

CHAPTER - II

RAISING OF PLANTATION

1. Site Reconnaissance

Information most commonly included in site reconnaissance are: Climate - temperature, rainfall (amount and distribution), relative humidity, and wind. Soil - depth of soil and its capacity to retain moisture, texture, structure, parent material, pH, degree of compaction, and drainage. Topography - important for its modifying effects on both climate and soil. Vegetation - composition and ecological characteristics of natural and (when present) introduced vegetation. Other biotic factors - past history and present land use influences on the site, including fire, domestic livestock and wild animals, insects and diseases. Distance from nursery, among these factors are: availability of labour, motivation of the local population, the distance of the forest plantation to the market and consumer centers .

2. Selection of the planting site

Where to plant, is generally a collective decision made by policy makers, foresters, and the planting crews, based on information obtained in the site reconnaissance. The key is to select the site that, when planted, will lead to the establishment of a successful forest plantation. The boundaries of the planting site, once the area has been chosen, should be marked with boundary posts. When there is a

danger of trespassing and damage by grazing animals, a boundary fence should be established. Fencing is costly and, therefore, should only be built when other means of protection are not effective.

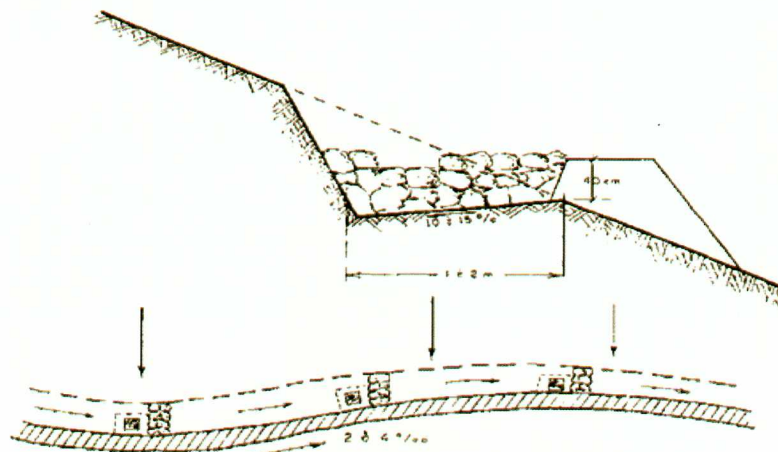
3. Species selection

When the best possible information has been collected on the characteristics of the site to be planted, the next step is the selection of the tree or shrub species to plant. The aim is to choose species which are suited to the site, remain healthy throughout the anticipated rotation, produce acceptable growth and yield, and meet the objectives of the plantation (fuelwood production, protection, etc.)

4. Preparation of the planting site

When the tree or shrub seedlings arrive from the nursery, the site should have been prepared to ensure that planting can proceed without delay. Remove competing vegetation from the site, Create conditions that will enable the soil to catch and absorb as much rainfall as possible. Surface runoff should be reduced to increase the moisture in the soil. Provide good rooting conditions for the planting, including a sufficient volume of rootable soil. Site preparation is directed toward giving the seedlings a good start with rapid early growth.

Soil Preparation Technique on Steep Slopes.



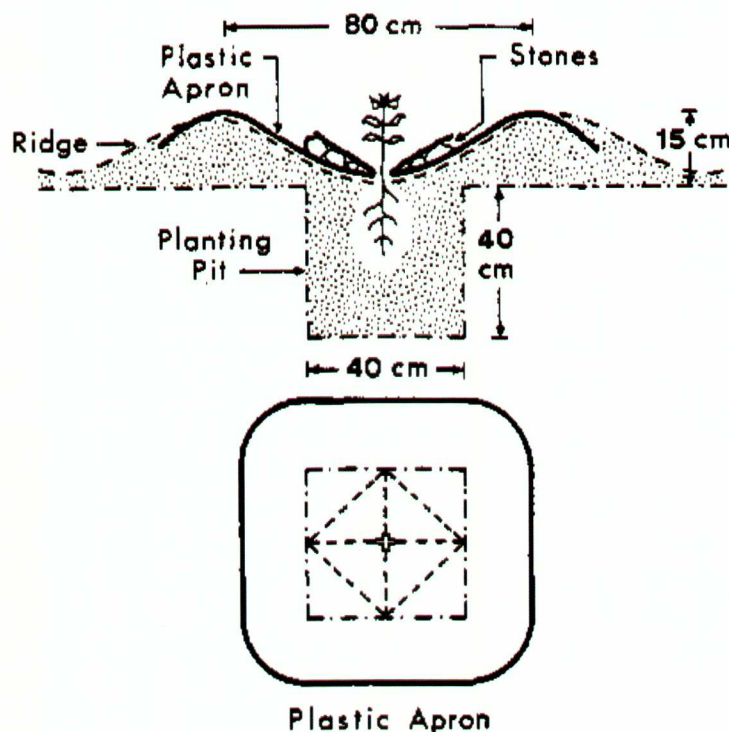
5. Time of planting

The planting season generally coincides with the rainy season; Usually, planting is started as soon as a specified quantity of rain has fallen. This amount of precipitation must be judged on the basis of local knowledge. Planting can also be initiated when the soil is wet to a specified depth. A common mistake is to start planting too soon. On the other hand, if planting is started too late, it may be difficult to complete a large planting programme in the

For example, with a spacing between lines of 3 meters and a spacing of plants within a line of 3 meters, a planting density of 1,111 trees per hectare will be required.

8. Maintenance of the plantation

Once a plantation has been established, the work should not be considered finished. It will be necessary, for example, to protect the plantation against weather, fire, insects and fungi, and animals. A variety of cultural treatments also may be required to meet the purpose of the plantation.



scheduled time, and the plants will lose the maximum benefit of rains after planting.

6. Planting of containerized stock

Planting of containerized stock is usually done in holes that are large enough to take the containers or the root-balls when the plants are removed from the containers. It is essential that the surrounding soil is firmed down around the plant immediately after planting to avoid the formation of air gaps which can lead to root desiccation.

7. Spacing of plantings

The amount of water available to a tree or shrub in a plantation is proportional to the stand density. Actual spacing varies with species, site, and the purpose of the forest plantation. In fuelwood plantations, for example, one might prefer closer spacings than employed in other kinds of plantations.

9. Fire

Damage by fire imposes a serious threat to plantations. The fire risk is generally high in the drier climatic regions; but, even in relatively moist or high rainfall areas, there may be warm and dry spells when the fire risk is high. Fire risk should be a major consideration from the early stages of plantation development.

10. Insects and fungi

Most insects and fungi are selective of the host species. In their natural environment, trees and shrubs normally attain a state of equilibrium with indigenous pests. Care taken in establishment and maintenance operations during the early years of a plantation can help to make a plantation more resistant to insects and fungi. Silvicultural measures include well timed, careful

thinning after establishment of the forest plantation.

11. Wild animals

Damage to forest plantations by wild animals & domestic animals mainly takes the form of tree browsing or de-barking. At times, hedges and fences are used to prevent intrusion by domestic animals. Where fencing costs are high, trespass by livestock can be controlled by guards.

A. Sal Plantation (by line sowing)

a) 1st year Creation & Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Feb-March	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Jan-Feb	15
3	Staking at spacing 2.20 m x 4 m including collection of bamboo sticks of 1 m length 15 cm underground etc. complete. Staking is to be done along the contour in slopes and in East West direction in plains.	April	5.5
4	Hoeing and re-hoeing of soil 22.31 cm deep and 46 cm wide in strip in 2.38 meter apart lines from centre to centre breaking of clods, removal of foreign materials, collection of seeds, sowing in three rows 7.5 cm(3") apart from seed to seed and 10 cm(4") in between the rows including re-sowing where necessary and complete in all respects to ensure full stocking. Requirement of seed is 5 kg /ha. (Proportionate expenditure should be incurred less where seeds are collected/ supplied separately)	May	50
5	Re-survey using GPS	June	
6	First weeding in line, 1 m wide, weeds being completely uprooted and cleared at base including cutting jungles in between the lines flush to the ground, including vacancy filling whenever required by Jamun/Chamal / Pongamia etc. spp.	June-July	12
7	Second weeding in line, 1 m wide, weeds being completely cleared and uprooted at base including cutting jungles in between the lines flush to the ground.	September	10
8	Making of diagonal inspection path 1 m wide by scraping with spade including maintenance of the same throughout the dry season	Nov-April	2 ½
9	Winter cleaning in line, 1 m wide, weeds being completely cleared and uprooted at base including cutting jungles in between the lines flush to the ground, including making of diagonal inspection path 1m wide and fire line 4m wide.	Dec-Jan	10

