



## Precision Silvicultural Practices of Teak (*Tectona grandis* Linn.f)

(\*Navaneetha Krishnan S<sup>1</sup>, Balasubramanian A<sup>2</sup>, Arasakumar E<sup>3</sup>, Vasanth V<sup>3</sup>, Nilav Ranjan Bora<sup>3</sup> and Gajjala Nitish<sup>3</sup>)

<sup>1</sup>Department of Silviculture and NRM, Forest College and Research Institute, Tamil Nadu Agricultural University, Mettupalayam - 641301, Tamil Nadu, India

<sup>2</sup>Dean Forestry, Forest College and Research Institute, Tamil Nadu Agricultural University, Mettupalayam - 641301, Tamil Nadu, India

<sup>3</sup>Department of Sericulture, Forest College and Research Institute, Tamil Nadu Agricultural University, Mettupalayam - 641301, Tamil Nadu, India

\*Corresponding Author's email: [nivasforestry@gmail.com](mailto:nivasforestry@gmail.com)

Teak (*Tectona grandis* Linn.f) is one of the most predominant and prominent hardwood tree species which grows extensively well in tropical conditions. Teak occurs mostly in parts of south and south-east Asia which contributes more than 90 percent of the world's teak resources. Teak is endemic to regions of India, Myanmar and Thailand whereas Teak has been introduced to regions of Sri Lanka, Indonesia, Malaysia, Vietnam East and West Africa.

Teak (*Tectona grandis* Linn.f) is generally a light demanding species with mean maximum temperature of about 43°C and mean minimum temperature of about 13°C. Teak is grown well in high light intensity of about 85 to 100 per cent. Teak shows promising growth under well drained alluvial soil with a pH range of about 6.5 to 7.5. The mean annual rainfall for teak growth varies from 800 to 2500 mm. Altitudinal range for teak growth is 1200 m above mean sea level. However, teak shows poor growth on shallow or hard pan soil, laterite, black cotton, acidic, dry sandy soil and waterlogged soils (Balakrishnan *et al.*, 2021).

Teak is prominently known as 'King of Timbers' ranks 1<sup>st</sup> place in furniture making in our country. The total wood demand in India is estimated to be 199 M cu.m. In the annual timber production, the teak production focuses only 0.25 M cu.m (Shrivastava and Saxena, 2022). Presently, 1.68 M ha teak plantation and 6.8 M ha natural teak forests in India (Kollert and Cherubini, 2022). India contributes nearly 45 percentage of the global teak plantations. But this country is a net importer of teak to satisfy the global demand. India globally ranks first in the teak wood consumption report. India alone consumes 70 to 100 per cent of teak logs from Africa and Latin America and 90,000 cu.m of teak import annually (Deb *et al.*, 2017; FAO, 2010). In order to reduce the import duty of teak there is a great enthusiasm among farmers to grow teak outside the forest area which is also appropriately supported by different government programs. In order to increase the yield under short rotation period Forest College and Research Institute developed a precision teak farming techniques. This will promote great enthusiasm among small farmers for teak cultivation.

### Site Preparation

Well drained alluvial soil is the most suitable soil for teak growth. As teak is a long term crop land preparation is the first and most important aspect. Soil depth should be 5 ft. or 6 ft. which increases the girth and height of teak trees. In order to break the hard pans rotavators are used. Rotavators have a series of spinning blades that breaks through the hard pans available in the soil. Again the land should be furrowed by using 5 rigid type, 5 tyne

cultivator which smoothens the land surface. Rain water can be harvested by raising the bund height in and around the site. Before going for pitting make sure that the land should be free from weeds.

### Pitting

After proper tillage operations, pitting is done at  $1.5 \times 1.5$  ft. i.e 1.5 ft. depth and 1.5 ft. width. While carrying out the pitting operations the surface soil and underground soil are kept in separate side. Biofertilizers like Phosphobacteria, *Azospirillum*, *Tricoderma viride* and *Bacillus subtilis* of 250g along with 1kg of farm yard manure (FYM) is applied to individual pits before planting. Proper mixing of both biofertilizers and farm yard manure is recommended. Finally surface soil gets mixed with these fertilizers and has been used before planting. Inorder to reduce the labour cost mechanized tool like earth auger is recommended inspite of manual pitting. Earth auger has the capacity of digging 45 – 60 pits in one hour.

### Planting

Selection of good quality seedlings is the first factor to be considered. Basically seedling with 1.5 to 2 ft. height is recommended for planting. Selection of quality seedlings depends on straight stem, branching pattern and prominent root zone. Mother tree seed selection method promotes more vigorous and vibrant seedlings. Mother trees grown in Topslip and Nilambur are the prominent source for vigorous seeds. Recommended spacing under precision teak farming technology is  $10 \times 10$  ft. While planting seedlings remove the polythene bag without disturbing the soil-root zone and place the seedlings in center of pit. Afterwards soil mixed biofertilizers is filled around the seedlings. Finally ensure that root zone is fully under soil and after planting soil stabilization is done in and around the seedlings.



