NATURALRESOUCES CONSERVATION AND DEVELOPMENT LEVEL- II

Learning Guide -25

Unit of Competence: Participate in Plantation Work

Module Title: Participating in Plantation Work

LG Code: AGRNRC2 M03 0919 LO1-LG-25

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LO1- Prepare for planting operation

Information Sheet	Learning Guide -25

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

- Identifying OHS Requirements
- Identify planting requirements and factors
- Selecting and checking and using equipment
- Identifying and Assessing potential risks and hazards
- Storing planting stock
- Establishing and maintaining communication with others

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

- Applicable ***OHS***, legislative, organizational and environmental ***requirements*** relevant to planting trees by hand are identified and complied with
- identified ***Planting requirements*** and ***factors*** from work order and applied in accordance with site and quality control requirements
- select, check and use ***equipment*** appropriate to work requirements are for operational effectiveness in accordance with manufacturer's recommendations
- identify and assess Potential and existing risks, hazards and site conditions are in accordance with OHS requirements
- establish and maintain Planting stock is appropriately stored in accordance with operational requirements
- ***Communication*** with others is in accordance with OHS requirements

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3, Sheet 4, Sheet 5 and Sheet 6”.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3, Self-check 4, Self-check 5 and Self-check 6” **in page -5, 7, 11,15,16,23 and 24** respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1 **in page -25.**
6. Do the “LAP test” **in page – 26** (if you are ready).

Information Sheet-1	Identifying OHS Requirements

1.1. Identifying OHS Requirements

Occupational health and safety (OHS) is a discipline dealing with the prevention of work-related injuries and diseases as well as the protection and promotion of the health of workers. It aims at the improvement of working conditions and environment.
Occupational health entails the promotion and maintenance of the highest degree of physical and mental health and social well-being of workers in all occupations.
OHS hazard in tree nursery work place include heavy materials and equipment, slippery or uneven surfaces, moving machinery and vehicles, solar radiation, and potential dangers from handling potting media, fertilizers, watering systems, and spider and insect bites.

1.2. Safe working procedures

An unsafe workplace results in injury and illness. Good work place keeping is essential to ensure a safe work environment. Environmental hygiene is about keeping your property free from rubbish or conditions that allow the workplace to become unsafe.
General rules to assist maintaining a safe workplace include:

- keeping work areas free of waste – clean up as you go, use waste and scrap bins
- mow and control weeds around work area and buildings
- regularly maintain fire breaks
- store all machinery and equipment away after using it
- keep all walkways and doorways clear of trip hazards
- control pets and vermin when necessary
- immediately clean up any oil or chemical spills
- Use of personal protective equipment
- Using personal protective equipment (PPE) is considered a lower order control on the hierarchy of control. PPE must be provided and worn where:
- Hazards are unable to be controlled by other measures (elimination, substitution, or in conjunction with other controls/measures)

- Supporting A forestation 2011

- Protection is required for chemical handling and application, according to instructions on product labels
- legislation/OH&S regulation requires it
- Material safety data sheets

Manufacturers and suppliers are responsible for making material safety data sheets (MSDS) available for all agricultural chemicals and hazardous substances. MSDS contain specific details and information about the hazards of substances and how to use and store them safely, including use of appropriate PPE, first aid and medical treatment. It also helps you to identify, assess and control risks associated with the use of the substance on your farm. MSDS must be made readily accessible and available to all users handling the chemicals.

1.3. First Aid Kit

Employers should supply and maintain appropriately stocked first aid kits that are strategically located. As tractors, trucks and utilities are classified as a workplace and used in isolation; a first aid kit should be fitted, according to the relevant risk. A list of emergency services, telephone numbers together with basic first aid notes should also be included.

All workers should be aware of the location of first aid kits and appropriate signs should indicate their locations. It is recommended that all workers have first aid skills. There is legislative requirements detailing what contents are to be kept in each kit, this may vary depending on your location and number of employees.

1.4. Emergency Procedures

In the event of an emergency, the property should have documentation readily available to employees and emergency services to respond appropriately in the event of an emergency. This information should be displayed or kept on the premises in a place that is easily accessible to the emergency services (for example in the office, workshop or located at the main entrance of the property).

