

**PROCEEDINGS OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS &
HEAD OF FOREST FORCE, KERALA
FOREST HEADQUARTERS, THIRUVANANTHAPURAM**

PRESENT: P. K. KESAVAN IFS

Sub: Consultative Workshop on the Status, Performance and Prospects of Teak Plantation in Kerala – regarding

Ref: Consultative Workshop dated 5th November 2019

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Government owned forests of Kerala, including the forest plantations, are being managed for their multiple benefits which include the ecosystem services. In view of the increasingly precarious situation on the supply of water, stable supply of clean water is becoming the most important function of our forests. This, on the one hand requires good plantations to be maintained with the best of the silvicultural practices while on the other hand requires the poor plantations to be reverted as natural forests with the prime function of water conservation. In this background, a consultative Workshop, attended by forest officials, academicians and scientists, was held on 5th November 2019 at Forest Head Quarters, Thiruvananthapuram on the "Status, Performance and Prospects of Teak Plantations of Kerala". The Workshop discussed various aspects of Teak plantations of Kerala that *inter alia* included the current demand of Teak across the globe and in Kerala, market share of government plantations and private holdings, its supply chain and customer preferences in terms of grain size, price and sources of origin.

Several ecological and silvicultural issues also came up for discussion. These included topics such as the performance of Teak plantations in various age classes and factors affecting their performance, feasibility of plantations in disaster-prone areas, hydrological functions, biodiversity value and the prospects of growing Teak in the homesteads and agroforestry systems of Kerala.

Overall, the workshop gave insights in to the following:

1. The trend of demand and supply of Teak globally and in Kerala, and the customer preferences - grain size, price, sourced from forests/private, trajectory of future demand and supply.
2. Information on the assessment on the performance of existing Teak plantations – old, medium and young, factors affecting the

performance of Teak plantations – ecological, edaphic, climatic, biotic, financial, management prescriptions, marketing etc.

3. Information on the locations of Teak plantations and disaster-prone areas of Kerala, wildlife corridors, unique ecosystems & habitats and riverine areas;
4. Information on the prospects of growing Teak in the homesteads and agroforestry system.
5. Guidance for future Working Plan prescriptions on Teak.

Based on the outcomes of the workshop and the approval of the CCF Council, the following advisory is issued for guidance on the future management of Teak plantations of Kerala.

1. **Management of existing Teak plantations:**

- (i) Teak plantations falling in Site Quality IV and V (poor/very poor areas) do not have good potential for developing into successful plantations. Such areas can be restored back to natural forests.
- (ii) The plantations falling in Site Quality I and II need to be intensively managed for big-sized timber and on long-term rotation. This means, after the completion of 50/60 years (the prescribed rotation at present), only a part of the mature trees are felled at every ten years and marketed at fancy price (*mohavila*). This shall avoid clear felling, a practice, that is increasingly being discouraged in Kerala on account of climatic, terrain and ecological reasons.
- (iii) Similarly, areas falling in disaster-prone areas (eg. above 30% slope), wildlife corridors, riverine areas, high-value biodiversity areas etc. need also be restored to natural forests.
- (iv) The plantations on Site Quality III that show good potential for future could be managed intensively on the lines of Site Quality I and II. However, if the areas falling in Site Quality III are showing signs of degradation, then they are to be restored as natural forests.
- (v) In some areas, Site Quality of plantations may not be readily available or may not reflect the correct picture of the site. In such cases, a broad categorization (Excellent/Good/Poor/Very Poor) of the plantations based on stocking, growth, soil conditions, invasive species, fire hazards, biotic pressure etc. can be used in tandem with

Site Quality in the assessment for decision making. This may broadly be equated as Excellent/ Good with Site Quality I and II, and Very Poor with Site Quality IV and V. Site Quality III may fall in good or poor status depending on the site-specific situations. It is also important to develop appropriate site-specific eco-restoration programmes for those areas decided to be restored to natural forests.

