



# **Natural Resources Conservation and Development**

## **Level II**

# **Learning Guide-35**

**Unit of Competence: Participate in Rehabilitation and  
Restoration of Degraded Areas**

**Module Title: Participating in Rehabilitation and  
Restoration of Degraded Areas**

**LG Code: AGR NRC2 LO2-LG-35**

**TTLM Code: AGR NRC2 M08 TTLM 0919v1**

**LO 2: Demarcate area to be rehabilitated**



<b>Instruction Sheet</b>	<b>Learning Guide #35</b>
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Organizational occupational health
- Assessing soil and existing vegetation
- Conducting area demarcation activities

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:**

- Observe and follow Organizational occupational health and safety procedures, practices, policies, and precautions
- Assess Soil and existing vegetation according to sampling procedures
- Conduct and Develop area demarcation activity and the site based on the site demarcation procedure and a map

**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 t 2, and Self-check 3” in **page -4, 7 and 11**respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1 and Operation Sheet 2 ” in **page -11, 12.**
6. Do the “LAP test” in **page – 12** (if you are ready).



<b>Information Sheet-1</b>	Organizational occupational health
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## 2.1. Organizational occupational health

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 rehabilitation of degraded area 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.

### 2.1.1. Observing safety procedures and practices

Service-specific safe work procedures may need to be developed on the basis of particular hazards and identified when undertaking the risk assessment. some of the Safe work practices and procedures;

details of how workplace health and safety inspections will be undertaken during the contract, considering:

- checklists to be used – frequency of inspections
- team members, and – actioning of inspection findings

### 2.1.2. Following policies and precautions

Details of hazard reporting procedures for the contract, including hazard report forms, and details of specific activities or areas targeted for inspection eg. plant, hazardous materials or electrical safety.

Safe work practices are generally written methods outlining how to perform a task with minimum risk to people, equipment, materials, environment, and processes. Safe job procedures are a series of specific steps that guide a worker through a task from start to finish in a chronological order.



<b>Self-Check -1</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. *What* considers the details of how workplace health and safety inspections will be undertaken during the contract,? (4 pts)

**Note: Satisfactory rating - 2 points**

**Unsatisfactory - below 2 points**

You can ask you teacher for the copy of the correct answers.

**Answer Sheet**

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Short Answer Questions**

1. \_\_\_\_\_



<b>Information Sheet-2</b>	Assessing soil and existing vegetation
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## 2.2. Assessing soil and existing vegetation

If severe erosion has taken place or if fertility has been depleted the soils may no longer be suitable for the original species and a new community, possibly exotic species able to tolerate the changed environment, may take over.

Soil fertility is improved based on the principle of organic farming (tree/crop residues, farm yard manure or promotion of short term fallows). Soils at the site must also remain reasonably intact.

Natural vegetation was originally woodland and bush land. However, due to severe deforestation, many areas turned treeless except for a few species.

Due to over-exploitation of woodlands and especially overgrazing, charcoal production and firewood collection, recovery of vegetation becomes difficult and slow.

### 2.2.1. Soil sampling techniques

#### **Principle**

Soil testing is an essential component of soil resource management. Each sample collected must be a true representative of the area being sampled. Utility of the results obtained from the laboratory analysis depends on the sampling precision. Hence, collection of large number of samples is advisable so that sample of desired size can be obtained by sub-sampling. In general, sampling is done at the rate of one sample for every two hectare area. However, at least one sample should be collected for a maximum area of five hectares. For soil survey work, samples are collected from a soil profile representative to the soil of the surrounding area.

Anyone can submit a sample(s) for testing. The Soil Testing Laboratory tests soil samples for pH, phosphate, calcium, magnesium, potassium, iron and copper, etc.

Before sampling



- Develop a soil sampling plan of your field. Samples should represent the area being tested, so collect samples from areas that are of the same soil type, appearance, or cropping history. Sample problem areas separately, if needed. From this plan, count the number of samples you will collect.
- Soil sample bags and addressed shipping boxes are available from your county Extension office if you are using Extension Soil Testing Laboratory. Obtain the materials you need to complete your sampling plan.

### **Materials required**

1. Spade or auger (screw or tube or post hole type)
2. Core sampler
3. Sampling bags
4. Plastic tray or bucket

### **Points to be considered**

1. Collect the soil sample during fallow period.
2. In the standing crop, collect samples between rows.
3. Sampling at several locations in a *zig-zag* pattern ensures homogeneity.
4. Fields, which are similar in appearance, production and past-management practices, can be grouped into a single sampling unit.
5. Collect separate samples from fields that differ in colour, slope, drainage, past management practices like liming, gypsum application, fertilization, cropping system *etc.*
6. Avoid sampling in dead furrows, wet spots, areas near main bund, trees, manure heaps and irrigation channels.
7. For shallow rooted crops, collect samples up to 15 cm depth. For deep rooted crops, collect samples up to 30 cm depth. For tree crops, collect profile samples.
8. Always collect the soil sample in presence of the farm owner who knows the farm better

#### **2.2.2 Soil sampling procedures**

For soil survey work, samples are collected from a soil profile representative to the soil of the surrounding area.

### **Procedure**



1. Divide the field into different homogenous units based on the visual observation and farmer's experience.
2. Remove the surface litter at the sampling spot.
3. Drive the auger to a plough depth of 15 cm and draw the soil sample.
4. Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray.
5. If auger is not available, make a 'V' shaped cut to a depth of 15 cm in the sampling spot using spade.
6. Remove thick slices of soil from top to bottom of exposed face of the 'V' shaped cut and place in a clean container.

