra Dam in Clause IX (E) of the Final Order. "

205 (3) after the addition of the above sentence, the following paragraph be added at the end of page 167 of Vol. I of the Report :

" We direct that the statement * The arrangement ----- in future years mentioned above be not added in the working tables prepared hereafter by the Tungabhadra Board or any other authority established in its place ".

(4) the following observation at page 190 of Vol. I of the Report be deleted :—

" but instead of co-operative approach and mutual agreement, there is vigorous opposition to all such extension schemes by the State of Mysore "

(5) (a) the words " We are providing for review disputing such claim." appearing in lines 5 to 21 at page 226 of Vol. I of the Report be deleted and in their place the following words be substituted :—

"In respect of this matter we propose to give suitable directions in Clause XIV(B) of the Final Order."

(b) the words "before the aforesaid reviewing authority or Tribunal" appearing in lines 19 and 20 at page 514 of Vol. II of the Report be deleted and in their place the following words be substituted :—

"before any authority or Tribunal even before the 31st May. 2000".

(6) the figure " 10 " be substituted for the figure " 7 1/2 " in line 2 at page 280, **206** lines 17 and 27 at page 283, line 10 at page 284, lines 4, 15 and 25 at page 285 , line 24 at page 286, lines 9 and 20 at page 287 of Vol. I of the Report.

(7) (a) the words " In 1947, the " appearing in the 23rd line at page 186 of Vol. I of the Report be deleted and in their place the word "The" be substituted.

(b) the figure " 1947 " appearing in line 16 at page 363 of Vol. I of the Report be deleted.

(8) at page 364 of Vol. I of the Report

(a) in line 6 the figure " 1955 " be substituted for " 1954".

(b) in line 14 the words " we find that " be substituted for the words "Since 1956 up to September 1960".

(c) in line 15 the word " considered" be deleted and the word " reasonable " be added before the word " requirement ".

(9) lines 1 to 4 at page 385 of Vol. I of the Report be deleted and in their place the following passage be substituted :—

" The above mentioned four works were under construction in September, 1960 and as they came into operation subsequently, their utilisations are not reflected in the figure of utilisations under minor irrigation works in Krishna **207** basin in Mysore State for the decade 1951-52 to 1960-61. However, as these works were committed as on September, 1960, their utilisations also may be protected. Adding the utilisations for the above works, the sub-basinwise utilisations under minor irrigation works in Krishna basin in Mysore State committed as on September, 1960 were as follows :—"

(10) the words "It is common case before us that" in the 11th line at page 387 of Vol. I of the Report be deleted and in their place the words "In our opinion " be substituted.

(11) the figure "213" be substituted for the figure "212" appearing at page 476 line 13 and page 484 line 4 of Vol. II of the Report.

(12) the figure and words "281 T.M.C. inclusive of evaporation losses" be substituted for the figure and words "264 T.M.C. " in lines 3 and 10 at page 578 and the figure "462.20" be substituted for the figure "445.20" in line 14 at page 578 of Vol. II of the Report.

(13) (a) the following sentences be added at page 600 of Vol. II of the Report at the end of the paragraph dealing with Clause IX of the Final Order :—

" We have placed the restrictions in Clause IX on a consideration of all **208** relevant materials including the progressive increase of return flow. In Clause IX(E), we have given directions as to how the water in the Tungabhadra Dam is to be utilised."

(b) in the paragraph dealing with Issue No. IV(B)(a) at page 602 of Vol. II of the Report after the sentence beginning with the words " With regard to Issue No. IV(B)(a)" and ending with the words " as mentioned hereinbefore ", the following sentence be added :—

" Whatever directions are necessary have been given in Clause IX(E) of the Final Order."

