



Presentation on,

## Training and Pruning in Tea



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# INTRODUCTION

- **Pruning** is a vital operation for tea management to limit the top growth and to stimulate the growth of the bush.
- **Pruning** is a process to the tea bush at a certain height to control the vertical growth and allow it expanding horizontally for comfortable plucking with renewed and vigorous branching pattern.
- **Training** is aimed at modifying it to form a low bush of good spread & of appropriate height for plucking.

- Training is most important to establish a well developed primary frame & branch system ensure a complete ground cover as early as possible.
- This is achieved by,
  - Decentring & pruning
  - Bending/Pegging

## Decentring and pruning

- Young plants are centered in the field to suppress apical dominance and for the production of lateral branches which in turn helps to attain a bush habit.
- Decentring and pruning combination involves cutting off the leader stem at a height between 7 and 20 cm from the ground.
- The cut should be clean and slope downward to the centre of the bush.
- Laterals are given a cut across at 35 cm above ground level. This excision promotes more laterals from the lower portion of the stem, thus increasing the number of pruning sticks.

- Next pruning of the plants, about 5 cm above the last prune mark, are done within two years after the first prune for recentring.
- The decentering operation should be done after the plants make one flush of growth following transplanting in the field and when they are at *banjhi* stage.
- Further, decentering should be done in presence of sufficient moisture in the soil.
- Root starch is also considered important for recovery and to minimise mortality after decentering.



**Decentred young plant in the field**

# Bending and pegging

- The primaries/secondaries are pegged from one month after planting in case of vigorous plants.
- Pegs are made out of pruned tea branches, bamboo, wood etc.
- Young plants should preferably have at least four stems before pegging.
- It is better to ensure that these are formed in the nursery by removing the apical bud.
- Shoots that are 30 to 60 cm height are bent at angles of 30 to 45 to the ground, and are then pegged down to the ground.
- All lateral shoots produced subsequent to the bending should also bent and pegged.



**Fig. 8.18:** Laterals of the young tea plant are pegged down to the ground to spread the branches, from which vertical shoots will form the frame of the plant.

# Frame forming Prune

- Planting from 20 to 26 months and at a height between 35 to 40 cm from the ground when the wood is atleast 1 cm thick, recentring and head-back of laterals to the side by pegging should be done.
- Subsequently pruning is done at 35 to 50 cm from the ground and then the frame is raised by 5 cm at each successive prune till a permanent frame is established.

# Low tipping

- Pruning is not required for first four years of planting in this method.
- Centering out within 10 weeks after planting and initial plucking at low level of 40 to 50 cm from the ground followed by a gradual rise or stepping up of the plucking table are to be done.
- The first pruning is done when the plants have attained above 85 cm height at the end of the fourth or fifth year with pruning height varying between 55 and 65 cm from the ground.
- This method produces good early crop but frame formation is poor.

# Lung or Thumb Pruning

- When plants are between 15 and 20 cm high, they are held between the thumb and the index finger, and the stem is broken in such a way that the tissues on one side of the stem are left intact for movement of water and nutrients.
- The broken portion is then bent towards the ground facing either south or west depending on the direction of row.
- The broken portion is removed after the shoots below it produced at least 4-5 new leaves.
- Small pruning knife can also be used for lung pruning & can be done even if starch content is not at its optimum.



**Thumb pruned young tea plant**

# Debudding

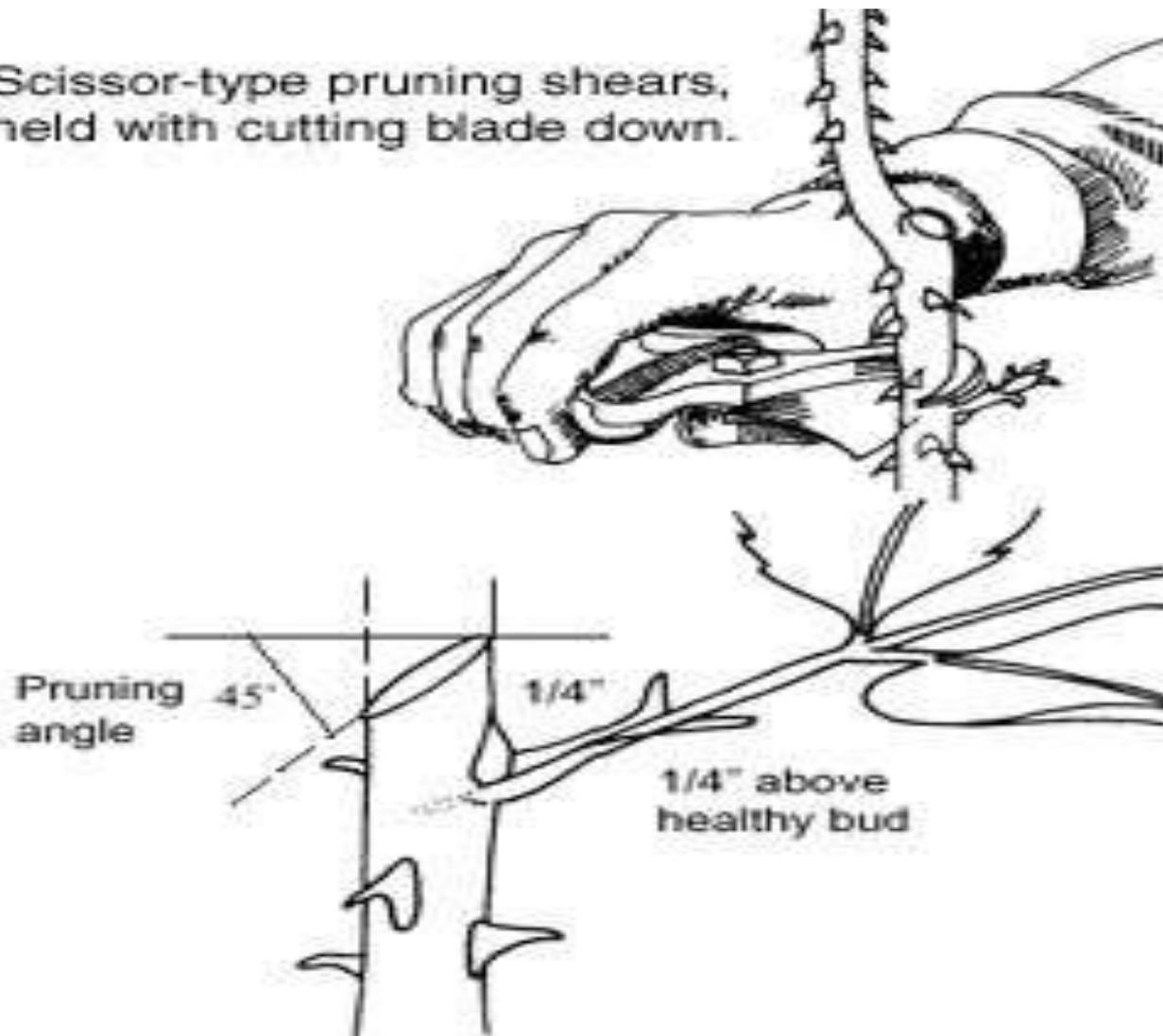
- Buds are removed from the upper portion of the plants leaving the low 20 cm untouched.
- The top two and a bud should be tipped off from plants in nursery two weeks before debudding.
- This will help to swell the buds below, 4 to 5 days before the plants are taken out to the field they can be debudded in the nursery.
- After about four weeks of planting in the field, removal of bud if any left out in the first operation should be done.
- Buds remaining below the height of 20 cm from the ground will grow and form healthy laterals.
- The main stem should be removed by giving a clean cut at about 20 cm above & thereafter normal tipping and plucking should be followed .