The documentation should be housed in an unlocked holder of substantial weatherproof construction and marked ‘Emergency information box’. Contents to be available in the ‘Emergency information box’ should include, but are not limited to:

 Property plan supporting A forestation 2011

- emergency contact listing
- chemical register and manifest
- Safe disposal of waste materials
- All waste materials should be safely disposed according to approved discharge system**.** Safe disposal of waste materials may involve the removal and/or disinfestations of organic waste, use of mixing site and neutralizing pits for disposal of chemicals and cleaning products, recycling seed trays, poly trays, bags, and recycling waste water.

Self-Check	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is OHS represent? (3)
2. Write the importance of First Aid Kit (3)

Note: **Satisfactory rating - 18points** **Unsatisfactory - below 18 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

2. _____

Information Sheet-2	Identify planting requirements and factors

1.2. Identify planting requirements and factors

1.2.1. Planting Requirements and Factors

A tree must grow well where it is going to be planted. Much of silviculture is concerned with achieving the best match between species variety and provenance and the planting site (including environmental improvements such as adding fertilizer and cultivation).

Relatively few descriptors of the environment (rain fall, temperature, frost occurrence, soil type etc) broadly define a site's potential, and the environmental conditions in the species' natural habitat are the best guide, at least to begin with, to the sort of conditions the planting site should have. This problem of matching species with the site is of little importance with indigenous species occurring naturally in or near the planting area, but it is of first importance when an exotic is to be planted.

Climate of the site: Amount and distribution of rainfall are very important when selecting species. However, an exotic species may grow over a wider range than its natural habitat and sometimes they may be restricted due to occurrence of fires, other than climate. E.g. Pinus radiate

Total annual precipitation: Trees water requirement differ considerably and species choice should be based on this. Drought hardy species found in regions of low rainfall (Acaain nlotica, Azadirata indica, Prosopis juliflora) will not grow in humid conditions. However, certain species show great flexibility e.g. Eucalyptus camaldulensis.

Rainfall distribution: The distribution of the rainfall during a year esp., the length of severity of a dry season is very important in species choice. Species naturally occurring where rainfalls in most months usually grow poorly in strongly monsoon climate even though the total rain fall may be the same

Water balance: Compare water balance of a species' Known habitat with that of the proposed planting site and this is an important step in matching species with site.

By plotting mean monthly rainfall evapotran aspiration potential, deficits become evident. Such graphs show at a glance the total amount of rainfall, the pattern of distribution, and the deficit periods – the main determinants of the water balance of a particular climate.

Other forms of precipitation: Occurrence of mist or low cloud, while not condensing in to rain can augment moister supply and reduce evapotran aspiration. It may be locally important and some species such as Pinus patula do benefit from mist condition.

Soil: For selecting species for planting, soil differences may lead to alteration in choice but only from among the species suited to the climate except of course where irrigation wholly changes the soil moisture regime. A few soils are so poor that attempting tree planting is questionable.

The chief soil properties affecting species choice also determine what pre planting ground preparation work is required. They are:

Depth – determine the routable volume, which influence the availability of nutrients and moisture

PH –Soil PH has an important influence on the availability of nutrients for plants. Microorganisms are also less active in soils that have a high or low PH; they decompose less organic matter, which results in fewer available nutrients. Structure and texture-Soil texture has major effects on forest growth, but these effects are indirect, manifested through the effect of texture features such as water holding capacity, aeration, and organic matter retention.

Self-Check	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the planting requirement and factors (10)

Note: **Satisfactory rating - 5points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

2._____

Information Sheet-3	Selecting and checking and using equipment

1.3. Selecting and checking and using equipment

1.3.1. Site clearing tools

The type of tool used should be adapted to the kind of vegetation that is being cleared.

The following tools used for site clearing should be checked:

- Brush hook
- Machete
- Scythe
- Slashes
- Hoes

1.3.2. Soil working tools

For ground preparation/soil working purpose, tools required such as hoes, mattocks, gesso, plow, etc. should be checked and arranged before starting the work activities in the field.

1.3.3. Laying out tools

For laying out purpose, tools required such as hoes, mattocks, gesso, meters, pegs, ranging pole, water level, clinometers, compass, etc. should be checked and arranged before starting the work activities in the field.