12. Weeding

Weeding is a cultural operation that eliminates or suppresses undesirable vegetation which, if no action were taken, would impair the growth of the plantation crop. A primary objective of weeding is to promote growth and development of the plantation crop, while keeping the costs of the operation within acceptable limits.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
10	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
11	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha		
12	Fencing to be done with approval of DFO		

b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/before taking up any work in 2nd year of plantation in case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF with specific recommendation for further course of action.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	First weeding in line, 1 m wide, weeds being completely uprooted and cleared at base including cutting jungles in between the lines flush to the ground, including vacancy filling whenever required by jamun/Chamal / Pongamia etc. spp	May-June	10
2	Vacancy filling after soil working in line including collection of seeds/ Seedlings and carrying this to site to completely restock the plantations (This is to be done where necessary only)	May-June	10
3	Second weeding in line, 1 m wide, weeds being completely cleared and uprooted at base including cutting jungles in between the lines flush to the ground.	Aug-Sept	10
4	Winter cleaning in line, 1 m wide, weeds being completely cleared and uprooted at base including cutting jungles in between the lines flush to the ground, including making of diagonal inspection path 1m wide and fire line 4m wide.	Dec-January	
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	10
6	Making of diagonal inspection path 1 m wide by scraping with spade and fireline 4 m wide by scraping with spade i/c maintenance of same throughout the dry season	Nov-April	2 ½
7	Cost of monitoring & Evaluation including carrying cost, maintenance of fencing 10% of the total expenditure per ha.		

c) 3rd Year Maintenance

1	First weeding in line, 1 m wide, weeds being completely uprooted and cleared at base including cutting jungles in between the lines flush to the ground, including vacancy filling whenever required by Jamun/Chamal / Pongamia etc. spp.	June- July	10
2	Second weeding in line, 1 m wide, weeds being completely cleared and uprooted at base including cutting jungles in between the lines flush to the ground.	Aug-Sept	10
3	Making of diagonal inspection path 1 m wide by scraping with spade and fireline 4 m wide by scraping with spade i/c maintenance of same throughout the dry season	Nov-April	2.5

4	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
5	Cost of monitoring & Evaluation including carrying cost, maintenance of fencing 10% of the total expenditure per ha.		

d) 4th Year Maintenance

1	First weeding in line, 1 m wide, weeds being completely uprooted and cleared at base including cutting jungles in between the lines flush to the ground, including vacancy filling whenever required by jamun/Chamal / Pongamia etc. spp.	June -July	10
2	2nd weeding in line, 1 m wide, weeds being completely cleared and uprooted at base including cutting jungles in between the lines flush to the ground.	June -July	10
3	Making of diagonal inspection path 1 m wide by scraping with spade including maintenance throughout the year including fire line	Nov- April	2 ½

e) 5th Year Maintenance

1	Cultural operation including weeding, cleaning spacing out and climber cutting etc.	July- Aug	12
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B. Teak Plantation - (a) 1st Year Creation & Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey.	Feb-March	-
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Feb- March	15
3	Staking at spacing of 3mX3m including collection of bamboo sticks of 1 meter length 15 cm. underground (1111 points say 1115) Staking to be done along contour in slope in east west direction in plain.	March-April	4.5
4	Stumps/Planting (size 9" X 1 1/2" / 22.80cm X 1.27cm) at a spacing of 3m by making hole with crow bar and ramming of soil thoroughly including collection, preparation and carrying of stumps to the plantation site (proportionate expenditure should be incurred less where stumps are supplied separately).	March/April	40
5	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha.	-	-
6	Vacancy filling with Teak stump including collection of Teak stump and carrying to the site to completely restock the plantation. (This is to be done where necessary only).	May-June	1
7	Re-survey using GPS.		
8	1st weeding including cleaning of base in thali at a radius of 1/3 metre by scraping and cutting of weeds in between the line flush to the ground.	June –July	10
9	2nd weeding including cleaning of base in thali at a radius of 1/3 metre by scraping and cutting of weeds in between the line flush to the ground.	August –September	13

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
10	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade subsequent control burning of debris including maintenance of the same throughout the dry season.	November to March	6
11	Winter cleaning including cleaning of base in thali at radius of 1/2m. by the lines flush to the ground (This operation is to be done only where necessary , after personal inspection & verification by DFO /higher officer)	Dec-Jan	8
12	Fencing with the approval of the DFO		
13	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. (10) ha. (contiguous or discrete).	Apr-March	

(b) 2nd Year Creation & Maintenance

1	1st weeding including cleaning of base in thali at a radius of 1/3 metre by scraping and cutting of weeds in between the line flush to the ground.	June-July	17
2	Vacancy filling with teak stumps including collection of teak stump and carrying to the site to completely restock the plantation. (This is to be done where necessary only).	April	6
3	2nd weeding including cleaning of base in thali at a radius of 1/3 metre by scraping and cutting of weeds in between the line flush to the ground	August/September	16
4	Winter cleaning including cleaning of base in thali at radius of 1/2m. by the scraping & cutting weeds in between the line flush to the ground.	December/January	10
5	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade subsequent control burning of debris including maintenance of the same throughout the dry season.	November to March	6
6	Engagement of a watch and Ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling @ 1 for min 10 ha (contiguous or discrete).	April- March	
7	Cost of carrying cost, monitoring and evaluation, maintenance of fencing will be 10 % of the total cost of planting of 1 ha.	-	

(c) 3rd Year Creation & Maintenance

1.	1st weeding including cleaning of base in thali at a radius of 1/3 metre by scraping and cutting of weeds in between the line flush to the ground.	June-July	15
2.	2nd weeding including cleaning of base in thali at a radius of 1/2 metre by scraping and cutting of weeds in between the line flush to the ground	August-September	12
3	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
4	Cost of carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha		
5	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March	6

(d) 4th Year Creation & Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Cultural operation which includes weeding cleaning and spacing out if required including climber etc.	July/August	10
2	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March (dry season)	6
3	Monitoring and evaluation will be 10 % of the total cost of planting of 1 ha		

C. Garjan plantation**(a) 1st Year Creation & Maintenance**

1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Feb-March	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Feb- March	15
3	Staking at spacing of 2.28 m. X 4 m including collection of bamboo sticks of 1 meter length 15 cm. Underground (1097 points say 1100) Staking to be done along contour in slope & in east west direction in plains.	March-April	5
4	Hoeing and re-hoeing of soil 22.86 cm. (9") deep and 46 cm (1'-6") wide in strip in 2.28cm apart lines from centre to centre braking of clods, removal of foreign materials, collection seeds and sowing 8 cm apart in three rows 10.0cm distance in between the rows including resowing where necessary and complete in all respect to ensure full stocking (Preparation expenditure should be incurred less where seeds are collected supplied separately).	May/ June (depending upon seed fall & availability of seeds)	44
5	Vacancy filling with stump including collection of seeds/ seedlings and carrying to the site to completely restock the plantation. (This is to be done where necessary only).	May-June	2
6	Resurvey using GPS		
7	1st weeding in line 1m.wide weeds being completely uprooted & cleared at a base including cutting of jungles in between the line flush to the ground.	June-July	12
8	2nd weeding in line 1m.wide weeds being completely uprooted & cleared at a base including cutting of jungles in between the line flush to the ground.	August/ September	15
9	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March	6
10	Winter cleaning in time 1m. wide weeds being completely uprooted & cleared at base including cutting of jungles in between the lines flush to the ground (This operation is to be done only where necessary , after personal inspection & verification by DFO.)	December/ January	10

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
11	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
12	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha		
13	Fencing to be done with the approval of the DFO		

(b) 2nd Year Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	1st weeding in line 1m.wide weeds being completely uprooted & cleared at a base including cutting of jungles in between the line flush to the ground.	June-July	20
2	Vacancy filling including collection of seed/seedlings and carrying to the site to completely restock the plantation.	May-June	6
3	2nd weeding in line 1m.wide weeds being completely cleared & uprooted at a base including cutting of jungles in between the line flush to the ground.	August/September	17
4	Winter cleaning in time 1 m wide weeds being completely operated and cleared at base i/c cutting of jungles in between the lines flush to the ground	Dec/ January	10
5	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March	6
6	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
7	Cost of fencing maintenance, carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha		

