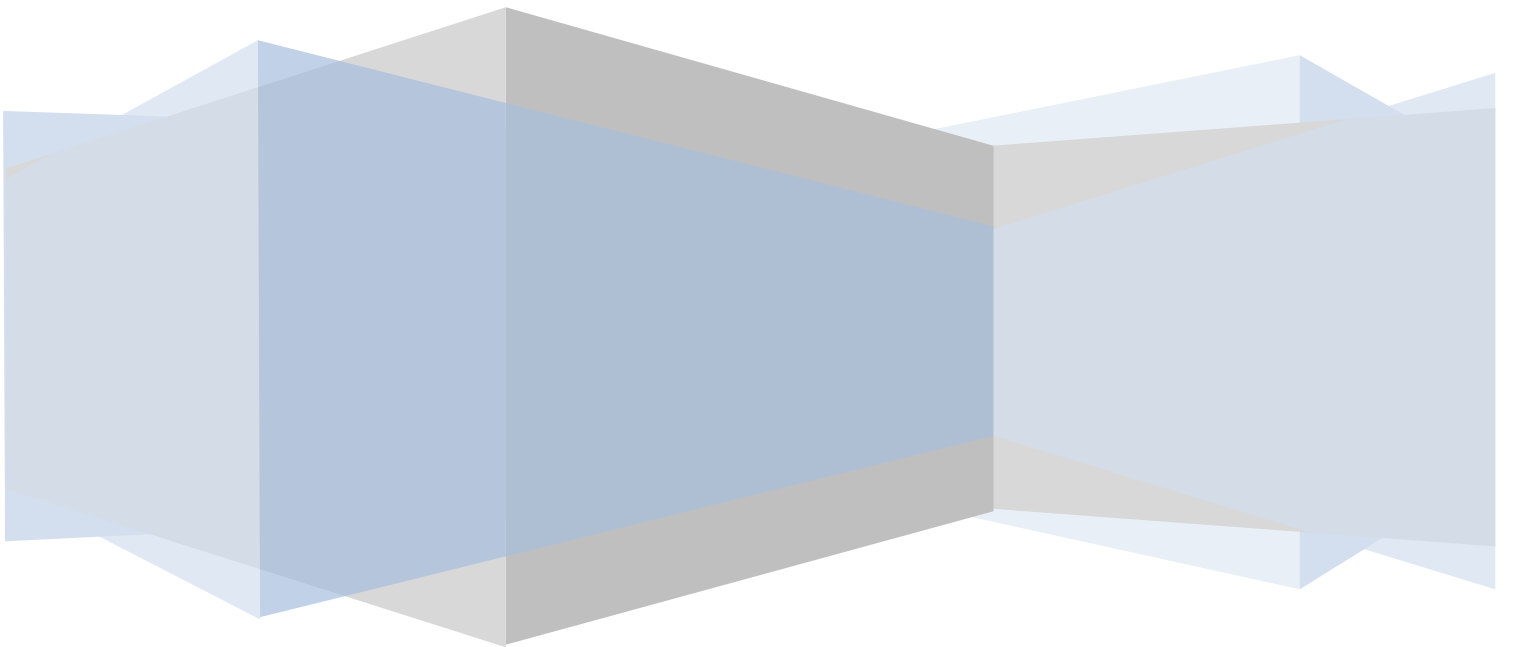


FOCUS, MIZORAM

OPERATIONAL GUIDELINES

SWEET TAMARIND



SWEET TAMARIND

1. INTRODUCTION

It is basically a forest species which can be grown as border plant or wind break around the orchard. It produces edible fruits and therefore, is also planted in the back yards. It is called by many names like Manila tamarind, Mitiambli, Madras thorn, Korkalikka is the local Tamil name, Jungle jilebi. Blackbead, Camachile, Thai- Sweet Tamarind, Monkey Pod, Seema Chintakayalu (Foreign Tamarind), Kona Puliyankai (Twisted Tamarind) It is also known as Ape's earring, Bread-and- cheese tree. The plant growing naturally on the waste land or being planted at community lands are main source of edible fruits. It is mainly grown as a hardy roadside tree or hedge plant. Its potential as a fruit has not been utilized. Leaves are browsed by horses, cattle, goats and sheeps. The plants are multipurpose and are often planted as live fence or thorny hedge which is eventually thick and impenetrable.

