

NATURAL RESOURCES CONSERVATION AND DEVELOPMENT LEVEL II

Learning Guide -26

Unit of Competence: - Participate in Plantation Work

Module Title: - Participating in Plantation Work

LG Code: AGRNRC2 M03 0919 LO1-LG-26

TTLM Code: AGRNRC2 TTLM 0919v1

LO 4- Cleanup and Document

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

Assessing and preparing planting site

- Identifying and reporting problems
- Maintaining and storing equipment

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to

- Identify and report Problems and equipment faults in accordance with site procedures
- Maintained and store equipment in accordance with manufacturer's recommendations and workplace procedures

Learning Instructions:

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information "Sheet 1 and Sheet 2".
4. Accomplish the "Self-check 1 and Self-check 2" in **page -6, and 11 respectively.**

4.1. Identifying and Resolving Problems

Equipment faults and malfunctions, quality of stock, unsuitability of stock, common diseases, pests, nutritional deficiencies, communication misunderstandings, environmental issues or damage, production quality and safety.

4.2. Weed Elimination methods

a. Spot hoeing

- Hoeing is confined to a circle 1-2m in diameter around each plant.
- Wider hoeing in drier areas
- Most common because of its cheapness

b. Total (clean hoeing)

- Practiced with eucalyptus and cypress
- Recommended in dry area
- It is expensive, exposes soil surface to intense sunlight and increases the risk of erosion.

c. Strip hoeing

The operations confined to a strip about 75 cm wide along the rows of plants. It is practiced where ground cultivation was done by strip hoeing or plowing.

4.3. Protection of plantation

4.3.1. Grazing

Tree seedlings may also be harmed by animals. Cattle, sheep, goats and sometimes wild animals must be kept out of the plantation until the trees are big enough to withstand grazing. This problem is most acute in dry areas with sparse vegetation where animals turn to planted trees for food. Without the cooperation of the livestock owner's protection will be difficult. It is therefore essential

to discuss the problem very early during planning and to meet regularly after planting to sort- out problems.

When bigger areas representing a large portion of the accessible grazing lands are being planted and where grazing is scarce, it might be necessary to divide the planting area into compartments and to plant them one at a time. The livestock is then allowed into the first compartment when the second one is being planted some years later, and so on. In this way the area where grazing has to be avoided is minimized. It may also be necessary to use species that are not readily grazed by the animals (for example proposes ailanthus and some eucalyptus). If these measures are not sufficient, fences should be built before or during planting.

For smaller plantations fences can be built with branches cut from thorny trees or other suitable material to protect the plants for the first couple of years. However, these kinds of fences require a large quantity of branches and may put an additional pressure on an already stressed forest or bush land.

Hedges of closely planted bushes and trees (live fences) can also be created. Thorny plants such as Cactus, Euphorbia, Aloe, Sisal, Acacia or Juniperus can be used. Species that can be grown from large cuttings are preferable. Live fences must, however, be planted some years before the trees are planted and be given time to reach a sufficient size to keep out the animals.

All types of fences have to be maintained. Where fences alone do not protect the plantation, a watchman can also be used to look after the plantation.

4.3.2. Fire prevention

Bush fires in planted areas are almost always man-made. Fire is used to clear land, to improve grazing and to chase away wild animals. Fires may also be caused by carelessness during charcoal burning and honey collection.

Prevention of fire depends to a great extent on information and extension work. An understanding of the value and benefits of the forest for all members of the community must be reached.

the plantation to be protected does not belong to individual private owners or to the local community, the interest of the local population can be increased by sharing the produce of the plantation. This can be done in several ways. Local people can be given the right to collect non-wood products like grass, mushrooms, honey, etc. They can also be offered a share of the wood or other products from the plantation. To protect large areas of state forest plantations, local people can be given private wood-lots to form a protective belt around the state forest.