**PRUNING**

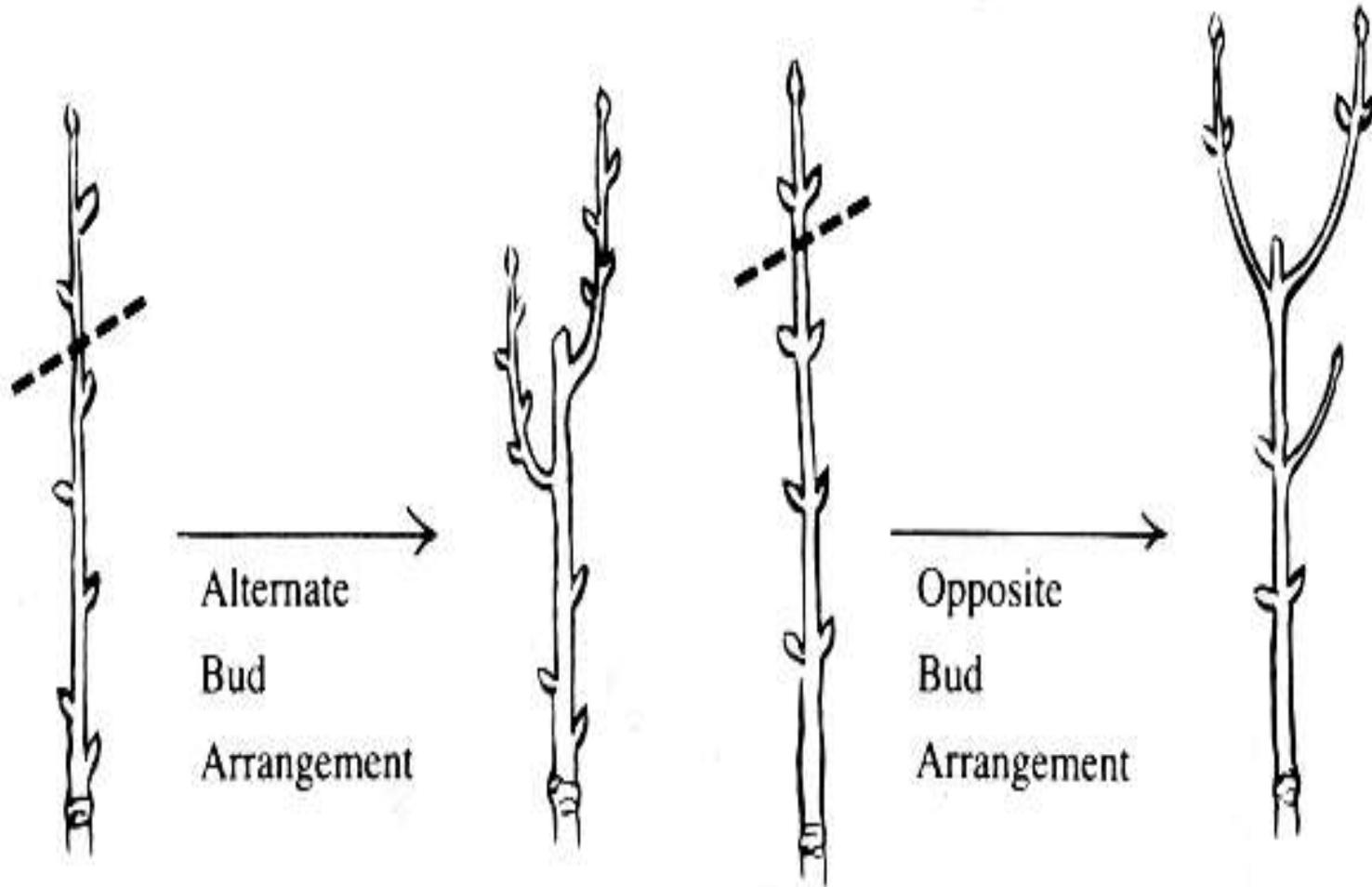
PRUNING

- ❖ **Pruning** is one of the most important operations, next to plucking, which directly determines the productivity of tea bushes.
- ❖ It is a necessary evil in the sense that it has to be carried out periodically in spite of huge crop loss it results.
- ❖ If pruning is delayed, in other words as the age of wood from pruning increases, the size and weight of growing shoots on plucking surface decreases.
- ❖ There is preponderance of bhanji shoots on plucking table as more and more buds fail to grow with loss of vigour of growing apices. Therefore, to maintain the vegetative growth, pruning is necessary.

