



Natural Resources Conservation and Development

Level II

Learning Guide-34

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

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

LG Code: AGR NRC2 LO1-LG-34

TTLM Code: AGR NRC2 M08 TTLM 0919v1

LO 1: Prepare for rehabilitation of degraded area



Instruction Sheet	Learning Guide #34
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying, assessing and reporting OHS hazards and risks
- Selecting and using suitable safety and personal protective equipment (PPE)
- Gathering baseline information
- Identifying environmental implications of rehabilitation and restoration works
- Selecting and preparing natural area restoration tools, equipment and machinery
- Carrying out pre-operational checks on tools, equipment and machinery

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, assess and report OHS hazards and risks
- Select and use suitable safety and personal protective equipment (PPE)
- Gather baseline information
- Identify environmental implications of rehabilitation and restoration works
- Select and prepare natural area restoration tools, equipment and machinery
- Carry out pre-operational checks on tools, equipment and machinery

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 -6, 9, 12 , 14, 16 and 17** respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, Operation Sheet 2 and Operation Sheet 3 ” in page -15.
6. Do the “LAP test” in page – 16 (if you are ready).



Information Sheet-1	Identifying, assessing and reporting OHS hazards and risks
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1.1. Identifying, assessing and reporting OHS hazards and risks

Agriculture is the major economic activity and the well being of the peoples in Ethiopia. Though it is the major activity however, its ability to satisfy the need of the population has shown either stagnation or a very slow growth rate during the last three decade.

The countries chronic food insecurity problem is the result of cumulative effects of varies factors that have been increasing in magnitude over many years. Some of the major factors contributing to the current food insecurity include:

- Widening gap between the level of food production and the rapid population growth.
- Degradation of the natural resource base.
- Dominance of farming system that highly depends on rain.
- Erratic and unreliable nature of the rainfall.

Degradation of land is caused by biotic and abiotic pressures. An ever increasing population places enormous demands on land resources. These pressures have led to drastic changes in the proportion of land utilized for agricultural activities, urbanization and industrial development.

Land degradation has a direct bearing on the productivity of soil, its vulnerability to rainfall variations, scarcity of drinking water, fodder and fuel wood. Given the interlink ages of crop production, livestock economy and environment, land degradation has a major impact on the livelihoods of the people, especially in rural areas.

Some of the most degraded lands in the country are the common property resources (CPRs). CPRs are resources on which people have an equal right of use. These resources include community pastures, community forests, wastelands and common dumping and threshing grounds.

Restoration ecology is the scientific study and practice of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats in the environment by active human intervention and action, within a short time frame.

Reforestation is the natural or intentional restocking of existing forests and woodlands that have been depleted, usually through deforestation. Reforestation can be used to improve the quality of human life by soaking up pollution and dust from the air, rebuild natural habitats



and ecosystems, mitigate global warming since forests facilitate biosequestration of atmospheric carbon dioxide, and harvest for resources, particularly timber.

The term *reforestation* is similar to afforestation, the process of restoring and recreating areas of woodlands or forests that may have existed long ago but were deforested or otherwise removed at some point in the past. Sometimes the term *re-afforestation* is used to distinguish between the original forest cover and the later re-growth of forest to an area. Special tools, e.g. tree planting bar, are used to make planting of trees easier and faster

In participation of rehabilitation of degraded areas there may be different hazards will occur. One way to classify the hazard is to think about how likely it is that an injury may occur. People often use the terms hazard and risk interchangeably, but they are not the same. **Hazard** means a thing or condition that may expose a person to a risk of injury or occupational disease. **Risk** means a likelihood of injury or occupational disease.

Occupational Health and Safety (OHS): Any occurrence which results in personal injury, disease or death, or property damage. OHS is a discipline dealing with the prevention of workrelated injuries and diseases as well as the protection and promotion of the health of workers.

A hazard: A hazard is anything that has the potential to harm the health or Safety of a person.

Risk: Risk is the significance of the hazard in terms of likelihood and severity of any possible injury.

