

EVS Lecture Notes

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Module 2 Land use

A. Definition

1. Land use: Land use is characterized by the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it" (FAO/UNEP, 1999).

2. Land use: The purpose for which an area of land is used by humans: e.g. cropland, urban settlements, forests. Wild or natural land, by contrast, is that not used by humans.

B. Types of land uses

There are many different categories when it comes to land use. The five most common uses are recreational, transport, agricultural, residential and commercial.

Understanding the specifics of each one can help when planning on investing in property.

1. Recreational

When a property's land use is defined as recreational, it means it is meant to be used for the enjoyment of the people who use it. This could be anything from parks and open spaces to athletic fields, playgrounds and swimming pools. Cities add recreational land into their blueprints to ensure the area has places for people to go and enjoy. These aren't essential for the development of a community, but help to attract both permanent residents and visitors.

2. Transport

Transport land is designed for the structures that help people get from one destination to the other. Transport land includes things like roads, airports, train stations and subway stations.

3. Agricultural

Agricultural land is used for the growing and harvesting of crops and livestock. These are things like ranches, farms and pastures.

4. Residential

The purpose of residential land is to build homes. This could mean mobile homes, single family homes or even apartment complexes. Depending on the local area, the status of the market and the type of residences you plan on building, you'll need to consider other things such as the accessibility to the property, the proximity to local amenities, the local schools, crime rate, etc. There are some restrictions associated with this type of land use, such as the types of animals permitted on the property (dogs and cats are usually ok, pigs and horses not-so-much) Other restrictions may include the size of the building, the minimum lot size how close buildings on your lot can be to each other.

5. Commercial

This type of land is designated for businesses, warehouses, shops and any other infrastructures related to commerce. This type of land is commonly used for office buildings,

restaurants, shops and other businesses. And while commercial land usually doesn't take up much space, it's critical to the economy of a community.

C. The Impact of Land-use on Environmental Quality

Environmental quality is a general term which can refer to: varied characteristics such as air and water purity or pollution, noise, access to open space, and the visual effects of buildings, and the potential effects which such characteristics may have on physical and mental health (caused by human activities).

The transformation of natural and semi-natural ecosystems by deforestation, cultivation, drying, urbanization, intensification and mechanization of agricultural practices, overexploitation of animal populations, global warming, desertification and general pollution are all direct and indirect causes of the accelerated environmental degradation and changes in land use.

(a) Deforestation

Deforestation is primarily due to the use of forest land for non-forest, because of practices and processes resulting from social, economic and ecological pressures, as the extension of cultivation, overgrazing, collecting wood for energy, drought, fires, etc.

(b) Degradation of biodiversity

Biodiversity is the main manifestation of the land use resulting in the diversity of ecosystems, species, breeds, varieties, and genomes. It is an important source of natural resources and economic wealth internationally and locally.

However, the consequences of various human activities, as intensive agriculture, overgrazing, uncontrolled industry, unplanned urbanization, related to economic development and population growth, go often against preservation of biodiversity and natural resources management. In extreme cases, the negative impact of these activities leads to irreparable loss of animal and plant species.

The rate of species extinction, estimated at one species every two centuries before our era, has increased during the twentieth century, by at least 40 for Mammals (including marine species), or even by 1000 for birds (including seabirds).

(c) Desertification and soil erosion

Article 1: "desertification" means land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities".

Desertification is not a natural expansion of existing deserts, but it is the soil degradation in arid, semi-arid and dry area. It is a process of progressive loss of soil productivity and depletion of vegetal cover due to human activities and climatic variations.

The land use has often a direct influence on desertification. It manifests itself through land overuse, poor management of grazing areas and livestock, mechanized agriculture, bad irrigation practices, mismanagement of the input and the omission of improve soil, deforestation, inadequate systems and land use policies, to which is added a series of natural factors that influence the process

of land degradation (aridity throughout the years, uneven rainfall, recurrent drought, etc.).

Over 31% have considered desertification and soil erosion as the largest form of land use degradation in their country. In this regard, it should be noted that desertification threatens one third of the total land area of the globe, more than 4 billion hectares. It also threatens the livelihood of about one billion people in over 100 countries, which depend on the ground for most of their needs and are typically the poorest in the world.

The combination of indirect factors such as population pressure, socioeconomic factors and policies, and international exchanges, as well as direct factors as land use and use practices, as well as processes related to climate cause a downward spiral of degradation and poverty.

