



## KERALA FOREST DEPARTMENT

Working Plan & Research Wing

No. WA-28/2020

Dated 19-01-2022

### CIRCULAR No. 02 / 2022

**Sub: - Improved Management of Teak Plantations - Protocol for Collection of Teak Seeds - reg:**

- Ref: - 1. Workshop held on 5th November 2019 at Forest Head Quarters, Thiruvananthapuram on the "Status, Performance and Prospects of Teak Plantations of Kerala" and subsequent discussions at various levels.
2. Proceedings Order No. KFDHQ/5528/19-WP&R/RA, Dated 19.11.2019

Teak (*Tectona grandis*) is considered a grand jewel in the diadem of tree species of the world. Kerala is credited with several milestone developments in the history of the Teak Plantations; be it the first Teak Plantation raised during 1840s in Nilambur, or the first stump planting done during 1890s in Aryankavu. During 20<sup>th</sup> century, there was exponential growth of Teak Plantations in Kerala. Until a few decades ago, Kerala was home to 30 per cent of the planted Teak in India and had a lead role in Teak trade.

It is a known fact that apart from factors like site selection, arresting soil degradation, avoiding replanting in unsuitable/elephant prone areas, timely completion of harvest operations, timely casualty replacement, weeding, soil working, manuring, thinning etc., one most important factor that determines the prospect of a Teak Plantation is the quality of seeds and planting materials. Good quality seeds collected at the right time from the right provenance, appropriate seed treatment and correct nursery practices are critical for the production of good quality stumps or Root Trainer Seedlings.

Kerala Forest Department has been following a standard set of practices for the collection of Teak seeds from identified Teak Seed Production Areas (TSPAs). With the age-old practice of using stumps as planting material giving way (at least partially) to Root Trainer Seedlings, it has become necessary to adapt and modify the silvicultural practices also as appropriate. Further, to meet the requirement of planting operations, both within the Department and outside, the requirement of Teak seeds is expected to increase in the coming years. Teak seed production is also showing wide fluctuations in quantity, quality and periodicity. At present, KFD is having three Central Nurseries and District Permanent Nurseries in various Districts. Recently, a Cold Storage Facility has also been set up at the Seed Centre, Kerala Forest Research Institute, Peechi for the long-term storage of Teak seeds. All these point to the necessity of codifying the modified Teak seed collection protocols and this Circular is issued with this objective.

**1. Assessment of Seed requirement by Territorial DFO / Social Forestry ACF**

- 1.1. As a thumb rule, Territorial DFOs/ Social Forestry ACFs shall ensure that Teak stumps and Root Trainer Seedlings are produced in equal proportion.
- 1.2. Area to be taken up for planting in subsequent two years shall be initially assessed by the Working Plan & Research wing based on the prescriptions of the Working Plans which shall then be circulated to the DFOs for incorporating the backlogs/ plantations not to be taken up etc. and the final area for planting is confirmed and consolidated at the Circle Level **before August 31<sup>st</sup>, every year**. Similarly, Social Forestry ACFs shall also assess their requirement for the subsequent year that shall be compiled by the Circle Heads concerned **before August 31<sup>st</sup>, every year**. Nursery for preparing Stumps are to be raised one year in advance. Seeds for this need to be collected in time and hence planning for meeting the requirement for the year after is also needed.
- 1.3. While assessing the requirements, Territorial DFOs/Social Forestry ACFs shall take into account the availability of stumps that are already being raised by the various Territorial /Social Forestry Divisions across the state.
- 1.4. The Division level Officers (Territorial/Social Forestry) should then forward the requirement of Teak seeds for raising mother bed nurseries for Teak stumps (for planting in the year succeeding the subsequent year) to the DCF (Research North) or the DCF (Research South), through their Circle Heads, depending on their jurisdiction. The requirement of seeds for raising Root Trainer Seedlings during the forthcoming planting season should be given

to the DFOs having Central Nursery. The DFOs in charge of the Central Nursery shall forward the Teak seed requirement through their Circle Heads to the DCF Research North/South, as the case may be. In both instances, the requirement should reach the DCF Research concerned **before 30<sup>th</sup> September every year**. To avoid duplication, no DFO except those having Central Nurseries should forward the requirement of seeds for Root Trainer Seedlings- as the same shall be placed by the DFOs in charge of the Central Nursery.

