Soil, 1. Deﬁnition, Function, and Utilization

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**Definition, function and utilization of soil**

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**ABSTRACT:**

A particular 5 plot or area surface soil sample collection and its profile study in lab. The study is near area or bills and forest. Because to know about the soil erosion with less moisture and its distinct variation in soil morphological,physical,chemical properties including the soil fertility status of surface soil along the toposquare. The sample text result show that available nitrogen,phosphorous and sulphur content. In topographic position observed higher moisture and higher cropping intensity. Soil also contain iron,magnesium,copper,zinc etc .positive correlation available zn,cu with soil organic content negative correlation with soil PH has been found. Various type of soil sample of study in various area found sandy,loomy,clay loam and sandy clay soil. Clay percentage in the medium land and low land found to be higher land. Soil acidity was found major crop production constrain of study area. Soil testing fertilizer and manures will help in for crop productivity as sustaining soil health.

Introduction

Soil science is the study of soil as natural resource on surface of earth including soil formation,classification and mapping physical,chemical,biological and fertility ,properties of soil and relation and management of soil. The soil is at the interface between the atmosphere and lithosphere. It also has the interface the hydrosphere. The soil substains the growth of many plants and animals from biosphere. We considered soil as a natural response to many environmental factors and processes acting on changing soil permanently.

Key Words:Soil Salinity,Soil Erosion, Desertification, Hydrophobic, Groundwater regeneration

ECOLOGICAL ASPECT OF PROTECTION OF SOIL -

Weakly interconnected with the other environmental compartments (water and air), soils are complex ecosystems. Due to these connections, soils have extensive interactions with other environmental compartments.play a crucial ecological mediation role. Soils can act as both sources and sinks in processes that move materials. Humans have owned soil from ancient times, in stark contrast to the other environmental compartments (air and water systems).This reality is emphasised by the idea of "owned land," which denotes "possession of soil." Land (Land) and dirt (Boden) are frequently used as synonyms in certain languages, including German. Therefore, in terms of both material and cultural dimensions, soil is the most crucial resource for human survival. Since soil is considered to be a form of propertyThe use of soil for nature conservation purposes or as a ground water reservoir for the production of drinking water can be restricted.The soil is the memory and archive of these activities in terms of its use and exploitation. In this regard, pollutions caused by Older usage, or "contaminated sites," are crucial to soil protection. The utilisation of some or all soil functions is frequently restricted now as a result of historical soil exploitation. Because of this, a soil that serves as a reservoir for groundwater regeneration and was contaminated in the past cannot be used as a water protection zone if through this contamination, due to displacement processes, concentrations of contaminants appear in the groundwater making it unsuitable for drinking water catchment. The issue with historical exploitations (contaminated areas) for soil protection is that the actual effects of this exploitation are still being felt today.

Function of soil:-

Soil is a complex, multiphase mixture of minerals, water, air, and organisms, together with the byproducts of their transformation and degradation.Widely varying forms of soil can form depending on the climate and the underlying rocks, and the rate of creation depends on how quickly the rocks weather in the bottom layers and how quickly biomass degrades in the upper layers.

Ecological soil function:-

The control of natural material and energy cycles is necessary for the soil to perform its regulatory function.

It encompasses all inputs to the soil, both material and immaterial, as well as the processes those introductions start.

Filter function:-

Mechanical retention of particles larger than 100 nm is what is meant by filtration [6]. When an aqueous suspension passes through pore systems, filtering takes place.

Gravitational potential (z) (downward) and matrix potential (y) (upward) influence how soil water behaves (hydraulic potential f). When these two potentials are in equilibrium, they are equal, or f 1/4 (y) (z) 1/4. The displacement of equilibrium occurs when water is added (by precipitation, for example), which raises the matrix potential. This infiltration is one of the most significant factors preventing erosion.

Pore blockage caused, for instance, by mud clogging or compaction might result in decreased filter effectiveness. The functions of the transformation and habitat (stagnant water, inadequate air) can also be negatively impacted by pore blockage.

Buffer solution:-The following principal areas are included in the buffer function:

The water balance is buffered

2. Acid input buffering

3. Pollutant and nutrient buffering

The ability of soils to store water in pore spaces through capillary forces is a major factor in the buffering of the water balance. because the

In a capillary, a liquid rises when its pressure (tension) is lower than atmospheric pressure until hydrostatic equilibrium is reached. With a reduction in capillary diameter, the capillary pressure and, consequently, the height to which the liquid rises, increase.

The majority of biological soil processes are impacted by the buffering of nutrients and contaminants. The following adsorption process is made feasible by the existence of organic and inorganic exchangers.