1.1 Nutrition Value

The fruits of sweet tamarind are very rich in various nutrient and anti-oxidant properties and various useful compounds have been extracted from different parts of manila tamarind which includes wax, hexacosanol, L-proline, L-leucine and asparagines from fruits, leucorobinetinidin, leucofisetinidin and melacacidin from wood; catechol, pectin, various yellow colour dyes from bark. Nutritive value of the fruits has been presented in the Table 1.

**Table 1: Nutritive value per 100g of pulp
(Verheij and Coronel, 1991)**

Moisture	75.8-77.8 g
Protein	2-3.3 g
Fat	0.4-0.5 g
Carbohydrate	18.2-19.6 g
Fibre	1.1-1.2 g
Ca	13 mg
P	42 mg
Fe	0.5 mg
Vitamin A	25 IU
Thiamine	0.24 mg
Riboflavin	0.1 mg
Niacin	0.6 mg
Ascorbic acid	13.8mg
Calories	78.8 K
Ash	0.6 %
Sodium	19 mg

1.2. Uses

Pithecellobium dulce is most often cultivated as an ornamental, shade or street tree planted on roadsides, and in backyards and hedges In Indonesia, it is often pruned

to be a shapely avenue tree, and occasionally used for more elaborate topiary. It is however, best known as a good hedging plant and is widely used as such in southern India, especially in Tamil Nadu. With regular trimming it produces a hedge which quickly forms a dense spiny barrier that is impenetrable to livestock if well maintained. It can withstand any amount of clipping. As a hardy, drought and heat tolerant, nitrogen-fixing tree it is more often planted because it tolerates harsh sites and heavy cutting than because of the products which it produces, none of which are of particularly high quality or significant commercial value.

The wood is used locally for construction, panelling, boxes, crates, agricultural implements, and cart wheels. Irregular growth habit and branchiness prohibit use as a sawn timber and the wood has never been used commercially, except in some areas for fuel. However, as a fuel wood it is not of very high quality, having only low to moderate calorific value, being thorny and burning with a very smoky flame. Nevertheless, the wood is used as a domestic fuel in many areas where firewood is in short supply and as fuel for brick kilns in India.

1.3. Medicinal uses

In Haiti root and bark decoctions are taken orally against diarrhoea; fruit pulp is taken orally to stop blood flow in case of haemoptysis. The seed juice is inhaled into the nostrils against chest congestion and pulverised seeds are ingested for internal ulcers. The leaves, when applied as a plaster, can allay pain of venereal sores and taken with salt can cure indigestion, but can also produce abortion. The root bark may be used to cure dysentery. The bark is used medicinally as a ferbrifuge.

2. AREA OF CULTIVATION

Sweet tamarind has large but unaccounted area as forest species. It is very common as roadside and fence plant in tropical and subtropical region. Since, it has never been counted under fruit species, systematic plantation as orchard has not been attempted so far. The fruits marketed and utilized for various purposes are mainly collected from the groves and roadside/waste land plantations. The *Pithecellobium* species is distributed over tropical Africa including coastal Africa, Latin America, Mexico, East Indies and South East Asia. Guyana, Venezuela, Brazil, Peru, Jamaica, Puerto Rico, Cuba, St. Croix, Philippines and India are the major countries where manila tamarind or sweet tamarind is commonly grown. In India, it is distributed throughout the country.

3. BOTANICAL DESCRIPTION

It is a very hardy and thorny tree and is small to medium sized semi-evergreen tree which can be grown up to 20 m height. The crown is spreading but irregular and trunk is short (about 1 m height) with crooked branches and somewhat shiny branchlets. Bark is grey and smooth in young trees, turning to slightly rough and furrowed in old trees. Bark exudes reddish-brown gum when injured. Leaves are bipinnately compound with a pair of pinnae, each with two leaflets that are kidney shaped and dark green in colour. Spines are present in pairs at the base of the leaf. New leaf growth and shedding of old leaves occur almost simultaneously, giving the tree an evergreen appearance.