Future action:

A Technical Committee is hereby constituted at each Territorial Circles with Circle Head as the chairperson and with TA to CCF, DFO concerned, one Working Plan Officer/ DCF Research and one expert from KFRI/KAU/IFG&TB as members. The constitution of the Committee is given at **Annexure I**. This Committee shall inspect each of the Teak plantations in the Circle and decide on their future management on the basis of the guidance given above and prepare the final report within three months. This Committee shall also propose prescriptions for eco-restoration of areas to be restored to natural forests, as appropriate. Once the report of the Technical Committee is approved, then the same shall be incorporated into the Working Plans, Management Plans, Administration Reports and budget proposals/ APOs.

2. Improving the productivity of Teak plantations

Teak wood, particularly, large-sized ones and poles have good demand and is presumed to hold its market share in the years to come. Moreover, these plantations are also reported to capture, sequester and retain large quantity of carbon. Hence, it is of paramount importance that the plantations retained after the process mentioned in point 1 above, and managed intensively and developed into quality plantations. Improving the performance and productivity of Teak plantations required revamping of all aspects ranging from seed selection to tending to marketing.

Future action:

The base document prepared by PCCF (FM) on improving the productivity of Teak plantations (**Annexure II**) can be expanded by incorporating, *inter alia*, the suggestions emerged in the Workshop and other best practices from the field. Director, Kerala Forest Research Institute, as agreed in the workshop, is required to coordinate this in consultation with officers of the Department and submit an improved package of practices for Teak within three months. Chief Conservator of Forests (Central Circle) shall liaise with KFRI on this.

3. Prospects of growing Teak in home-steads and agro-forestry systems

There are enough scientific evidence available now to show that after the age of 20-25 years, there is not much difference between juvenile Teak and mature Teak and also between the Teak grown in forest plantations and home-steads, though the specific tracts where they grow may have a bearing on wood qualities and aesthetics. Currently, some of the Teak timber reaching Kerala market from abroad range in age between three and twenty years only. This shows that Teak holds excellent prospects for growing in home-steads and agroforestry systems of Kerala. However, appropriate models on these, including the prospects of short-rotation, Teak based agroforestry systems are to be evolved and documented.

Future action:

Dean, College of Forestry, Kerala Agricultural University, as agreed in the workshop, is required to develop an interim Action Plan for the promotion of Teak in the homesteads of Kerala that can be implemented in collaboration with Agricultural Department, Krishi Vigyan Kendra etc. This proposal also will be readied within three months. Chief Conservator of Forests (High Range Circle) shall liaise with the College of Forestry on this.

4. Undertaking field research programmes

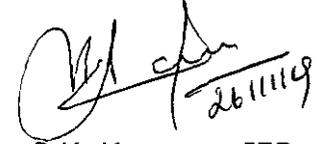
As of now, there is a need to develop more precise data on the demand and supply of Teak in Kerala. This is a major research gap and thus needs to be plugged. Similarly, workable models on Teak-inclusive agroforestry systems should be demonstrated on ground in varying conditions.

Future actions:

- a) Kerala Forest Research Institute will submit a project proposal to undertake a focussed field study on the demand and supply of Teak in Kerala, including projections for future. Financial support for this can be considered from the Kerala Forest Development Fund (KFDF).
- b) College of Forestry, Kerala Agricultural University, will submit a project proposal to demonstrate various models on Teak-inclusive agroforestry systems. Financial support for this can be considered from the Kerala Forest Development Fund (KFDF).

The success of the above-mentioned action points depends entirely on the precision, accuracy and efficiency of time-bound and dispassionate ground-

truthing. I may urge each one associated with this historic step to take up this task with utmost earnestness and with a sense of purpose. Chief Conservator of Forests (Working Plan & Research) will update the progress on these Action Points, on a fortnightly basis, after coordinating with the Circle Heads, KFRI and the College of Forestry.