(14) (a) the words "T.M.C. " in lines 22, 23 and 24 at page 604 of Vol. II of the Report be deleted ; and

(b) sub-paragraph (B) of paragraph 2 in lines 25 to 28 at page 604 and lines 1 to 4 at page 605 of Vol. II of the Report be deleted and in its place the following sub-paragraph (B) of paragraph 2 be substituted :—

209 " (B) If the total quantity of water used by all the three States in a water year is more than 2060 T.M.C., the States of Maharashtra, Mysore and Andhra Pradesh shall share the water in that water year as mentioned below :—

(i) Up to 2060 T.M.C. as stated in paragraph 2(A) above and excess upto 2130 T.M.C. as follows:

State of Maharashtra	..	35% of such excess
State of Mysore	..	50% of such excess
State of Andhra Pradesh	..	15% of such excess

(ii) Upto 2130 T.M.C. as stated in paragraph 2(B)(i) above and excess over 2130 T.M.C. as follows:

State of Maharashtra	..	25% of such excess
State of Mysore	..	50% of such excess
State of Andhra Pradesh	..	25% of such excess

(15) (a) " A " in line 17 at page 606 and the whole of sub-paragraph (B) of paragraph 7 at lines 1 to 5 from bottom at page 606 and lines 1 to 5 at page 607 of Vol. II of the Report be deleted.

(b) the words " and as often as the Krishna Valley Authority thinks fit" be inserted after the words " last week of May " and before the words " the Krishna Valley Authority " in paragraph 8 in lines 6 and 7 at page 607 of Vol. II of the Report.

210 (c) the word " May" in paragraph 9(A)(ii) in line 22 at page 607 of Vol. II of the Report be deleted and in its place the word " July " be substituted.

(d) in line 23 at page 616 of Vol. II of the Report at the end of the paragraph beginning with the words "In the first case the State of Andhra Pradesh", the words "share equally" be deleted and in their place the words " share equitably " be substituted.

(16) the following words in lines 2 to 4 at page 704 of the Report Vol. II be deleted :—

" , which according to the State of Maharashtra were in existence even before 1960".

(17) the following words in the 3rd and 4th lines from the bottom at page 719 of Vol. II of the Report be deleted :—

" , as contemplated under the sanctioned Project".

APPENDIX-B

As indicated under clarification No. 7 of Reference No. II of 1974 by the State of Andhra Pradesh the following typographical and or clerical errors be corrected in the Report :—

At page 63 of Vol. I of the Report line 2, substitute "30 per cent" for "3 per cent".

„ 104	”	”	”	line 2, substitute " new " for " New " .
„ 176	”	”	”	last line, substitute " 1956 " for " 1957".
„ 181	”	”	”	line 9, substitute " Satara " for " Stara " .
„ 278	”	”	”	last line, delete " from " .
„ 289	”	”	”	last but one line, delete " , " .
„ 290	”	”	”	first line, substitute " 20th " for " 17th
305	”	”	”	line 4, substitute " lend " for " land " .
" 355	”	”	”	third line from the bottom, substitute " 29, 403" for "29.403".
" 357	”	”	”	line 17, substituted "82, 569" for "82, 659".
„ 383	”	”	”	last line, substitute " uses " for " users "
„ 411 of Vol.	”	”	”	line 15, substitute " Right " for " Left "
„ 450	”	”	”	line 8, substitute " 6000 " for " 6600 " .
" 459	”	”	”	line 7 from the bottom substitute " 33 " for "39".

At page 497 of Vol. II of the Report last but one line, substitute " 1693.36" for "1684.11". 212

" 508	”	”	”	line 3, add after " Project " the words " and there is some carry-over capacity in the existing Bhadra Project".
" 529	”	”	”	line 3 from bottom, substitute the words " executing its " for the word " this " .
„ 535	”	”	”	line 10, substitute "data" for "date".
" 605	”	”	”	lines 11 and 14, substitute "unutilised" for " utilised " .
" 609	”	”	”	line 5, substitute " insurmountable " for " unsurmountable " .
„ 609	”	”	”	line 16 substitute "onset" for "on-set".
„ 609	”	”	”	line 21, substituted "not so" for "as".
" 610	”	”	”	last line, substitute " project in " for " project to " .
„ 612	”	”	”	line 10, substitute "can" for "cannot".
" 694	”	”	”	line 4 from bottom, substitute " 34,000 " for "39000".