Scissor-type pruning shears, held with cutting blade down.



Pruning operation



Pruning stimulates lateral shoot growth close to the cut

## Objectives of Pruning

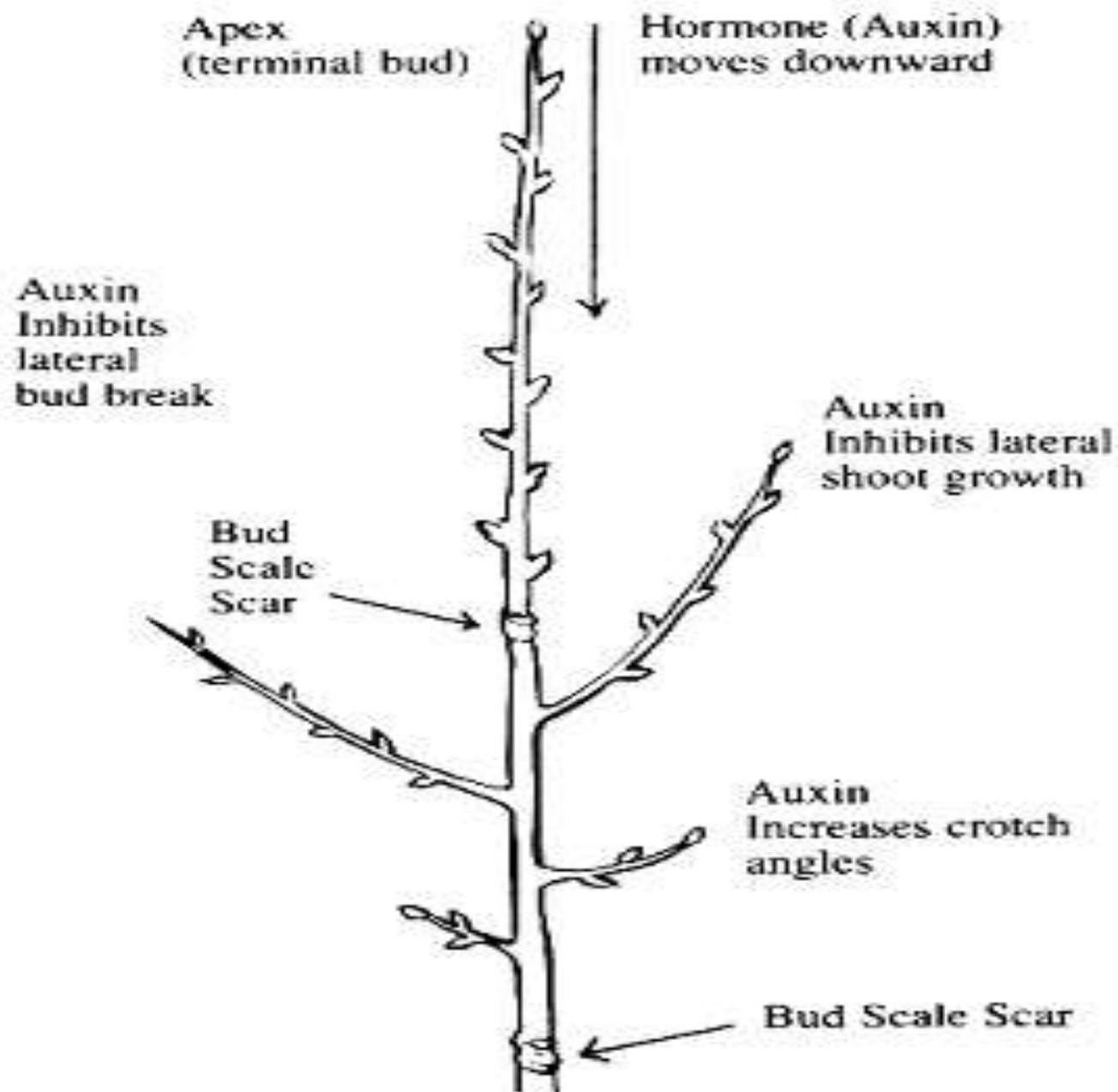
- To check the reproductive growth and provide stimulus for vegetative growth
- To remove the dead wear and unproductive wood
- To renew the actively growing branches which can support the sufficient volume of maintenance foliage on it.
- To maintain the height and dead frame for economic plucking.

- To increase the growth hormone for vegetative growth.
- To derive store energy for the production of the growing shoot.
- To improve bush hygienic.
- To reduce the incidence of pest and diseases which help to rejuvenate the bushes for the maximum cross production.
- To regulate the crop harvest.
- To renew the growing branches and maintenance the foliage to meet physiological needs of the plant.