P.K. Kesavan, IFS
Head of Forest Force, Kerala

To

PCCF & CWW / PCCF (P&D) / PCCF (FM) / APCCF (A) / APCCF (FB&A) / APCCF (V) / APCCF (SF) / APCCF (NR)

All CCFs / All CFs / All DCFs / All DFOs / All WW / All WPO / All ACFs (SF) / All DFOs (FS) / All DFOs (TS) / All ACFs

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Constitution of the Technical Committees

Sl.No	Name	
Southern Circle		
1	Chief Conservator of Forests	Chairperson
2	TA to CCF	Member
3	DCF (Research), South	Member
4	DFOs of the concerned Divisions	Member
5	Dr. Gopakumar S., Professor, College of Forestry, Thrissur	Expert Member
High Range Circle		
1	Chief Conservator of Forests	Chairperson
2	TA to CCF	Member
3	Working Plan Officer, Munnar	Member
4	DFOs of the concerned Divisions	Member
5	Dr. Sandeep, Scientist, KFRI, Peechi	Expert Member
Central Circle		
1	Chief Conservator of Forests	Chairperson
2	TA to CCF	Member
3	ACF, Forest Resource Survey Cell, Thrissur	Member
4	DFOs of the concerned Divisions	Member
5	Dr. E.V.Anoop, Professor, College of Forestry, Thrissur	Expert Member
Eastern Circle		
1	Chief Conservator of Forests	Chairperson
2	TA to CCF	Member
3	Working Plan Officer, Palakkad	Member
4	DFOs of the concerned Divisions	Member
5	Dr. Kunhamu T.K., Professor, College of Forestry, Thrissur	Expert Member
Northern Circle		
1	Chief Conservator of Forests	Chairperson
2	TA to CCF	Member
3	Working Plan Officer, Kozhikkode	Member
4	DFOs of the concerned Divisions	Member
5	Dr. Hrideek, Scientist, KFRI, Peechi	Expert Member

RAISING SUCCESSFUL TEAK PLANTATIONS

The Teak plantations raised in forests of Kerala under Taungia System till late 1980s were a success. The success rate got drastically reduced subsequently coupled with sever elephant damages during the last 2 decades. But, there are some very good plantations also raised during this period. That means the current practices, if suitably modified with additional inputs, caution and attention, will suffice for raising of successful plantations. Some of the tips are given below:

1) Arresting soil degradations in mature Teak plantations

Gully pluggings and other soil-moisture conservation activities to be carried out in Teak plantations immediately after the final thinnings and fire should be prevented in the area.

2) Avoiding Teak replantings in unsuitable areas

Avoid Teak replantings in site quality IV and V. Also avoid Teak replantings in areas which have not yielded Teak wood (including small wood) @ 100M³/Ha in the previous rotation. Crop change may be done after 2nd rotation in site quality III. Also, avoid felling of the miscellaneous crops and replantings in areas suggested in Working Plans – steep slopes, areas within 30 meters from rivers/ streams, rocky area, hilltops, areas with shallow soils, tall grass areas, and marshy areas.

3) Elephant inhabited Teak plantation areas

Avoid from Teak re-planting or have solar fencing protections.

4) Timely completion of harvest operations

The harvest operations should be completed and the area made available for pre-planting operations by March end.

5) Slash felling, burning, heaping and reburning operations

To be completed in summer months and the entire area should be subjected to the burning and reburning operations.

6) Nursery

Seed source is crucial. Seeds from one plantation or one location is ideal. Seeds collected from different areas may be avoided for planting in a single plantation. For stump nursery, only 3 Kg of graded seeds/ standard bed is sufficient. 5 beds are required for planting 1 Ha with good quality stumps. 11 months old seedlings are required for making the stumps. Thatties, preferably of bamboos, are a must for stump nursery to produce stumps with sufficient root length.

7) Seed pre-treatment

Seeds filled in gunny bags and immersed in water for 2 days before sowing is ideal. In case of alternate soaking during the nights and drying during the day time, it should be carried out for 5 days.

8) Stumps/ Root trainer seedlings

Never reduce the lengths of stumps. Stumps with 8 inch length root portion and 1 inch length shoot portion with thickness of thumb finger at collar, can withstand the dry spells after planting. Dipping the stumps in a root hormone solution after the preparation of the stumps can give 100% sprouting after the planting. Dipping in a fungicide solution can prevent any decaying of the stumps, after the planting. Root trainer seedlings grown for 75 days in the root trainers (15 days in shade house and 60 days in hardening place) having 20 to 25 cm height is ideal. Root trainer seedlings beyond 3 months in the containers, lose their quality and are unfit for planting.