## **2. Steps for Seed Collection by Deputy Conservators of Forests, Research (North/South)**

- 2.1. The DCF Research North/South shall ensure that the seeds are collected only from the existing TSPAs or those plantations identified and approved by the Chief Conservator of Forests (Working Plan & Research) through a process as elaborated in paragraph 3 below.
- 2.2. As far as possible, seeds collected from the TSPAs or identified additional plantations as in para 3 below, shall be used for preparing planting stock for raising plantations in the same/nearby locality.
- 2.3. As far as possible, seeds that fall from January onwards, each year, shall be collected since they are known to be of better quality and viability.
- 2.4. Seeds with relatively good size shall be given preference.
- 2.5. In good seed years, seeds beyond the requirement for that year can be collected subject to the seed storage capacity of Seed Centre, Peechi. Seeds collected beyond March 31 shall be stored, as per requirement, for subsequent use. The CCF (Working Plan & Research) shall issue necessary authorization for collection of additional quantity of seeds.
- 2.6. Based on the requirements received, as given in 1.4 above, the Deputy Conservators of Forests, Research (North/South) shall immediately initiate tender procedures to collect that year's good quality seeds from TSPAs/identified plantations. The Tender procedures including issuing Work Order and executing Agreement shall be completed **before December 31<sup>st</sup> each year**.
- 2.7. In the case of seed collection from the additional plantations identified and approved by the Chief Conservator of Forests (Working Plan & Research) as elaborated in paragraph 3 below, if there is no time left for completing the tender procedures for the collection of seeds, considering the urgent nature of work (emergency work), the clause 1.14 of the GO (RT)

141/2021/F&WLD dated 06-05-2021 may be invoked and the works can be awarded without tender formalities to any Contractor having valid registration. Alternatively, the work may be carried out departmentally or through Vana Samrakshna Samithies (VSSs) or Eco-Development Committees (EDCs) on the basis of sanctioned estimate, without Contractor's profit. In case, the works are to be entrusted with the VSSs/EDCs, the Territorial DFOs concerned shall complete the seed collection procedures (based on a written request from the DCF Research (North/South) as mentioned in para 4.1 below.

2.8. If the requirement of seeds exceeds the anticipated quantity of seeds from the existing TSPAs, the DCF, Research (North/South), shall make necessary arrangements to collect seeds from those identified plantations as given in Paragraph 3 below.

**3. Procedure for identifying additional Plantations as seed source when existing TSPAs are not able to meet the demand of seeds in a particular year**

3.1. Each year, based on the requirements of seeds received, as given in 1.4 above, the DCFs Research (North/South) shall make a careful assessment of the anticipated quantity of seeds expected from the existing TSPAs and if the anticipated quantity is short of the requirement, a report shall be submitted to the CCF (Working Plan & Research).

3.2. Based on the report mentioned in paragraph 3.1 above, the CCF (Working Plan & Research) shall constitute an Evaluation Committee through a Proceedings for selection of superior plantations fit for seed collection to overcome the expected shortage of seeds from TSPAs. The Evaluation Committee shall consist of the DCF Research ( North/South), as the case may be, the Territorial DFO concerned, the ACF (Research) concerned, expert members from the Kerala Forest Research Institute, Thrissur and College of Forestry (Kerala Agricultural University) Thrissur or any other relevant Scientific Institute. The DCF Research (North/South) shall be the Convenor of the Committee.

3.3. On receipt of the Proceedings, as given in 3.2 above, the DCF (Research North/South), as the case may be, shall within 3 days, communicate to the Territorial DFOs to inform the list of identified good quality Teak Plantations in their jurisdiction which can be evaluated by the Evaluation Committee.

- 3.4. The Territorial DFOs shall forward the list of identified good quality Teak Plantations in their jurisdiction to DCF Research (North/South), as the case may be, within 15 days of the receipt of the letter as mentioned in 3.3 above. The plantations with better phenotypic performance and having better seeding history may be considered for this.
- 3.5. The DCF Research (North/South), shall communicate with the other members of the Evaluation Committee, coordinate and arrange for field visits to evaluate the identified good quality Teak Plantations in their jurisdiction immediately. After evaluation, the DCF (Research North/South) shall forward the Evaluation Committee's report, with specific remarks and due comments/recommendations on each plantation, signed by all the members of the Committee to CCF (Working Plan & Research).
- 3.6. Based on the above report, the CCF (Working Plan & Research) shall issue a Proceedings identifying those plantations recommended by the Evaluation Committee as additional plantations for seed collection (apart from the existing TSPA).
- 3.7. Once the additional plantations are selected as above, they shall be kept as reserve or buffer plantations up to a maximum of 5 years from the year of selection for collection of seeds in case there is shortage of seeds from the TSPAs. After the 5<sup>th</sup> year, the procedures as mentioned in Paragraphs 3.1 to 3.6 will be repeated. During these 5 years too, in any year, if the TSPAs can't meet the requirement of seeds, the DCF Research (North/South) shall intimate the same to the CCF (WP&R) before proceeding with the seed collection from these additional plantations.