APPENDIX-C

231 As indicated under clarification No. IX of the Reference No. III of 1974 by the State of Karnataka, the following modifications be made in the Report:—

At page 596 of Vol. II of the Report line 6, the figure " 14.42 " be substituted for the figure " 14 ".

At page 596 of Vol. II of the Report line 14, the figure " 15.95 " be substituted for the figure "17.80".

At page 596 of Vol. II of the Report line 15, the figure " 22.90 " be substituted for the figure "26.47".

At page 596 of Vol II of the Report line 16, the figure " 120.35 " be substituted for the figure "125.35".

At page 596 of Vol. II of the Report line 22, the figure " 57 " be substituted for the figure " 52 ".

At page 597 of Vol. II of the Report line 13, the figure " 195.45 " be substituted for the figure "190.45".

At page 597 of Vol. II of the Report line 18, the figure " 120.35 " be substituted for the figure "125.35".

At page 597 of Vol. II of the Report line 19, the figure " 195.45 " be substituted for the figure "190.45".

At page 597 of Vol. II of the Report line 24, the figure " 560 " be substituted for the figure " 565 ",

At page 597 of Vol. II of the Report line 25, the figure " 700 " be substituted for the figure " 695 ".

At page 604 of Vol. II of the Report line 22, the figure " 560 " be substituted for the figure " 565 ".

At page 604 of Vol. II of the Report line 23, the figure " 700 " be substituted for the figure " 695 ".

At page 666 of Vol II of the Report line 20, the figure " 14.42 " be substituted for the figure " 14 ".

At page 702 of Vol. II of the Report after line 12, the following be added :—

" 4. Lift irrigation being item No. I(j) (iii) of MRPK-XXXI to be covered by the Koyna-Krishna Lift Irrigation Scheme—1865 Mcft ".

214 At page 702 of Vol. II of the Report line 13, the figure "7153 " be substituted for the figure " 5288 ".

At page 702 of Vol. II of the Report, in line 23, ", " be substituted for " and " and in line 24 after the words " Gudavale Command area " the words " and Koyna-Krishna Lift Irrigation Command Area " be substituted. In the same line the figure " 7153 " be substituted for the figure "5288 ".

At page 702 of Vol. II of the Report line 26, the figure " 15,947 " be substituted for the figure " 17,812 ".

At page 702 of Vol. II of the Report line 28, the figure " 15.95 " be substituted for the figure " 17.8 ".

At page 704 of Vol. II of the Report the last sentence be deleted and in its place the following be substituted :

"This demand of 22.37 T.M.C. taken as worth consideration includes the demands of 1570 Mcft., 747 Mcft. and 1234 Mcft. aggregating to 3551 Mcft. under item I(a), I(j) (iv), I(j) (viii) of MRPK-XXXI which we have allowed under bandharas, weirs and lift irrigation schemes at pages 699 to 702. Deducting 3551 Mcft. from 22.37 T.M.C. and adding 4.1 T.M.C., the total demand of 22.919 T.M.C. or say 22.90 T.M.C. is worth consideration."

At page 705 of Vol. II of the Report line 12, the figure " 14.42 " be substituted for the figure " 14 ".

At page 705 of Vol. II of the Report line 21, the figure " 15.95 " be substituted for the figure " 17.80".

At page 705 of Vol. II of the Report line 22, the figure " 22.90 " be substituted for the figure "26.47".

At page 705 of Vol. II of the Report line 23, the figure " 120.35 " be substituted for the figure "125.35".

At page 719 of Vol. II of the Report, the last sentence reading "The demand of the State of Mysore to the extent of 52 T.M.C. for this Project is worth consideration " be deleted and in its place the following be substituted :

"Another 5 T.M.C. is required for Hippargi Weir. Thus the demand of the State of Mysore to the extent of 57 T.M.C. is worth consideration for the present".