Safety: The provision and control of work environment systems and human behaviour which together give relative freedom from those conditions and circumstances which can cause personal injury, disease or death, or property damage. Hazardous Substances Any substance that has the potential to harm the health of persons in the workplace and includes chemicals scheduled under the Poisons Act, chemicals classified under the Dangerous Goods Act (1975) or Hazardous Wastes.

Forest fire incidence: Forest fires prediction combines weather factors, terrain, dryness of flammable items, factors to derive forest fire incident in a logistical regression model, and built a forest fire ignition probability model.

Factors that influence the degree of risk include:



- The type of exposure, and
- The length of time of exposure to the hazard.

The benefits of assessing and managing risks

The effective systematic management of risks improves worker health and safety, as well as productivity.

Eliminating and controlling risks in the workplace helps to:

- prevent and reduce the number and severity of workplace injuries, illnesses and associated costs
- promote and improve worker health, wellbeing and capacity to work, and
- helps to foster innovation and improve quality and productivity of work.

In conclusion, it is necessary to tie loose ends together and to differentiate hazards, damage, risk and risk management:

(1) **Hazards** are defined as "naturally occurring or human-induced process(es) or event(s) with the potential to create loss, i.e. a general resource of danger". (Smith, 1996:5)

(2) Environmental and socio-political processes may result in detrimental changes in an individual's and household's assets. While these changes do not result in easily noticeable losses they result in vulnerability increasing the chance that future hazards have a disastrous impact.

(3) **Damage** results from hazards and is defined as any negative impact on assets and/or the well-being of individuals and groups. Damage is often unevenly spread within one population. The extent of damage is not only dependent on the severity of the hazard but also on the vulnerability of the household.

(4) Hazards and the related damage are unpredictable. The culturally and socially embedded perception of this unpredictability is called uncertainty.

(5) Risk relates to an unpredictable or hardly predictable event which has consequences that are perceived negatively. Risks are the culturally and socially embedded perceptions of future possible damage. Risks are neither directly observable nor are they directly measurable.

(5) Risk minimization is always based on the culturally and socially embedded assessments and perceptions of past and future damage. The analysis of prior personal experiences or



consensus based models is always a necessary first step for developing risk minimizing strategies. Risk minimization may be based on conscious decisions or may be embedded in custom and refers to (a) attempts at eliminating the occurrence of negatively evaluated events and (b) to strategies to decrease vulnerability and (c) to limiting the impact of damage once it has occurred.

In order to prioritize ecosystem services for conservation or restoration, it is necessary to know in which areas natural habitats have more potential to decrease exposure to flooding and erosion from sea-level rise (SLR) and storm surges. This can provide place-based information of where the natural habitats shield susceptible populations from streams and flooding.

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.

Self-Check -1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page: 2 pts each choice question

1. Eliminating and controlling risks in the workplace helps to:
 - a. prevent and reduce the number and severity of workplace injuries, illnesses and associated costs
 - b. promote and improve worker health, wellbeing and capacity to work, and
 - c. helps to foster innovation and improve quality and productivity of work.
 - d. All
2. Degradation of land is caused by
 - a. biotic pressures
 - b. abiotic pressures
 - c. agricultural activities
 - d. all
3. Risk minimization may be
 - a. Attempts at eliminating the occurrence of negatively evaluated events and



- b. Strategies to decrease vulnerability and
- c. Limiting the impact of damage once it has occurred. D. All

- 4. Write the differences between risk and hazards.(6 points)
- 5. List Factors that influence the degree of risk (5 points)

Note: Satisfactory rating - 10 points Unsatisfactory - below 10 points

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

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

- 1. _____
- 2. _____
- 3. _____
- 4. _____

- 5. _____



Information Sheet-2	Selecting and using suitable safety and personal protective equipment (PPE)
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1.2. Selecting and using suitable safety and personal protective equipment (PPE)

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.

Protective clothing, equipment and appliances are complementary to, not a substitute for, full instruction, sufficient training and adequate supervision. There are common PPE in restoration work. These are:

Safety wears:

Closing – the choice of closing is important for the safety of the natural area workers and has obvious consequences for the working capacity. Ideally, the clothing should protect the workers from radiant heat, rain, thorns, insect bites etc. It should allow free movements of the body, permits easy passage of air and perspiration, look attractive and display bright color for safety purpose.

