



FOREST DEVELOPMENT CORPORATION OF MAHARASHTRA LIMITED
(Government of Maharashtra Enterprise)
CIN: U45200MH1974SGC017206
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No. Plan/R&M/CR-52/22-23/ 2989

Dated 16 November 2022

CIRCULAR

Subject: Standard Operating Procedure for Collection, Storage, Transportation and Treatment of Teak Seeds

Preamble

- 1.0 FDCM has been created with paramount objective of raising plantations of economically important species on forest lands assigned to it. To fulfill this obligation, FDCM has been managing forests assigned to it on sound principles of silviculture. The use of genetically superior planting stock (seed) is one of the primary requirements to raise successful plantations and teak is no exception.
- 2.0 Seed is a tender living entity, requiring utmost care and attention, else it is bound to perish. The ultimate success of teak-plantations therefore depends on the seeds used to raise them and thus, strict enforcement of the desired protocol in that regard assumes great importance. In order to suggest measures for collection and treatment of best quality teak-seeds, having optimal germination percentage, a Committee was setup under the chairmanship of the Divisional Manager, Nagpur Division vide this office Order No. Plan/R&M/CR-52/22-23/2335 dated 21st September, 2022. These Guidelines have been formulated based on the recommendations of the said Committee and after taking into consideration other relevant aspects in this regard.

General

- 3.0 By and large, teak-trees are leafless throughout the greater part of hot season. The new leaves ordinarily appear from April to June according to locality and season; in wet seasons they sprout early, while in abnormally dry seasons trees remain leafless longer than usual.
- 4.0 Teak tree flowers profusely. On an average, each healthy and vigorously growing teak tree bears more than 300 inflorescences. Each such inflorescence has 5000-7000 flowers. However, only less than 1% flowers result in fruiting.
- 5.0 The fruits ripen from November to January and fall gradually, some remaining on the tree through part of the hot season. The fruit is a hard, bony, irregularly globose nut, somewhat pointed at apex, enclosed in a thick, felty, light brown covering, containing one to three, rarely four, seeds.
- 6.0 The nut is enclosed in the inflated bladder-like calyx, 0.8-1.5 inch in diameter. Throughout the cold season, the feathery erect fruiting panicles are conspicuous on the trees.

Mother trees of superior phenotypic and genetic qualities

- 7.0 Mother trees of superior phenotypic and genetic qualities must be selected for the seed collection purpose. Ideal characteristics of superior mother trees are straight form, long clear bole, uniformly developed crown, less branching, vigorous growth and disease-free tree.
- 8.0 Bifurcated trees, excessively big crown, bent stem, excessive branching and insect infected trees are characteristics of inferior tree.

- 9.0 **Quality seeds must be collected from Seed Stands, Seed Production Areas and Seedling Seed Orchards.**
- 10.0 **Seed Stand (SS)-** It is a portion of natural forest or plantation with trees of superior phenotypic and genetic qualities, exhibiting the characteristics mentioned in para 7.0 above, which is selected for seed collection.
- i. A Seed Stand may be selected either from a teak-plantation or natural forest.
 - ii. Areas prone to natural calamities and destructive wildlife must be avoided.
 - iii. Areas should be accessible even during monsoon.
 - iv. The interspacing between the trees should be reasonably large so as to ensure development of uniform crown and thereby production of greater number of seeds per tree.
 - v. If the selected stand is a plantation, then the seed source of plantation must be known.
 - vi. Trees in the selected stand must be in their reproductive (20-40 years) age.
- 11.0 **Seed Production Area (SPA)**—It is an area managed specifically to produce adequate volume of quality seeds. Natural forest or plantation may be thinned by retaining only the necessary mother trees. Inferior trees may be thinned out in a Seed Stand to convert it to Seed Production Areas.
- i. The SPA should be a minimum of 4 ha. having minimum 100-150 superior mother trees in the age group of 25-40 years.
 - ii. SPA should be conveniently accessible in all seasons.
- 12.0 **Seedling Seed Orchard (SSO)**—When seeds from phenotypically superior mother trees are collected from various places and are planted at one place or orchard for seed collection, then such an orchard is called the Seedling Seed Orchard. Such plantations, when further matured are evaluated and inferior trees therein are removed. The initial spacing is kept at 3m x 3m, which may be increased gradually upto 10 m x 10 m.
- 13.0 **Identification of New Seed Stands**—From the point of view of perpetual production of genetically superior seeds, apart from maintaining the existing Seed Stands, Seed Production Areas and Seedling Seed Orchards, new Seed Stands, fulfilling the requisite parameters and preferably having an area not less than 4 ha. (from the management point of view) must be identified by the Divisional Managers concerned forthwith. For this purpose, appropriate tracts of natural forests and existing teak plantations, fulfilling the requisite criteria may also be explored. The range-wise and compartment-wise details of such areas must be reported to the concerned Regional Managers.
- 14.0 **Notifying the New Seed Stands**—After receiving the reports as mentioned in para 13.0 above, the Regional Managers, after due scrutiny and verification as they deem fit, shall notify new Seed Stands from where seeds can be collected. A copy of all such notifications shall be endorsed to the Seed Processing Units, as well as to the Managing Director for the purpose of monitoring.
- 15.0 With the passage of time, new Seed Stands shall be identified and Seed Production Areas and Seedling Seed Orchards shall be developed and notified in the manner prescribed above.