(c) 3rd Year Maintenance

1	1st weeding in line 1m.wide weeds being completely uprooted & cleared at a base including cutting of jungles in between the line flush to the ground.	June-July	20
2	2nd weeding in line 1m.wide weeds being completely cleared & uprooted at a base including cutting of jungles in between the line flush to the ground.	August/ September	17
3	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March	6
4	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
5	Cost of fencing maintenance, carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha		

(d) 4th Year Maintenance

1	1st weeding in line 1m.wide weeds being completely uprooted & cleared at a base including cutting of jungles in between the line flush to the ground.	June-July	17
2	2nd weeding in line 1m.wide weeds being completely cleared & uprooted at a base including cutting of jungles in between the line flush to the ground.	August/ September	16
3	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March	6

(E) 5th Year Maintenance

1	Cultural operation which includes weeding cleaning and spacing out & climber cutting.	July/August	12
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D. Gamar Plantation**(a) 1st Year Creation & Maintenance**

SL. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey.	Feb-March	-
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Feb- March	15
3	Staking at spacing of 3 meter X 3 meter including collection of bamboo sticks of 1 meter length 15 cm. underground (1111 points say 1115).	March –April	4
4	Stumps/Planting (size 9" X 1/2"/ 22.80cm X 1.27cm) at a spacing of 3m by making hole with crow bar and ramming of soil thoroughly including collection, preparation and carrying of stumps to the plantation site (preparation expenditure should be incurred less where stumps are supplied separately).	April- May, if there is early rain, planting should be started in March.	17
5	Resurvey using GPS	May	-
6	Vacancy filling with Gamar stump including collection of Gamar stump and carrying to the site to completely restock the plantation. (This is to be done where necessary only).	May-June	1
7	1st weeding including cleaning of base in thali at a radius of 0.5 m. by scraping cutting of weeds in between the line flush to the ground.	June-July	10
8	2nd weeding in line 1m.wide weeds being completely uprooted & cleared at a base including cutting of jungles in between the line flush to the ground.	August/September	13
9	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March	6
10	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
11	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha.		

(b) 2nd Year Maintenance

1	1st weeding including cleaning of base in thali at a radius of 0.5 m. by scraping cutting of weeds in between the line flush to the ground.	June-July	17
2	Vacancy filling including collection of stumps and carrying to the site to completely restock. (This is to be done where necessary only).	April-May	2
3	2nd weeding including cleaning of base in thali at a radius of 0.5 m. by scraping & cutting of weeds in between the line flush to the ground.	August/ September	16
4	Winter cleaning including cleaning of base in thali at radius of 0.5m. by the scraping & cutting weeds in between the line flush to the ground (This operation is to be done only where necessary , after personal inspection & verification by DFO / higher officer).	December/January	10
5	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March	6
6	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
7	Cost of fencing maintenance, carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha		

(c) 3rd Year Maintenance

1	1st weeding including cleaning of base in thali at a radius of 0.5 m. by scraping cutting of weeds in between the line flush to the ground.	June-July	15
2	2nd weeding including cleaning of base in thali at a radius of 0.5 m. by scraping & cutting of weeds in between the line flush to the ground.	August/ September	12
3	Making of diagonal inspection path 1m. wide by scraping with spade and fire line 4m. wide by scraping with spade including maintenance of the same throughout the dry season.	November to March	6
4	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
5	Cost of fencing maintenance, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha plantation.		

(D) 4th Year Maintenance

1	Cultural operation which includes weeding cleaning and spacing out & climber cutting etc.	July/August	10
2	Making of diagonal inspection paths 1m. wide by scraping with spade and fire line 4m. slide by scraping with spade including maintenance of the same throughout the dry season.	November to March (dry months)	6

E. Aided Natural Regeneration

Aided Natural Regeneration with quality seedling of suitable species – (This will be applicable for the treatment patches net area) only

(a) 1st Year Creation & Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Feb-March	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. Complete.	Jan-Feb	10
3	Digging of pits of 30 cm x 30cm x 30 cm size up to 250 nos pits 3m x 3m spacing and slashing down the new growth of weeds	Feb-March	7
4	Removal of unwanted coppice including singling out of best one selected including cutting of old malformed trunk if any to support coppicing from root stock.	Jan-Feb	To be approved by the DFO, if required
5	Re-filling of pits after removal of foreign materials, breaking of clods and planting of stumps/ rhizome /seedling after removal of seedling pots, including pitting with crowbar for teak and carrying of stumps /seedlings up to plantation site etc. Complete.	April-May	8
6	Cost of bamboo rhizomes if it is bamboo ANR	March-April	As per rate specified
7	Resurvey using GPS	June-July	LS
8	Requirement of seeds per ha. The cost of seed, bamboo and tying material etc to be decided by the SDFO with the approval of DFO	-	
9	One Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level.	Feb-March	6
10	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Nov-March	7
11	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1m dia. (if necessary and or proportionate)	Feb-March	1
12	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).		
13	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha.		
14	Fencing with the approval of the DFO.		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

SL. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Weeding including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling including digging of pits, refilling & planting including carrying of seedlings etc complete.	May-June	12
2	Winter cleaning including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground including making of fire line 4m wide/ diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	12
3	Earth mounding for bamboo spp with scraping of soil with spade ramming properly up to 1.25m dia (if necessary and or proportionate) only for bamboo .	Feb-March	7
4	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
5	Cost of fencing maintenance, carrying cost, monitoring and evaluation will be 10 % of the total		

(c) 3rd Year Maintenance

1	One weeding including cleaning of base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	June -July	12
2	Making of fire line 4m wide and diagonal inspection path 1m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
3	Engagement of a watch and Ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. (10) ha. (contiguous or discrete).	April- March	
4.	Cost of fencing maintenance, monitoring and evaluation will be 10 % of the total cost of planting of 1 ha.		

F. AR Energy Plantation

Artificial regeneration of Teak/ other misc species by planting of 2500 nos seedling per ha at 2m x 2m spacing

(a) 1st Year Creation & Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Feb-March	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. Complete.	Jan-Feb	18
3	Staking at spacing 2mx2m (2500 plants) with sticks of 1m long and 15 cm wide including collection of sticks etc complete to be done along the contour in slopes and in East West direction in plains	Feb-March	10
4.	Digging of pits 30cm x 30cm x 30 cm size for misc fast growing species at 2mx 2m spacing and with crowbar for planting of required teak stump and slashing down the new growth of weeding.	Feb-March	68

S. No	Particular of work and specifications	Time of work	Rate /DL/ha
	For Teak (Teak shall not require digging of pit and refilling, planting of Teak by crowbar and stump preparation etc. complete).		40
5	Re-filling of pits after removal of foreign materials, breaking of clods and planting of seedling after removal of seedling pots, carrying of seedlings up to plantation site, including preparation of thali for water conservation etc complete.	April-May	79
6	Resurvey using GPS		
7	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June-July	22 (Misc) 8 (Teak)
8.	Second Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug-Sep	18
9.	Winter cleaning by cutting of weeds and climber making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season	Dec-January	10
10.	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).		
11.	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total expenditure for 1 ha.		
12.	Fencing as per approval of the DFO		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June-July	22 (Misc) 8 (Teak)
2	Second Weeding including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug- Sept	18
3	Winter cleaning including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush the ground including making of fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	10
4	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
5	Monitoring and evaluation, maintenance of fencing, 10% of the entire cost of plantation per ha.		