<b>Self-Check -2</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. List materials required for soil sampling.(10pts)
2. \_\_\_\_\_ is improved based on the principle of organic farming (tree/crop residues, farm yard manure or promotion of short term fallows). (2pts)

**Note: Satisfactory rating - 6points**

**Unsatisfactory - below 6 points**

You can ask you teacher for the copy of the correct answers.

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Short Answer Questions

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

2 . \_\_\_\_\_



<b>Information Sheet-3</b>	Conducting area demarcation activities
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### 1.3. Conducting area demarcation activities

The external boundary must be evident:

- i. It defines areas and boundaries with respect to the adjacent landholder; this is especially important where degraded land, agriculture, grazing and grass burning are practiced;
- ii. It takes a legal claim to avoid unsuspecting trespass or theft;
- iii. In the few years after planting, trees are not always obvious and a well-defined boundary will lessen the chance of mistakes and accidents.

Where exactly the planting takes place especially the boundary of it is crucial factor in social and community forestry projects. Involvement of local people in these discussions is excellent people's participation and encourages their commitment.

Boundaries should be defined and marked using beams which may be durable wooden poles, stones or concrete pillars. The poles should be between 1.5 to 2 m tall. Continuous line of live trees or shrubs can also be used as boundary. These trees or shrubs should be fast growing and distinctively different from surrounding forest vegetation.

Plantation boundaries are frequently marked by a stout fence, which is erected for protection purposes. Where protection is not needed some permanent marking, such as concrete pillars should be erected at least at corners and changes of direction.



**Planting trees and shrubs on demarcated area**

#### .3.1. Site closure activities

- Area closure is a very low input conservation measure because the only thing that is practice is to prohibit livestock & human interference.





- It is a passive restoration when no action is taken except to cease environmental stressors such as agriculture or grazing.
- The main objective is to improve the ground vegetation cover of degraded land by natural regeneration
- There is no tree plantation what is done is to close the area from 3 to 5 years until 80% of the natural vegetation attain.
- In need a very tight willingness of the community for its effectiveness.
- After the natural vegetation attain 80% it is possible to use with proper management.
- If the enclosure diversity is very low enrichment plantation is possible but the species should be more of local rather than exotic.
- Mostly this is a good conservation for marginal lands.

### .3.2. Site demarcation procedure

All we can do for now is to rehabilitate certain ecological functions, through reconstruction of ecological structures on a limited basis, which were lost by environmental degradations. Agro ecological condition includes: climate, soil, physiography, and biotic factors to be assessed. The species selection first must be adapted to the site condition. The climate, soil, and biotic factors affect the growth and performance of trees shrubs and other forms of vegetation directly while the physiographic factors affect the climate and the soil thus affect the vegetation From the point of view of selecting species for rehabilitation systems, several climatic parameters should be considered, such as annual rain fall, humidity, number of rainy days, mean minimum and mean maximum with extreme range of temperature.

Along with ecological criteria such as biodiversity richness and the extent of fragmentation and degradation selecting forest landscape rehabilitation (FLR) target zones according to topographic criteria. They regard the following landscape types as particularly appropriate for FLR: riparian and steep areas, saline or water-logged areas, mining sites, habitats of particular species, buffer zones around protected areas, corridors between protected areas and forest fragments, buffer strips within and around plantations, and over logged or secondary re-growth forests and other degraded areas.



### .3.3. Developing map

The pre planting survey is a detailed study of the rehabilitation area to enable a manager or villager:

- To decide what land should be left unplanted for protection, conservation, landscape or amenity reasons;
- To select species for planting by site type;
- To determine what ground preparation is required;
- To consider possible harvesting systems;
- To plan internal lay outs of roads, ridges, firebreaks and location of water points, depots etc taking in to account (I) to (IV) above.

The pre-planting survey differs from a general site evaluation survey to assess afforestation potential in that it is more detailed study of a particular area to be planted. Of course, the pre-planting survey will include relevant data from the site evaluation work, which normally have preceded it.

Information such as terrain, drainage, soils, vegetation cover, communication, services, and special factors, which may preclude planting, is collected in an orderly way. This will be done by systematic sampling of the land, study of aerial photographs, discussion with former owners, local people and through contact with local or regional government officer. The information is presented both in written and in map form. A convenient map scale is 1:10,000, which can accommodate most details normally required for planning plantation establishment.





<b>Operation Sheet 1</b>	Assessing soil and existing vegetation
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Soil sampling procedure

Steps

- Collect all necessary materials and tools
- Divide the field into different homogenous units based on the visual observation and farmer's experience.
- Remove the surface litter at the sampling spot.
- Drive the auger to a plough depth of 15 cm and draw the soil sample.
- Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray.
- If auger is not available, make a 'V' shaped cut to a depth of 15 cm in the sampling spot using spade.
- Remove thick slices of soil from top to bottom of exposed face of the 'V' shaped cut and place in a clean container.

<b>Operation Sheet 2</b>	Demarcate area
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Develop map of demarcated area

Procedures

Methods of area measurement in the field carried out by one of the following method. a) Division area into triangle b) Offset from straight line c) Double meridian distance d) Coordinate

- Area measurement in the map
- i) Division of area into triangle ii) Coordinate square iii) Using of plan meter

Methods of drafting of a map divided in the four methods a) plotting traverse b) plotting details c) Drawing topography and specific d) Finishing the map



LAP Test	Practical Demonstration
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within --- hour.

**Task 1-** Determine soil sampling procedure

**Task 2** Develop map of demarcated area

### Reference:

<https://www.youtube.com/watch?v=XOdPJDSTvjM>

Smith, K., 1996, **Environmental Hazards. Assessing Risk and Reducing Disaster.** Routledge, London.

<https://www.slideshare.net/RochelleNato/lesson-1-use-of-farm-tools-and-equipment>