**NURSERY TECHNIQUE (PREPARATION)**

**Location** : It is very necessary to locate the nursery near the plantation site. The nursery should be located as far as possible in a flatland, near water source. Try to locate the Nursery on the Northern, Western aspects of a Hill slope; try to avoid Southern Aspects on hill slope because of too much sunshine and heat. The nursery beds must not be allowed to become dry after the seeds are sown. The nursery beds should be well drained, there should be no stagnancy of water.

**Soil Working** : The nursery site should be clear felled of all vegetation if the Nursery is a new one. The jungle clearance may be done during winter to early Spring season preferably before Weeds ripen their fruits so that weeds may be decreased in the Nursery beds, it burns of the seeds the Weeds and other undesirable plants.

It is desirable to plough or hoe the soil in the winter and allow it to weather for some time. The Nursery beds may be raised if the area is plain to ensure good drainage, in hill sides it may be a little sunken to conserve moisture though during very heavy rain there is possibility of it getting flooded if drainage is not made

**Nursery bed size** : The ploughed soil can be organized into beds of 1 metre wide, 15 cms high,6- 10 metres long, or as long as the topography would allow. The soil in the nursery should be worked into a compact, smooth, and fine textured consistency. If the nursery in flatland it should be separated by a pathway of 30 cms, so that the beds can be weeded by standing on the pathway.

**Seed sowing** : The seeds may be sown evenly spread over the beds, and a thin layer of fine soil is spread evenly over the seeds. This type of sowing may be done very small sized seeds of kadam, Bogipoma etc.  For bigger sized seeds, a small straight furrows across the length of the bed may be made in the beds with a light dibble or a wooden stick and the seeds sown in the furrows and covered up with soil.

**How deep must the seeds be sown**? :  The Thumb Rule is to bury the seeds at the depth of the seeds’ diameter.

**Moisture/Temperature of the Beds** : Moisture and temperature of the soil in the Nursery beds are very important factors for germination of the seeds. To achieve this, the beds may be covered with transparent polythene sheets with it’s ends weighed down by small stones or clods of soil. This will prevent moisture loss through evaporation and increase the temperature of the nursery beds, though in practice this is easier said than done. It is more practical to expose the beds to the Suns to water the beds to maintain the correct moisture level in the nursery beds.

**Seed treatment**:- Seed collected should always be from authentic sources and should be treated before sowing.Sedd treatment is generally done by mixing with Bavistin or indofil M-45 2-4 gm per kg of seed.

**Time of Sowing** :  Seed sowing should be done according to season of the species in concern..

**Fertility of the nursery** :  For proper growth of the seedling a fertile soil is desirable, but when soil in the nursery is more fertile than the plantation site, the plants do not fare very well initially in the first year of the plantation but how successfully the plants have grown in the first year determines the success and failure of the Plantation. Therefore, raising of seedlings from normally fertile soil would be best suited in the field condition.

**Weeding in the Nursery** :  Nursery cannot be weeded when the tree seedlings have not yet established their root system properly. If weeding is done, at this time the seedling would be uprooted. This is the reason why at the time of preparing nursery, the plant debris should be burnt thoroughly before original weed plants are burnt. Nursery can be weeded  only when the root system of the seedlings have established properly. Leaves of the mature seedlings individuals may be plucked off to distribute sunlight to other smaller seedlings, so that all seedlings attain equal size.

**Quantity of seeds in a Nursery Bed** :  Greater the number of seeds planted in a bed, smaller will be the size of the seedling at the time of planting. To get quality sized seedling (thumb size), the seed may be sown broadcast in the Nursery bed and then when they are few leaves old, some may be pricking out so that the remaining may be spaced at about 3-4 cms apart. The pricked out seedling may be planted in polybag nursery.

**Preparation on Seedling for Plantation in polythene bags:**

. If seedlings are to be raised in polythene bags, then one has to select the correct size materials.

The first thing  to be done is to collect polythene bags from the market which are available in various sizes. The seedlings grown in polybags will have to the transplanted at the end of the year, this would mean that a very big bag is not needed; only a 10 cms diameter would be suffice for raising one-year old seedlings. If you want to prepare bigger size seedling, you may select bigger polythene bags.

During the dry season, dry soil may be prepared into fine textured consistency, this may be filled into the polybags and compacted by holding the fully filled bag and dropping it to the ground from 30 cm above the ground without letting the soil spill out. When the soil settles at a level less than the mouth of the bag, more soil may be added to make the soil almost filling the bag fully. It may be mixed with manure if the soil is not fertile. Normally, soil that has been lying fallow for several years need no chemical fertilizers. Organic manure can be used if required.Generally 1 part dry cowdung is mixed with 1 part sand or 2 parts of good loamy soil. Seed are sown directly into the bags during the sowing season i.e February-June.Azotobactor/Rhyzobium 4-5gm/polybag and neemcake 5 gms/polypod will yield good results.