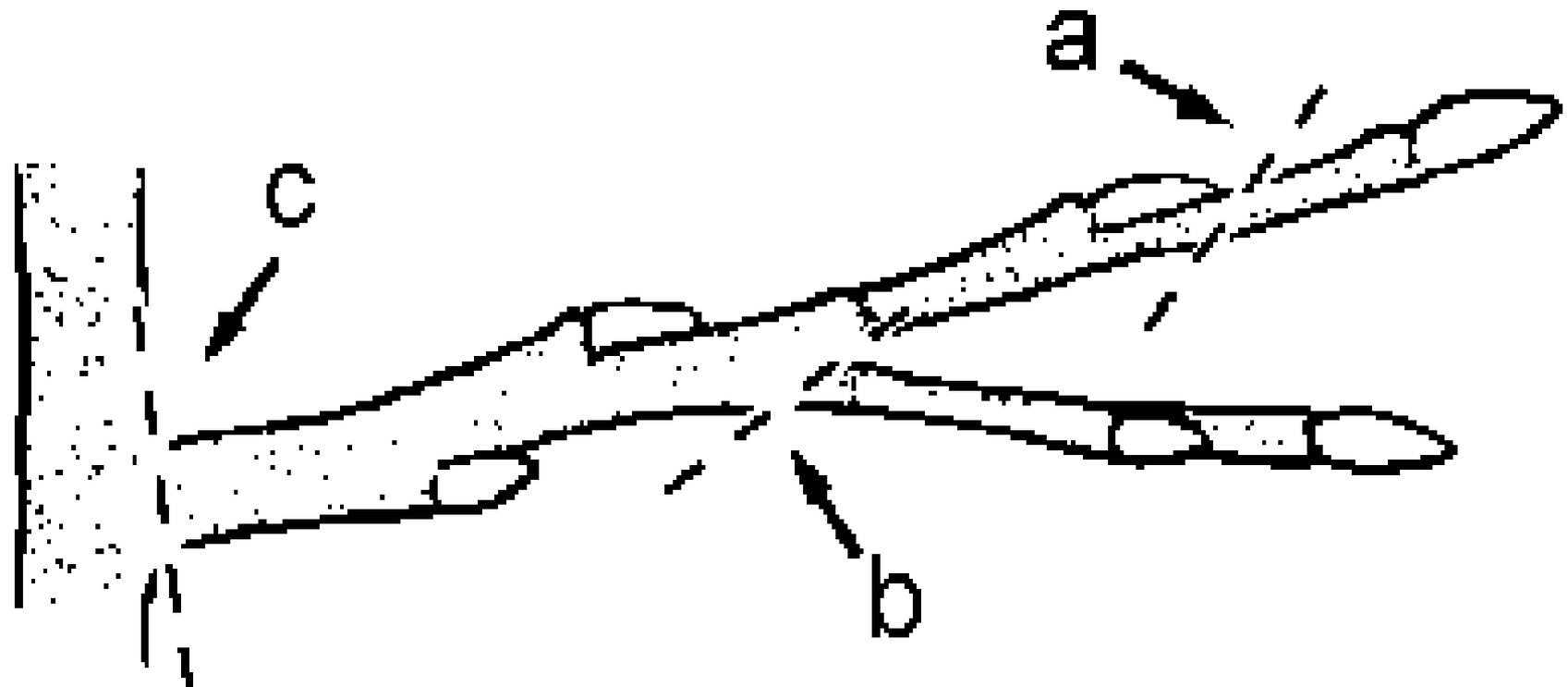
- Minimizing formation of **banjhi** and spreading of pests and diseases.
- Controlling crop during rush period and to achieve better crop distribution.
- Maintaining quality in the processed Tea.
- To help the structure of flush.
- Easy to plucking of the Tea leaf.

# Basic Botanical Principles of Pruning

- ❖ Terminal bud produces a hormone (auxin) that directs the growth of lateral buds
- ❖ Auxin suppresses the growth of lateral buds and shoots
- ❖ If terminal bud is removed, lateral buds and shoots below the cut will sprout and/or grow
- ❖ Most vigorous new growth occurs within 6-8" of the pruning cut
- ❖ Sunlight hastens the development of lateral shoots

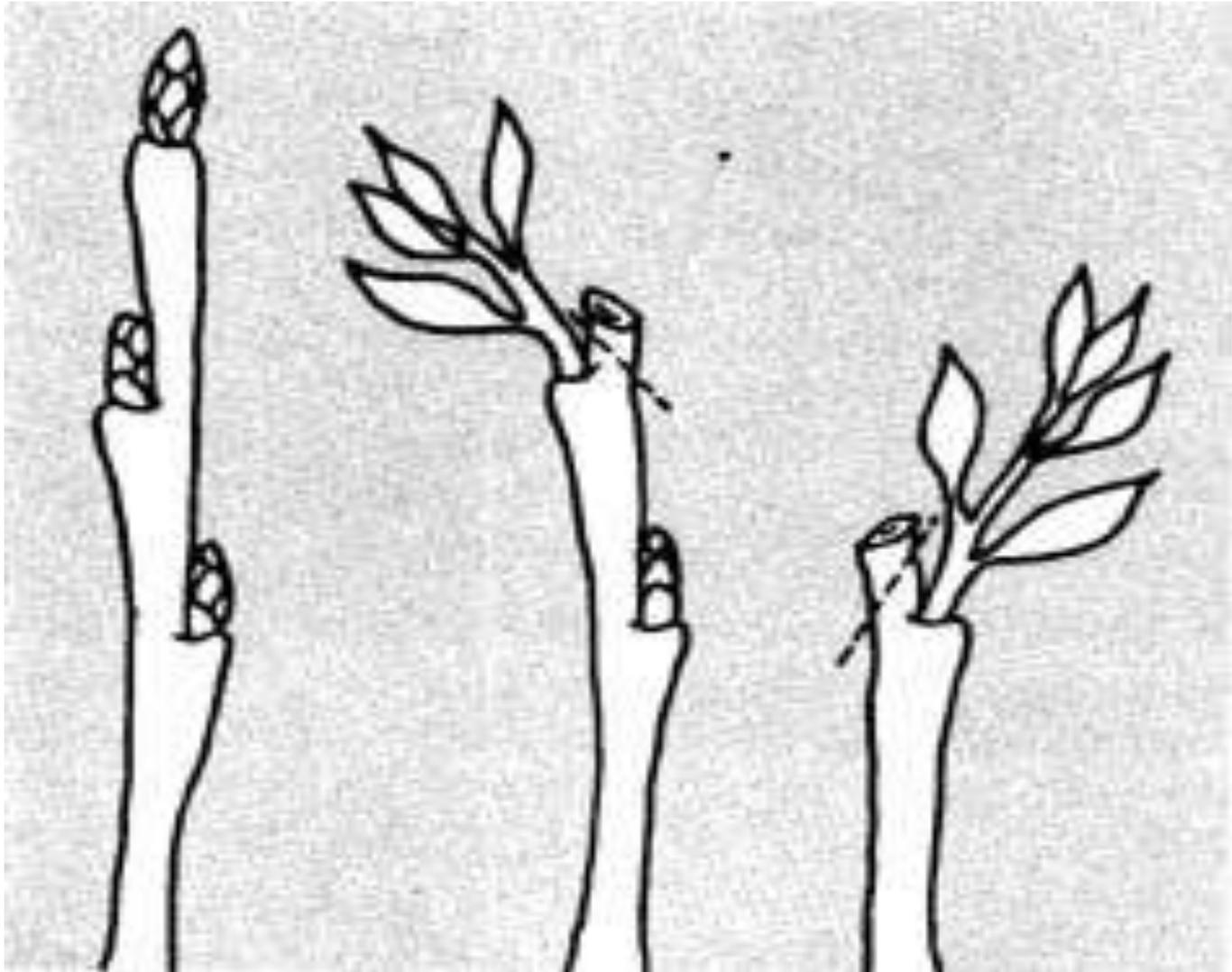


## Cut Back to a Bud



*Figure 5. Always cut back to a bud (a), a lateral branch (b) or main trunk (c), and avoid leaving a stub.*