Seed Collection

- 16.0 Seed Stands, Seed Production Areas and Seedling Seed Orchard shall be properly demarcated on ground.
- 17.0 The fruit yielding capacities of Seed Stands, Seed Production Areas and Orchards, shall be assessed by a forest-officer not below the rank of a Forester, in the month of February by measuring the weights of seeds collected in sample plots of 50 m x 50 m size.

- 18.0 All obstructions, hindering the seed collection and growth of mother trees must be removed. To facilitate this, the entire area must be cleaned and carefully controlled burnt, immediately prior to the actual collection every year. The controlled burning shall be done under the strict supervision of the Range Forest Officer concerned.
- 19.0 Fallen fruits may be conveniently collected by clearing the ground under the trees and sweeping up the fruits every few days. The fruits may, if necessary, be lightly beaten off the trees with sticks. However in no case, immature fruits should be plucked. For convenience in storage and transport, the pericarp (bladder-like calyx) and other foreign substances shall be removed. This can be done by half filling a bag with the fruits and vigorously rubbing and shaking it, after which the fruits can be separated from the nuts by winnowing.
- 20.0 After removing all leaf litter and other foreign substances, seeds must be filled in jute bags and dispatched to the collection centers at Division level. Jute bags facilitate the proper aeration to the seeds.
- 21.0 Plastic bags should not be used, as seeds are bound to be destroyed due to rise in temperature and fungus caught inside the plastic bag.
- 22.0 A model Estimate for the seed collection is enclosed herewith as **Annexure-I**.

Deployment of Staff, Roles and Responsibilities

- 23.0 At present, the responsibility of seed-collection rests with the Seed Units at Nagpur and Nashik. However, considering the limited staff available with the said Units, the responsibility of collection shall henceforth with the concerned Regions and Divisions.
- 24.0 The seed-collection period is March-April, by which time the field staff is relieved from the works related to annual felling and extraction of felled material. Regional Managers and Divisional Managers shall ensure that dedicated teams for the purpose of seed-collection are constituted under the respective Assistant Managers. Each such team shall be responsible for the collection from the Seed Stands, Seed Production Areas and Seedling Seed Orchards, specifically assigned to them by the Divisional Manager.
- 25.0 Seed-collection requires technical skill. Therefore, training sessions shall be conducted before the start of collection season every year, to guide the teams about their roles and responsibilities. The Range Forest Officers concerned shall ensure that the laborers deployed for the seed-collection are briefed properly beforehand.
- 26.0 The seeds collected in the aforesaid manner shall be transported to the raw-seed collection godowns at Division level through available means. If deemed necessary, private vehicles may be hired to avoid undue delay.

Storage of Raw-seeds in respective Divisions and Transportation to respective Seed Units.

- 27.0 All existing raw-seed storage godowns must be refurbished and necessary facilities for storage must be made available. Range Forest Officers shall be personally responsible for the upkeep and maintenance of such godowns. The Regional Managers and Divisional Managers must take stock of the storage facilities for raw seeds and if necessary, initiate process for setting up new godowns with modern storage facilities.
- 28.0 The jute bags in which seeds are stored, must be distinctly labelled with the source of seeds, i.e. the range, round, beat, compartment and source i.e. Seed Stand, Seed Production Area or Seedling Seed Orchard as the case may be, from where seeds are collected.

29.0 To restrict the time span between the seed-collection and commencement of seed-treatment at Seed Treatment Units to a minimum, necessary arrangements for transportation from the raw-seed storage godowns to the processing units must be made. If FDCM vehicles are not available, private vehicles may be hired for this purpose also.

Treatment

30.0 Germination of teak seed is often poor due to dormancy and therefore it requires pre-treatment by alternate wetting and drying for about 15 to 20 days to break the dormancy.

31.0 Removal of mesocarp may be done for 7-10 minutes in mesocarp scrubbing machine. The staff and laborers deployed on such machines must be provided with necessary safety gears.

Storage Facility

32.0 Storage godowns to store the treated seeds must be provided with desired storage facilities and proper ventilation. Necessary arrangements for the fumigation facilities must be provided in the storage godowns.

33.0 Jute bags storing the seeds must be labelled with their source as mentioned in para 28.0.

34.0 A model Estimate for treatment of seeds and their storage is enclosed herewith as **Annexure-2**.

35.0 The time-schedule for various operations involved in the process is enclosed as **Annexure-3**.

36.0 A video documentary prepared by the Maharashtra Forest Department on the subject matter is also available on the official website www.fdcem.nic.in of the FDCM.

Encl. As above


Vikas Gupta
Managing Director

To,
The General Manager, Nagpur Region
Regional Managers(All)
Divisional Managers(All)
Assistant Managers (All)
Range Forest Officers (All)

Copy to—
The Principal Chief Conservator of Forests (HoFF), Maharashtra State, Nagpur.