The sown polybags should be preferably kept in shade and the soil not allowed to become dry. the seeds can be sown broadcast in a prepared nursery bed and watered regularly. Watering of minute seeds should be not done by splashing water with ordinary water can because the water drops are liable to splash the minute seeds preventing the seeds the time to strike root. Water should be sprayed in the beds preferably till root system of the seedlings are well developed. Beds should be moist rather than wet. If beds are kept constantly moist, it may not require sheds. The seeds are allowed to germinate and grow up to about 3 cms to 5 cms and then pricked out and planted in the polybags and grown till it is fit for plantation in the field.

.**Pest and diseases in nursery**

Many diseases attack plants in nursery.Few symptoms are discussed here.

Symptoms on root-wilting,withering of plants without any apparent damage of shoots or leaves.

 Symptoms on shoot-Cut shoots either near ground or up ,cutting of leaves smoothly,or irregularly.

Other symptoms are-pox like marks,large number of puntures, rasped and distorted leaves ,blotching of leaves etc.

Control measures-endosulphan(35 EC),0.1%, Malathion 0.1%

**Two special contact poisons effective for all categories of insect pests.**

1. Crude oil emulsion:-

Add 1 lt diesel and 350 gms of crude vegetable soap(sliced) to 3 ltrs of hot water and stir violently to make an emulsion with no free oil on the surface.Then add 12 lt of more water to it along with 25gm glue to make it adhesive.

 2. Nicotine solution-

Dry tobacco leaves:1.25kg

Crude soap:400gms

Water:100lts

Boil tobacco with soap in 10 lts water ,then add balance 90 lt water.

**Diseases**

Symptoms-Decay of seedlings with blackening of collar portion .

Control-Bordeaux mixture 1% @ 560lts/Ha of nursery soil.

Symptoms-Black spots and yellow patches on leaves.White growth around,black/brown spots on the underside of leaves.

Control-Bordeaux mixture 1% @ 560lts/Ha of nursery soil.

 Preparation of Bordeaux mixture 1%:-

Copper sulphate:2kg

Quicklime:2kg

Sugar:60gm

All these are added to 225lt of water .

**Suggested Species for raising nursery**

As main target of this sector is drought proofing hence , raising of forest varieties nursery should be taken into consideration. Suggested varieties are Segun or teak, Mehgoni, Kadam, sal , Gamari etc.

Out of these only teak will require 1—1/2 yrs to be ready for distribution/plantation.

Other species are short duration and are easily growing.

Among short duration horticulture species Papaya can be raised.

Plants which are very small in size should be mixed with ash or soil and should be covered with straw for better germination. While watering utmost care should be given as water should be sprinkled otherwise ,seed will get damaged.

**An idea for making estimate for nursery species**.

Total beds needed:12nos.

Size of the beds: 6m×1.2m( breath should be 1.2 m ,length may be adjusted according to convenience).

Two components are there . Wage component and Material Component.

Wage component:

|  |  |  |
| --- | --- | --- |
| Sl no. | Description of works | No of mandays |
| 1 | Selection of site and cleaning | 1 |
| 2 | Labour charges for fencing including cutting and splitting of bamboo,binding of wire rigidly with nail and pole etc. | 7 |
| 3 | Preparation of mother bed and polypod beds | 5 |
| 4 | Potting mixture preparation & filling up of polypods(250 polypods/mandays) | 40 |
| 5 | Seed sowing in mother bed | 2 |
| 6 | Preparation of shed with bamboo and thatch | 7 |
| 7 | Pricking out seedlings | 6 |
| 8 | Two times weeding in mother bed and polypod beds | 12 |
| 9 | Watering in mother bed and polypod beds. | 30-90 |
| 10 | Plant protection measures | 4 |
| 11 | Labour fpr carrying drinking water | 3 |
| 12 | Labour for look after children | 2 |
|  |  |  |

Non wage component

|  |  |  |
| --- | --- | --- |
| Sl no  | Description of materials | Estimated amount |
| 1 | Cost of polythene packets(approx 12kg)@Rs 140/kg | 1680 |
| 2 | Cost of good loamy soil half truck | 1500 |
| 3 | Cost of half truck sand | 500 |
| 4 | Cost of half truck load well decomposed dry cow dung(100cft) | 2000 |
| 5 | Cost of pesticide-1.Bavistin for seed dressing @ 3-4 gm /kg of seed.2. carbofuran3G@5g/polypacket+ Mancozed75wp 2.5g/lt (optional) | 1500 |
| 6 | Cost of material for shed and fencing i.e bamboo Rs 4000/- for 40 bamboos @Rs 100/- per bamboo and straw LS Rs600/- | 4500 |
| 7 | Cost of seeds( as required) |  |
| 8 | Cost of other materials | 1000 |
| 9 | Cost of neem cake @5gm/polypod | 800 |
| 11 | Supervisor |  |
| 12 | Display board +photography | 700 |
| 13 | Worksite facilities | 300 |
|  |  |  |

**Teak(Segun)**

Scientific name : *Tectoma grandis.*

Large deciduous tree upto 40 mts long.