# Making an angled cut



## Pre-requisites for pruning

- Starch reserve in the plant is a major determinant for pruning because the new growth relies on the starch reserves.
- Therefore, pruning in any form without an adequate reserve of carbohydrates could be disastrous (Banerjee, 1993)
- At the time of pruning, removal of a large volume of foliage and young shoot takes place and that stops carbohydrate synthesising activities of the plants. It is the carbohydrate reserve in the roots that helps the plant to recover from pruning.

- Potash fertilizer has a great influence on the recovery of bushes from the pruning. Application of potash fertilizer before pruning is therefore a common practice.
- The other factors that influence pruning time are the risk of sun scorch during dry season, infestation of pests etc.

# Time of pruning

- In general, pruning is carried out when the tea bush is dormant and there is a good reserve of root starch.
- This has a significant effect on the recovery of the bushes after pruning.
- The appropriate timing for pruning is basically considered from an assessment of the growth rate of the plant.
- It should be at a point when growth has sufficiently slowed down to create a favorable carbohydrate balance, so that, a layer of foliage could grow and get established well before the hot spell (Banerjee, 1993).
- Time of pruning also affects total yield despite its influence on the distribution of crop
- The best time for pruning may differ with cultivars, which can be ascertained by root starch reserve test.

## Pruning schedule of mature Tea population:

Types of prune	Months/ Time
Light prune (LP)	First December—End December (Week)
Deep skiff (DSK)	First February—End February (Week)
Medium skiff (MSK)	Mid January—First February (Week)
Light skiff (LSK)	End January—Whole February (Week)
Medium prune (MP)	24—30 Years

# Resting before pruning

- For LP generally resting is not required.
- However, if there is inadequate foliage, the tea bushes are given rest by stopping plucking from 3 weeks before pruning.
- Very weak tea plants and those due for MP should be rested 5-8 weeks prior to pruning.
- Vigorously growing well-shaded tea bushes are pruned first.
- For MP/HP in the year of prune additional doses of potash and phosphate are also applied and in inadequate shaded areas, temporary shade of *Indigofera teysmanii* at 3-4 m apart should be planted a year before pruning.

# Pruning Tools



Bow Saw



Hedge Shears



Pruning Saw with D Grip



Lopping Shears



Combination Pole Saw-Pruner



Pruning Saw with Crescent Grip



Folding Saw



Draw Cut or Scissor-Action Pruners



Anvil or Snap Cut Pruners

# Types of pruning

## Light Pruning:

- Tea bushes are usually pruned every 3 or 4 years at 4 -5 cm above the last pruning cut.
- This type of pruning is called light prune (LP).
- The time period from one light prune year to another is called one pruning cycle and LP is a thus, natural sequence given at the end of a pruning cycle.
- It helps to renew the wood, regulate crop distribution, reduce pests and diseases and maintain ideal frame height of the bushes.

