

**NATURAL RESOURCES
CONSERVATION AND DEVELOPMENT
LEVEL II**

Learning Guide -24

Unit of Competence: Assist Nursery Work

Module Title: - Assisting Nursery Work

LG Code: AGRNRC2 M05 0919 LO7-LG-24

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LO 07: Record and document

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

- Recording and documenting nursery site information
- Reporting Problems or difficulties
- Reporting Materials, equipment and machinery wastage /damage
- Communicating work completion and hazard information
- Reporting work outcomes

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

- Record and document all site and nursery planting beds preparation , seedling transplant, tending and the nursery environment maintenance activities on daily basis in standard organizational formats
- Report Problems or difficulties in completing work to required standards or timelines to *appropriate personnel?*
- Record and report Materials, equipment and machinery wastage /damage to supervisor
- Communicated Work completion and hazards information to supervisor in standard procedure and formats

Work outcomes are reported in standard format to the supervisor.

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, and Sheet 5”.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3, Self-check 4, and Self-check 5” in page -5, 8, 10, 13 and 21 respectively.

7.1. Recording and documenting nursery site

A nursery is an area where young plants can grow with special care and protection.

It produces seedlings for a forestation and tree planting. Seedlings are usually needed in large numbers and young trees of most species do not survive well if directly grown on the plantation site. It is therefore easier and cheaper to grow seedlings in one place - the nursery - and plant them only when they need less care and protection.

The purpose of a nursery, therefore, is to grow seedlings:

- of the required species;
- of the right size and sturdiness at the beginning of the planting season;
- in sufficient numbers for the intended tree planting program

7.2. Types of nursery

Nurseries may be categorized on the intended length of time a nursery supposed to serve and scale of production. Some nurseries are established to serve for few years while other are established to serve for many years. Hence nurseries may be called *temporary nurseries or permanent nurseries depending on the number of years they serve*.

Temporary nurseries are small to medium in size, in which small numbers of plants are raised during a few years only. On the other hand, permanent nurseries are usually large centrally located nurseries which produce several hundred or millions of seedlings each year

Access: Near supervisor's living quarters ("The farmer's footprints = best manure for the farm").

Accessible at all times, preferably close to the road.

The nursery terrain should preferably be public land (owned by the government or the community) so that management may be free in its decisions. Make sure traditional rights to use the land (e.g. fuel wood collection, grazing or water) do not interfere. For private land and water rights, clear lease agreements have to be made.

An alternative may be to assist individuals or groups (farmers, women, schools, etc.) to set up a nursery, for instance within a private garden.

7.3. Size:

The size of the nursery area depends on:

- the number of seedlings required for planting;
- The time it takes to produce seedlings of the desired size and species in the nursery;
- the size of the containers used

The prototype layout shown opposite is for a medium-sized nursery with an annual capacity of about 100,000 containerized plants using pots of 8 cm diameter when filled. (If pots of, say, 4.5 cm diameter filled are used, 250,000 seedlings can be accommodated.) This layout can be scaled up or down according to the specific requirements

7.4. Pricking out

Sowing in seedbeds requires transfer of the germinated plants into pots after some time. This operation is known as pricking out. It is very important that the seedlings are pricked out when they have reached the right size. This is when the seedling has its first true leaves. These are the leaves which appear after the germination leaves. If transplanted earlier, the seedlings are too delicate. Later, their roots get too long or the seedlings stop growing because they are too close together.

Seedbed and pots should be watered thoroughly the day before pricking out to avoid damaging them.

Seedlings are lifted with a little shovel or a flat piece of wood. Only healthy, well-developed seedlings are pricked-out. Unsatisfactory ones are thrown away.

If roots are too long, prune them with a sharp knife. If only a tap root has to be cut, use your fingernails.

The seedlings dry out extremely quickly. The roots may die after only three minutes in the full sun or if exposed to dry wind. Therefore, work under shade; work in the late afternoon or when the sky is cloudy. Keep the seedlings under a moist cover (but not in water!).

Source: ILO 1989

Make the dibble holes deep and wide enough to accommodate the roots. The roots should not be bent or point upwards. The hole is closed by gently pressing soil around the plant with the fingers. Water the plants and shade them.

- *Earmuffs*: fit over and around the ears. A fluid of foam filled cushion seals them against the head.
- *Earplugs*: fit snugly inside the ear. There are a variety of types, including foam and soft rubber plugs.
- *Respirators*: for protection of inhalation
- *Goggles*: for eye protection
- *Gloves*: for hand protection
- *Safety shoes/steel caped boots*: for foot protection
- *Overall wear*: for body protection
- Face mask
- Sun hat
- Sun screen location

7.5. 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

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.

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 Site clearance tools and equipment? (5)
2. Write Types of nursery (5)

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

❖ **Short Answer Questions**

1 _____

2 _____

7.1. Reporting Problems or difficulties

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 look out for potential hazards and report it. In many cases, there is a desire to plant trees in order to give protection to degraded areas. On such fragile sites, great care should be taken not to disturb the soil. Often complete protection of the already existing vegetation is sufficient to obtain a natural re-growth after sometimes. When trees are to be inserted on to such sites, it must be done carefully often in combination with the construction of small check dams.