Boot – primarily they help prevent slipping on rock, logs and unstable slopes, protect against sharp objects and falling weight.

Helmets – are especially important for tree felling and tractor operation. Chain saw operator needs with eye and ear protection.

Gloves – also advisable to protect the workers hand against thorns and harmful plants.

First aid kit At each work site a first aid box should be available containing adhesive plaster, bandages sterile compressors, triangular bandages, safety pins, and a pair of scissors, forceps, a disinfectant and a short first aid guide written in local language.

Face musk - a protective mask covering the nose and mouth or nose and eyes. A face mask is a device that you wear over your face, for example to prevent yourself from breathing



bad air or from spreading germs, or to protect your face when you are in a dangerous situation.

Sun hat – is a broad-brimmed hat that protects the head and neck from the sun. A sun hat (also known as the harvest hat or field hat) is a head covering specifically designed to shade the face and shoulders from the sun. The style of a sun hat can range from small to large brims. However, as a general guideline, the brim is four to seven inches in length.

Sun screen lotions are used to protect the skin from the harmful effects of the sun. There are various types of sunscreens available in many forms (e.g., cream, lotion, gel). When applying sunscreen to the face, be careful to avoid contact with the body. It is best for infants to stay out of the sun and wear protective clothing (e.g., hats)

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

1. Which one of the following is not a Personal Protective Equipment (PPE) in restoration work? **(2 points)** A) Clothing B) Helmet C) Chain saw D) Earmuffs
2. _____ is a device that you wear over your face. **(2 points)**
A. Sun screen lotions B. Sun hat C. First aid kit D. Face musk

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. _____
2. _____



Information Sheet-3	Gathering baseline information
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1.3. Gathering baseline information

Baseline information refers to collection of **baseline information** on biophysical. It refers to collection of **baseline information** on biophysical, social and economic aspects of a rehabilitation area.

Rehabilitation is seen as the most viable way of mitigating the effects of land degradation. Box (1978) and Wali (1992) defined “rehabilitation” as an act of improvement from a degraded state.

Degradation of land is caused by biotic and abiotic pressures. An ever increasing population places enormous demands on land resources. These pressures have led to drastic changes in the proportion of land utilized for agricultural activities, urbanization and industrial development.

Land degradation has a direct bearing on the productivity of soil, its vulnerability to rainfall variations, scarcity of drinking water, fodder and fuel wood. Given the interlinkages of crop production, livestock economy and environment, land degradation has a major impact on the livelihoods of the people, especially in rural areas.

The time it takes to achieve the objectives of rehabilitation at a particular site will vary; some are likely to be relatively quick while others may last beyond a human lifetime.

In the case of ecological restoration, several preconditions must be met before recovery is possible, irrespective of the method used. Only then may it be feasible to attempt restoration. A key issue is deciding how much intervention is needed beyond simply protecting the site from further disturbances; that is, how many species must be deliberately brought to the site and how many can be relied upon to colonize unaided?

These biophysical changes have both social and economic impacts, with the most immediate effects being felt by communities that depend on forests for part or all of their livelihood. Forest resources provide food, medicines and firewood, resources that now have to be obtained from more distant forests. And as forest areas are reduced pressure on the remaining forests increases even more.



- Baseline studies are fundamental tools for measuring success or failure (for monitoring flora and fauna changes over time and the impact of rehabilitation on the livelihoods of people). Therefore, ensuring the collection of baseline data on the biophysical and socio economical conditions is necessary to rehabilitate the degraded area.

1.3.1. Organizational rules, regulation and guidelines

There are numerous written standards or guidelines for recommended manufacturing and operating practices. Some are based on design principles, some on performance. Subjects covered in these standards include methods of testing various safety devices; design, construction and characteristics of the cranes; inspection, testing, maintenance and operation procedures; recommended equipment and control lay-out. These standards form the basis of government and company health and safety regulations and operator training.