9) Planting

Growth and establishment of the seedlings, in the first year, is the most crucial factor in success of the Teak plantation. The growth period is only 7 to 8 months upto January. Above 1 meter height and sufficient

thickness to the stem to be achieved by this period, for surviving in the summer. As such, early planting is a must. Stump planting in April to May 15th, and root trainer planting during May last week to June end. The planted stumps require a dry spell for proper sprouting. The root trainer seedlings also can be planted by May last week after immersing the trays in water for a few minutes. The stump planting in June and the root trainer plantings after July, 15 will invariably be a failure. There are chances for unfilled crowbar portion remaining on the base portion of the stumps after the planting. Such unfilled portion of the crow bar hole can lead to drying up or decaying of the stumps. Hence, proper compaction of soil with crow bar from all sides of the crowbar hole at sufficient depth is required. With a view to promote the field establishment and growth of the root trainer seedlings, 25 gm to 50 gm NPK can be applied in the pit before covering the same. The spacing need to be invariably 2 mx 2m.

10) Casualty replacement

Casualty replacement to be done, invariably with root trainer seedlings, during July – August.

11) Reduction of double leaders

Timely reduction of double leaders during the first year is essential. Many shoots will be there for the stump planting and a timely reduction of the unwanted ones are essential.

12) Weedings

One weeding extra to the normal numbers is required per year up to 5th year.

1st Year: Spade weeding (May-June for stump planting, June-July for root trainer) and 3 knife weedings (Aug-Sept, Oct-Nov & Jan). The first weeding shall invariably be a spade weeding. The fourth weeding can be given the FSR rate for first year third weeding.

2nd Year : 4 knife weedings (May-June, Aug-Sept, Oct-Nov. & Jan). The 4th weeding can be given the FSR rate for second year third weeding.

3rd Year : 3 knife weedings (May-June, Aug-Sept. & Nov- Dec). The third weeding can be given the FSR rate for third year second weeding.

4th Year : One knife weeding and climber cutting during Aug- Sept. FSR rate 100 (a) (i), 100 (a) (ii) or 100 (a)(iii).

5th Year : One knife weeding and climber cutting during Aug- Sept. FSR rate 100 (a)(i), 100 (a)(ii) or 100(a)(iii)

(Required only if mechanical thinning is not proposed during 5th year)

13) Platform formation / maintenance

Platform formation (60 cm x 60 cm x 30/2 cm with inward slope) during Aug-Sept. in first year. Maintenance of platforms during April – May in 2nd and 3rd years. This is an important activity for moisture conservation, keeping the seedling base devoid of grass and weeds, and for aiding the fertilizer application.

14) Fertilizer applications

Fertilizer applications is important.

1st Year : Base manure of 25 to 50 gm NPK (50 gm can be 25 gm Urea and 25 gm Rajphose) in pit at the time of root trainer planting, 50 to 75 gm NPK per plant during Aug- Sept. for stump root trainer plantings.

2nd Year : 50 to 75 gm NPK per plant during August – Sept.

(50 gm NPK can be 20 gm Urea, 25 gm Rajphose and 5 gm MOP)

15) Scrapping around the base of the seedlings

The base of the Teak seedlings should be always kept clean to avoid the root competition by grass and weeds and also to prevent the stem borer attacks. Scrapping 30 to 45 cm radius around the base of the seedlings during Dec- Jan need to be done during first and second years.

16) Labourers camping in sheds

The culture of labourers camping in sheds within the plantation may be promoted. A group of labourers can camp within the area and carry out the various activities during the first 3 years. This would provide the required protection to the plantation from wildlife, fire etc besides ensuring timely execution of the operations. Normally, additional labour force will be required only during the pre-planting operations, planting operations, spade weeding, platform making / maintenance and fertilizer applications.

17) Prevention of Stem borer attacks

Keeping the base of the seedlings free from grass and weeds during the first 3 years can prevent the stem borer attack to a great extent. Timely weeding, formation / maintenance of platforms and scraping the base of the seedlings can help preventing the stem borer attacks.

18) First Mechanical thinning

The first mechanical thinning can be done in good Teak plantations in 5th or 6th year. During the first mechanical thinning, the alternate diagonal rows alone should be removed, which would give an even spacing of 2.83 m x 2.83 m. The alternate planting rows should never be removed, which would give an irregular spacing of 2m x 4 m.