(c) 3rd Year Maintenance

1	First weeding including cleaning of base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	June –July	20 (Misc) 8 (Teak)
2	Second Weeding including cleaning of base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level.	Aug-Sep	15
3	Winter cleaning including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush the ground including making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	10
4	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).		
5	Cost of fencing maintenance, Monitoring & Evaluation, will be 10 % of the total cost of plantation		

d) 4th Year Maintenance

1	First weeding including cleaning of base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	June -July	15 (Misc) 5 (Teak)
2	Cultural operation by weeding and climber cutting including Making of diagonal inspection path 1m wide by scraping with spade and maintenance of the same throughout the dry season including Making of fire line 4m wide by scraping with spade including maintenance of the same throughout the dry season.	Dec-January	12

e) 5th Year Maintenance

1	Cultural operation by weeding and climber cutting including Making of diagonal inspection path 1m wide by scraping with spade and maintenance of the same throughout the dry season including making of fire line 4m wide by scraping with spade including maintenance of the same throughout the dry season.	Dec-January	12
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G. AR (Misc) Plantation

Artificial regeneration of Misc species by planting of 1,111 nos seedling per ha at 3m x 3m spacing

a) 1st Year Creation & Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Feb-March	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. Complete.	Jan-Feb	15
3	Staking at spacing 3mx3m (1,111 plants) with sticks of 1m long and 15 cm wide including collection of sticks etc complete to be done along the contour in slopes and in East West direction in plains	Feb-March	4
4.	Digging of pits 30cm x 30cm x 30 cm size for misc. fast growing species at 3mx 3m spacing.	Feb-March	23

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
5	Re-filling of pits after removal of foreign materials, breaking of clods and planting of seedling after removal of seedling pots, carrying seedlings up to plantation site, including preparation of thali for water conservation etc complete.	April-May	35
6	Resurvey using GPS		
7	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June-July	25
8.	Second Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug-Sep	18
9.	Winter cleaning by cutting of weeds and climber making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season	Dec-January	18
10.	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
11.	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total expenditure for 1 ha.		
12.	Fencing as per approval of the DFO		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June-July	25
2	Second Weeding including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug- Sept	18
3	Winter cleaning including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush the ground including making of fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same through out the dry season.	Dec-January	10
4	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
5	For Monitoring and evaluation, maintenance of fencing, 10% of the entire cost of plantation per ha		

(c) 3rd Year Maintenance

1	First weeding including cleaning of base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	June –July	20
2	Second Weeding including cleaning of base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level.	Aug-Sep	15
3	Winter cleaning including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush the ground including making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	10
4	Engagement of watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April- March	
5	Cost of fencing maintenance, Monitoring & Evaluation, will be 10 % of the total cost of plantation per ha.		

d) 4th Year Maintenance

1	First weeding including cleaning of base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	June -July	15
2	Cultural operation by weeding and climber cutting including Making of diagonal inspection path 1m wide by scraping with spade and maintenance of the same throughout the dry season including Making of fire line 4m wide by scraping with spade including maintenance of the same throughout the dry season.	Dec-January	12

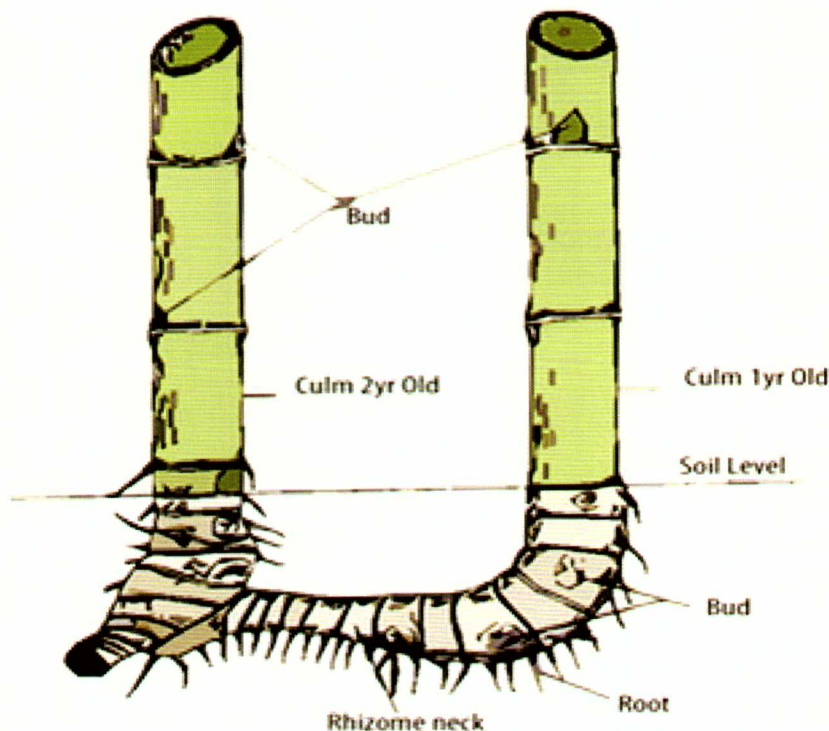
e) 5th Year Maintenance

1	Cultural operation by weeding and climber cutting including Making of diagonal inspection path 1m wide by scraping with spade and maintenance of the same throughout the dry season including making of fire line 4m wide by scraping with spade including maintenance of the same throughout the dry season.	Dec-January	12
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Bamboo Rhizome Propagation

Bamboo rhizome propagation or offset propagation is a traditional vegetative propagation method, and perhaps the most commonly used propagation technique for bamboo. However, it is only practicable for cultivating a few clumps due to the extensive labour and cost this technique requires.

What is a Bamboo Offset ? A bamboo offset is the lower part of a single culm usually with 3-5 nodes (i.e. about 1 to 1.5m) with the rhizome basal and roots attached. It has a high rate of success because, basically, a complete plant system is being transplanted.



Obtaining Bamboo Offsets

To ensure a high survival rate for the bamboo rhizome, timing of extraction plays a crucial role. Offsets are best collected and planted from February to March, which is just before rainy / growth season. In this period the food and nutrient reserves in the rhizome are at their peak. This will help sustain the new plant so that they are capable of establishing new roots and transfer these food reserves to the new shoots during rainy / growth season. If rhizomes are collected later, in the late rainy season after the new growth has started, they usually fail to establish.

How to collect a bamboo rhizome ?

- ❖ Collect the rhizome from a healthy parent clump.
- ❖ For thick walled bamboo species: Select a 1-2 year old culm, and cut off the top portion at about 1 to 1.5 m height (3 to 5 nodes from ground level bearing viable branch buds).
- ❖ For thin walled bamboo species: Select a rhizome assembly with 2 or 3 offsets connected to each other.
- ❖ The rhizome attached to this culm must be carefully separated at the rhizome neck. Do not damage the rhizome and attached roots when digging out the offset.

- ❖ The underground rhizome and roots of the offset should be immediately wrapped in banana leaves, gunny bags or sacks containing with moist sawdust or straw for transportation.
- ❖ Bamboo in cut condition desiccate and dries up very quickly. Cover the top of the culm with a poly bag or soil and cow dung mix, to prevent desiccation.
- ❖ Transport the offsets to the planting area or nursery, as soon as possible.

Transplanting Bamboo Rhizomes

- ❖ In tropical to subtropical regions rhizomes are transplanted just before the rainy season. Any prevailing drought has to be avoided by watering, otherwise survival will be significantly lower.
- ❖ Before transplanting bamboo rhizomes, dip / drench the rhizome in a fungicide solution like Bavistin (or similar fungicide), appropriately diluted at 1 gram per litre.
- ❖ Dig a pit of 50 x 50 x 50 centimetres or 30X30X30 centimetres depending on the species as a norm for medium-sized bamboos. Smaller pit sizes will do for smaller species, and larger bamboos will need bigger pits.

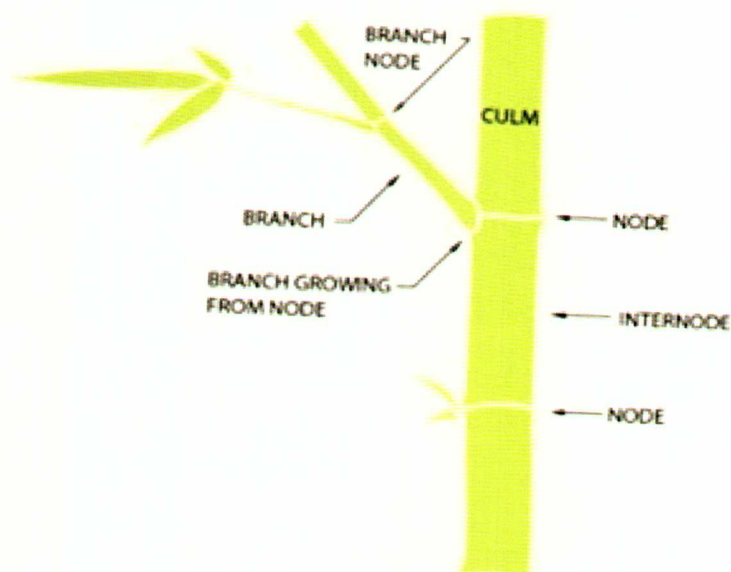
- ❖ The dug-out soil should be mixed with farm yard manure and / or a chemical fertilizer.
- ❖ Transplant the bamboo offset vertically in the pit.
- ❖ Preferably leave the top of the culm covered with polythene bag and cavity filled with water to prevent

drying. Alternatively, cover the cut end using soil and cow dung mix.

