DEVELOPMENT OF AGROFORESTRY MODELS

TEAK IN FARM-FORESTRY

Teak *(Tectona grandis* Linn. F), a member of the family Verbenaceae, is a large deciduous tree with round crown and tall clean cylindrical bole. Teak is indigenous to Indian peninsula and continental south-east Asian region (Myanmar-Thailand-Laos) with discontinuous distribution pattern. The natural distribution of teak covers a wide range of latitude between 9° - 25° 30' N and longitude between 73° - 104° 30' E.

Teak in Agroforstry

Locality factors favouring teak growth

Teak grows from sea level to an altitude of 1200 m. It grows best in tropical climate and to a greater extent in the sub-tropical climate also. Though it can tolerate annual rainfall as low as 750 mm and as high as 4,000 mm; it grows well within an annual rainfall range of 1,500 to 2,000 mm. It can tolerate extremes of temperature: as high as 48^0 C and as low as 2^0 C. Teak is a strong light demander. The most suitable soil for teak is deep and well-drained alluvium, with an optimum pH range of 6.5 to 8.0 and relatively high content of Calcium and Phosphorous. Adaptability to different eco-climatic conditions coupled with the economic importance has made teak an ideal species for raising plantations both in forests and farm lands.

Utility

The multipurpose timber of teak has favourable strength properties besides having outstanding merit in the retention of shape and working qualities like easy to saw, finish to a smooth surface and takes polish well. The heart wood is one of the most naturally durable woods and has resistance to termite and fungal attack due to the presence of polyphenols. Hence, it has been described as one of the most durable timbers of the world. The entire bole and branches down to a thin end diameter of 12.5 to 15 cm is utilized. Traditional use of teak poles for electricity transmission and timber for railway sleepers are a time-tested testimony of its suitability for out door uses. The persistent demand and continued shortfall of its availability make it one of the dearest species in the tropics.

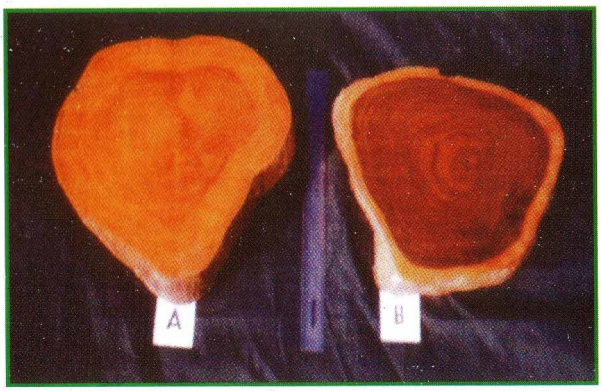
Plantation Establishment and Management

In forestlands, regeneration occurs both by artificial and natural ways. Since natural regeneration through seed is very poor, artificial regeneration through nursery technique is widely adopted. Stump planting is normally followed for large-scale plantation programme. Teak stumps of 25 cm long (with 2.5 cm shoot and 22.5 cm root) are prepared from one year old seedlings and used as planting stock and planted in auger holes (usual practice). Initial stocking ranges from 1000 to 2500 trees/ha. First thinning (mechanical thinning) is done around the age of four to five years and the second thinning (mechanical thinning) at ten to fifteen years as soon as the branches start to touch the adjacent trees. Both in first and second thinning the removal of trees will be as high as 50% of available stocking.

A final selection thinning may be performed at middle of rotation age (around 20-25 years) with an ideal final stocking of 200 to 300 trees/ha. Final felling is normally done at the age of 60 years.

Teak as an Agroforestry component

Sustained preference to any other timber has hiked the price of teak. This, in turn, has lead to raising of teak plantations outside the forest areas, particularly in the farmer's field during the present decade. In farm fields, Teak is planted both as a sole crop in the form of block plantation as well as introduced as an agroforestry component. In block plantations, a spacing of 2 x 2 m or even 3 x 3 m is adopted.



Basal discs of teak tree of 12-years - old in farmland (A) and 20 - years - old in forestland (B).

Under agroforestry practices, mostly the trees are grown in bunds or in wide rows of 8 m width. Within row, spacing normally varies from 2 to 4m. Since trees are grown in farm conditions, no separate irrigation is given to trees during cropping period. But, during fallow period, the tree rows receive irrigation twice a month just to assure survival of tree component. Further, such a restricted irrigation is expected to aid in formation of heartwood which is nearer (if not equivalent) to that formed in teak grown in rainfed condition.

Teak tree in farmland in boundary planting.

The trees in farmlands grow faster and produce more biomass when compared to plantations in the forest areas. The average girth at breast height (gbh) at 12 years age under agroforestry systems, ranged from 80-90 cm and the total height 12-15 which in turn produced stem wood volume of 9.9 cft/tree. This higher productivity in farmland could be attributed to the fact that the trees share the benefit of intensive land management practices like irrigation and other cultural operations provided to the agricultural crops. The volume of timber produced at 12 years in farmland is as same as that produced at 20 years in forestland (9.2 cft / tree). Further, the properties of wood from 12 - years - old tree in farmland is also comparable to that of 20 - years - old tree in forestland. Hence, teak can be one of the best-suited tree species for agroforestry and there exist great possibility of growing teak in farmland and harvesting at 12 years age for the production of small timber/poles.

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