After a site has been disturbed due to human being activities, it is the responsibility of human to restore the site. It is accepted that restoration may take many years to achieve. However human being has a responsibility to ensure that the environmental value of our activities is maintained for future generations to appreciate. This guideline discusses factors influencing successful site rehabilitation and restoration of disturbed areas.

Rehabilitation should be done in accordance with the sites Environmental Management Plan. There are many areas affected by road construction and maintenance activities that require rehabilitation, the major areas being degrade area, gully, over grazing, and eroded areas by erosion. The members of the Partnership shall perform the duties and responsibilities as set forth in these Rules.

1.3.2. Site rehabilitation and restoration plans

Site rehabilitation should ensure that all disturbed areas caused by agricultural activities, construction and maintenance activities are restored, leaving a stable environment that is conducive to the establishment of landscapes characteristic to the area. The aim of restoration is to get a seed mix that will provide an initial protective canopy cover using short lived annual grasses backed up by grass species that are likely to be durable and persistent. It is an important component of human activities, since vegetation acts to reduce dust and wind erosion, suppress weed infestations and provide protection to exposed surfaces from raindrop impacts and erosion processes. Most rehabilitation programs also involve some form of vegetation establishment (re-vegetation). Regardless of the land use objective, the chosen vegetation must be productive and sustainable. If the vegetation is for commercial use, then productivity levels need to be competitive with similar enterprises on natural soils. Where native vegetation is restored,



productivity levels must be sufficient to establish and maintain a self-sustaining ecosystem. Restoration of species diversity can be a critical objective for rehabilitation programs aimed at re-establishing native ecosystems. Success in this endeavor is often dependent on first establishing the appropriate habitat and ecosystem recovery processes that will subsequently encourage the full suite of flora and fauna to recolonize.

1.3.3. Consulting with the local community

Consultation with workers and their health and safety representatives is required at each step of the risk management process. By drawing on the experience, knowledge and ideas of your workers, you are more likely to identify all hazards and choose effective control measures.

Reasonably practicable: Deciding what is reasonably practicable to protect people from harm requires taking into account and considering all the relevant matters, including:

- the likelihood of the hazard or risk occurring
- the degree of harm that might result from the hazard or risk
- knowledge about the hazard or risk, and ways of minimizing or eliminating the risk
- the availability and suitability of ways to eliminate or minimize the risk, and
- after assessing the extent of the risk and the available ways of eliminating or minimizing the risk, the cost associated with available ways of eliminating or minimizing the risk, including whether the cost is grossly disproportionate to the risk.

Community consultation is integral to the appropriate provision of facilities across the city. It provides Council with an understanding of local issues and the community values attached to natural areas and associated facilities. Community involvement and consultation also encourages an appreciation of Council's land management aims, counters possible misunderstanding, and fosters Community stewardship of local parks and reserves.

In order to generate widespread community awareness of this draft Plan of Management, advertisements were placed in the rehabilitation program; letters were sent to known user groups and copies of the draft were posted on board, with hard copies available at Offices and the public libraries at Windsor and Richmond.

During the exhibition period of the draft document, comment was invited on the values and issues addressed in the Plan, with suggestions for alternative strategies also



requested. Council has considered all submissions relevant to the plan of management prior to finalisation and subsequent adoption of the plan.

Comments regarding this or any other adopted Plan of Management may be submitted at any time for consideration in future plans of management.

Self-Check -3	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 the importance of consulting with community in rehabilitation works?(5pts)

Note: Satisfactory rating - 3 points

Unsatisfactory - below 3 points

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

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

_____.

Information Sheet-4	Identifying environmental implications of rehabilitation and restoration works
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1.4. Identifying environmental implications of rehabilitation and restoration works

Restoration ecology is the scientific study and practice of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats in the environment by active human intervention and action, within a short time frame.



The **purpose** of rehabilitating degraded areas is; production gains (socio-economic circumstances) together with improvements in biodiversity and ecosystem function (e.g. watershed protection, reductions in salinity) that lead to more sustainable forms of production.