1.3.3.1. Seedling Transporting Tools

Seedlings, both bare rooted and containerized, should be safely transported and delivered to the planning site. Depending upon the location of planting site, transportation facilities such as arrangement vehicles should be done before stinting seedling transportation. For bare rooted seedlings, preparation of covering materials such as banana leaves or any suitable covering materials is important. Containerized seedlings should be transported by using trays and boxes and covering materials should be arranged to minimize damage to the seedling by sun and wind.

1.3.4. 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.

Self-Check	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the tools and equipment at least five (3)

Note: **Satisfactory rating - 18points** **Unsatisfactory - below 18 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

2._____

Information Sheet-4	Establishing and maintaining communication with others

1.4. Establishing and maintaining communication with others

Communication can be defined in many ways. In simple terms communication is:

- Information transmitted
- A verbal or nonverbal message
- A process by which information is exchanged between individuals through a common system of symbols, signs, or behavior

Key elements in communication

There are three key elements in the communication process, which we will refer to throughout our discussion of interpersonal communication. They are:

- ✓ You
- ✓ Your audience
- ✓ Your message

YOU bring professional experience and education and training to the communication process. You have earned credibility with your employees, your board members, the public, the media, and your fellow workers.

In order to be an effective communicator, you need to know who your **AUDIENCE** is.

The **MESSAGE** element is equally important. What do you want to say? What is the best way to communicate the message?

There is a basic rule used by journalists for writing a newspaper story that can help you focus your message. A well-written story should contain the: **who, what, when, where, why**, and **how** of the story in the first paragraph or two. If it does not, it will not hold our attention.

The same principle applies to your message in the process of interpersonal communication. If you do not let your audience know quickly the: **who, what, when, where, why,** and **how** of your message, you risk their losing interest, being inattentive, and tuning out. Therefore, whether spoken or unspoken, messages should contain most of these elements: **Who, What, When, Where, Why** and **How**.

Communication tools

There are four basic communication tools: **Listening, Speaking, Reading** and **Writing.**

All four of these basic tools can be learned and improved. First, you must want to improve your communication skills. Next, you must understand them, and recognize their importance in the communication process. Then, you need to learn some new skills. Finally, you must practice good skills to become a better, more effective communicator.

How we get and use information

How much information we retain in the communication process depends on many factors. It is important for each of us to recognize how we learn best. Do we remember most of what we read? Most of what we hear? Do we learn more if someone shows us?

Typically, we retain information at these rates:

10 percent of what we read

20 percent of what we hear

30 percent of what we see

50 percent of what we see and hear

70 percent of what we see and discuss

90 percent of what we do

Another way to think about how we retain information is this adage:

Tell me and I will probably forget,

Show me and I might remember,

Involve me and I will learn.

Communication may be:

- ***Nonverbal messages***: unspoken and more difficult to interpret than verbal messages, but are just as important. This is particularly true when you think that someone is saying one thing and showing body language that tells a different story.

- ***Writing:*** a type of unspoken communication. Communication in writing is powerful and lasting. Whether you write a letter, a memo, or an email message, written communication can be recalled word for word.
- ***Spoken***: this is often misquoted and misremembered.
- ***Writing lasts a long time. So, think carefully about written communication.***

Work place communication

Effective communication in the workplace happens with effort. That effort must include participation and agreement between supervisors and employees. Each must want similar goals. Each must work with the other to achieve the goals.

A sense of common purpose can be the key in getting along with your coworkers. If you do not understand your departments or organization's goals and objectives, ask your boss. If you and your coworkers focus on common purpose, tasks become easier and results more predictable.

Self-Check	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What mean communication? (5)
2. Write the basic communication tools (5)

Note: **Satisfactory rating - 18points** **Unsatisfactory - below 18 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

2._____

Information Sheet-5	Storing planting stock

1.5. **Storing planting stock**

1.5.1. Storing**:** means that seeds are kept under considerations that maintain viability at reduced physiological activity, and protecting seeds from deterioration by fungi and insect attack.

1.5.2. Handling Seedlings

The time between the seedlings, leaving nursery and their being planted should be as short as possible. They must be constantly protected from strong light, heat and drying out. There are small root hairs that will dry out and wither in seconds if left exposed to the sun or dry winds. The seedling should be thoroughly watered before leaving the nursery. This will provide the seedling with the largest possible reserve of water and minimize the risk of soil being shaken out of the pots during transport.