- ❖ In case of prolonged dry weather, daily watering is required for new plantations.
- ❖ Eliminate weeds around the newly transplanted rhizome or add sufficient mulch.

Bamboo from Culm Cuttings

1. Cut a few cuttings from one or two years old bamboo plant



in various sections with a hacksaw. Each section must contain at least one node and one internode. Remove the existing leaves in between.

2. Fill a pot with potting mix or a mixture of equal parts of coarse sand and loam.
3. Seal the first ridges of bamboo cuttings with wax to save them from rotting or drying. Melt the wax and simply dip it in about 1/8 inch.
4. Pour 2 tablespoons of rooting hormone in a plastic bag and immerse the bamboo cuttings in it. Shake

off the excess rooting hormone and make several holes in soil and plant cuttings in it.

5. Cover the cuttings with clear plastic bag and set the pot in a warm area, out of direct sunlight. Water them to keep the soil moist.
6. When the new shoots are seen it means cuttings are forming roots. Continue to grow the bamboo plants in containers or plant outside when weather warms up.

G. Cost of Rhizomes

SL. No	Name	Scientific Name	Rates (Amt. In Rs/ unit)
1	Bari	<i>Bambusa vulgaris</i>	55
2	Barak	<i>Bambusa balcooa</i>	65
3	Mirtinga /Rupai	<i>Bambusa pulda</i>	20
4	Kanak Kaich	<i>Thyrsostachys oliveri</i>	15
5	Paora /Asper	<i>Bambusa polymorpha</i>	30
6	Bom/ Dolu/Makal/ Pecha	<i>Bambusa cacharensis</i>	40

H. Bamboo through rhizome/offsets (Bari /Barak /Pecha/Bom/Paura/Asper/Makal/Dolu)

1. Model : (a) 4.5X4.5M spacing with rhizome (one year old) 495 plants per ha for species Bari (*Bambusa vulgaris*); Barak (*Bambusa balcooa*); Bom/ Betua (*Bambusa cacherensis*); Pecha (*Dendrocalamus hamiltonii*); Makal (*B. pallida*); Dolu (*Schizostachyum dollua*); Paura (*B. polymorpha*); Asper (*Dendrocalamus asper*)

(a) 1st Year creation and Maintenance.

SI No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Jan - Feb	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Jan - Feb	15
3	Staking at spacing 4.5 mx4.5 m (495 rhizomes) with sticks of 1m long and 15 cm wide including collection of sticks etc complete to be done along the contour in slopes and in East West direction in plains	Feb - Mar	4
4	Digging of pits 50cm x 50cm x 50 cm size for 495 rhizomes at 4.5m X 4.5m spacing and slashing down the new growth of weeds	Feb - Mar	35
5	Re-filling of pits after removal of foreign materials, breaking of clods and planting rhizome and carrying of rhizome up to plantation site etc. complete including cutting down the new shoots of weeds. 20% rhizome should be retained in sand bed for vacancy filling.	Mar - Apr	32
6	Application of required PPC (plant protection chemical) fertilizer including anti termite.		@Rs. 2.00 per plant
7	Cost of rhizomes including vacancy filling		As Prescribed
8	Re-survey using GPS		
9	First Weeding and Vacancy Filling including base cleaning in thali at a radius of 0.75 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	Jun - Jul	15
10	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb - Mar	10
11	Second Weeding including base cleaning in thali at a radius of 0.75 m by scraping with spade and cutting of weeds in between the lines flush to the ground level.	Aug - Sep	13
12	Winter cleaning & Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec - Jan	6
13	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	April- March	
14	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total amount per ha per year		
15	Fencing with the approval of DFO		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	May-June	15
2	Second Weeding including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug- Sept	13
3	Making of fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
4	Earth Mounding with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb-March	10
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).		
6	Cost of carrying, maintenance of fencing, monitoring and evaluation will be 10 % of the total cost per ha per year.		

(c) 3rd Year Maintenance

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June -July	15
2	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb-March	10
3	Making of fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
4	Cost of carrying, maintenance of fencing, monitoring and evaluation will be 10 % of the total cost per ha per year.		
5	Engagement of watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).		

2. Model: (a) 2m X 2m spacing with rhizome (one year old) 2500 plants per ha for kanak kaich (*Thyrsostachys oliveri*) species.

(a) 1st Year Creation & Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Jan-Feb	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. Complete.	Jan-Feb	18
3	Staking at spacing 2 m x 2 m (2500 rhizomes) with sticks of 1m long and 15 cm wide including collection of sticks etc complete to be done along the contour in slopes and in East West direction in plains	Feb - Mar	10
4	Digging of pits 30cm x 30cm x 30 cm size for 2500 nos Bamboo plants at 2mX2 m spacing and slashing down the new growth of weeds	Feb-March	50
5	Re-filling of pits and planting of rhizome after removal of foreign materials, breaking of clods and carrying of rhizome up to plantation site etc. Complete including cutting down the new shoots of weeds . 20% rhizome should be retained in sand bed for vacancy filing.	Mar-April	62
6	Application of required PPC (plant protection chemical) fertilizer including antitermite.		Rs 1.00 per plant As specified
7	Cost of rhizome		
8	Re-survey using GPS		
9	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required rhizomes including digging of pits, refilling & planting including carrying of seedlings.	June-July	30
10	Second Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug-Sep	25
11	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1m dia.	Feb-March	35
12	Winter making & fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
13	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling, watch and ward for min. 10 ha. (contiguous or discrete).	April -March	
14	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of plantation per ha.		
15	Fencing with the approval of DFO		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required rhizomes including digging of pits, refilling & planting including carrying of seedlings.	May-June	35
2	Second Weeding including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug- Sept	30
3	Making of fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
4	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb- March	35
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	Apr- March	
6	Cost of carrying, maintenance of fencing, monitoring and evaluation will be 10 % of the total expenditure per ha.		

(c) 3rd Year Maintenance

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June -July	35
2	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1m dia.	Feb-March	35
3	making of fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
4	Monitoring and evaluation will be 10 % of the total expenditure per ha.		
5	Engagement of watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	April March	

3. Model : (a) 3m X 3m spacing with Bamboo rhizome (one year old) 1,111 Rhizomes per ha for species Miritinga (*Bambusa tulda*); Rupai (*Dendrocalamus longispathus*).

(a) 1st Year Creation & Maintenance

1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Jan-Feb	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Jan-Feb	15
3	Staking at spacing 3 m x 3 m (1111 rhizomes) with sticks of 1m long and 15 cm wide including collection of sticks etc complete to be done along the contour in slopes and in East West direction in plains	Feb - Mar	4.5

4	Digging of pits 30cm x 30cm x 30 cm size for 1111 Bamboo rhizomes at 3mX3m spacing and slashing down the new growth of weeds.	Feb-March	25
5	Re-filling of pits and planting of rhizome after removal of foreign materials, breaking of clods and carrying of rhizome up to plantation site etc. complete including cutting down the new shoots of weeds. 20% rhizome should be retained in sand bed for vacancy filing.	March-April	30
6	Application of required PPC (plant protection chemical) fertilizer including antitermite.		@ Rs 2/- per plant
7	Cost of rhizomes		As prescribed
8	Re-survey using GPS	June	
9	First weeding and Vacancy Filling including base cleaning in thali at a radius of 0.75 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June-July	22
10	Second weeding including base cleaning in thali at a radius of 0.75 m by scraping with spade and cutting of weeds in between the lines flush to the ground level.	Aug-Sep	18
11	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1m dia.	Feb-Mar	20
12	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
13	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	April - March	
14	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of plantation.		
15	Fencing with the approval of DFO.		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

1	First weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	May-June	22
2	Second weeding including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug- Sept	18
3	Earth Mounding with scraping of soil with spade ramming properly up to 1.25 m dia.		15

4	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
5	Engagement of a watch and Ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling watch and ward for min. 10 ha. (contiguous or discrete).	Apr-March	
6	Cost of carrying, monitoring and evaluation, Maintenance of fencing will be 10 % of the total cost of plantation per ha.		