#### **4. Procedure for Seed Collection from additional plantations selected and maintenance of these plantations**

- 4.1. Collection of Teak seeds is highly seasonal, with the seeding period being from the end of November to March-April. Experience shows that anticipated seed requirement of Territorial/Social Forestry Divisions and the expected seed quantity from the existing TSPAs can be assessed at the earliest only by October- November each year. Variations in rainfall, flood, drought and other factors could also affect the availability of Teak seeds. In any particular year, if seeds are to be collected from the identified additional plantation as mentioned in Paragraph 3.1 to 3.6 above, and if there is no time left for completing the tender procedures for the collection of seeds, considering the urgent nature of work (emergency work), the clause 1.14 of

the GO (RT) 141/2021/F&WLD dated 06-05-2021 may be invoked and the works can be awarded without tender formalities to any Contractor having valid registration. Alternatively, the work may be carried out departmentally or through Vana Samrakshna Samithies (VSSs) or Eco-Development Committees (EDCs) on the basis of sanctioned estimate, without Contractor's profit. In case, the works are to be entrusted with the VSSs/EDCs, the Territorial DFOs concerned shall complete the seed collection procedures (based on a written request from the DCF Research (North/South)). In such cases, the CCF (WP&R) shall place the funds under the relevant Budget Heads at the disposal of the Territorial DFOs concerned. In cases where the seed collection is done in this manner, the Territorial DFOs concerned shall arrange to hand over the seeds to the DCF Research North/South in batches of sufficient quantity for further transportation to Seed Centre.

- 4.2. The selected additional plantations, as in para 3.6 above, shall be handed over to the DCF Research (North/South) and the same will be maintained by the Research Wing as in the case of existing TSPAs.
- 4.3. For all TSPAs/ identified additional plantations, the DCF Research (North/South) shall carry out all timely silvicultural operations except thinning. For thinning, the DCF Research North /South shall carry out all operations upto the marking of trees and the thinning will be carried out by the Territorial DFOs concerned.
- 4.4. The funds for undertaking the silvicultural operations can be met from the regular Plan Budget Heads meant for the purpose and also from the Kerala Forest Development Fund (KFDF) or any other Budget Head as appropriate.

**5. Seed transportation to Seed Centre, testing, grading and distribution of seeds to the Territorial/SF Divisions from KFRI based on the requirement**

- 5.1. The DCF Research (North/South) shall ensure that the seeds collected as per the procedure elaborated in para 1 to 4 above are transported to Seed Centre, KFRI, Peechi using Departmental vehicle or other means of transport, in batches, either every week or whenever sufficient quantities are collected. Also, it will be ensured that the Teak seeds which are being transported in lots are having proper labels showing the source (location), quantity in Kg and date/s of collection. This is very important since the source of seeds need to be traced upto the Journal of the new Plantation.

