MAINTENANCE OF BAMBOO PLANTATIONS DURING EARLY MATURATION

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EARLY MATURATION PHASE (YEARS 3-5)

- The focus of maintenance during the early maturation phase (about years 3–5) is to **reduce clump congestion and coppicing and train the clump** to make it easier to harvest the matured bamboo poles, which are commonly found in the centre of the clump.

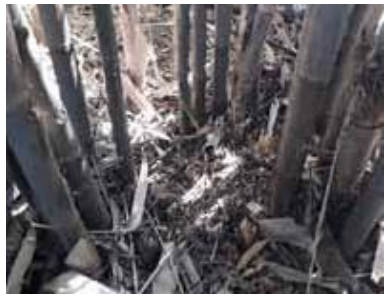
- Clump congestion is not a serious problem in **running bamboo or long-necked rhizome bamboo. But it is a serious problem in short-necked clumping bamboo**, such as lowland bamboo (*Oxytenanthera abyssinica*), and bamboo species belonging to the genera *Bambusa, Cephalostachyum* and *Dendrocalamus*.

EARLY MATURATION PHASE (YEARS 3-5)

- If the clumps are not managed from the beginning (first three to five years), clump congestion is likely to happen.
- Congestion of bamboo culms/poles in a clump makes it difficult to harvest the mature poles (inside the clump, close to the centre).
- When young culms (usually found in the periphery of the clump) are injured or felled, many **coppice shoots** develop creating clump congestion

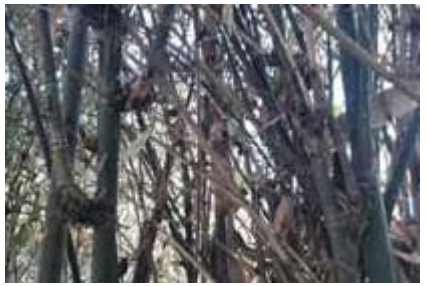
CLEANING AND THINNING

- Start thinning from year 3 or 4 of plantation.
- **Remove/cut dead, old or damaged culms/poles (in the middle of the clump) and malformed culms.** (Usually, new shoots are produced towards the outer side, and those located in the inner portion are the older ones).
- The cleared clump will allow easy access to the centre of the clump for easy harvesting.
- Maintain this year after year



PRUNING AND DE-BUDDING

- **Pruning branches and de-budding** in the bottom one-third of the height of the bamboo culm reduces clump congestion and helps in providing a healthy and airy environment in the clump. It also reduces pests and diseases.
- **Pruning and de-budding** should be introduced from year 3 of the plantation. The best time for pruning and de-budding is the end of the monsoon (once the new shoots develop into a well-grown culm)
- **Pruning-** Prune/de-bud the branches/buds close to the node to avoid re-growing of sprouts for leftover branch buds.
- **Use sharp tools** (hacksaw) to avoid damage to outskin






SHOOT THINNING

- During shooting, there can be numerous shoots emerging from the same mother culm or pole. They usually develop into weak culms due to insufficient water and nutrient supply from the mother culm/pole and become congested.
- **Keep one or two shoots to grow from a single mother, and dig out other shoots.**
- Shoot thinning improves the quality of the emerging bamboo poles and creates space for culm management, especially for harvesting in the future.
- **Completely remove any shoots (including rhizomes) that have the entire rhizome above the ground.**

THINNING

One bamboo rhizome has about 6-12 buds and has the potential to produce 6-12 bamboo poles, depending on the species

Four bamboo shoots/poles emerging from a single mother results in poor quality (lesser diameter and height of bamboo poles).

SHOOT THINNING

Four bamboo shoots emerging from one mother culm (left) and two bamboo shoots emerging from one mother culm (right).

Leave one strong bamboo shoot to grow into a culm (each mother) and dig out the weakest ones

Only one shoot emerging from a mother culm; leave it to grow into a culm.

FIRE CONTROL & SOIL LOOSENING

Fire Control: After cleaning, pruning and thinning of clumps, remove the cut culms, branches and twigs from the bamboo plantation to avoid fire and incidence of pests, insects and diseases.

Maintain a fireline of at least 20 m surrounding the bamboo plantation.

❑Soil Loosening and Soil Mounding.

Loosen the soil surrounding the bamboo culm; apply five baskets (≈30 kg of manure/compost/ash), and if available, an additional 500 g of NPK. Mix the fertiliser with loosened soil,

Carry out soil mounding at the base of the clump and trench around the clump.

MAINTENANCE DURING SEEDLING STAGE (YEAR 1-3)

During this phase, maintenance practices focussed on ensuring survival of plants and to enable faster regeneration or increase in number of culms / poles. Key maintenance practices include:

1) Vacancy filling or beating up

2) Weed control

3) Soil loosening

4) Soil amendments including fertilization

5) Soil mounding and trenching

6) Mulching

7) Additional maintenance aspects (irrigation, trench, etc) 8) Inter-cropping

VACANCY FILLING OR BEATING UP

VACANCY FILLING OR BEATING UP Even with best planting and maintenance, 100 per cent survival will not be possible.

For commercial bamboo cultivation: to maximize yield, replacement is necessary.

During the first year, 10-15 per cent and during the second year 5 per cent vacancy filling may be necessary.

WEEDING AND SOIL LOOSENING

WEEDING AND SOIL LOOSENING Growth of a young bamboo plants in early stage can be hampered by weeds and any other competing vegetation. Weeds weaken the root and stem development, and also contribute to occurrence of insect, pest and disease.

Weed clearance should be done at least two times each, during the first two years. The weed eliminate climbing vines as well.