There can be phenomena:

1. Van der Waals forces: important for humus and organic pollutants

2. Hydrogen bonds: important for mineral surfaces and organic contaminants

3. Complexes of electron donors and acceptors: important for humus and organic pollutants

4. Hydrophobic bonding: important for humus and organic contaminants

5. Ion bonding is important for humus, clay minerals, organic contaminants, and inorganic pollutants and nutrients.

Regarding both organic and inorganic contaminants, covalent bonding is important.

Transformation function:-

Chemical substances behave differently in the pedosphere depending on their characteristics, their environment, and occasionally manmade activities. The transformational capability

allows for the soil to self-clean. Both abiotic (such as reactions on mineral surfaces and photochemical reactions) and biotic processes can degrade and change materials in soil.

The ability of soils to self-clean is influenced by a number of factors, one of which is the presence of microbes, which supply the enzymes required for biotic transformation processes.

Productive function:-

The soil's capacity to serve as a substrate for cultivated plants (food and feed plants, renewable resources) is what defines its productive function. impact on the

Since agriculture, forestry, and horticulture are all meant to generate a profit, productive function is typically evaluated in economic terms rather than ecological ones. Nevertheless, farming has an impact on a number of ecological soil functions.

UTILISATION OF SOIL

The most biggest ecological problem of the world is the of consumption & destruction of the soils or the top soil. ie. the destruction of the soil's ie. the destruct of the surface.The soil is the basis for food production. However in the highly developed and industrialized countries.

1. Problems of sites of acidification & of Contaminated sites
2. Damage andSoil Pollution
3. soil salination.
4. Land Many thousands of hectares of cultivated are lost each year through erosion, salination and desertification. Thus, in 1975 erosion 40x106 ha unusable for ag Cultivation. In Argentina in 1980, 22X106 nearly.

 Land utilisation -

The use of land for various purposes is known as land utilization.

 Land supports natural vegetation, wild life, human life, economic activities, transport and communication systems. thus land is an ultimate resource. in india 43% of land is plain area which supports vegetation, wild life, human life, etc., 30% is mountains that supports rivers, tourism, etc. and 27% is of plateaus that supports forest, minerals etc.

Destruction of soil-

The degradation of soil by erosion, salination, desertification, and forest destruction are all occurring on a larger scale than the sealing of land discussed above.

Industrial farming practises hasten the loss of the priceless topsoil in the frequently very labile ecosystems of the non-industrialized nations, where 80% of the world's population growth takes place. After a brief phase of meagre yields, this quickly causes the growth of dry zones and desertification in the subtropics and tropics due to erosion .

Erosion. The main factor in soil deterioration is wind or water erosion. Water erosion removes 25 000 106 t of soil worldwide each year.

chemical degradation -

After some time of use by salination the agricultural kand renders usable by agricultural irrigation are threatened

Acidification of soils and contamination are two additional elements of chemical deterioration that are intimately linked to anthropogenic industrial pollution.

Despite having a smaller overall footprint than the areas affected by the other chemical degradation processes, there are several "hot spots" with serious issues in the intensively industrialised areas.

Nutrient loss is the most significant chemical degradation process in terms of area.

Losses of nutrients are caused by the current or past overuse of soils by unsustainable farming practises.

DESERTIFICATION -

Every sixth person on earth is impacted by the spread of deserts, which cover around 25% of the planet's area . Approximately 6 ×106 hectares of pastureland turn into desert each year. In this way, the deserts have grown by 120 ×106 ha since 1970.

FOREST:

When trees are cut down in forests, soil is indirectly destroyed. When trees are cut down, the soil is frequently left vulnerable to erosion by water or the wind.

Each year, more than 5× 106 acres of tropical rain forest are destroyed to make way for agriculture. More than 20 ×106 hectares of moist tropical forests have been transformed into cattle pasture in South America by farmers and ranchers since 1970.

 In South America (especially Brazil), Central Africa, Southeast Asia and the Pacific Region, as well as Russia, forest land is reportedly drastically decreasing. In the impacted areas, loss rates range from 100,000 to several million hectares.

**Conclusion:**

**In conclusion, soil is the naturally occurring, complex mixture of minerals, organic matter, water, air, and living organisms that covers the Earth's surface. Its primary functions include providing support for plants, acting as a medium for nutrient and water uptake, and serving as a habitat for various organisms. Soil plays a crucial role in agriculture, forestry, construction, and waste management, making it an essential resource for human and ecosystem well-being. Proper soil management and conservation are vital to ensure sustainable utilization and protect this valuable natural resource for future generations.**

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**Conflict of interest:**

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