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VARIOUS CLASSIFICATIONS OF THE INDIAN SOIL AND ITS CONSERVATION

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ABSTRACT

The highest part of the Earth's crust is known as soil. Weathering of rock under the effect of climate, vegetation, relief, and parent rock causes it to develop. Soil is a mixture of rock debris as well as organic compounds that forms on the surface of the earth. Relief, climate, vegetation, parent material, and other life-forms, as well as time, are all important elements in soil formation. The agriculture sector is totally dependent on the soil and its quality. If the quality of soil is good then the crop production is also increases therefore the income of the farmers also increase as well as the economy. It is need to maintain the quality of the soil for better production. The major group of soil are to be found in India are: Red soil, black soil, alluvial soil, desert soil etc. The quality of the soil is damage or degrade by the soil corrosion and it is very harmful for the crop as well as plants in agriculture sector. The main thing is to minimize this effect and there are various methods for control or prevent the corrosion of the soil. Its play an important role in farming and forestation so, to maintain the quality is also important for us to the growth of plants and the production.

KEYWORDS: *Agriculture, Alluvial soil, conservation, Forrest, Red soil, soil erosion.*

1. INTRODUCTION

The upper most part of the earth crust is known as soil. This soils are formed due to weathering of rocks. Mineral particles, organic materials, air, water, and live beings make up the majority of the system, which interacts slowly yet constantly. The majority of plants obtain their nutrients from the earth, and they are the primary food source for humans, animals, and birds. As a result, the majority of living things on land rely on soil to survive. Because soil is readily damaged, swept away, or blown away, it is a valuable resource that must be carefully managed. We can avoid harming one of the most important building elements of our ecosystem and food security if we understand soil and manage it appropriately. Soil is formed continuously, but this process take a time, when rocks break down due to weathering and it is a process that can be biological, chemical, or physical. Soil formation is further aided by the accumulation of material caused by the actions of wind, gravity and water, these procedures can take tens of thousands of years to complete. Soil formation is influenced by five key interacting components. The properties of soil varies depending on the how the long soil have weathered[1]–[3].

Clays and iron and aluminium oxides are formed when minerals from rocks are worn further. The soils of India have been divided into various types based on their colour, composition, origin as well as its location. Soil is essential to the Earth's environment. Human life would be extremely difficult without dirt. Soil gives plants a place to plant their roots and stores the nutrients they need to flourish. Soil functions are soil capabilities that are significant for a variety of agricultural, environmental, nature protection, landscape architecture, and urban uses. The ground provides the basic environment and condition for crops that feed humans, domestic animals, and wildlife. Because the majority of plants cannot survive without the presence of earth, it is critical to conserve this resource. Soil conservation is also important for water supply, as earth layers serve as natural filters to improve water quality. Water, on the other hand, is required to dissolve nutrients for plants. The soil conservation is necessary for the controlling of soil erosion and improve the quality of the soil. The soil have number of classification and the soil are found in different location are to be different as well as the different kinds of soil use for the different types of crop in different location[4], [5].

1.1. Types Of Soil:

The various types of soils are as follows**:**

1.1.1. Alluvial Soil

The alluvial soils are deposited by the surface of water. These soils are formed differently than other types of soils, which are made through the long process of rock transformation. This soil covers fourty percentage of the total area of the country. The nature of this soil are vary such as from loam to clay (figure 2). Alluvial soil are largest and most of the important soil in India. These soil consist of potash in large amount but the phosphorous level is very low. It provided lots of function like the greatest in serving as the earth's kidneys. This soil remove the sediments and nutrients flowing in the water adjacent. It improve the water quality of the river. The major principle behind the formation of alluvial soil are the flooding. The variation in colour of alluvial soils are varies itself such as light gray to ash gray. The occurrence of this soil are starting from Punjab (west) to west Bengal and Assam in the east, they are also found in deltaic alluvium.

1.1.2. The alluvial soil are classified into two types as follows:

The Khadar soils are found in the valley bottom's low parts, which are inundated nearly every year. They are pale brown sandy clays and loams that are more dry and leached, less calcareous and carbonaceous, and less kankary. While Bhangar is an older alluvium system that was deposited farther from the floodplains. Calcareous concretions can be found in both the Khadar and Bhangar soils (Kankars). The lower and middle Ganga plains, as well as the Brahamaputra valley, have more loamy and clayey soils. From west to east, the sand content declines.