1.5.3. Containerized seedlings

Only the containers should be held when containerized seedlings are carried. Seedlings should never be held by the shoots. Whenever possible, use boxes for transport. Metal platforms of vehicles often get very hot, and this will burn the root tips at the bottom of the pots. Pour water over the platform and/or spread out soil, straw or twigs. It is especially important to put a thick layer over the exhaust pipe otherwise the heat may destroy some of the seedlings. If the seedlings are loaded onto carts, pickups or trucks, load densely and upright. Make sure that they do not fall over during the transport. If necessary, water the plants on the arrival at the planting site.

If a vehicle is carrying the plants, it should travel at moderate speed and the plants should be covered by a layer of grass, a mat or a tarpaulin to prevent them from being dried out by the wind.

Transport from the nursery to the planting site is often a limiting factor, slowing the progress of the planting work. Simple metal structures with several shelves, as shown in the illustration on the preceding page, can multiply the capacity of trucks and trailers several fold. Source: ILO 1993

1.5.4. Bare-rooted seedlings

Bare-rooted seedlings have to be packaged in order for the roots to be well protected from drying out. Sacking, banana leaves, plastic bags with ventilation holes or cans may be used for packing.

- **Storing seedlings**

If the seedlings have to be stored a few days before planting, keep them in a dark and cool place, a cool cellar or elsewhere in the shade. If bare-rooted seedlings are packed in bags, the bags should not be opened.

Bare-rooted seedlings which cannot be planted in a few days must be healed-in close to the planting site to minimize later transport. "Healing-in" means temporarily putting barerooted seedlings in moist soil, under shade, until they can be used for planting. Healing-in should be avoided but it may sometimes be necessary.

1.5.5. Healing-in

- Dig a trench under a shade tree in loose, well drained, but moist soil.
- Separate the seedlings from the bundles.
- On one side of the trench, which should be slightly sloping, arrange the seedlings individually in upright position.
- Cover the roots with soil taken from the opposite side of the trench, thus making room for the next row of seedlings. Source: ILO 1993
- The roots should be covered up to, or a little above, the root collar.
- Firm the soil with the hands. Then place the next row of seedlings.
- During dry weather the seedlings have to be watered.

- ❖ If the location is not very shady, the seedlings should be covered by brush to discourage the emergence of shoots.

1.5.6. **Quality of seedlings and grading**

You should only use seedlings of good quality. Never use seedlings left over from the year or the planting season before. Replacement is much more expensive than seedling production.

Seedlings of good quality have:

- ➢ a shoot between one or two times the length of the root (or the pot);
- ➢ a sturdy, woody stem with a strong root collar;
- ➢ a symmetrical, dense crown;
- ➢ a root system with many thin roots in addition to the tap root;
- ➢ no signs of fungus or insect attack

Seedlings of inferior quality should never leave the nursery. If they have, they should be rejected at planting stage. If the plantation site is varied, it may be useful to separate the plants into two or three quality classes. The best plants should be used on the most difficult or inaccessible part of the site. Second quality plants should be used on the more favorable part of the site where replacement planting is less costly.

1.5.7. **Stripping and trimming**

With tall, broadleaved species, young shoots and part of the foliage must be trimmed or stripped off to reduce transpiration until the roots have had a chance to reestablish their water supply function. Some species such as *Azidirachta indica* should be stripped of all leaves except for the terminal bud and two or three near it. Remove the leaves carefully. The terminal bud must not be damaged. If possible the plants should be stripped in the nursery before lifting out.

Overgrown seedlings of some broadleaved species like Eucalyptus can be trimmed back to the right root: shoot ratio with a pruning shear. After planting they survive much better than seedlings that are too large.

Source: ILO 1993

1.5.8.General principles to be consider during storing

- storage conditions should be dry and cool
- effective storage must include pest control
- proper sanitation is necessary in seed storage
- seed must be dried to a state moisture limit
- stored high quality seeds separately
- decrease storage temperature and reduce moisture content to minimize physiological activity and over heating
- Consider factors affecting the viability of seeds during storage: moisture content; maturity; temperature, oxygen; fungi; bacteria, insect…etc.
- The higher the moisture content and temperature will lead to the deterioration through the action of fungi, molds & overheating.