(c) 3rd Year Maintenance

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June -July	20
2	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb-March	15
3	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
4	Cost of carrying, monitoring and evaluation, maintenance of fencing will be 10 % of the total cost of plantation per ha.		
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	Apr-March	

I. Bamboo plantation through seedlings

1. Model : 4.5mX4.5M spacing with Bamboo poly bag seedlings (one year old) 495 plants per ha for species Bari (*Bambusa vulgaris*); Barak (*Bambusa balcooa*); Bom/ Betua (*Bambusa cachensis*); Pecha (*Dendrocalamus hamiltonii*); Makal (*B. pallida*); Dolu (*Schizostachyum dollua*); Paura (*B. polymorpha*); Asper (*Dendrocalamus asper*).

(a) 1st Year creation & Maintenance.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Jan-Feb	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Jan-Feb	15
3	Staking at spacing 4.5 m x 4.5 m (495 plants) with sticks of 1m long and 15 cm wide including collection of sticks etc complete to be done along the contour in slopes and in East West direction in plans	Feb - Mar	4
4	Digging of pits 30cm x 30cm x 30 cm size for 495 poly bag seedlings at 4.5m X 4.5m spacing and slashing down the new growth of weeds	Feb-March	18
5	Re-filling of pits after removal of foreign materials, breaking of clods and planting polybag seedlings and carrying of seedlings up to plantation site etc. complete including cutting down the new shoots of weeds.	April-May	22

S. No	Particular of work and specifications	Time of work	Rate /DL/ha
6	Application of required PPC (plant protection chemical) fertilizer including anti termite.		@ Rs 1/- per plant
7	Re-survey using GPS	June	
8	First Weeding and Vacancy Filling including base cleaning in thali at a radius of 0.75 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June-July	15
9	Second Weeding including base cleaning in thali at a radius of 0.75 m by scraping with spade and cutting of weeds in between the lines flush to the ground level.	Aug-Sep	12
10	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
11	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	April - March	
12	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of plantation per ha.		
13	Fencing with the approval of DFO		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	May-June	18
2	Second Weeding including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug- Sept	12
3	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-Jan	6
4	Earth Mounding with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb-March	10
5	Engagement of watch and Ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April-March	
6.	Cost of carrying, monitoring and evaluation, fencing maintenance will be 10 % of the total cost of plantation per ha.		

(c) 3rd Year Maintenance

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June -July	18
2	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb-March	10
3	Making of fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
4	Engagement of a watch and Ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April March	
5	Cost of carrying, monitoring and evaluation, fencing maintenance will be 10 % of the total cost of plantation per ha per yr.		

2. Model : (a) 3m X 3m spacing with Bamboo polybag seedlings (one year old) 1111 plants per ha for species Miriting (*Bambusa tulda*); Rupai (*Dendrocalamus longispathus*).

(a) 1st Year creation & Maintenance.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Jan-Feb	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Jan-Feb	15
3	Staking at spacing 3 m x 3 m (1111 plants) with sticks of 1m long and 15 cm wide including collection of sticks etc complete to be done along the contour in slopes and in East West direction in plans	Feb-March	4.5
4	Digging of pits 30cm x 30cm x 30 cm size for 1111 Bamboo plants at 3m X 3m spacing including vacancy filling and slashing down the new growth of weeds	Feb-March	25
5	Re-filling of pits and planting polybag seedlings after removal of foreign materials, breaching of clods and planting of poly bags and carrying of polybag seedlings up to plantation site etc. complete including cutting down the new shoots of weeds.	March-April	30
6	Application of required PPC (plant protection chemical) fertilizer including anti termite.		@ Rs 1/- per plant
7	Re-survey using GPS	June	
8	First Weeding and Vacancy Filling including base cleaning in thali at a radius of 0.75 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June-July	25

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
9	Second Weeding including base cleaning in thali at a radius of 0.75 m by scraping with spade and cutting of weeds in between the lines flush to the ground level.	Aug-Sep	18
10	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1m dia.	Feb-March	10
11	Winter cleaning & making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
12	Engagement of watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	April - March	
13	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of plantation per ha.		
14	Fencing with the approval of DFO		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant species including digging of pits, refilling & planting including carrying of seedlings.	May-June	25
2	Second Weeding including base in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Aug- Sept	18
3	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
4	Earth Mounding with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb-March	15
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	Apr-March	
6	Cost of carrying, monitoring and evaluation, fencing maintenance will be 10 % of the total cost of plantation per ha per yr.		

(c) 3rd Year Maintenance

1	First Weeding including base cleaning in thali at a radius of 0.5 m by scraping with spade and cutting of weeds in between the lines flush to the ground level including vacancy filling with required plant spp including digging of pits, refilling & planting including carrying of seedlings.	June -July	20
2	Earth Mounding for bamboo spp with scraping of soil with spade ramming properly up to 1.25 m dia.	Feb-March	15

3	Making of fire line 4m wide & diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-January	6
4	Monitoring and evaluation, fencing maintenance will be 10 % of the total cost per ha per yr.		
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	Apr-March	

J. Artificial Regeneration through Seed Muli Bamboo (*Melocanna baccifera*) Spacing 3m × 3m (No of pits 1111/ha)
(a) 1st Year Creation & Maintenance

Sl. No	Item details	Time of work	Rate /DL/ha
1	Pre-survey by clearing jungle 1.5m wide strip by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey	Jan-Feb	
2	Site preparation including cutting of jungle slush to the ground, disposal of debris etc. complete.	Mar-April	15
3	Staking at spacing 3m x 3 m (1,111 points) with sticks of 1m long and 15 cm wide including collection of sticks etc complete to be done along the contour in slopes and in East West direction in plains	May-June	4.5
4	Digging of pits 30cm x 30cm x 30 cm size for 495 poly bag seedlings at 3m X 3m spacing and slashing down the new growth of weeds	May-June	30
5	Cost of seed 1111 Nos. (as fixed by the DFO separately)		
6	Refilling of pits, after removal of foreign materials, and planting including carrying of seedlings. The sowing of seeds should be done placing the seeds in horizontal position. After planting of the seeds the pit is refilled in such way that the 10 cm layer of earth cover the seed. This will help the seed to take the nutrient of the top layer of the soil. The pits should be filled making small mound (so that on onset of rain it becomes level with the ground) to avoid any water stagnation as this will result in rotting of the seeds. Care should be taken to ensure that seeds sown are mature seeds and planting is done within in one month of collection.	June-July	28
7	Application of insecticides (As per the requirement. The cost will be decided by the DFO separately)	June-July	
8	Resurvey using GPS	June –July	
9	First weeding including cleaning of base in thali at a radius of 0.5m by scraping with spade and cutting of weeds in between the lines flush to the ground level	July	15
10	Second weeding including cleaning of base in thali at a radius of 0.5m by scraping with spade and cutting of weeds in between the lines flush to the ground level	Sept-Oct	4.5

Sl. No	Item details	Time of work	Rate /DL/ha
11	Making of diagonal inspection path 1m wide by scraping with spade and fire line 4m wide by scraping with spade including maintenance of same throughout the dry season.	Nov-March	6
12	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	April-March	
13	Cost of pre-survey, re- survey, carrying cost, monitoring and evaluation will be 10 % of the total cost of plantation per ha		
14	Fencing as approved by the DFO		

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

Sl. No	Item details	Time of work	Rate /DL/ha
1	First weeding including cleaning of base in thali of a radius of 0.5m by scraping with spade and cutting of weeds in between the lines flush to the ground level	June-July	15
2	Earth mounding around the plant in 45cm and 30cm height	Sept.-Oct.	15
3	Winter cleaning by cleaning around the base of the plant in radius of 0.5m and cutting of weeds in between the lines flush to the around	Nov-Dec	10
4	Making of diagonal inspection path 1m wide by scraping with spade and fire lime 4m wide by scraping with spade including maintenance of same through out of the dry season	Nov-March	6
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. 10 ha. (contiguous or discrete).	April-March	1
6	Monitoring and evaluation, fencing maintenance will be 10 % of the total cost of plantation per ha per year.		

(c) 3rd Year Maintenance

Sl. No	Item details	Time of work	Rate /DL/ha
1	Earth mounding around the plant in 45cm and 30cm height	Sept-October	15
2	Making of diagonal inspection path 1m wide by scraping with spade and fire line 4m wide by scraping with spade including maintenance of same through out of the dry season.	Nov-March	6
3	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April –March	
4	Monitoring and evaluation, fencing maintenance will be 10 % of the total cost of plantation per ha per yr.		