Firebreaks combined with a well designed road system may keep the fire from spreading. Firebreaks consist of corridors about 20 m wide that are kept without vegetation cover. Maintenance of firebreaks is simple but labor intensive. They must be cleared at least once a year at the beginning of the dry season. Controlled grazing or cutting grass for stall-feeding can be used to minimize the amount of flammable dry grasses in the forest. Controlled grazing can also be used for clearing firebreaks. Plantation staff and peasant association members may be trained in fire control. Small fires might be extinguished with water or plantation tools such as hoes or spades. If a fire has spread over a bigger area, the only practical way to control the fire is to remove flammable fuel from the path of the fire by opening up corridors without vegetation (fire lines). Already existing fire lines such as firebreaks and roads can be enlarged. Large forest fires can be fought with the help of backfire. A backfire is started on a strong fire line and directed towards the main fire. A wide corridor will be burned and when the two fires meet they will die for lack of fuel. Backfiring techniques need a lot of labour and should only be used under the supervision of an experienced fire fighting crew since there is always a danger that the fire can spread away from the back of the fire, starting new main fires.

4.3.3. Insects, diseases and rodents

Tree seedlings may also be harmed by insects, diseases and rodents. Species liable to insects and diseases should be avoided. The best form of protection is to diversify the plantation, using various tree species. Treatment with pesticides or dipping of plants (i.e. planting seedlings treated with pesticides) may also be used.

Rodents may cause damage to saplings, especially at high altitudes. The best form of protection from rodents is to keep the soil around the seedlings bare, i.e. well weeded. Rodents avoid bare soil where they are visible to birds of prey. Therefore, weeding limits the damage that can be done by rodents above the soil surface. Mechanical protection of the lower stem of young trees also works quite well. A suitable protection would be a split bamboo tube. The two halves of the tube are placed around the stem and tied together with a string. Protecting seedlings from rodents that damage the roots underground is more difficult. Traps, repellants or poisoning may be used.

4.3.4. Fertilizer application

On poor sites a dose of manure or chemical fertilizer may be valuable. It should be applied during a rather dry period towards the end of the rainy season, preferably in combination with weeding in order to avoid run-off or absorption by weeds. The simplest method is to apply about one tablespoon of chemical fertilizer in two small patches on each side of the tree, 15-30 cm from the stem, and hoe it in.

4.3.5. Causality replacement

Beating up is a planting operation done shortly after major plantation establishment to replace failures occurred for various reasons.

Mortality after the main planting activity is inevitable. This initial mortality may be due to:

- ❖ Deterioration of seedlings by mishandling
- ❖ Improper planting technique
- ❖ Occurrence of bad weathers after planting
- ❖ Attack by insect pests and diseases
- ❖ Seed competition
- ❖ Animal damage

Beating up is expensive as this involves large holes, larger stock, and long distance per plant. Therefore, it is carried out if the established stocks considered being unacceptably low.

Up to 20% mortality is accepted but if survival is less than 25% the plantation needs a complete replanting. It is also influenced by the pattern of mortality. If it occurs in an evenly distributed pattern, the need for beating up could be lesser. But if it is patchy creating scattered large gaps, we need to carry out beating up.

The time of beating up vary with the growth rate of the species. For fast growing species like eucalypts, the beating up needs to be done with in the season- usually 3-4 weeks after planting.

For slow growing species, it can be done after a year or the next growing season. When it is done in the same season an extra amount of seedlings in the same stock must have been kept, so that they will be of the same size with the previously planted seedlings. Beating up should mainly consider areas of concentrated or continuous mortality. All single isolated failures need not necessarily be planted. Seedlings used must be robust healthy and having good root development.

Self-Check	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the basic **Weed Elimination methods** (10)

Note: Satisfactory rating - 18points

Unsatisfactory - below 18 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____
 2. _____
 3. _____
- _____

4.4. Maintaining and storing equipment

4.4.1. Maintenance

4.4.1.1. Sharpening stones

Traditional sharpening stone: abrasive stones are often shaped to have a traditional rectangular or square sharpening bed.