3.1. Flowering

Flowers are borne on short-stalked, whitish, racemelike or spiciform panicles 10 to 20 cm in length and 1 to 1.5 cm in diameter, often in one year old twig on terminal compound inflorescence. Each branch has around 15-20 white flower in round heads. Each flower is 0.3 to 0.5 cm long with hairy corolla and calyx. Fruit is a pod, 10 to 15 cm long, 1 to 1.5 cm wide, curled up tightly and reddish-brown in colour. Each pod has five to ten shiny black coloured seeds, which are surrounded by thick, spongy, dry pulp and 9,000-26,000 seeds/kg.

Sweet tamarind may first produce flowers when trees are 2 years of age. Flowering generally occurs between December and May and fruits can be obtained on tree from February to August depending on the climatic condition. Pollination is mainly done by insect and honey bee rearing which increases pollination. Fruits are ready to harvest approximately 3 to 4 months after flowering. Fruits are available in the market from summer to early monsoon season.

4. CLIMATE AND SOIL

In its native range, the climate is dry to semi arid sub tropical and tropical with mean rainfall ranging from 500 to 1000 mm. It can tolerate shade and drought conditions but susceptible to severe frost. It has been successfully planted in areas with a mean annual rainfall as low as 400 mm and with a maximum dry season of 4 to 5 months. Sweet tamarind reportedly grows well in semiarid region of India characterized by mean monthly temperature ranging from 7 to 80C in January and 40 to 420C in May and June.

Sweet tamarind is a drought hardy plant which can be grown in waste land. It tolerates a wide range of soil types including clays, rocky limestone soils, nutrient poor sand and soils with high, brackish water table. In India, the tree is reported to grow well on saline sites and on severely eroded Montana wastelands.

5. PROPAGATION AND ROOTSTOCK

5.1. Propagation by seed

It is commonly propagated by seed. Seed are sown in polythene bag containing FYM, sand and Clay in equal proportion. Seed do not require scarification or other treatments for germination. Freshly harvested seed germinate easily in 1 to 2 days after sowing while dried seeds take 30-35 days for germination. Seed remain viable in storage for approximately 6 months. Seedlings raised on nursery are used for replanting after 4-6 months. Seedlings may be pricked out from the germination beds to transplant beds or polythene bags after 6 months and young plants need the shelter from dry and hot winds.

5.2. Propagation by vegetative method

It can be propagated through hardwood cuttings. The best time for taking cutting is in July-August and treatment with 1000 ppm IBA improves rooting. Budding, grafting and layering are also successful at limited scale.

6. VARIETY

No systematic work has been carried out to identify germplasm of manila tamarind and therefore recognized varieties of sweet tamarind are presently lacking. However, mainly two types of sweet tamarind i.e. Red aril and creamy aril types are common in most parts of the country.

7. CULTIVATION

7.1. Planting

It is multipurpose tree species. Its method of planting and after care differs with use. For hedge, seed are sown in 2-3 rows at 15 cm distance which develops an impenetrable fence after regular training and pruning. To develop a shelter belt, seedlings are transplanted at 3-4 m spacing around the orchard. For fruit production seedlings of Inga are planted in square system at 8 x 8 m spacing. Vegetative multiplied plants are planted at 6 x 6 m spacing. July-August is the best time for planting when the saplings are planted in the well prepared and filled pits of 60 x 60 x 60 cm. In problematic soil, pits size can be enhanced as per need.

7.2. Training and pruning

Training is essential at initial stage to provide better frame work. As avenue plant, the tree trunk is kept clean up to 3-4 m height and then branches are allowed in all directions. It does not require regular pruning to produce fruits. *Pithecellobium* tree has fast growth rate and vigorous coppicing capacity and therefore can withstand any amount of pruning, lopping or browsing by animals. For hedge regular pruning is necessary.

7.3. Irrigation

It is hardy tree and grows very well even without irrigation. At initial stage, irrigation is required to establish the young plant. Once established, irrigation is not mandatory to produce fruits. Irrigation during summer improves fruit size and yield.