K. Roadside/Urban Plantation

1. Objectives of Roadside Plantations

- a. To enhance aesthetic appeal of road corridor
- b. To reduce the impacts of air pollution and dust
- c. To provide much needed shade on glaring hot roads during summer
- d. To reduce the impact of ever increasing noise pollution caused due to increase in number of vehicles
- e. To arrest soil erosion at the embankment slopes
- f. Prevention of glare from the headlight of incoming vehicles
- g. Moderating the effect of wind and incoming radiation
- h. Ex-situ conservation of native RET species of the region

2. Identification of Roads for Plantations

- a. Roads for raising plantations should be identified in consultation with PWD department
- b. Roads should have adequate land beyond shoulder of the road for raising plantation.
- c. Newly improved roads should be selected
- d. The Roads in the proposal for improvement and widening next few years should be avoided
- e. Type of Roads like PMGSY, State Highways(SH), National Highways(NH) should be identified and essential for planning
- f. The roads having chances of further expansion /widening in future should be avoided.

3. Selection of Plant/Tree species

The tree species for planting along the roads mainly depend on the objectives of plantation, location of planting along road like single row, multiple row or median plantation etc.

3.1 General Characteristics of Tree species for Roadside Plantation

- a. The Tree specie should be native and are suitable and adaptable to particular Agro climatic zone.
- b. The Tree species should be fast growing and resistant to biotic stress like insect and fungal attacks and abiotic stress like drought etc.
- c. The Tree species should have deep rooted system and resistant to wind damage

- d. The tree root system should interfere with working of drainage facilities
- e. The trees with high crown forms secure better visibility are ideal
- f. The trees species that retain their foliage are longest are ideal than deciduous trees
- g. The long slender trees unable to support own weight and brittle trees should be avoided
- h. The tree species should have social, economic and recreational benefits

4. Planning of Roadside Plantation:

- 4.1.1. Survey of entire road landscape through Transact Walk and observe the availability of land beyond road shoulders, topography of land etc
- 4.1.2 Dividing the entire Road landscape into homogenous landscape sections based on the available width for planting, soil condition, topography and climate.
- 4.1.2 Planting pattern mainly depends on available Right of Way(ROW)

4.2 Single Row Planting:

- a. Rural Roads like PMGSY roads and other roads having limited land beyond the shoulder of Road.
- b. Single Row on either side of the road
- c. Spacing between plants

❖ For Ornamental species in Urban Area: 3 meters

- a For shade and multipurpose tree species: 5 meters
- d. Age of Tree Sapling: More than two years
- e. Height of Sapling: not less than 2 meter
- f. Number of Plants/km: 200 for shade trees or 333 for ornamental plants on either side of the road
- g. Technical specification for Planting of Sampling in Roads:

❖ Rural Roads: Minimum 0.5 meter beyond the toe of the roadway or close to edge of ROW and clear of side drains

❖ National Highways: 1 meter from the toe of the embankment or 6 meter from the edge of the shoulders

4.3 Two Rows/Multiple Rows:

- a. National Highways with adequate Right of Way
- b. First row along highway should be planted smaller to medium sized ornamental trees

- c. Second Row depends on availability of land mainly taller shade bearing trees than first row
- d. Technically specification of Planting First Row
 - ❖ **Species:** Ornamental small to medium height trees
 - ❖ Spacing: 3 meter X 3 meter
 - ❖ Pit size: 60cmX60cmX60cm
 - ❖ Age of Sapling: 2 years
 - ❖ Height of Sampling: 1 to 1.5 meter
 - ❖ Number of plants/km: 333 No on either side
 - ❖ Location of Planting: 1 meter from the Toe of embankment or 6 meter from the edge of shoulder
- e. Technical specification of Planting second row or last row:
 - ❖ Species: Shade bearing tall species
 - ❖ Spacing: 5 meter X 5 meter

- ❖ Pit size: 75cmX75cmX75cm
- ❖ No. of Plants/km: 200 No on either side
- ❖ Age of Sampling: More than 2 years
- ❖ Height of Sampling: more than 2 meters

4.4 Planting in Median of the Road

- 4.4.1. Species to be planted are low to medium height with ornamental value to enhance visual experience of road corridor
- 4.4.2. Number of rows of flowering shrubs depends on the width of median
 - ❖ Median width less than 1.5 meter: Only Grass planting
 - ❖ Median width up to 3 metre: single row of Ornamental planted with spacing of 3m X 3m.
 - ❖ Median Width of 5 to 6 meter: two rows of shrubs planted with 1.5 meter spacing from inner edge of the median
 - ❖ Pit size: 60cmX60cmX60cm

Spacing: 5M X 5M No of Plants/KM: 200 No

Pit Size: 75cmX75cmX 75cmTall seedling Ht & Age: 2 meter & > 2years

1st year Creation & Maintenance

Sl. No	Particulars of Activity	Unit	Per KM
1	Survey and site cleaning along the road	DL	15
2	Digging of Pit size of 75cmX75cmX75cm with a spacing of 5 meter on either side of the road and Filling 1/3rd of pit with FYM	DL	40
3	Planting and refilling of pits with FYM and Soil and application of insecticide etc	DL	30
4	Live fencing with locally available material/plant guard with name plate	Rs /Plant	To be fixed by DFO
5	Carrying cost of tall poly bag seedling	Rs /seedling	To be fixed by DFO
4	Gap filling, Weeding and hoeing once in a Month from June to September	DL	15
5	Maintenance, weeding as and when required and watering 4 times per month from October to March	DL	50
6	Cost of Water or truck of 5000 litres for 4 times per month for 6 months (Rs 3000 per Truck X 4 X 6)	LS	-
7	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. (1-3) KM. (contiguous or discrete)	April-March	
8	Monitoring & Evaluation 10% of the cost of plantation per KM.		

2nd & 3rd Year Maintenance

S. No	Particulars of Activity	Unit	Per KM
1	10 % Gap filling, Weeding and hoeing once in a Month from April to September	DL	20
2	Maintenance fencing, weeding as and when required and watering 2 times per month from October to March	DL	25
3	Cost of Water or truck of 5000 litres for 4 times per month for 6 months	LM	To be fixed by DFO
4	Engagement of watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and ward for min. (1-3) (contiguous or discrete)	April-March	1

TREES FOR ROADSIDES

<i>Aegle marmelos</i> (Bel)	<i>Lagestroemia parviflora</i> (Sidajarul)
<i>Albizia lebbbeck</i> (Shirish)	<i>Lagerstroemia speciosa</i> (Jarul/Gang)
<i>A.procera</i> (Karai)	<i>Lannea Coromandelica</i> (Bhadi)
<i>Anthocephalus cadamba</i> (Kadam)	<i>Madhuca indica</i> (Mahuwa)
<i>Artocarpus chaplasi</i> (Chamal)	<i>Mallotus Phillippensis</i> (Tung / Kamela)
<i>Artocarpus heterophyllus</i> (Kathal)	<i>Michelia champaca</i> (Champa)
<i>Averrhoa carambola</i> (Kamranga)	<i>Magnolia grandiflora</i> (Duli Champa)
<i>Azadirachta indica</i> (Neem)	<i>Mangifera indica</i> (Am)
<i>Bauhinia purpurea</i> (Kanchan)	<i>Peltophorum pterocarpum</i> (yellow flame tree)
<i>Bauhinia variegata</i> (Sweet Kanchan)	<i>Polyalthia longifolia</i> (Debdaru)
<i>Callistemon lanceolatus</i> (Bottle brush)	<i>Pongamia Pinnata</i> (Pongamia tree)
<i>Callistemon linearis</i> (Bottle brush)	<i>Samania saman</i> (Rain tree)
<i>Cassia fistula</i> (Sonal)	<i>Saraca indica</i> (Ashoka)
<i>Cassia javanica</i> (Java Cassia)	<i>Spathodea campanulata</i> (Nandi Flame)
<i>C.nodosa</i> (Bandar Lathi)	<i>Stebulus asper</i> (Sheora)
<i>Cassia Siamea</i> (Monjori)	<i>Sterculia alata</i> (Gorak neral)
<i>Casuarina equisetifolia</i> (Casuarina)	<i>Sterculia villosa</i> (Udal)
<i>Delonix regia</i> (Krishna chura)	<i>Swietenia mahogoni</i> (Mahagani)
<i>Dillenia pentagyna</i> (Hargaja)	<i>Syzygium cumini</i> (Kala jam)
<i>Erythrina indica</i> (Mandar)	<i>Tamarindus indica</i> (Tetul)
<i>Ficus religiosa</i> (Aswatwa / Bat)	<i>Terminalia arjuna</i> (Arjun)
<i>Garuga pinnata</i> (Kajikara)	<i>Trema orientalis</i> (Naircha)
<i>Gmelina arborea</i> (Gamar)	<i>Trewia nudiflora</i> (Medda)
<i>Grevillea robusta</i> (Silver oak)	<i>Vitex peduncularis</i> (Awal)
<i>Holarrhena antidysenterica</i> (Kurchi)	<i>Zizyphus jujuba</i> (Barai)
<i>Jacaranda mimosifolia</i> (Jacaranda)	