### Irrigation

Drip irrigation system is the most suitable irrigation method for teak plantation. Optimum utilization of water is possible in drip irrigation system. Furrow method of irrigation is also been followed in areas where the water availability is high. It will take around 15 – 20 days for teak seedlings to survive under optimum climatic conditions. Irrigation during the stress period boosts the growth of the teak plants. By increasing the inputs of irrigation and frequent thinning practices, it is possible to increase the diameter growth rate of teak plants. It has been observed that teak trees grown under irrigated condition grew faster than the non-irrigated land. Teak seedlings show vigorous growth in first 3 years with proper irrigated conditions.

### Weeding

Teak is a light-demanding species but under poor light conditions its growth and development are reduced sharply. Hence intensive weeding is recommended for teak during the early establishment of the plantation, i.e. 1 to 3 years. It is essential to carry out nearly 3 weeding operations in the first year followed by 2 operations in the second year and 1 operation in the third year respectively. Following weeding operations on a regular basis helps in better growth and development of teak seedlings.

## Pruning

Pruning is one of the important technique to be followed in precision teak farming technology. Under these technology two different pruning operations need to be carried out. They are,

1. Bud Pruning
2. Branch Pruning

**Bud Pruning:** Removing a bud which is an undeveloped or embryonic shoot and normally occurs in the axil of a leaf or at the tip of a stem is known as bud pruning. Removing the buds by manual methods is recommended in early growth stages of teak plantations. Bud pruning usually done after 6 months of planting by removing the bud which is located at the tip of a stem (Terminal buds), buds which is located in the axil of a leaf (Axillary bud) and the buds which is located on trunk or on roots (Adventitious buds). The objective of bud pruning is to shape the tree, control its growth, and encourage desirable branching patterns. When it comes to teak trees, bud pruning is not as commonly practiced as it is for other types of trees, but it can still be applied in specific situations.

**Branch Pruning:** When managing teak wood on short rotations, it is necessary to prune branches to produce clear wood in the basal logs. The objective of branch pruning is to get the straight and knot free good quality timber. Thus, the pruning schedule needs to be coordinated with tree growth in order to minimize the diameter of the knotty central core. An optimum objective is to prune branches where the tree bole is 12cm in diameter. This produces a minimal practical core of knots.

Trees with the height of about 7 ft to 10 ft with more prolific side branches need to be pruned. Long handled pruner is an instrument used for pruning the side branches. The main purpose of long handled pruner is to maintain the trees without side branches upto 20 ft height. Under precision teak farming technology maintaining straight bole upto the height of 20-25 ft without side branches is the most important aspect. Pruning helps in maintaining the trees with straight bole and knot free timber.



## Thinning

Depending on site quality and the size of initial spacing the first and second thinning is conducted at 5 and 10 years respectively. But under precision teak farming technology selective thinning is recommended after 3 years of planting. Teak trees under good site conditions reaches upto 25 to 30 ft height within 15 years. Under 10x10 ft spacing approximately 434 plants per acre has been planted. Due to closer spacing competition between the trees occurs and the growth suppressed trees need to be selected and removed. Selective thinning is need to be carried out every year upto the harvesting period. The main advantage of selective thinning is removing the suppressed trees and enhancing the growth of remaining trees. During the final harvest period nearly about 100-150 vigorous growth trees to be retained per acre. This will enhance the productivity and provide more profit to the tree farming community.

## Fertilizer Management

Generally for teak plantation NPK ratio recommended is about 150:100:100 per acre. After initial planting 10g of DAP need to be applied in 3 months interval which enhances the growth. After planting nitrogen in the form of urea at 50g in 6 months interval and phosphorous in the form of SSP (Single super phosphate) at 30g in 6 months interval is

recommended for teak. Under poor growth conditions 75g of urea and 60g of SSP on yearly basis is recommended for first 3 years of teak plantation i.e. 24 months interval. The fertilizers are effective for enhancement of growth in young teak trees.

### **Pest Management**

Majorly teak plantation is affected by two important pests namely Teak defoliator and Teak skeletonizer. These are the seasonal pests they affect the plantation in peak season and left without severe damage in off season. In case of severe damage recommended dosage of neem seed kernel extract (NSKE) at 5% can be applied. Setting up of light trap to trap adult moths will reduce the infestation levels. Clip badly affected leaves with larva will be the control measures for teak defoliator. Skeletonization of leaves will be the control measure for teak skeletonizer. Severe damage results in browning of leaves.

### **Harvest**

Teak trees should be harvested at an appropriate age and size to ensure optimal timber quality. The ideal age for teak harvesting is typically between 20 to 25 years, depending on the growth rate and the specific objectives of the plantation. The yield of teak trees varies from 80-110 tonnes per acre under farmland conditions. Proper handling and transportation of harvested teak logs are essential to minimize damage and maximize the value of the wood. Process the logs promptly to prevent deterioration and maintain timber quality.