At page 769 of Vol. II of the Report line 9, the figure " 57 " be substituted for "52". 215

At page 769 of Vol. II of the Report line 26, the figure " 195.45 " be substituted for "190.45".

The Final Order set forth in Chapter XVI of the Original Report Vol. II pages 776-800 modified in accordance with the explanations given by the Tribunal under section 5(3) of the Inter-State Water Disputes Act, 1956 is given below :—

Final Order of the Tribunal

The Tribunal hereby passes the following Order :—

Clause I

This Order shall come into operation on the date of the publication of the decision of this Tribunal in the Official Gazette under section 6 of the Inter-State Water Disputes Act, 1956.

Clause II

The Tribunal hereby declares that the States of Maharashtra, Karnataka and Andhra Pradesh will be free to make use of underground water within their respective State territories in the Krishna river basin.

This declaration shall not be taken to alter in any way the rights, if any, under the law for the time being in force of private individuals, bodies or authorities.

Use of underground water by any State shall not be reckoned as use of the water of the river Krishna.

217 Clause III

The Tribunal hereby determines that, for the purpose of this case, the 75 per cent dependable flow of the river Krishna up to Vijayawada is 2060 T.M.C.

The Tribunal considers that the entire 2060 T.M.C. is available for distribution between the States of Maharashtra, Karnataka and Andhra Pradesh.

The Tribunal further considers that additional quantities of water as mentioned in sub-Clauses A(ii), A(iii), A(iv), B(ii), B(iii), B(iv), C(ii), C(iii) and C(iv) of Clause V will be added to the 75 per cent dependable flow of the river Krishna up to Vijayawada on account of return flows and will be available for distribution between the States of Maharashtra, Karnataka and Andhra Pradesh.

Clause IV

The Tribunal hereby orders that the waters of the river Krishna be allocated to the three States of Maharashtra, Karnataka and Andhra Pradesh for their beneficial use to the extent provided in Clause V and subject to such conditions and restrictions as are mentioned hereinafter.

Clause V

(A) The State of Maharashtra shall not use in any water year more than the quantity of water of the river Krishna specified hereunder :—

(1) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the Official Gazette up to the water year 1982-83. **218**

560 T.M.C.

(ii) as from the water year 1983-84 up to the water year 1989-90 560 T.M.C. plus a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(iii) as from the water year 1990-91 up to the water year 1997-98 560 T.M.C. plus a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects. **219**

(iv) as from the water year 1998-99 onwards 560 T.M.C. plus a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisation for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(B) The State of Karnataka shall not use in any water year more than the quantity of water of the river Krishna specified hereunder :—

(i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the Official Gazette up to the water year 1982-83.

700 T.M.C.

(ii) as from the water year 1983-84 up to the water year 1989-90 700 T.M.C. plus a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects. **220**

(iii) as from the water year 1990-91 up to the water year 1997-98 700 T.M.C. plus a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(iv) as from the water year 1998-99 onwards 700 T.M.C. plus a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisation for irrigation in the Krishna river basin during the water

years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

221 (C) The State of Andhra Pradesh will be at liberty to use in any water year the remaining water that may be flowing in the river Krishna but thereby it shall not acquire any right whatsoever to use in any water year nor be deemed to have been allocated in any water year water of the river Krishna in excess of the quantity specified hereunder :—

(i) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the Official Gazette up to the water year 1982-83.

800 T.M.C.

(ii) as from the water year 1983-84 up to the water year 1989-90
800 T.M.C. plus

a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

222 (iii) as from the water year 1990-91 up to the water year 1997-98
800 T.M.C. plus

a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(iv) as from the water year 1998-99 onwards 800 T.M.C. plus
a quantity of water equivalent to 10 per cent of the excess of the average of the annual utilisation for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

(D) For the limited purpose of this Clause, it is declared that—

(i) the utilisations for irrigation in the Krishna river basin in the water year 1968-69 from projects using 3 T.M.C. or more annually were as follows :—

223

From projects of the State of Maharashtra	..	61.45 T.M.C.
From projects of the State of Karnataka	..	176.05 T.M.C.
From projects of the State of Andhra Pradesh	..	170.00 T.M.C.