L. Broom Grass Plantation

(Spacing: 2m x 2m = 2500 points/ ha)

(a) 1st Year creation and Maintenance.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Preliminary Survey by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey.	Jan-Feb	
2	Site Preparation including cutting of jungle slush to the ground, disposal of debris, etc complete.	Jan-Feb	15
3	Staking at spacing 2 m x 2 m (2500 plants /ha) with stick 1 m long & 1.5 cm wide including collection of stick etc complete to be done along contour in slope and in east-west direction in plains.	Feb-March	10
4	Digging of pits of 30 cm x 30 cm x 30 cm size up to 2500 no of pits at 2 m x 2 m spacing, slashing down the new growth of weeds.	Feb-March	50
5	Refilling of pits after removal of foreign materials, breaking of clods and planting of stumps/ rhizomes/ seedlings after removal of seedlings pot, including pitting with crowbar and carrying of stumps/ seedlings up to plantation site etc complete.	March-April	25
6	Rhizome collection cost (@ 125 no of seedlings/ DL)	March-April	20
7	Fencing. Providing nylon net fencing with bamboo post (400 m approx length around the plantation area) after 2 m interval, 200 nos posts of 2 m length to be approved by DFO.	March-April	
8	Re-survey using GPS.	June	
9	Cost of making one GCI Sheet signboard (size 3' x 4') including painting, writing & fitting fixing.		
10	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	June - July	24
11	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sept	18
12	Monitoring & Evaluation 10% of the cost of plantation per ha.		
13	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April-March	

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	May-June	24
2	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sept	18
4	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-Jan	6
5	Monitoring & Evaluation 10% of the cost of plantation per ha.		
6	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April-March	

(c) 3rd Year Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	June –July	18
2	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sep	16
4	Monitoring & Evaluation 10% of the cost of plantation per ha.		
5	Engagement of watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	Dec-January	1

M. Large Cardamom Plantation

(Spacing: 2m x 2m = 2500 points/ ha)

(a) 1st Year creation and Maintenance.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Preliminary Survey by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey.	Jan-Feb	1
2	Site Preparation including cutting of jungle slush to the ground, disposal of debris, etc complete.	Jan-Feb	10
3	Staking at spacing 2 mx 2 m (2500 plants /ha) with stick 1 m long & 1.5 cm wide including collection of stick etc complete to be done along contour in slope and in east-west direction in plains.	Feb-March	10

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
4	Digging of pits of 30 cm x 30 cm x 30 cm size up to 2500 no of pits at 2 m x 2 m spacing, slashing down the new growth of weeds.	Feb-March	50
5	Refilling of pits after removal of foreign materials, breaking of clods and planting of stumps/ rhizomes/ seedlings after removal of seedlings pot, including pitting with crowbar and carrying of stumps/ seedlings up to plantation site etc complete.	March-April	25
6	Rhizome collection cost (@ 125 no of seedlings/ DL)	March-April	
7	Fencing. Providing nylon net fencing with bamboo post (400 m approx length around the plantation area) after 2 m interval, 200 nos posts of 2 m length to be approved by the DFO	March-April	20
8	Re-survey using GPS.	June	
9	Cost of making one GCI Sheet signboard (size 3' x 4') including painting, writing & fitting fixing.		
10	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	June - July	24
11	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sept	18
12	Monitoring & Evaluation 10% of the cost of plantation per ha.		
13	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April-March	1

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	May-June	24
2	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sept	18
3	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-Jan	6

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
4	Monitoring & Evaluation 10% of the cost of plantation per ha.		
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April-March	18

(c) 3rd Year Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	June –July	18
2	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sep	16
4	Monitoring & Evaluation 10% of the cost of plantation per ha.		
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	Apr-March	

N. Gandhaki Plantation

(Spacing: 2m x 2m = 2500 points/ ha)

(a) 1st Year creation and Maintenance.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	Preliminary Survey by using GPS instrument, cleaning of the periphery. Track polygon (raw data) is to be submitted within 5 days after completion of survey.	Jan-Feb	
2	Site Preparation including cutting of jungle slush to the ground, disposal of debris, etc complete.	Jan-Feb	15
3	Staking at spacing 2 m x 2 m (2500 plants /ha) with stick 1 m long & 1.5 cm wide including collection of stick etc complete to be done along contour in slope and in east-west direction in plains.	Feb-March	10
4	Digging of pits of 30 cm x 30 cm x 30 cm size up to 2500 no of pits at 2 m x 2 m spacing, slashing down the new growth of weeds.	Feb-March	50
5	Refilling of pits after removal of foreign materials, breaking of clods and planting of stumps/ rhizomes/ seedlings after removal of seedlings pot, including pitting with crowbar and carrying of stumps/ seedlings up to plantation site etc complete.	March-April	25
6	Rhizome collection cost (@ 125 no of seedlings/ DL)	March-April	20
7	Fencing. Providing nylon net fencing with bamboo post (400 m approx length around the plantation area) after 2 m interval, 200 nos posts of 2 m length to be decided by the DFO	March-April	

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
8	Re-survey using GPS.	June	
9	Cost of making one GCI Sheet signboard (size 3' x 4') including painting, writing & fitting fixing.		
10	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	June - July	24
11	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sept	18
12	Monitoring & Evaluation 10% of the cost of plantation per ha.		
13	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April-March	

(b) 2nd Year Maintenance: Field check is to be conducted by DFO in each plantation by 30th April/ before taking up any work in 2nd Year of plantation. In case of unsatisfactory condition a comprehensive report is to be submitted to the PCCF through DFO with specific recommendation for further course of action.

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	May-June	24
2	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sept	18
3	Making of fire line 4m wide& diagonal inspection path 1 m wide by scraping with spade and maintenance of the same throughout the dry season.	Dec-Jan	6
4	Monitoring & Evaluation 10% of the cost of plantation per ha.	May-June	24
5	Engagement of a watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	Apr-March	

(c) 3rd Year Maintenance

Sl. No	Particular of work and specifications	Time of work	Rate /DL/ha
1	First weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	June –July	18
2	Second weeding (including cleaning of base in thali of 0.5 m radius manually with khurpi or by scraping with spade and cutting of weeds in between the lines flush to the ground level).	Aug-Sep	16
4	Monitoring & Evaluation 10% of the cost of plantation per ha.		
5	Engagement of watch and ward responsible for maintenance of fencing, cattle watching etc. His continuation will be based on survival percentage of seedling. Watch and Ward for min. 10 ha. (contiguous or discrete).	April-March	1

O. River Bank Plantations

(Spacing: 2m x 2m = 500 points / km in one row)

River banks are important and sensitive habitats. They're subject to flooding, soil erosion, soil deposition and rechanneling. The river water carries chemicals and other substances to and from the area being planted. Riverside plantings give habitat to native wildlife, furnishing not only food and shelter but a corridor for wildlife movement. The best trees for river bank planting are native species

that have good root systems, can withstand flooding and possible periods of constant moisture, provide good wildlife habitat and don't have the invasive tendencies of many exotic species. The most preferred species in Tripura condition is native bamboo species.

Spacing 2m x 2m 500 plants per km in one row), wherever sufficient space is available, multiple rows may be followed.

1st Year Creation & Maintenance

Sl No.	Particular of work and specifications	Time of work	DL/KM
1	Clearing of site and removal of debris	Feb-Mar	25
2	Digging of pits 30cm X 30cm x 30cm	April	30
3	Refilling of pits and planting	Apr-May	40
4	Making cost jungra to be approved by DFO	April-May	LS
5	Cost of bamboo pole, binding wire and fitting, fixing etc.	April-May	LS
6	Watch and ward to be approved by DFO	-	-
7	Weeding and earth mounting for bamboos to be decided by the DFO	-	
	2nd Year maintenance		LS
1	First weeding	May- June	25
2	Winter cleaning and earth mounting	Dec-Jan	15