(d) Degradation of water quality

Land use decisions can have significant impacts on water quality. This is particularly the case for development decisions, which make intensive use of land watersheds. The impact on water quality depends on the intensity of land use, which can be classified as low intensity (eg open

spaces including woodlands, shrubs, grassland, farmland, and managed green spaces) or high intensity (eg residential, commercial and industrial land use).

What is aquatic pollution?

We talk about aquatic pollution when the balance has been altered permanently by the intake of excessive amounts of either more or less toxic substances, related to natural or human activities, as well by hot water. These pollutants can cause various types of pollution: increasing mortality of some animal or plant species; making them disappear sometimes, altering their physiological capacity and deteriorating the water quality at the point of making it unsuitable for certain uses, such as human consumption. There are various forms of water pollution including surface water by industrial and municipal wastes, and by agricultural practices, groundwater by over-pumping, dumping of household and industrial waste, as well as practices sewerage.

When development occurs, the manner of land use causes changes in the way water is transported and stored. The combination of constraints related to impervious surfaces

(driveways, roads, sidewalks, roofs, etc.) and compacted land creates a barrier to water infiltration coming from rainfall and snowmelt. This causes the decrease of water quality, the increase of volume and velocity of runoff, the increase of the frequency and severity of floods, the loss of storage capacity and runoff water in natural vegetation etc.

(e) Degradation of air and atmosphere and global warming

Deforestation, urban sprawl, agriculture, and other human influences alter and fragment the natural landscape. This disturbance of the land use causes changes in the atmospheric concentration of some substances and materials such as carbon dioxide which can range from microscopic to macroscopic scale, and thus alters the energy flows balance on the surface of the Earth.

(f) Contamination from waste

Contamination caused by waste is considered by the United Nations Environment Program (UNEP) as an extremely important issue in all areas of the planet. Poor management of waste presents enormous risks on the

environment, welfare and health of humans and animals and determines the behavior of actors in the land use. The risks listed below are for illustrative purposes.

The presence of garbage dumps in urban and suburban areas hinders the development of economic and tourist activities and degrades the quality of living. The dumps and landfills misplaced in urban areas and poorly managed are unsightly and smelly and can contaminate soil, groundwater and streams. Waste incineration contributes to air pollution. Insufficient collection of solid waste clogs the sewerage of wastewater and stormwater and generates a lot of nuisance.

Toxic, hospital and hazardous waste untreated properly constitute a significant danger to soil, to population and to public health. In this way, radioactive waste can be lethal and pollute large areas for centuries to come. Medical waste are also dangerous as it may exacerbate the spread of diseases and infections. Over than 40% of SAI surveyed stated that the waste contamination is one of the major threats of land degradation in their country.

(g) Modern agriculture

Agriculture is an important source of livelihood because it is the process of producing food, feed, fiber, and many other desired products by the cultivation of plants and the raising of domesticated animals (livestock). It is an art of managing the growth of plants and animals for human use. Let's study how the development in the agriculture techniques have impacted the environment and ecosystem.

What is Modern agriculture?

Modern agriculture is an evolving approach to agricultural innovations and farming practices that help farmers increase efficiency and reduce the number of natural resources like water, land, and energy necessary to meet the world's food, fuel, and fiber needs. The agribusiness, intensive farming, organic farming, and sustainable agriculture are other names of modern agriculture.

Impact of Modern Agriculture on the Environment

As we know that modern agriculture improved our affordability of food, increases the food supply, ensured the food safety, increases sustainability, and also produces more biofuels. But at the same time, it also leads

to environmental problems because it is based on high input–high output technique using hybrid seeds of high-yielding variety and abundant irrigation water, fertilizers, and pesticides. The impacts of modern agriculture on the Environment are discussed below:

(i) Soil Erosion

The top fertile soil of the farmland is removed due to the excessive water supply. This leads to the loss of nutrient-rich soil that hampered productivity. It also causes global warming because the silt of water bodies induces the release of soil carbon from the particulate organic material.

(ii) Contamination of groundwater

The groundwater is one of the important sources of water for irrigation. From agricultural fields, nitrogenous fertilizers leach into the soil and finally contaminate groundwater. When the nitrate level of groundwater exceeds 25 mg/l, they can cause a serious health hazard known as “Blue Baby Syndrome”, which affects mostly infants even leading to their death.

(iii) Water-logging and salinity

The salinity of the soil is one of the reasons of low productivity just because of the improper management of farm drainage. In this situation, the roots of plants do not get enough air to respiration then it leads to low crop yield as well as low mechanical strength.

(iv) Eutrophication

It refers to the addition of artificial or non-artificial substances such as nitrates and phosphate, through fertilizers or sewage, to a freshwater system. It leads to an increase in the primary productivity of the water body or the 'bloom' of phytoplankton.

