LESSON 1 SCOPE AND NATURE OF LAND MANAGEMENT

Land management is far broader than sustainable farming practices – it includes the sustainable management of urban regions, peri-urban regions, rural regions, coastal regions, forests, parks and wilderness areas.

Clear some space when planting anything to prevent weed competition, at least initially

INTRODUCTION

Sustainable land management is the key to preserving our natural resources in a healthy state for the enjoyment of all - for cultural, social, and recreational pursuits as well as for agricultural and other commercial uses, now and into the future. Our natural resources include soil, water, natural environments, and their allied bio-diversity. With an ever-growing world population, improved land management is vital to our future.

Land management encompasses:

- Protection of health of our natural environments.
- The sustainable use of soil and water.
- Maintaining or improving water quality.
- Improving the health of the soil and protecting it from erosion, salinity, acidity, disease and weed infestation.

Suggested Tasks: ▼

During this course, there will be a number of suggested tasks and additional reading.

The course is intended to take you 20 hours. You may find it takes longer to complete all of the additional reading and suggested tasks.

The tasks are optional, so you take as few or as many as you wish to fit into your time frame.

But please bear in mind that the more you do, the more you learn.

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Suggested Tasks

Throughout this course you will be provided with suggested tasks and reading to aid with your understanding. These will appear in the right hand column. Remember: these tasks are optional. The more you complete, the more you will learn, but in order to complete the course in 20 hours you will need to manage your time well. We suggest you spend about 10 minutes on each task you attempt, and no more than 20 minutes unless otherwise specified.

- Protection and reintroduction of biodiversity – the flora and fauna (including soil life e.g. microorganisms and insects).
- Retention and protection of isolated stands of vegetation and soil ground cover.
- Fire management
- Increasing resilience to change - such as climatic variations.

Many economies depend on primary production, and to ensure sustained production this must go hand in hand with wise management of the land. Where land has been degraded or its use is not sustainable, rehabilitation is required to improve or restore the land to good health and ensure future sustainability. Land degradation occurs through both natural and human induced processes, with many problems arising from poor human management of this resource.

Land Degradation

Land degradation is broadly defined as a human induced phenomenon which lowers the capacity of the land to support life on a sustainable basis. When the productivity of the land is compromised, it has a flow-on effect; the food supply is also compromised, as is the economic welfare of the country in question.

In many cases, land degradation is brought about by inappropriate land use focussed on short term gains without much thought to the long term 'pain' or consequences. However, there is also natural (geological) land degradation such as erosion of newly formed lands from volcanic eruptions.

About 25% of the planet's land is estimated to be affected by land degradation (of one form or another) and this affects the lives of more than a billion people, spread across many countries. The loss of species due to land degradation is also huge with more than 20,000 species lost each year. The world population is expected to reach 9 billion by 2050, with the increase concentrated mainly in developing countries, and with increased urbanisation within these countries. To feed the growing world population, we need to use the land more productively, but also more sustainably.

Tackling land degradation (improving already degraded lands) or preventing further degradation is not easy, and often requires a combination of bio-physical, sociological, cultural, political and economic interventions. We already have the techniques and technology to tackle degradation and improve lands, but this had to be combined with human and financial elements to be successful.

Planting vegetation beside rivers will reduce erosion

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Suggested Tasks

Write down 5 reasons why it is important to manage land sustainably.

For you personally, what is the most important reason from your list above? Why did you choose this particular one?

CAUSES OF LAND DEGRADATION

There are many reasons for land degradation including:

Deforestation

This is caused by land clearing for agriculture, quarrying, housing construction materials, for fuel and also furniture creating a loss of habitat for animal life and a decrease in species diversity, both fauna and flora. Deforestation creates bare land exposed to wind and rain which leaves the area open to erosion as the top (organic) layers of soil may be washed away. Deforestation contributes to climate change - when land is cleared, stored carbon is released into the atmosphere as (mainly) carbon dioxide.

Desertification

The degradation of drylands into deserts (in arid, semi-arid and dry sub-humid areas) through human actions such as intensive agriculture i.e. monoculture, overgrazing, excessive land tillage, removal of vegetation, irrigation causing salinity, depleting aquifers through over use of groundwater for agricultural purposes and using already fragile or marginal land for agriculture.

Waterlogged soil degrades faster with traffic (human, machine or animals)

Waterlogging

The rising of the water-table close to the surface of the soil (or in the case of ponding above the soil surface) through bad irrigation management practices, thereby lowering land productivity. Waterlogging can also be caused by floods or prolonged inundation of low lying land. When soils are waterlogged there is also an increase in the release of greenhouse gas nitrous oxide (N_2O).

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Suggested Tasks

Do some research and identify an area of land which has become degraded in your region.

You could look online, or in newspapers or books.

See if you can identify what has caused the degradation and over what period this degradation has occurred.

Write down four consequences of this degradation.

Loss of Nutrients

Nutrient depletion in soils is common on irrigated, eroded and intensively farmed lands. Nutrients can be lost through run-off, leaching and overuse of land and bad management. Nitrogen is also lost from soils through the natural process of denitrification.

Erosion: the loss of soils through wind erosion and water erosion, sometimes as a result of excessive tillage or incorrect land management, especially of sloping lands, resulting in soil structural decline - but also as a natural occurrence.

Plaster & builders rubbish contaminates soil

Salinization

The increase of soluble salts (calcium, magnesium) in the soil - both through naturally occurring processes and through agricultural activities (e.g. over-irrigation). Salinization can also occur in coastal regions through the encroachment of sea-water into coastal lands, due to the over-use of groundwater from coastal water sources (rivers, lakes etc.).

Acidification

Acidification results in a decrease in soil pH (usually below pH 5) . The pH is a measure of the concentration of hydrogen ions in the soil, with 7 representing neutral, > 7 alkaline and < 7 acidic. Soil acidification is naturally occurring (especially in areas of high rainfall) and is influenced and varied according to the character of the landscape, the minerals present in clay, the soil texture and its buffering capacity i.e. the soil's ability to stop changes in pH and nutrients by adsorption (drawing them up) and to release them (cation exchange capacity).

A pH meter is a basic tool for conducting environmental assessments of soil

Although a natural process, soil acidification is increased through agricultural activity. Acidification changes the chemistry of the soil which can result in restriction of available nutrients (i.e. they are 'locked-up' in low pH soils e.g. phosphorus and molybdenum);