

# **Practical Manual**

## **Restoration Ecology**

**Course No. FNR 321; Credit Hrs. 2(1+1)**

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**College of Horticulture & Forestry  
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**Syllabus:**

Tree species suitable for different degraded lands. Identification and study of various degraded lands. Visit to nearby degraded lands (eroded site, ravine and sand dune, coastal area, waterlogged area, denuded hill slopes, land slips and landslides, avalanche and cold desert, mined out, dry, rocky and murramy areas) and afforestation programme.

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## Experiment No. 1

### **Objective: Identification and study of various degraded lands**

Land degradation is a process in which the land has lost some of the biological and physical property and reduced natural productivity due to various human induced processes.

**1. What is an eroded site? Explain and identify the site nearby if available.**

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**2. What is ravine and sand dune? Explain and identify the site nearby if available.**

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**3. What is waterlogged area? Explain and identify the site nearby if available.**

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**4. What is denuded hill slopes? Explain and identify the site nearby if available.**

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### IMPORTANT TERMS RELATED TO DEGRADED LANDS

**Eroded site:** Soil erosion is the movement of soil particles by natural processes such as wind or water. Soil erosion normally occurs very slowly on undisturbed soils with natural vegetation. It is only when soils are cultivated for arable cropping or are intensively grazed that soil erosion and degradation can become an issue. The area degraded by erosion process is considered as eroded site.

**Ravine and Sand dune:** A ravine is a landform that is narrower than a canyon and is often the product of stream bank erosion. Ravines are typically classified as larger in scale than gullies, although smaller than valleys. A ravine is generally a fluvial slope landform of relatively steep (cross sectional) sides, on the order of twenty to seventy percent in gradient.

A sand dune is a mound of sand formed by the wind, usually along the beach or in a desert. Dunes form when wind blows sand into a sheltered area behind an obstacle. Dunes grow as grains of sand accumulate.

**Coastal area:** The coastal zone is an interface between the land and sea, which comprised of a continuum of coastal land, intertidal area, aquatic systems including the network of rivers and estuaries, islands, transitional and intertidal areas, salt marshes, wetlands and beaches.

Coastal zones are constantly undergoing changes in shape and environment due to natural processes and anthropogenic interventions which becomes a concern.

**Waterlogged area:** Waterlogging occurs when there is too much water in a plant's root zone, which decreases the oxygen available to roots. Waterlogging can be a major constraint to plant growth and production and, under certain conditions, will cause plant death. This constraint may not be apparent until the whole soil profile is saturated and water appears on the surface.

**Denuded hill slopes:** The hill slopes are stripped off its covering or removing its surface and making it bare. This condition is susceptible to natural degradation processes like erosion and can be aggravated by human intervention if not managed properly. The management of denuded hill slopes included afforestation of different species of plants resistant to erosion.

**Land slips and landslides:** The term landslide or less frequently, landslip, refers to several forms of mass wasting that include a wide range of ground movements, such as rockfalls, deep-seated slope failures, mudflows, and debris flows. Landslides occur in a variety of environments, characterized by



either steep or gentle slope gradients, from mountain ranges to coastal cliffs or even underwater, in which case they are called submarine landslides.

Gravity is the primary driving force for a landslide to occur, but there are other factors affecting slope stability that produce specific conditions that make a slope prone to failure. In many cases, the landslide is triggered by a specific event (such as a heavy rainfall, an earthquake, a slope cut to build a road, and many others), although this is not always identifiable.

**Avalanche and cold desert:** Avalanches are masses of snow, ice, and rocks that fall rapidly down a mountainside. An avalanche (also called a snowslide) is an event that occurs when a cohesive slab of snow lying upon a weaker layer of snow fractures and slides down a steep slope. Avalanches are typically triggered in a starting zone from a mechanical failure in the snowpack (slab avalanche) when the forces of the snow exceed its strength but sometimes only with gradual widening (loose snow avalanche). After initiation, avalanches usually accelerate rapidly and grow in mass and volume as they entrain more snow.

**Mined out area:** Mining is the extraction of valuable minerals or other geological materials from the Earth, usually from an ore body, layer, ridge or placer deposit. These deposits form a mineralized package that is of economic interest to the miner. Ores recovered by mining include metals, coal, oil shale, gemstones, limestone, chalk, dimension stone, rock salt, potash, gravel, and clay. But the mining process opens up the land at higher pace than it can be naturally recovered. The exposed land is again susceptible to other degradation processes like erosion and landslides. Sometimes many heavy metals which was embedded in the earth have been exposed to the environment causing pollution near the mining area.

**Dry, rocky and murramy areas:** Dry areas occur in climates that are warm year-round, and may receive several hundred centimeters of rain per year, they have long dry seasons which last several months and vary with geographic location. These seasonal droughts have great impact on all living things in a forest, agricultural and horticultural land.

Rocky areas are those land comprising more of rocky elements limiting the land in its use in agricultural, horticultural, forestry and recreational purposes.

Murramy areas are those lands having high amount of gravels with lateritic material. The use of these areas are also restricted due to more amount of gravels in its composition.

**Salt Affected Soils:** Soils which have high amount of salts in upper surface thus affecting the normal growth of crops/plants are called salt affected soils.

**Soil Pollution:** Soil pollution is defined as the presence of toxic chemicals (pollutants or contaminants) in soil, in high enough concentrations to pose a risk to human health and/or the ecosystem. The contaminants occur naturally in soil when their levels are not high enough to pose a risk, soil pollution is said to occur if the levels of the contaminants in soil exceed the levels that should naturally be present.

**Afforestation:** Afforestation is the process of introducing trees and tree seedlings to an area that has previously not been forested. Afforestation can be done through tree planting and seeding, naturally or artificially. Similarly, reforestation can be considered a form of afforestation.