Fruit ripens in Dec-Feb.

Seeds per kg-1430 /kg

**Seed Treatment**

Seed treatment is very effective rather important as teak seeds have hard mesocarp.This treatment is called" pit method "or "soak and dry "method. In this method, fruit mesocarp is subjected to decay by burying them in pits with cowdung slurry for 21 days, with soaking for 10 days followed by drying for one day and again soaking for 7 days. This will be done for 3 times and after 21 days seed s will be sown after doing seed treatment with Bavistin or indofilM-45 @4-5 gm per kg of seed.

**Preparation of bed-**

Prepare a mother bed by making a furrow with stick at 6"×6" spacing.It is advocated to keep the saplings in nursery bed for 1 year.After 1 year prepare stump cutting by making a slanting cut above the ground (6"-8") and 4" below the ground.Before distribution make a slunting cut upper end and prun the roots.

Detailed estimate:

Size of mother bed=6m×1.2 m( length can be adjusted according to convenience)

Wage component:

|  |  |  |
| --- | --- | --- |
| Sl no. | Description of works | No of mandays |
| 1 | Selection of site and cleaning | 1 |
| 2 | Labour charges for fencing including cutting and splitting of bamboo,binding of wire rigidly with nail and pole etc. | 7 |
| 3 | Marking on the mother bed with bamboo stick for sowing seeds at 6"×6" spacing | 1 |
| 4 | Labour for soak and dry treatment of seeds including preparation of cowdung slurry  | 4 |
| 5 | Seed treatment with Bavistin 4-5gm/kg of seed | 1 |
| 6 | Sowing of seeds in mother bed | 10 |
| 7 | Preparation of shed with thatch and bamboo | 7 |
| 8 | Watering ,weeding and cleaning  | 100 |
| 9 | Preparation of stump cuttings& pruning of roots | 12 |
| 10 | Chemical spraying | 5 |
| 11 | Water carrier | 3 |
| 12 | Looking after child  | 2 |
| Total |  | 153(20808) |

 Non wage component

|  |  |  |
| --- | --- | --- |
| Sl no  | Description of materials | Estimated amount |
| 1 | Cost of good loamy soil half truck | 1000 |
| 2 | Cost of half truck load well decomposed dry cowdung(100cft) | 2000 |
| 3 | 1.Bavistin for seed dressing @ 3-4 gm /kg of seed. | 500 |
| 4 | Cost of material for shed plus fencing i.e bamboo Rs4000/- for 40 bamboos @Rs 100/- per bamboo and straw LS Rs500/- | 4500 |
| 5 | Cost of seeds(13 kg) | 1500 |
| 6 | Cost of other materials | 1000 |
| 7 | Pesticides | 500 |
| 8 | Supervisor | 1224 |
| 9 | Display board +photography | 700 |
| 10 | Worksite Facilities | 500 |
| Total |  | 13424 |

**General instructions**

 1. You are requested to send pending fund requisition for long term and short term nursery 2011-12.

2. You are requested to send completion certificate of the completed schemes and update in the MIS accordingly.

3. Fund requisition for the long term nursery schemesof 2012-13 should be sent after starting of work and MIS should be updated properly.

4. Gardeners are engaged scheme wise, hence blocks who have not taken up any nursery schemes are requested to take up short term nursery schemes for 2012-13.

5. Estimates for short term nursery should be sent to district within December.

6. Balance fund lying with the PIA s should be utilized immediately

7. For long term nursery schemes of 2012-13,it is observed that many blocks have not entered the schemes in MIS yet which should be done immediately.

8. Fund will be released for 2012-13 schemes after MIS is uptodate for 2011-12 schemes .

9. There should be parity between nursery MPR and requisition.

10. Seeds should be procured from authentic sources through tender process.

11.It is noticed that no work order is generated and issued to SHGs engaged for nursery raising, which should be looked into.

12. No fund should be lying unutilized at PS end.

13. Any technical difficulty faced during nursery raising should be brought to the notice of this office immediately .

14. Keeping in consideration nursery schemes ,social forestry schemes should be planned, as our main aim is drought proofing.

15. Tender should be called for purchasing of seeds, other mqterial component should be purchased by spot quotations.

16. success stories should be sent to district.

17.Photographs at various stages should be taken and selected should be sent to district.