Revolving grindstone: it consists of a sand stone wheel, equipped with a crank, stone and a water container.

Whetstone: there are two main types of whetstones, natural and synthetic. The granules of the synthetic stones are extremely hard and cut steel very well. Honing the edge with a whetstone requires water, which speeds the sharpening and makes the edge smoother.

Files: The file is the most common general-purpose tool for sharpening saw and various kinds of edged implements. The cutting patterns of files can be described as either double-cut or single-cut.

File maintenance: oil and grease are removed from a new file by putting the file in to warm water. Alternatively, the file is rubbed (in the direction of the teeth) with a Harwood stick, pieces of charcoal, or wire brush, during use the steel particles, which collect in the file, can be removed in the same way, or by tapping the file against a block wood.

Rasps: Rasps are used to shape soft materials like wood for tool handles and the hooves of draft animals. Rasps are not used on metals.

Filing vices: A stump vice is suitable to help hold two man cross cut saws for filling or for setting teeth. A portable wooden vice can be useful for both bow saw and crosscut saws.

Maintenance of axes: An axe is sharpened in a series of steps. First blade taper is measured with a taper gauge. The grindstone is used to reshape the edge. After the edge has the desired symmetric shape, the grindstone is used to sharpen the edge on both sides. The whetstone is then applied for final honing. Often it is necessary to remove a broken axe handle. On one method, the first step is to saw off the top of the handle stub (close to the eye) to make a flat surface.

Maintenance of Hand saws: Before beginning maintenance of the bow saw blade it must be verified that the saw blade is straight (not twisted) in the frame.

a. Cleaning the saw blade: Resin, rust, oil and dirt are wiped off the blade with a cotton cloth moistened in cleaning fluid. A suitable cleaning solution consists of 70% kerosene, 20% turpentine, and 10% engine oil. A burr knife, made of a discarded bow saw blade also can be used for cleaning. Care must be exercised so as not to scratch the saw blade.

b. Jointing, shaping, setting and filing the teeth

1. Jointing: the saw blade is effective only if the top of all teeth is at the same height. The teeth are brought to the same height with the help of a flat file and a jointer.

The jointer acts as gauge to keep the file perpendicular to the edge of the saw blade at the desired tooth height.

A self-made wooden jointer for the bow saw blade can be checked for accuracy with the help of pocket mirror. The kerf of the jointer is perpendicular to its sides, than the line of the kerfs and their reflections in the mirror should be perfectly parallel. A self-made wooden jointer for the crosscut blade may be checked in the same way.

The jointing is done by pushing the file forward over the top of the jointer does the jointer. The jointing stroke should be touching all of the teeth. Because the blade wears most heavily in the middle, extra filing strokes may be necessarily at the ends of the blade.

After jointing, each tooth should have a clearly defined flat top of 0.5-1.0 mm. This flat top will diminish in to a small dot during the filing of the tooth bevels.

2. Shaping: The correct height and form of the teeth are obtained by shaping depending on the gullets between them (For inexpensive bow saw blades, it is not worthwhile to file the gullets.)

Once the gullets are deepened, the burrs need to be removed. This can be done with a hard flat file or whetstone. The whole side of the whetstone must rest against the blade.

3. Setting: teeth are set by bending them alternately to the right and left. Thus the kerf is always wider than the thickness of the blade. For example, the width of the kerfs will be 1.3mm for a blade thickness of 0.90mm and a setting of 0.20mm. Settings are wider for soft woods than for hard woods as follows:

	<u>Soft wood</u>	<u>Hardwood</u>
	<u>(Setting in mm)</u>	<u>(Setting in mm)</u>
Bow saws	0.20 – 0.30	0.15 – 0.20
Crosscut saws	0.30 – 0.50	0.20 – 0.30

Different setting devices are available. Precise setting can be achieved with a setting iron and a simple wooden setting indicator.