7.4. Orchard management

Intercultural operation can be introduced at initial stage to control weeds and for better soil management. One or two weeding can be done as per needs.

7.5. Mulching

Sweet or manilla tamarind is hardy and drought tolerant plants, however, paddy straw, dry banana leaf etc. can be used as mulch beneath the tree canopy. Black polythene mulch is very effective to conserve soil moisture.

7.6. Intercropping

Inter crops such as coffee, tea, cacao, cardamom can be taken under humid tropical conditions and other seasonal inter crops like cow pea, brinjal, can be grown at initial stage of manila tamarind.

7.7. Mineral nutrition

The systemic information on nutritional requirement of manila tamarind is not available since the existing plantations are mainly in shelter belts and road side plantations where nutrients are generally not applied. However, application of 50 kg FYM during monsoon improves fruit set, fruit size and yield in a bearing tree. Application of 40-50 kg FYM and 500 g phosphatic fertilizer per tree has been found beneficial. Fertilizers should be applied during February-March and July-August and light irrigation should be given after application of fertilizers.

8. HARVESTING, YIELD, POST-HARVEST MANAGEMENT AND STORAGE

Ripe fruits are manually harvested when peel colour turns from green to pink or when pulp becomes pinkish in colour. However climbing on the tree is a risk because tree has thorny stem and branches. To harvest the fruits from a tall (10-15 m) tree, thin and long bamboo poles having a sharp pruning knife (skeel) fixed at the top of it, is used for harvesting. Harvested pods are separated from the twigs and packed in bamboo baskets and wooden basket for marketing. Fruit can be stored for a few days at room temperature. The pulp is extracted from the pods by removing the peel and seeds. Fresh fruits are eaten. The fruits do not store for long and must be eaten within a few days.

9. IMPLEMENTATION ARRANGEMENT

1. The project is proposed to be implemented in selected villages in the project districts namely, Champhai, Kolasib, Serchhip and Mamit Districts.
2. All the beneficiaries should be a member of the Landless FIG from the selected districts. The beneficiaries must be selected by the District Project Management Units.
3. At district level, the project would be supervised by District Level Coordination Committee (DLCC) of the concerned districts.
4. At village level, Lead Farmers of the concerned village would be the focal point.
5. 50% of the beneficiaries will be women, preferably youth between 18-40 years of age.
6. Potential land having area of at least 0.5 Ha per household would be identified for sweet tamarind cultivation. The land identified should be in written agreement/understanding with the rest of the villagers in the covered area. This must be supported by decision taken in the Gram Sabha clearly demarcating the land area for cultivation of sweet tamarind.
7. Seeds/ Planting materials and other inputs are to be procured by the FIGs from the authorized dealers or nurseries supported under the project.
8. The FIGs should maintain auditable cash book under the supervision of concern Staff at Circle and VLW.
9. The required seed treatment, plant protection measures should be taken under the guidance of the FOCUS Staff and Agriculture Department.
10. Frequent monitoring should be performed by the FOCUS staff under the supervision of the technical staff from Horticulture/Agriculture Department.
11. Signed Vouchers for the above activities should be kept ready after the completion of each activity and must be submitted by the FIGs to the concerned District Project Manager, FOCUS.

12. Format for Utilization Certificates as already enclosed in FIG Guidelines should be signed by the concerned FIGs and submit to the DPM through Village Level Workers/ /SAC.

10. INVESTMENT COST OF SWEET TAMARIND CULTIVATION UNDER SEEDLINGS FOR TREES AND FODDER

The unit cost for seeds/planting materials is ₹ 2500 per household.

The project will provide support in about 0.5 Ha of land for each farmer/household.

SI No	Particulars	Rate	Amount (₹)	IFAD loan (₹)	GOM (₹)	Beneficiaries (₹)
1	Cost of seeds/planting material	LS	2250	2025	225	-
2	Transportation and handling (source to site)	LS	100	90	10	-
3	Land preparation	LS	100	90	10	-
4	Planting of Sett	LS	200	-	-	200
5	Intercultural operations (weeding etc)	LS	300	-	-	300
6	Monitoring	LS	50	45	5	-
TOTAL			3000	2250	250	500