# Light Pruning

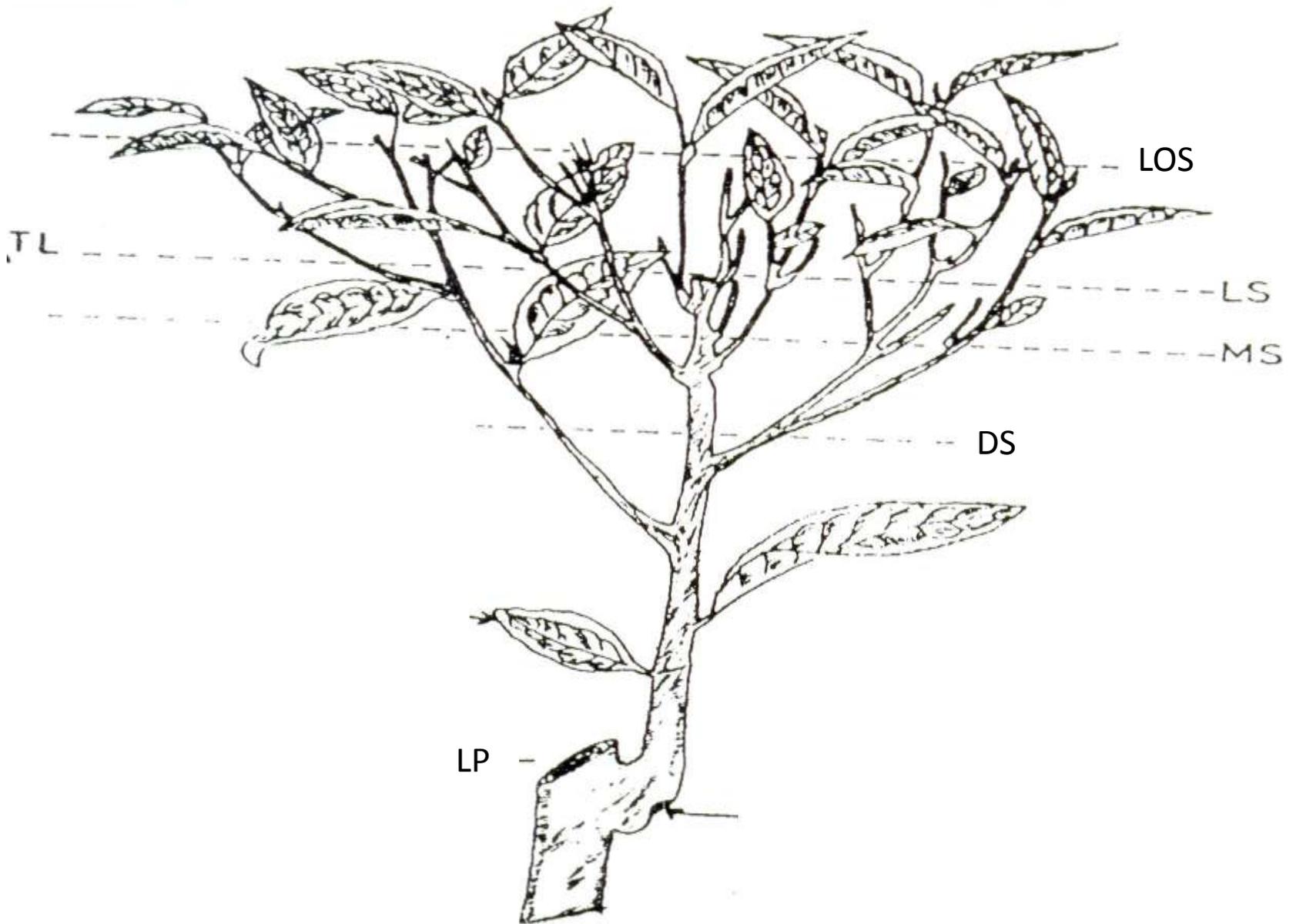


## Height Reduction Pruning and Medium Pruning

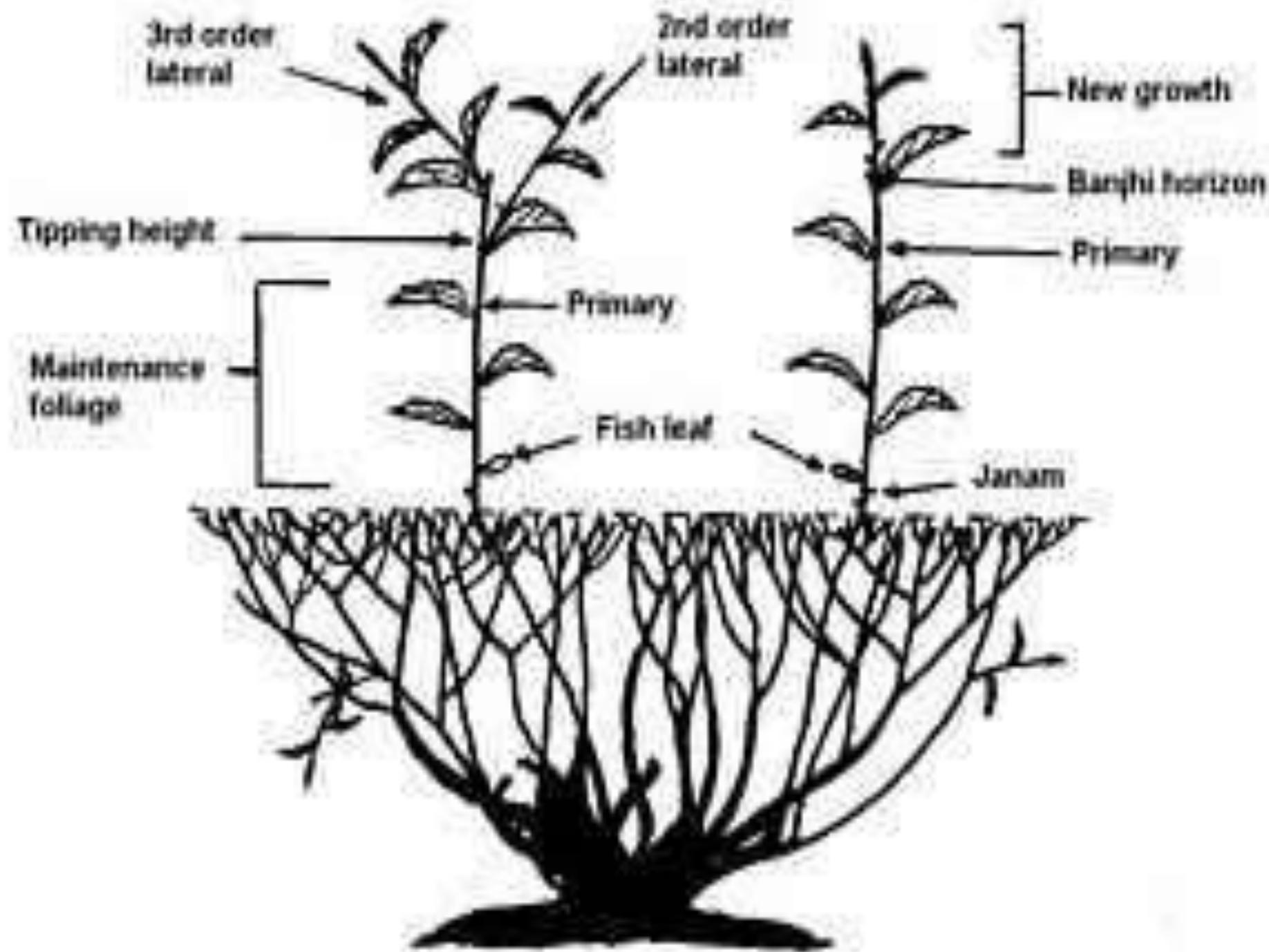
- When the tea bushes grows tall and plucking becomes difficult, they are brought down to an optimum height by height reduction prune (HRP) at 60-70 cm, or medium prune (MP) at 45-60 cm above ground.
- Both HRP and MP help in rejuvenating the tea bushes that have become old and their yields have started declining.
- MP removes the knots and unproductive excess woods and facilitate consolidation by infilling of vacancies.
- Medium pruning thus provides opportunity for taking many corrective measures for improving the health and production capacity of old tea sections.

# Skiffing

- A lighter form of cut which removes knotted and congested stems permits flushing to resume after only a short interval.
- It is done sometimes in order to lower the plucking table.
- The object of skiffing, particularly in north India, is to have an early high quality first flush and total crop as well.
- Skiffing also helps in thickening the pruning wood and improving the general health of the bushes.
- In south India, skiffing is not a common practice and rarely done in well-managed estates.
- It is restored to only when the bushes increase, making the plucking difficult and there is a necessity of postponing the pruning operation.
- It is done in south India at a height less than 65 cm.
- Skiffing is not severe enough to term a 'prune'. Different forms of skiffing are practiced are....