Weeding and soil loosening improves the sanitary environment (turning soil reduces pests and insect attack);

Enables free expansion of root, rhizomes and increases moisture retention capacity of soil.

WEEDING AND SOIL LOOSENING (2)

There are two options for weed clearing and soil loosening namely

(1) ploughing and (2) spot weeding.

Ploughing and soil loosening: If ploughing is possible, undertake ploughing in the bamboo plantation area or site.

Along with ploughing, **clear all the weed and loosen** the soil around bamboo clumps.

SOIL AMENDMENT INCLUDING MANURE AND FERTILISER APPLICATION

- **Manure and fertiliser application** stimulates rapid growth of plants. All sorts of soil amendments including organic (cow dung, compost, farm yard manure, ash) and inorganic fertilizer (NPK) can be applied.
- Thoroughly **mix the applied manure/compost** with loosened soil.
- Alternatively, **fertilizer can also be applied by creating trenches or holes** around the bamboo clump.
- After application of manure / fertilizer **cover the trenches** / holes with soil.

TRENCHING

Heap / mound the soil mixure around and over the base of the plant; and prepare a trench (at least 50 cm radius) around bamboo plant to retain water.

MULCHING

Spreading a thick layer (~ 5 to 10 cm) of organic matter (green and/or dry matter: **straw, trees leaves and twigs**) on surface of soil. Helps in **conserving soil moisture** (reduce evapo-transpiration), **controls weed growth** and **improves soil fertility and organic carbon.**

AMOUNT AND TIMING OF MANURE / FERTILIZER FIRST APPLICATION:

One month after planting (when plant resume regrowth after planting), apply one basket (5 kg) of well rotten manure or compost.

-In addition to this, 50 gm of NPK can also be applied.

Second application: At the beginning of next rainy season (year 2), apply two baskets (10 Kgs) of manure or compost.

-In addition, 100 – 150 gm of NPK may also be applied.

Third application: In the beginning of next rainy season (year 3), apply 5 baskets (30 Kgs of manure or compost).

-In addition, about 500 gm of NPK can also be applied. Repeat the process in following years.

NOTE:

Bamboo has high demand for silica. Bamboo leaves, rice husk, etc. are rich in silica. Compost prepared using bamboo leaves, rice husks are good.

Caution:

- Make sure sufficient soil moisture is available: Apply inorganic fertilizer (NPK) only when there is sufficient soil moisture and/or rain. In case of dry conditions, application of NPK will result in fertilizer poising mortality of plants.
- Do not apply the inorganic fertilizer (NPK) directly to sensitive parts of the plant like rhizome.
- Always mix the fertilizer well with soil and manure and/or cover with soil.

ADDITIONAL MAINTENANCE ASPECTS

Irrigation: Irrigation helps in reducing mortality in young plants and facilitates growth. Especially during year 1 of plantation establishment irrigate bamboo plants during long dry spells in an interval of 10 – 15 days. Apply water (15 – 20 litres) in trenches created around bamboo plant by channel irrigation or spot irrigation.

ADDITIONAL MAINTENANCE ASPECTS (2)

Trenching for increasing water retention and soil moisture: In drier location or semi-arid regions, rainfall is relatively scanty. Trenches can be created to collect and store more water to increase soil moisture by collecting the run-off generated

Flat Land: Create a rectangular trench (1.5 M length X 30 cm width X 20 cm depth) or create a circular trench around the bamboo clump (1 meter radius).

ADDITIONAL MAINTENANCE ASPECTS (3)

Flood Management: Prolonged flood conditions will cause rotting of rhizome and root system due to abnormal respiration metabolism caused by shortage of air flow.

Firstly, do not plant bamboo in locations prone to floods.

In case of accidental flood creating a drainage system is essential.

INTER-CROPPING WITH BAMBOO

Inter-cropping is highly encouraged as it is beneficial for farmers to generate income till bamboo plantation provide regular income. In addition, inter-cropping **helps in weed control, reduces evapo-transpiration, and increases soil organic matter.** With inter-cropping, there will be **regular maintenance of plantation site** (without additional work), which favours survival and growth of bamboo.

Depending on the site condition, species, scientific management practices, harvesting of bamboo can start from four – six year.

Until complete canopy closure inter-cropping can be practised.

During the initial two years, due to large spacing, any crops (including high light demanding crops) can be grown.

During year 3 and 4 with canopy closure, shade loving crops can be inter-cropped

INTER-CROPPING WITH BAMBOO (2)

Commonly grown intercrops (first and second year): Soya bean, cassava, mustard, tobacco, chilies, water melon, vegetables, tuber crops, pine apple, banana, peas, green gram, lintels, pigeon pea, pea nuts / ground nut, moringa, papaya, etc.

corn and wheat can also be grown (but they are intense consumer of nutrients and belong to same family of bamboo).

Commonly grown intercrops (year 3 and 4): Ginger, turmeric, shade loving sweet potato and yam, medicinal plants, and other shade loving crops.

OTHER CONTROL MEASURES DURING YEAR 1 – 2 OR 3

Other control measures during year 1 – 2 or 3 (depending on growth of plantation)

- **Don't do trimming of foliage and branches and shoot collection** to allow the bamboo stands to build sufficient energy / food reserves for optimal growth.
- **Maintain fencing and fire break, and prohibit cattle or animals** from intruding as bamboo is an excellent fodder for cattle/animals.

THUMB RULE FOR INTERCROPS:

- Do not plant intercrops within a radius of 1 to 1.5 meters around the bamboo clump to avoid competition.
- Avoid intercrops belonging to grass family (maize / corn, wheat). Both bamboo and inter-crops compete for nutrients and are attacked by mostly same insects and pests.

Thanks