(ii) annual utilisations for irrigation in the Krishna river basin in each water year after this Order comes into operation from the projects of any State using 3 T.M.C. or more annually shall be computed on the basis of the records prepared and maintained by that State under Clause XIII.

(iii) evaporation losses from reservoirs of projects using 3 T.M.C. or more annually shall be excluded in computing the 10 per cent figure of the average annual utilisations mentioned in sub-Clauses A(ii), A(iii), A(iv), B(ii), B(iii), B(iv), C(ii), C(iii), and C(iv) of this Clause.

Clause VI

Beneficial use shall include any use made by any State of the waters of the river Krishna for domestic, municipal, irrigation, industrial, production of power, navigation, pisciculture, wild life protection and recreation purposes.

Clause VII

(A) Except as provided hereunder a use shall be measured by the extent of depletion of the waters of the river Krishna in any manner whatsoever including losses of water by evaporation and other natural causes from man made reservoirs and other works without deducting in the case of use for irrigation the quantity of water that may return after such use to the river.

224

The water stored in any reservoir across any stream of the Krishna river system shall not of itself be reckoned as depletion of the water of the stream except to the extent of the losses of water from evaporation and other natural causes from such reservoir. The water diverted from such reservoir by any State for its own use in any water year shall be reckoned as use by that State in that water year.

The uses mentioned in column No. 1 below shall be measured in the manner indicated in column No. 2.

Use	Measurement
Domestic and municipal water supply.	By 20 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.
Industrial use	By 2.5 per cent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir, storage or canal.

(B) Diversion of the waters of the river Krishna by one State for the benefit of another State shall be treated as diversion by the State for whose benefit the diversion is made.

225

Clause VIII

(A) If in any water year any State is not able to use any portion of the water allocated to it during that year on account of the non-development of its projects or damage to any of its projects or does not use it for any reason whatsoever, that State will not be entitled to claim the unutilised water in any subsequent water year.

(B) Failure of any State to make use of any portion of the water allocated to it during any water year shall not constitute forfeiture or abandonment of its share of water in any subsequent water year nor shall it increase the share of any other State in any subsequent water year even if such State may have used such water.

Clause IX

As from the 1st June next after the date of the publication of the decision of the Tribunal in the Official Gazette

(A). Out of the water allowed to it, any water year —

(i) more than 7 T.M.C. from the Ghataprabha (K-3) sub-basin.

226

(ii) more than the quantity of water specified hereunder from the main stream of the river Bhima.

(a) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the Official Gazette upto the water year 1989-90.

90 T.M.C.

(b) as from the water year 1990-91.

95 T.M.C.

(B). Out of the water allocated to it the State of Karnataka shall not use in any water year—

(i) more than the quantity of water specified hereunder from the Tungabhadra (K-8) sub-basin

(a) as from the water year commencing on the 1st June next after the date of the publication of the decision of the Tribunal in the Official Gazette up to the water year 1982-83.

295 T.M.C.

227

(b) as from the water year 1983-84 up to the water year 1989-90

295 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1975-76, 1976-77 and 1977-78 from its own projects using 3 T.M.C. or more annually over the utilisations from such irrigation in the water year 1968-69 from such projects.

(c) as from the water year 1990-91 up to the water year 1997-98

295 T.M.C.

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisations for irrigation in the Krishna river basin during the water years 1982-83, 1983-84 and 1984-85 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

228

(d) as from the water year 1998-99 onwards 295 T.M.C. plus

a quantity of water equivalent to 7 ½ per cent of the excess of the average of the annual utilisation for irrigation in the Krishna river basin during the water years 1990-91, 1991-92 and 1992-93 from its own projects using 3 T.M.C. or more annually over the utilisations for such irrigation in the water year 1968-69 from such projects.