Different forms of pruning: LP- light prune, DS- deep skiff, MS- medium skiff, LS- light skiff, LOS- level of skiff, TL- tipping level



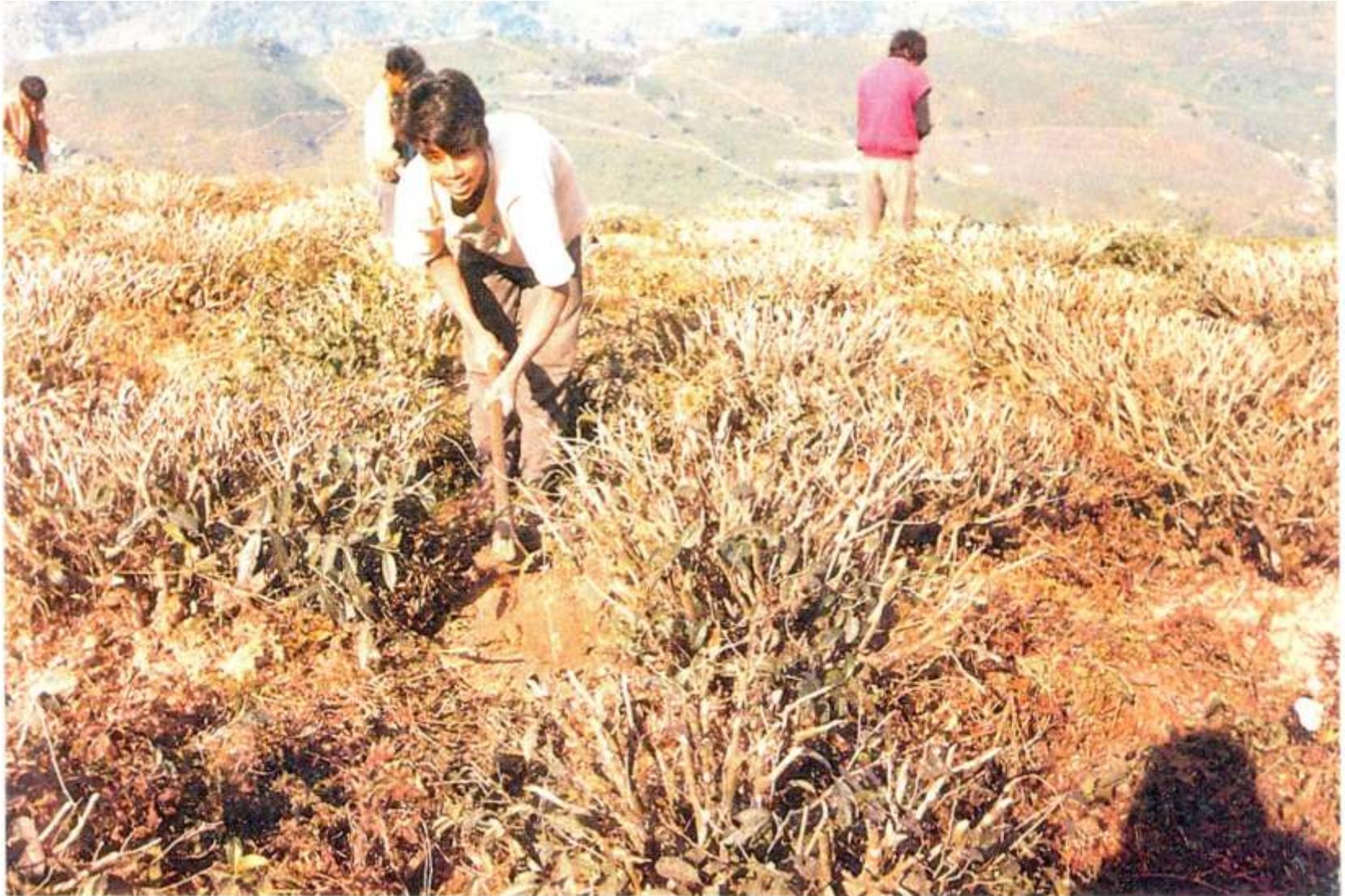
## **Deep Skiff**

- Deep skiffing (DS) of tea bushes is done normally between 12-15 cm above the last LP mark. The DS helps to regulate crop distribution and to reduce the ill effects of drought, excessive creep and the height of plucking table.

## **Medium Skiff**

- Medium skiff (MS) is normally given at 5 cm over last Deep skiff mark. The objective of MS is to regulate crop distribution, reduce the ill effects of drought, reduce the incidence of excessive banjji formation and reduce the height of plucking table.

# Deep skiff in Darjeeling hill



## **Level of Skiff and Light Skiff**

- Level of Skiff (LOS) is given 4-6 cm above the tipping mark mainly to level the plucking surface. Light Skiff (LS) is usually given up to 1 cm above the previous tipping height.