7.2. Environmental protection

Soil and water conservation

Desirable characteristics of the species are;

- Good survival and fast growing on poor site
- Ability to produce a large amount of litter
- Strong and wide spreading root system with numerous fibrous roots; on sites prone to land slides deep roots are essential.
- Easy to establish; little need for tending
- Capacity to form a dense crown and to retain foliage year round or at least the dry season
- Resistance to insect, disease and browsing damage
- Able to improve soil through nitrification

Some useful species are: *Acacia* species, *Eucalyptus* species and *Albizzia lebbek*

- **Biophysical factors**

The main factors which may limit tree growth and choice of species are:

Climatic factors

- a. **Seasonal deficiency of water** which causes slow growth, low yields and in most series causes even death. Sometimes this can be solved by irrigation. In areas with sever dry seasons correct choice of species is essential.

- b. **High temperate:** this may cause ever green species suffer from excessive transpiration stress during high temperate in dry seasons. Again to minimize heat damages, correct choice of species is necessary.
- c. **Low temperate:** frost can damage and kill young plants in coldest places in highlands. For such sites, frost- hardy species must be planted (*Juniperus, Hageniya, Olea*).

Soil factors

- a. **Unfavorable soil profiles with hard pans:** growth may be limited either by the physical inability of roots to penetrate such layers or by inability of rain water to inter the soil so that the water is lost from the site by runoff. Before starting large plantations it is necessary to check that the soils are deep enough: e.g. a minimum depth for Zambian eucalypt plantation is said to be about 2m. In Madagascar where soils of some plantations are shallow, the hard pan is broken with a crawler- tractor down subsoil which rips the ground down to 60cm.
- b. **Nutrient deficiencies:** Shortage of Nitrogen, phosphorous and potassium
Remedy: Fertilization

Crop factors

Pests and disease: *Armillary mellea*- fungus in old stumps can attack pinus species especially *P. patual* in hard wood sites where indigenous forest was cleared. Also *P. radiate* is susceptible

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 hazard? (5)

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

❖ **Short Answer Questions**

1 _____

2 _____

7.3. Reporting Materials, equipment and machinery wastage /damage

After completion of activities, all tools and equipment must be cleaned. The nursery working environment should be kept clean of any waste 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. Plant diseases and pests can be checked by proper hygiene conditions in the nursery.

Keep the nursery area itself free of weeds. Many plant species can be alternate hosts of nursery pests.

This precaution includes a sensible selection of ornamentals, shade, hedge and windbreak plants in and around the nursery, as they too can be hosts for pests such as nematodes. The substrate can harbor plant pathogens and should therefore be steam pasteurized, if necessary. A simple steam pasteurizer can be constructed from an old and clean oil drum. Containers and seeds can be surface sterilized by soaking them in a 10% household bleach solution for 12-24 hours.

With time and heavy use, blades will become blunt, will chip and even break. Blunt or broken blades affect productivity, apart from being uncomfortable to work with. Regular maintenance is important. Loose handles are dangerous and should be fixed immediately. Raised safety grips on the handles reduce the force needed to guide the tool and prevent tools from slipping out of the hands. Repair or maintenance can be done by sharpening the blade with a file or, when the blade is extremely damaged, by cutting back the blade and then sharpening it again.

Check regularly that tools are in good working order. Supervisors play a major role in observing if the tools are suitable for the different tasks, if they are properly maintained and sufficiently durable

- Ability to produce a large amount of litter
- Strong and wide spreading root system with numerous fibrous roots; on sites prone to landslides deep roots are essential.
- Easy to establish; little need for tending
- Capacity to form a dense crown and to retain foliage year round or at least the dry season
- Resistance to insect, disease and browsing damage
- Able to improve soil through nitrification

Some useful species are: *Acacia* species, *Eucalyptus* species and *Albizia lebbek*

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. After completion of activities write the next steps (5)

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

❖ **Short Answer Questions**

1 _____

2 _____

7.4. Communicating work completion and hazard information

After completion of activities, all tools and equipment must be cleaned. The nursery working environment should be kept clean of any waste 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. Plant diseases and pests can be checked by proper hygiene conditions in the nursery. 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. 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 *non-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 materials should be stockpiled for removal and safe disposal out of the nursery site. A clean and safe work site should be maintained while completing nursery activities.

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.

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 susceptible.

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 Wastes categorized as a hazard (5)

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

❖ **Short Answer Questions**

1 _____

2 _____

Information Sheet-5	Reporting work outcomes
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7.5. Reporting work outcomes

Proper labeling and record keeping are required in order to keep track of species and seedling batches produced. This is particularly important when several provenances or cultivars of the same species are raised in the nursery. The minimum information required includes:

- Species name and provenance, source of seed (e.g., own collection, name of seed dealer).

- Date of sowing.
- Number or quantity (in g) of seeds sown.
- Location and or condition of germination (e.g., seed bed, heated, sand).
- Germination percentage (or number of seedlings emerged).
- If unavoidable: date of pricking out.
- Type and size of containers.
- Substrate used.
- Any treatment given during nursery period – such as fertilizer (when, which, how much), shade (density), pest and disease control (when, which pest/disease, which method used, product name, concentration).
- Date and number of seedlings removed – and reason (e.g., diseased, damaged, bad development).
- Date and number of seedlings harvested for experimental reasons, sold, planted or given out.

Simple entries in a nursery logbook are sufficient, although a variety of computerized systems have been developed that may be more convenient if a large number of batches are being raised. A batch of seedlings should be given a unique serial number at sowing, which is retained until the last seedling of this batch has left the nursery.

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. Reporting work out comes? (5)

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

❖ Short Answer Questions

1. _____

2. _____

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