Excessive use of fertilizers that consists of nitrogen and phosphorus leads to over nourishment of the lakes/water bodies and gives rise to the phenomenon of eutrophication (EU = more, trophication= nutrition).

(v) Excessive use of Pesticide

There are many pesticides that are used for destroying pests and boosting crop production. Earlier arsenic, sulfur, lead, and mercury was used to kill pests. For Example-

Dichloro Diphenyl Trichloroethane (DDT) content pesticides were used, but unfortunately, it also targeted the beneficial pests. Most importantly, many pesticides are non-biodegradable, which also linked to the food chains which are harmful to the human being.

Deforestation is also the reason for loss of a natural habitat, with large numbers of trees being cut down for residential and commercial use. Urban growth has become a problem for forests and agriculture, the expansion of structures prevents natural resources from producing in their environment. In order to prevent the loss of wildlife the forests must maintain a stable climate and the land must remain unaffected by development. Furthermore, forests can be sustained by different forest management techniques such as reforestation and preservation. Reforestation is a reactive approach designed to replant trees that were previously logged within the forest boundary in attempts to re-stabilize this ecosystem. Preservation on the other hand is a proactive idea that promotes the concept of leaving the forest as is, without using this area for its ecosystem goods and services. Both of these methods to mitigate deforestation

are being used throughout the world economic transfers (one person or group gains at another’s expense) rather than net gains. It is usually best to consider all impacts, including those affecting other areas and times, although impacts to a particular group can be identified and highlighted.

Table- Impact of Land use

Economic	Social	Environmental
<p>1. Value of land devoted to transportation facilities.</p> <p>2. Land use accessibility.</p>	<p>1. Relative accessibility for different groups of people – impacts on equity and opportunity.</p> <p>2. Housing affordability.</p>	<p>1. Greenspace and wildlife habitat.</p> <p>2. Hydrologic impacts.</p>

<p>3. Transportation costs.</p> <p>4. Property values..</p> <p>5. Costs to provide public services.</p> <p>6. Economic development and productivity.</p> <p>7. Stormwater management costs</p>	<p>3. Cultural resources (e.g., heritage buildings).</p> <p>4. Traffic accidents.</p> <p>5. Public health (physical fitness).</p> <p>6. Aesthetic impacts.</p>	<p>3. Heat island effects.</p> <p>4. Energy consumption.</p> <p>5. Pollution emissions</p> <p>6. Deforestation</p>
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D. Land Degradation

The change in the characteristic and quality of soil which adversely affect its fertility is called as Degradation. Land degradation is the major consequences of direct

interference of human activities in the natural phenomenon. Land degradation means:

1. Loss of natural fertility of soil because of loss of nutrients.
2. Less vegetation cover
3. Changes in the characteristic of soil.
4. Pollution of water resources from the contamination of soil through which water sweeps into ground or runoff to the water bodies.
5. Changes in climatic conditions because of unbalanced created in the environment.

Causes of Land Degradation:

(a) Deforestation:

Deforestation is taking place at a faster rate due to increasing demands of timber, fuel and forest products which results into degradation of land resources.

(b) Overgrazing:

Overgrazing refers to excessive eating of grasses and other green plants by cattle. It results into reduced growth of vegetation, reduced diversity of plant species, excessive growth of unwanted plant species, soil erosion, and degradation of land due to cattle movement.

(c) Agricultural practices:

The modern agricultural practises, excessive use of fertilizers and pesticides has adversely degraded the natural quality and fertility of the cultivation land.

(d) Industrialization:

Development of industries for the economic growth of the country leads to excessive deforestation and utilization of land in such a way that it has lost its natural up gradation quality.

(e) Urbanization:

Increasing growth of population and demand for more residential areas and commercial sectors is also one of the reasons for land degradation

E. Prevention and Control Measures for Land Degradation:

Following are some practices for controlling land degradation:

1. Strip farming:

It is a practice in which cultivated crops are sown in alternative strips to prevent water movement.

2. Crop Rotation:

It is one of the agricultural practice in which different crops are grown in same area following a rotation system which helps in replenishment of the soil.

3. Ridge and Furrow Formation:

Soil erosion is one of the factors responsible for land degradation. It can be prevented by formation of ridge and furrow during irrigation which lessens run off.

4. Construction of Dams:

This usually checks or reduces the velocity of run off so that soil support vegetation.

5. Contour Farming:

This type of farming is usually practiced across the hill side and is useful in collecting and diverting the run off to avoid erosion.