For the limited purpose of this sub-Clause, it is declared that—

The utilisations for irrigation in the Krishna river basin in the water year 1968-69 from projects of the State of Karnataka using 3 T.M.C. or more annually shall be taken to be 176.05 T.M.C.

229

Annual utilisations for irrigation in the Krishna river basin in each water year after this Order comes into operation from the projects of the State of Karnataka using 3 T.M.C. or more annually shall be computed on the basis of the records prepared and maintained by that State under Clause XIII.

Evaporation losses from reservoirs of projects using 3 T.M.C. or more annually shall be excluded in computing the 7 ½ per cent figure of the average annual utilisations mentioned above.

(ii) more than 42 T.M.C. from the Vedavathi (K-9) sub-basin and
 (iii) more than 15 T.M.C. from the main stream of the river Bhima.
 (C) Out of the water allocated to it, the State of Andhra Pradesh shall not use in any water year—
 (i) more than 127 T.M.C. from the Tungabhadra (K-8) sub-basin and more than 12.5 T.M.C. from the Vedavathi (K-9) sub-basin.
 (ii) more than 6 T.M.C. from the catchment of the river Kagna in the State of Andhra Pradesh.

(D) (i) The uses mentioned in sub-Clauses (A), (B) and (C) aforesaid include evaporation losses.

(ii) The use mentioned in sub-Clause (C) (i) does not include use of the water flowing from the Tungabhadra into the river Krishna.

(E) (1) The following directions shall be observed for use of the water available for utilisation in the Tungabhadra Dam in a water year—

230

(a) The water available for utilisation in a water year in the Tungabhadra Dam shall be so utilised that the demands of water for the following Projects to the extent mentioned below may be met :—

(i) Tungabhadra Right Bank Low Level Canal .. 52.00 T.M.C.

Water available for Tungabhadra Right Bank Low Level Canal shall be shared by the States of Karnataka and Andhra Pradesh in the following proportion :

State of Karnataka 22.50

State of Andhra Pradesh 29.50

(ii) Tungabhadra Right Bank High Level Canal—Stages I and II .. 50.00 T.M.C.

Water available for Tungabhadra Right Bank High Level Canal shall be shared by the States of Karnataka and Andhra Pradesh in the following proportion :

State of Karnataka 17.50

State of Andhra Pradesh 32.50

(iii) Tungabhadra Left Bank Low Level and High Level Canals .. 102.00 T.M.C.

(iv) Raya and Basavanna Channels of the State of Karnataka .. 7.00 T.M.C.

(v) Assistance by way of regulated discharges to Vijayanagar Channels other than Raya and Basavanna Channels of the State of Karnataka .. 2.00 T.M.C.

(vi) Assistance by way of regulated discharges to the Rajolibunda Diversion Scheme for use by the States of Karnataka

231

and Andhra Pradesh in the proportion mentioned in Clause XI (C) .. 7.00T.M.C.

(vii) Assistance by way of regulated discharges to the Kurnool-Cuddapah Canal of the State of Andhra Pradesh.. 10.00T.M.C.

230.00T.M.C.

The utilisations of the Projects mentioned in sub-Clauses (a)(i), (ii) and (iii) above include the evaporation losses in the Tungabhadra Dam Which will be shared in accordance with Clause XI(D).

(b) If, in any water year, water available for utilisation in the Tungabhadra Dam is less than the total quantity of water required for all the Projects as mentioned above, the deficiency shall be shared by all the Projects proportionately. The proportions shall be worked out after excluding the evaporation losses.

232 (c) If, in any water year, water available for utilisation is more than the total quantity of water required for all the Projects as mentioned above, the requirements for all the Projects for the month of June in the succeeding water year as estimated by the Tungabhadra Board or any authority established in its place shall be kept in reserve and the State of Karnataka shall have the right to utilise the remaining water in excess of such reserve in the Tungabhadra Dam for its Projects mentioned in sub-Clauses (a)(i), (ii) and (iii) above drawing wafer from that dam even though thereby it may cross in any water year the limit on the utilisation of water from Tungabhadra (K-8) sub-basin placed under Clause IX(B) of the Final Order but in no case such utilisation shall exceed 320 T.M.C.