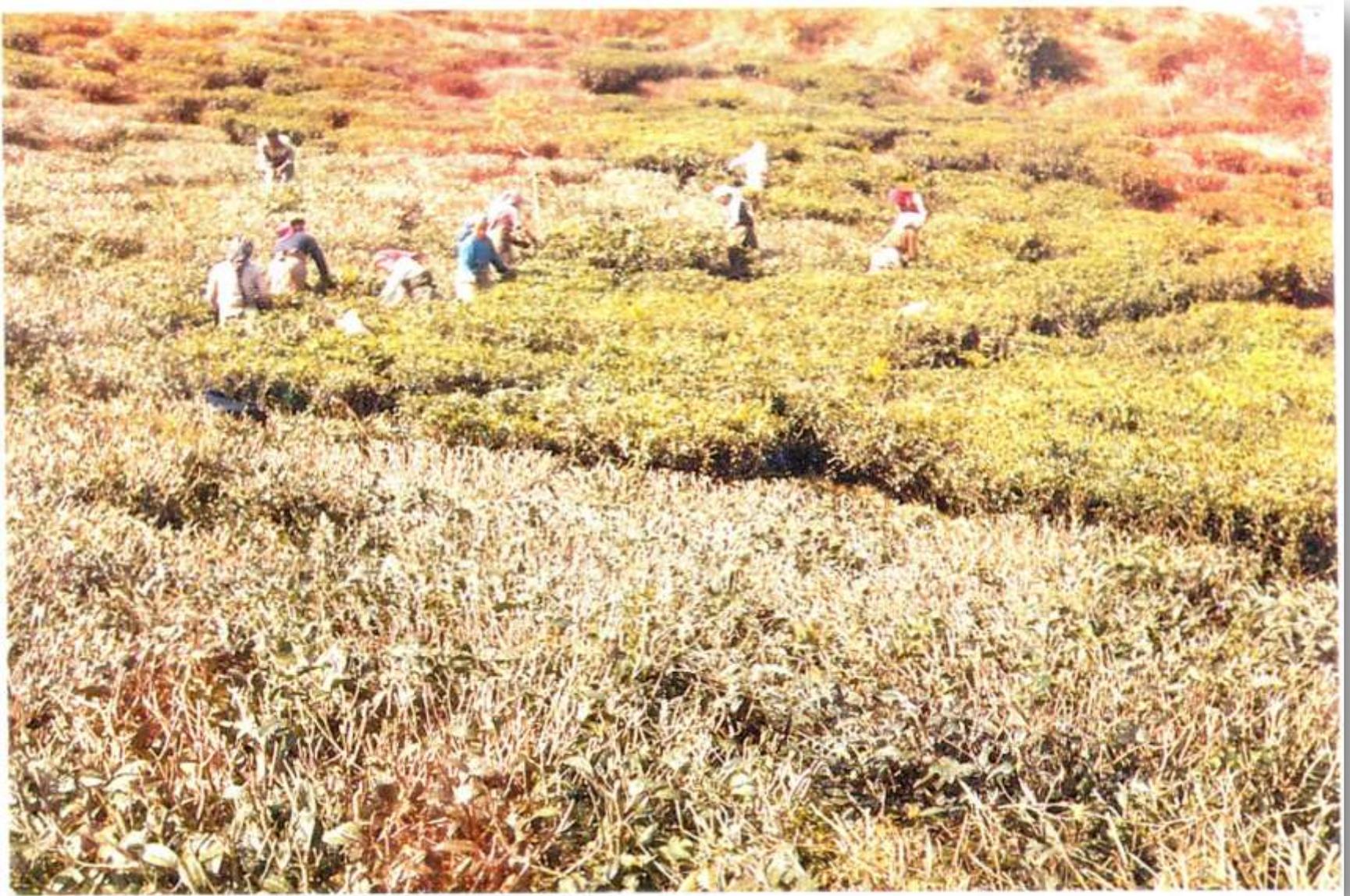
### **Un pruned (UP):**

- It is the most top layer of a tea population which portion is not cut.
- This portion may be found at the interval period between two pruning practices.

## Tea after a Light skiff in Darjeeling hill



In darjeeling hill Tea given a level-off-skiff (LOS)



# Heavy or Low pruning

- Heavy prune (HP) is given at 15-45 cm for complete renewal of frame.
- Here all above ground parts of the tea bushes are cut down and this operation is carried out only when the root system is considered strong enough to withstand the shock and initiate new growth.
- In practice however, very low pruning is generally avoided now a days as it results in heavy mortality, particularly in Assam jhats growing in poorly shaded sandy soil.
- This pruning can only be done after considering the health of plants and starch reserve.

# Tea Plants after Heavy Pruning



## Down, Collar or rejuvenation pruning

- Corrective or rejuvenation pruning is a most severe operation in which the bole of the bush is cut at ground level or even 5 cm below the ground level.
- Rejuvenation pruning facilitates removal of the dead and defunct wood and development of good, healthy and new primary frames.
- It also implies restoration of plant density by infilling and/or inter planting.
- It is strictly need-based operation and the factors for determining rejuvenation are the age of the bush, vacancy, drainage, yield trend and jhat of tea.
- Fields where the frames of the bushes are diseased and unsound need to be rejuvenated.

# Tea plant after Rejuvenation pruning



# Pruning cycle

- The interval time between two successive prunes is called the **pruning cycle**.
- In the plains of Northeast India under normal growing conditions 3-4 year pruning cycle and for Darjeeling depending upon elevation a 4-5 year pruning cycle is suitable.
- In comparison to annual prunes, which causes a heavy rush only during the main season, well-balanced extended pruning cycles will provide an even distribution of crop resulting in an even flow to the factory throughout the season.

## Some of the normally followed pruning cycles are

Well shaded, young and vigorously growing tea areas	LP-UP-UP
Normal tea growing areas	LP-UP-DS-UP
Droughty areas	LP-UP-DS/LP-DS-UP
Darjeeling (low elevation)	LP-UP-DS-UP
Darjeeling (mid & high elevation)	LP-UP-UP-DS-UP

❑ Pruning cycle varies from 1-6 years based on the following **criteria's**....

- ❖ Varsity to variety
- ❖ Season to season
- ❖ Growth pattern of tea garden
- ❖ Soil climatology conditions
- ❖ Height of plucking level
- ❖ Quality and quantity of crop pattern
- ❖ Availability of pluckers
- ❖ pests and diseases
- ❖ vigour and kind of tea

# Factors affecting pruning,

- Sun scorch damage
- Drought damage/Blister damage
- Growth time desired
- Rest period required
- Crop required
- Nutrient status
- Pest damage
- Yield required
- Well equipment

# Approximate Gain in Crop Over Annual Prune

Type of prune	Gain in crop
DS	10 - 15%
MS	15 - 20%
LS	20 - 25%
LOS	25 - 30%
UP	30 - 35%



**Pruning Operation by Labour**



**A smooth cut sloping inwards**



**A pruner placing pruning litter on the ground**



**A pruned tea field**



**Bush sanitation after pruning**



**Pruned tea bushes covered with pruning litter**



**Recovery from pruning**

# References

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**THANK U**