4. Filing: Filing sharpens the teeth so that they slice through the fibers of the wood. Oblique bevels (half bevels) are made when only the outer (upper) part of the tooth is filed. Oblique bevels are needed for two-man crosscut saws. Full bevels are made when the whole side of the tooth is filed. Full bevels are made on bow saws only.

6. Removing burrs: When filing bevels, burrs are formed on the reverse side of the teeth. If they are left there, they make it difficult to file the other bevels.

For a bow saw blade, a burr knife is held against the blade with the thumb. Burrs are first removed from the bottom of the tooth. The burr knife is side up the tooth, and down the bevel of the other side.

Burrs are removed from a crosscut blade with a whetstone. The whetstone is rested flat against the blade and passed slightly along both sides of it.

7. Making a sawing test: Having carried out the preceding steps in saw maintenance, the worker evaluates the results. A visual inspection is followed by a sawing test at a felled tree of at least **15 –20cm** diameter. A smaller tree may not correctly test the saw's performance. The sawing test will show if the saw runs obliquely, pinches, or jumps.

Sharpening stones

Traditional sharpening stone: abrasive stones are often shaped to have a traditional rectangular or square sharpening bed.

Revolving grindstone: it consists of a sand stone wheel, equipped with a crank, stone and a water container.

Whetstone: there are two main types of whetstones, natural and synthetic. The granules of the synthetic stones are extremely hard and cut steel very well. Honing the edge with a whetstone requires water, which speeds the sharpening and makes the edge smoother.

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Rasps: Rasps are used to shape soft materials like wood for tool handles and the hooves of draft animals. Rasps are not used on metals.

Filing vices: A stump vice is suitable to help hold two man cross cut saws for filing or for setting teeth. A portable wooden vice can be useful for both bow saw and crosscut saws.

❖ **Correct handling of materials, tools and equipment**

All tools and equipment as well as materials should be handled according to the manufactures guidelines. Tools and equipment should be maintained regular and arranged in groups of similarity. Tools and equipment should be checked for any problem regularly. Broken tools should be identified, maintained and made ready for work. Plant debris and waste materials produced during nursery work activities should be identified, separated and stored safely for further processing. **Biodegradable** waste materials such as plant debris should be separated from **none-biodegradable** one, such as plastics, and stored separately. These materials should be prepared and processed in an appropriate and safe manner. Plant debris can be used for the preparation of compost, one of the important soil components, in the nursery. Surplus west materials should be stockpiled for removal and safe disposal out of the nursery site after transporting seedlings to planting area. A clean and safe work site should be maintained while completing planting activities.

After completion of activities, all tools and equipment must be cleaned. The nursery working environment should be kept clean of any west materials and plant debris.

If there is any broken tools and equipment, it should be maintained. Broken handles and blunted tools should be checked on time, maintained and made ready for work.

All tools and equipment should be well organized and stored in groups of similarity after maintenance.

Self-Check	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is maintenance? (5)
2. Write the purpose of maintenance (5)

Note: Satisfactory rating - 18points

Unsatisfactory - below 18 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

Reference

- Evans.J. 1992. Plantation forestry in the tropics. Oxford University press, New York.
- ILO. 1993. Planting trees, all illustrated and technical guide and training manual. Booklet
- No.7
- Yemiru. T and Abram, Plantation Establishment and Management Hand out (unpublished material)
- Vinod,K. . Nursery and Plantation Practice in Forestry, IFS
- Phil O'Callaghan, Frank Delahunty and Gaynor Baker. 2008. OH&S: A quick reference guide for broad acre agriculture. Publication No. 06/111. www.rirdc.gov.au. Accessed on December 2010
- Takele Tadesse and Mengesha Admassu. 2006. Occupational Health and Safety. www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_sci. Accessed on July 2011.
- Toni Rosenbaum. 2005. Effective Communication Skills. Ithaca, New York 14853-5701. www.clrp.cornell.edu. Accessed on July 5, 2011