(d) The balance water, if any, shall be kept stored in the dam for use in the next year.

(2) The working tables for the utilisation of the water in the Tungabhadra Dam shall be prepared as hithertofore by the Tungabhadra Board or any other authority established in its place so as to enable the States of Karnataka and Andhra Pradesh to utilise the water available for utilisation in the Tungabhadra Dam as aforesaid.

233 (3) If in any water year, either of the two States of Karnataka and Andhra Pradesh finds it expedient to divert the water available to it in the Tungabhadra Dam for any one of its Projects to any other of its Project or Projects mentioned above for use therein, it may give notice thereof to the Tungabhadra Board or any other authority established in its place and the said Board or authority may, if it is feasible to do so, prepare or modify the working table accordingly.

(4) The States of Karnataka and Andhra Pradesh may use the water available in the Tungabhadra Dam in accordance with the aforesaid provisions and nothing contained in Clause V shall be construed as overriding the provisions of Clause IX(E) in the matter of utilisation of the water available in the Tungabhadra Dam nor shall anything contained in Clause IX(E) be construed as enlarging the total allocation to the State of Karnataka or as enlarging the limit of acquisition of any right by the State of Andhra Pradesh in the waters of the river Krishna.

(5) The States of Karnataka and Andhra Pradesh may by agreement, without reference to the State of Maharashtra, alter or modify any of the provisions for the utilisation of the water available in the Tungabhadra Dam mentioned above in any manner.

Clause X

(1) The State of Maharashtra shall not out of the water allocated to it divert or permit the diversion of more than 67.5 T.M.C. of water outside the Krishna river basin in any water year from the river supplies in the Upper Krishna (K-1) sub-basin for the Koyna Hydel Project or any other project.

Provided that the State of Maharashtra will be at liberty to divert outside the Krishna river basin for the Koyna Hydel Project water to the extent of 97 T. M. C. annually during the period of 10 years commencing on the 1st June, 1974 and water to the extent of 87 T.M.C. annually during the next period of 5 years commencing on the 1st June, 1984 and water to the extent of 78 T.M.C. annually during the next succeeding period of 5 years commencing on the 1st June, 1989.

234

(2) The State of Maharashtra shall not out of the water allocated to it divert or permit diversion outside the Krishna river basin from the river supplies in the Upper Bhima (K-5) sub-basin for the Projects collectively known as the Tata Hydel Works or any other project of more than 54.5 T.M.C. annually in any one water year and more than 213 T.M.C. in any period of five consecutive water years commencing on the 1st June, 1974.

(3) Except to the extent mentioned above, the State of Maharashtra shall not divert or permit diversion of any water out of the Krishna river basin.

Clause XI

(A) This Order will supersede—

(i) the agreement of 1892 between Madras and Mysore so far as it related to the Krishna system ;

(ii) the agreement of 1933 between Madras and Mysore so far as it related to the Krishna river system ;

235

(iii) the agreement of June, 1944 between Madras and Hyderabad ;

(iv) the agreement of July, 1944 between Madras and Mysore so far as it related to the Krishna river system ;

(v) the supplemental agreement of December, 1945 among Madras, Mysore and Hyderabad ;

(vi) the supplemental agreement of 1946 among Madras, Mysore and Hyderabad.

Copies of the aforesaid agreements are appended to the Report of the Tribunal.

(B) The regulations set forth in Annexure ' A ' (1) to this Order regarding protection to the irrigation works in the respective territories of the States of Karnataka and Andhra Pradesh in the Vedavathi sub-basin be observed and carried out.

*

(1) Annexure ' A ' mentioned above is the same as Annexure ' A ' to the Final Order appearing at pages 792 to 794 of Vol. II of the Report.