- 5.2. Steps shall be taken at Seed Centre, Peechi for immediate grading and distribution of Teak seeds after the cutting test. Germination tests of collected seeds shall follow subsequently.
  - 5.3. Seeds below the prescribed minimum viability (10%) should not be supplied to the field from the Seed Centre.
  - 5.4. For proper planning of the distribution of graded seeds from Seed Centre Peechi to the Territorial/ SF Divisions, the requirement of seeds, as informed by the Territorial/ SF Divisions (as given in para 1.4 above), shall be intimated by the DCF Research (North/South) to Seed Centre, Peechi and they in turn shall intimate the Territorial DFOs/ SF ACFs concerned as soon as the seeds are ready for distribution.
  - 5.5. On getting intimation from Seed Centre, Peechi, Territorial DFOs and Social Forestry ACFs who have submitted their requirement (as per para 1.4 above) shall make necessary arrangements to collect the seeds without any delay.
  - 5.6. The Seed Centre shall intimate the details of distribution to the DCF Research (North/South) as soon as distribution of seeds starts.
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6. **Handling the requirement of seeds in poor seed year or years of erratic weather conditions like extreme rains/flood etc.**
    - 6.1. In case of eventualities like poor seed year, extreme rainfall/flood years etc., seeds from proven sources, collected scientifically by Institutions like KFRI, IFGTB Coimbatore can be considered, subject to the prior approval of Appellate authority formed for the purpose as mentioned in para. 6.2 below.
    - 6.2. An appellate Committee with CCF Working Plan & Research as Chairman, the five Territorial Circle Heads and the Deputy Conservators of Forests, Research (North/South) as members shall supervise the process of seed collection and ensure the availability of quality seeds during bad seed years. The DCF Research (North and South) shall be the convenors of the Committee. The Appellate Committee, based on a request received from the Convenors shall hold meetings, assess the seed availability and decide on alternate arrangements for the supply of seeds as mentioned in para 6.1 above and give necessary orders.

## 7. Timely operations for producing good quality planting materials

To ensure production of optimum sized and good quality planting stock, planning the sowing of seeds in time is of utmost importance. Hence, for raising root trainer seedlings, the seeds should be sown latest by March 31<sup>st</sup> every year and for Teak stumps, the seeds to be sown by 30<sup>th</sup> April every year.

Territorial DFOs/ Social Forestry ACFs who are collecting the seeds from Seed Centre at Peechi shall ensure that the seeds are properly pre-treated and all necessary procedures to prepare good quality planting stock in time are carried out. The directions in the Proceedings Order No. KFDHQ/5528/19-WP&R/RA, dated 19.11.2019 (copy attached as Annexure) should also be strictly adhered to.



Principal Chief Conservator of Forests &  
Head of Forest Force, Kerala



To

The PCCF & CWW/ PCCF (V&FI)/ PCCF (P&D)/ PCCF (FM)/ APCCF (SF)/ APCCF & CEO CAMPA/ APCCF (A)/ APCCF (F, B & A)/ APCCF (NR).

The Director, KFRI, Peechi/ The Dean, College of Forestry, Kerala Agricultural University.

All CCFs/ All CFs/ All DCFs/ All DFOs/ All Wildlife Wardens/ All Working Plan Officers/ DCF Research North & South/ All ACFs/ All officers of Working Plan & Research Wing/ Officers -in - charge of Seed Centre, Peechi Thrissur.



**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 5<sup>th</sup> November 2019

**Order No.KFDHQ/5528/19-WP&R/RA, Dated 19.11.2019**

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 5<sup>th</sup> 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 Circle 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**

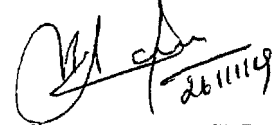
As of now, there is a need to develop more precise data on the demand and supply of Teak in Kerala. This is a major research gap and thus needs to be plugged. Similarly, workable models on Teak-inclusive agroforestry systems should be demonstrated on ground in varying conditions.

#### **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

Dr.Gopakumar.S, Professor, College of Forestry, Thrissur  
Dr.E.V.Anoop, Professor, College of Forestry, Thrissur  
Dr.Kunhamu.T.K, Professor, College of Forestry, Thrissur  
Dr.Hrideek, Scientist, KFRI, Peechi  
Dr.Sandeep, Scientist, KFRI, Peechi

## Annexure I

## Constitution of the Technical Committees

| Sl.No                    | Name   |               |
|--------------------------|--|---------------|
| <b>Southern Circle</b>   |  |               |
| 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 |
| <b>High Range Circle</b> |  |               |
| 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 |
| <b>Central Circle</b>    |  |               |
| 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 |
| <b>Eastern Circle</b>    |  |               |
| 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 |
| <b>Northern Circle</b>   |  |               |
| 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. Hrudeek, 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 2<sup>nd</sup> 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 15<sup>th</sup>, 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 m x 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 5<sup>th</sup> year.

**1<sup>st</sup> 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.

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

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

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

**5<sup>th</sup> 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 5<sup>th</sup> 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 2<sup>nd</sup> and 3<sup>rd</sup> 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.

**1<sup>st</sup> 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.

**2<sup>nd</sup> 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 5<sup>th</sup> or 6<sup>th</sup> 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.

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