Restoration for ecological reasons and biodiversity conservation purposes emerged more recently. The idea of restoring forests for ecological reasons was essentially linked to the insight that protected areas, rarely covering more than five to ten per cent of the land area of a given country or region, would not be sufficient to assure their role in conserving the full range of biodiversity. Forest clearing locally impacts on biodiversity through reduced total areas of suitable habitat, change in landscape patterns, and forest fragmentation. Fragmentation induces physical effects such as edge effects, leading to changes in species composition and structure, and isolation, leading to a loss of connectivity.

The **Objectives** of the Environmental Restoration and Rehabilitation Program are:

- ✓ to restore degraded environmental resources, including rare and endangered ecosystems
- ✓ to protect important ecosystems and habitats of rare and endangered flora and fauna
- ✓ to prevent or minimize future environmental damage
- ✓ to enhance the quality of specific environmental resources
- ✓ to improve the capacity of eligible organizations to protect, restore and enhance the environment
- ✓ to undertake resource recovery and waste avoidance projects and to prevent and/or reduce pollution.

Self-Check -4	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 purpose of rehabilitating degraded areas.(5pts)
2. List some of the Objectives of the Environmental Restoration and Rehabilitation Program.(10pts)

Note: Satisfactory rating - 8 points

Unsatisfactory - below 8 points

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

Answer Sheet

Score = _____

Rating: _____



Name: _____

Date: _____

Short Answer Questions

Information Sheet-5	Selecting and preparing natural area restoration tools, equipment and machinery
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1.5. Selecting and preparing natural area restoration tools, equipment and machinery

The choice of tools for rehabilitating specific degraded areas depends first on the priorities and management objectives of stakeholders followed by the costs and benefits associated with available rehabilitation techniques and the economic, social, and environmental values of the land resources in their current and desired future states. These include: Fertilizers, seeds, site cultivation tools, vehicles and wheelbarrow.

Fertilizers- is any material of natural or synthetic origin (other than liming materials) that is applied to soils or to plant tissues to supply one or more plant nutrients essential to the growth of plants.

Seeds- A seed is an embryonic plant enclosed in a protective outer covering. The formation of the seed is part of the process of reproduction in seed plants, the spermatophytes, including the gymnosperm and angiosperm plants.

Site cultivation tools used for earth work

Lesson 1

Use of Farm Tools and Equipment

garden tools

rakes fork spade shovel hoe shears hand fork trowel ax (also axe)

lawn mower wheelbarrow hose watering can sprinkler

By: ROCHELLE SABDAO-NATO
 Reference: Grade 7 Learners Module on Agricultural Crop Production

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

Vehicles- A **vehicle** (from Latin: vehiculum) is a machine that transports people or load. **Vehicles** include wagons, bicycles, motor **vehicles** (motorcycles, cars, trucks)

Wheelbarrow- A wheelbarrow is a small hand-propelled vehicle, usually with just one wheel, designed to be pushed and guided by a single person using two handles at the rear, or by a sail to push the ancient wheelbarrow by wind. The term "wheelbarrow" is made of two words: "wheel" and "barrow."



→ [More images for Wheelbarrow](#)

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Self-Check -5	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 purpose of wheelbarrow?(5pts)
2. List some materials and tools used for restoration and Rehabilitation Program.(10pts)

Note: Satisfactory rating - 8 points

Unsatisfactory - below 8 points

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

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

Information Sheet-6	Carrying out pre-operational checks on tools, equipment and machinery
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1.6. Carrying out pre-operational checks on tools, equipment and machinery

No plan of action can be put into place before a risk assessment has been performed. The risk assessment provides a baseline to protect assets, these include the *tools, equipment and machinery required to rehabilitate and restore the degraded areas*, against various threat. So before undertaking any of the operations the tools and equipment should be checked for the safety of the tools and the worker.

Self-Check -6	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 purpose of pre-operational checks on tools, equipment and machinery?(8pts)

Note: Satisfactory rating - 4 points

Unsatisfactory - below 4 points

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

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

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>

