DEPENDABILITY AND WATER AVAILABILITY

- *Hydrological Studies*

- *Water Availability Studies*

- *Dependability*

- *Procedure for Working Out 75% Dependability*

- *An Example*

Introduction

In the planning and operation of an Irrigation project, it will be frequently required to carry out the water availability studies .These studies are part of Hydrological studies which involve the study of occurrence of water due to rains, precipitation, and its transformation into surface water, runoff, within the catchment in a given time period

HYDROLOGICAL STUDIES

Hydrological studies, in general, consist of the following studies like:

Yield studies of water in the given time period – Assessing the Quantum of water in a time period at a specified site.

Reservoir Sedimentation studies - Assessing the Reservoir capacity and Quantum of sediment in the serviceable life period.

Simulation studies - Preparation of working tables for arriving at the success rate for deciding the project viability.

Design flood Studies - for designing the magnitude of flood and also arriving at size of the structure for safe passage of designed flood.

WATER AVAILABILITY STUDIES

Water availability studies or Yield studies indicate the available water at a given site in a given time.The important and basic data required for this purpose is:

- Rainfall data

- River discharge data

- Utilisations above and below the project site proposed

- Availability of water in a reservoir at a given point of time (assessed by capacity tables prepared exclusively for the reservoir)

- Any additions into the reservoir from other sources like tributaries/ canals etc

DEPENDABILITY

The water available for a reservoir thus is worked out at a given point of time. However while calculating the expected yield in a river at a project site, we also need to look into the dependability aspect also. The concept of dependability involves the following :

- The Average Gross yield

  – The arithmetic mean of the Gross yields available in the given period of time

- The 75% dependable Gross yield

  – The yield that is exceeded or equalled in 75% of times in given period of time

- The Average Net Yield

- The 75% Dependable Net Yield

PROCEDURE FOR WORKING OUT 75% DEPENDABILITY

Generally, while designing an Irrigation project, the practice is to adopt 75% depenadability which in simple terms means that the quantity of available water assured in three years out of four years cycle at a given site in a river. The procedure to arrive at 75% dependability is as follows:

- Arrange the observed yearly (annual peak) flows as they occurred in the past

- Arrange the values in the descending order i.e, highest value first, to lowest value last.

- Arrive at the sl.no. for the 75% dependability

- Identify the corresponding value for 75% dependability

EXAMPLE FOR WORKING OUT 75% DEPENDABILITY:

–   Series of Observed gross flows (yearly peak flow) (12 year period) occurred in Mcum 70, 40, 82, 68, 75, 78, 74, 55, 48, 32, 67, 30.

–   Arrange the values in the decending order ie
    82, 78, 75, 74, 70, 68, 67, 55, 48, 40, 32, 30

–   75% dependability of the elements in series ¾ * 12 = 9

–   9th value is 75% dependable value in the ordered series (order in decending order)

–   Corresponding value (of 75% dependable yield) in the series is 48 Mcum

–   The 75% dependable value of water flow in the given series is therefore 48 Mcum