236 (C) The benefits of utilisations under the Rajolibunda Diversion Scheme be shared between the States of Karnataka and Andhra Pradesh as mentioned herein below :—

Karnataka	1.2 T.M.C.
Andhra Pradesh—	15.9 T.M.C.

(D) The reservoir loss of Tungabhadra reservoir shall be shared equally by the works of the State of Karnataka on the left side and the works on the right side of the reservoir. The half share of the right side in the reservoir loss shall be shared by the States of Andhra Pradesh and Karnataka in the ratio of 5.5 to 3.5.

Clause XII

The regulations set forth in Annexure ' B' (1) to this Order regarding gauging and gauging sites in the Krishna river system be observed and carried out.

Clause XIII

(A) Each State shall prepare and maintain annually for each water year complete detailed and accurate records of—

- 237**
- (a) annual water diversions outside the Krishna river basin.
 - (b) annual uses for irrigation works using less than 1 T.M.C. annually.
 - (c) annual uses for irrigation from all other projects and works.
 - (d) annual uses for domestic and municipal water supply.
 - (e) annual uses for industrial purposes.
 - (f) annual uses for irrigation within the Krishna river basin from projects using 3 T.M.C. or more annually.
 - (g) areas irrigated and duties adopted for irrigation from irrigation works using less than 1 T.M.C. annually.
 - (h) estimated annual evaporation losses from reservoirs and storages using 1 T.M.C. or more annually.
 - (i) formulae used and co-efficient adopted for measuring discharges at project sites.

Each State shall send annually to the other States a summary abstract of the said records.

The said records shall be open to inspection of the other States through their accredited representatives at all reasonable times and at a reasonable place or places.

(B) The records of gauging mentioned in Annexure ' B' to this Order shall be open to inspection of all the States through their accredited representatives at all reasonable times and at a reasonable place or places.

(1) Annexure ' B' mentioned above is the same as Annexure ' B' to the Final Order appearing at pages 795 to 800 of Vol. **II of the Report.**

Clause XIV

238

(A) At any time after the 31st May, 2000, this Order may be reviewed or revised by a competent authority or Tribunal, but such review or revision shall not as far as possible disturb any utilisation that may have been undertaken by any State within the limits of the allocation made to it under the foregoing Clauses

(B) In the event of the augmentation of the waters of the river Krishna by the diversion of the waters of any other river, no State shall be debarred from claiming before any authority or Tribunal even before the 31st May, 2000 that it is entitled to a greater share in the waters of the river Krishna on account of such augmentation nor shall any State be debarred from disputing such claim

Clause XV

Nothing in the Order of this Tribunal shall impair the right or power or authority of any State to regulate within its boundaries the use of water, or to enjoy the benefit of waters within that State in a manner not inconsistent with the Order of this Tribunal

Clause XVI

In this Order,

(a) Use of the water of the river Krishna by any person or entity of any nature whatsoever within the territories of a State shall be reckoned as use by that State

239

(b) The expression "water year" shall mean the year commencing on 1st June and ending on 31st May

(c) The expression "Krishna river" includes the main stream of the Krishna Iyer, all its tributaries and all other streams contributing water directly or indirectly to the Krishna river

(d) The expression " T M C " means thousand million cubic feet of water

Clause XVII

Nothing contained herein shall prevent the alteration amendment or modification of all or any of the foregoing clauses by agreement between the parties or by legislation by Parliament

Clause XVIII

(A) The Governments of Maharashtra, Karnataka and Andhra Pradesh shall bear their own costs of appearing before the Tribunal The expenses of the Tribunal shall be borne and paid by the Governments of Maharashtra Karnataka and Andhra Pradesh in equal shares These directions relate to the reference under Section 5(1) of the Inter-State Water Disputes Act, 1956

(B) The Government of India and the Governments of Maharashtra, Karnataka and Andhra Pradesh shall bear their own costs of appearing before the Tribunal in the references under Section 5(3) of the said Act The expenses of the Tribunal in respect of the aforesaid references shall be borne and paid by the Governments of Maharashtra, Karnataka and Andhra Pradesh in equal shares

240