Annexure-1

Model Estimate for Seed Collection from Seed Stand, Seed Production Area and Seedling Seed Orchard

Wage rate = Rs. 425.96 (As on 15.11.2022)				
S.No.	Particulars	Man Days	Material cost/ha (in Rs.)	Total in Rs./ha.
1	Demarcation of SS, SPA and SSO Area once in four years (After scrubbing the bark of the tree, apply three oil paint bands, two of black colours and in between red colour of width 6 (six) cm at a distance of 6 cm and the distance between two trees shall be 20 meters.)	1.00 per ha.	400/-	826.00
Cleaning -				
2	Cutting of unwanted coppice, bushes, climbers etc along with removal of the same and controlled burning. (December to January)	3.00 per ha.	0	1277.90
3	Estimation of Teak Seed Yield (5% of total area)	0.5 per plot (50 mtr X 50 mtr)	0	213.00
4	Fixing of triangular metallic labels of standard size with FDCM monogram and tree serial number engraved and fixing with screw to the seed bearer teak trees, where not done earlier applicable for SPA (Fully converted) and SSO but not for SS.	1.00 per 100 trees	4000/- per 100 trees	It depends on the no. of teak trees.
5	Application of Bordeaux Mixture to seed bearer teak trees up to 1.00 m height from ground level for SPA (Fully Converted), TSO	4.00 per ha.	1000/-	2703.85
6	Fire protection works including cutting and burning of fire lines of 6 m wide around SS, SPA, TSO (December to January)	1.00 per ha.	0	426.00
7	Seed Collection, hand scrubbing, removal of leaf litter, foreign matters and shifting the collected seed to a common collection point within the compartment (March to April)	0.20 per Kg	0	85.20


 Managing Director

ANNEXURE - 2

साग बियाने प्रक्रिया अंदाज पत्रक

(एक टन साग बियाने करिता) मजूरी प्रति दिन :- 425.96

अ. क्र.	कामाचा तपशील	मनुष्य दिन	मजूरी	साहित्य खरेदी खर्च	एकूण रक्कम रूपये
1	2	3	4	5	6 (4+5)
1	जागा सफाई करणे	0.90	383.40	0.00	383.40
2	गोदामातील साग बियाणे वाहतूक करून ओट्यावर स्रोत निहाय खाली करणे	3.00	1277.90	0.00	1277.90
3	स्रोत निहाय साग बियाणे पसरविणे व 15 ते 20 से. मी. जाडीचा थर करणे.	2.00	851.95	0.00	851.95
4	ओट्यावरील साग बियाणेवर पाणी फवारणी करणे.	2.00	851.95	72.00	923.95
5	ओट्यावरील साग बियाणे फावड्याचे सहाय्याने वर खाली करणे.	10.00	4259.60	11.00	4270.60
6	यांत्रिक पद्धतीने साग बियाणे वरील Mesocarp काढणे.	12.00	5111.60	700.00	5811.60
7	Mesocarp काढलेले साग बियाणे सूर्यप्रकाश मध्ये वाळविणे.	3.00	1277.90	72.00	1349.90
8	सूर्यप्रकाश मध्ये वाळविलेल्या साग बियाणांची यांत्रिक चाळणीने (grading machine) प्रतवारी ठरविणे.	5.00	2129.80	300.00	2429.80
9	प्रक्रिया केलेले साग बियाणे व त्यात भरणे व वजन करणे तसेच मार्कर पेन ने स्रोत / वजन लिहिणे व शिलाई करणे.	4.00	1703.85	54.00	1757.85
10	वजन केलेले साग बियाणांचे पोते स्रोतनिहाय गोदामांमध्ये वाहतूक करून थप्पी लावणे.	4.00	1703.85	18.00	1721.85
11	एकूण		19551.80	335.00	20778.80
12	किरकोळ व आकस्मित खर्च 5%				1038.94
	एकूण एकंदर				21817.74

प्रति टन खर्च (साग बियाणे)

:- रू 21817.74


प्रति किलो खर्च (साग बियाणे)

:- रू 21817.74 or Say 22.00


व्यवस्थापकीय संचालक

Annexure-3
Seed Collection, Transport and Treatment Schedule

Sr. No.	Particulars	Time Period	Remarks
1	2	3	4
1	Demarcation of SS,SPA and SSO Area	November - December	Once in four year
2	Cleaning- Cutting of unwanted coppice, bushes, climbers etc along with removal of the same and controlled burning.	December - January	Every year
3	Estimation of Teak Seed Yield (5% of total area)	Mid-January - February	Every year
4	Seed Collection, hand scrubbing, removal of leaf liter, foreign materials and shifting the collected seed to a common collection point within the compartment	March to April	Every year
5	Transport of collected raw seeds from Divisions to respective Seed Units.	By May end	Every year
6	Seed Treatment including laboratory testing and grading of treated seeds	By March end	Every year
7	Packing and Storage	By April end	Every year
8	Treated Seed Supply to Nursery	By Mid May end	Every year


Managing Director