1.5.9.There are different types of seed storage mechanism:

1) Open storage without moisture or temperature control.

2) Warm storage with moisture control.

3) Cold storage with or without moisture control.

4) Cold moist storage.

1.5.10.Storage of Vegetative Materials

- vegetative materials must be kept dump, (place for temporary storage)
- Parent plants are maintained in the open field or in the garden, if weather conditions are, favorable.
- Place cuttings in bags or basket in the shaded nursery.
- Storage in pits (cuttings from rhizomes, tuber shoot)

1) Steps of Storing in Temporary pits

— Dig the pit on the try ground

— put the vegetative materials in even layers

— pour sand into the empty space between the vegetative materials

— Fill the pit with sand to the top

— cover the tip with straw

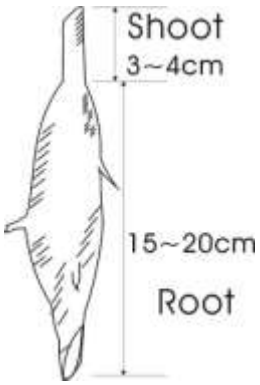
— cover with plastic sheet

2) Layering — is the method of producing rooted seedlings from shoots while they are attached to the mother tree or shrub.

— it is applicable only for low branching shrubs.

3) Grafting- is an art of connecting two pieces of living plant tissues so that they may unite and develop as one plant. The part that grows into the root systems is called **stock** and the part that grows into the shoot system is called **scion**. fresh bud

4) stumps- are parts of seedlings from which most of the shoot and side roots have been removed, leaving only a 20~25㎝ long pieces. 80% of which is root and 20% is shoot.



Only used for broad-leaved species

e.g. ***neem; Acacia cyanorphylla; Gliricida sepium; Chlorophoa excelsa***

1.5.11. Tissue culture: micro propagation.

It is possible to clone vast numbers of individuals from a single small fragment, or explants, from parent tissues. The explants may be single seeds, stem tips, or embryos. One of the most basic methods is to use a piece of stem tissue as the explants (tobacco, carrot, endive, asparagus, citrus, aspen, willow, etc).During tissue culture, the balance of growth regulators is carefully controlled so that the explants cells are divided repeatedly, producing a mass of undifferentiated callus tissue composed mainly of parenchyma cells and a few vascular cells. Pieces of the resulting callus can be transferred to separate culture containers and thus be cloned indefinitely.

Self-Check	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is storing? (5)
2. Write the basic **General principles to be consider during storing** (5)

Note: **Satisfactory rating - 18points** **Unsatisfactory - below 18 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

2._____

Information Sheet-6	Identifying and Assessing potential risks and hazards

1.6. Identifying and Assessing potential risks and hazards

A hazard is anything that has the potential to harm the health or safety of a person and in the case of dangerous goods, includes damage to property.

OHS hazard in tree nursery work place include heavy materials and equipment, slippery or uneven surfaces, moving machinery and vehicles, solar radiation, and potential dangers from handling potting media, fertilizers, watering systems, and spider and insect bites.

The workplace needs to be free from these hazards, therefore all persons on a daily basis when walking and working around the property, need to be on the lookout for potential hazards and report it.

All waste materials should be safely disposed according to approved discharge system. Safe disposal of waste materials may involve the removal and/or disinfestation of organic waste, use of mixing site and neutralizing pits for disposal of chemicals and cleaning products, recycling seed trays, poly trays, bags, and recycling waste water.

Ecological Waste Management is the proper handling of the things we throw away in a manner that does not harm anyone or anything, be it human, animals or the environment. Proper handling includes the collection, transport, processing, recycling or disposal of waste materials produced by human activity in order to reduce their negative effect on the environment.

Waste is unwanted material or substance produced by human activities, which are usually referred to as rubbish, trash, garbage or junk.

Wastes can be categorized in to:

- Non-Hazardous wastes are wastes that pose no immediate threat to human health and the environment (Includes plant debris.)
- Hazardous wastes are:

1. Wastes that have common hazardous properties such as ignitability and reactivity.

2. Wastes that contain leachable toxic components

Self-Check	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is hazard? (6)

Note: **Satisfactory rating - 3points** **Unsatisfactory - below 3 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