1.1.3. Black soil

The soil present in India have the rich in metals, minerals, magnesium and aluminium. It cover most of the deccan plateau which included some portion of the Gujrat as well as Tamil Nadu. The black are very deep, and these soil are called Regur soil or Black cotton soil. Clayey, deep, and impermeable soils characterise the black soils. When wet, they inflate and become sticky, and when dry, they shrink. As a result, these soils develop large fractures throughout the dry season. As a result, there is a form of self-plowing. Because of its slow absorption and loss of moisture, black soil maintains moisture for an extended period of time, allowing crops, particularly rain-fed crops, to thrive even during the dry season.The black soils are chemically rich in lime, iron, magnesia, and alumina. They also have potash in them. However, they are deficient in phosphorus, nitrogen, and organic matter. The soil varies in colour from deep black to grey.

Features of the black soil as follows:

- Black soil covers the majority of the Deccan.
- The water retaining capacity is higher.
- The colour is light black to deep black it varies.
- It consist of iron, organic substance, calcium etc.
- The black soils are deficient in nitrogen as well as phosphorous.

1.1.4. Red soil:

The colour of these soils are generally raddish to brownish which are obtaining from weathering of granites. Red soil is basically developed in where the temperature is warm and climate is moist. It found in mixed forests, and they are formed from the sedimentary rocks which are consist of large amount of iron. The red soils are not suitable for agriculture because it doesn't contain sufficient nutrients. In India it cover about approx. 29 percentage of the total soil cover. These soils are seen in Uttar Pradesh, goa, Kerala, Tripura, Madhya Pradesh, etc.Due to ferric oxide coatings on soil particles, the colour changes from red to yellow. The texture of these soils varies greatly, from loam to clayey loam. They are deficient in nitrogen, phosphorus, and humus, and their soil depth ranges from shallow to very deep.

*1.2.*The various types of red soil are shown below:

1.2.1. Laterite soil:

The word laterite was derive from the latin word "later" which means it is a types of bricks. They form when temperatures are high and there is a lot of rain, with wet and dry spells in between. Heavy rainfall encourages soil leaching (nutrients are carried away by water), resulting in the loss of lime and silica and the formation of a soil rich in iron oxides and aluminium compounds. Laterite soils are reddish-brown in colour due to the lack of clay and the presence of red sandstone gravel.They can be found primarily on the peaks of the Western and Eastern Ghats, as well as the Satpuras and Vindhyas, in the states of Karnataka, Kerala, Assam, Maharashtra, Orissa, Madhya Pradesh, and Tamil Nadu. Bauxite or ferric oxides are abundant in laterite soils. Lime, magnesia, potash, and nitrogen are all in short supply. Laterite as well as lateritic soils are excellent construction materials. Laterite soils are commonly used in house construction as bricks.

1.2.2. Saline soil& alkaline soil:

Usara soils are another name for them. Because saline soils have a higher amount of sodium, potassium, and magnesium, they are sterile and incapable of supporting vegetative growth. Because of the arid climate and inadequate drainage, they have higher salts. They can be found in arid and semi-arid climates, as well as wet and swampy environments. The texture of the soil varies from sandy to loamy.Saline, arid, and semi-arid soils can be found in Rajasthan, Punjab, Uttar Pradesh, Haryana, Gujarat, and Maharashtra. These soils are infertile and uncultivable, ranging in texture from sandy to loamy sand, with a nitrogen shortage and a high perviousness, resulting in limited water retention capacity.

1.2.3. Peaty soil:

They can be found in locations with a lot of rain and high humidity, as well as areas with a lot of vegetation. As a result, a considerable amount of dead organic matter accumulates in these places, giving the soil a high humus and organic content. Organic matter levels in these soils may reach fourty to fifty percent.These soils are mostly found in Orissa, Kerala some part of Bihar, UP, and West Bengal Kottayam, etc. The chemical properties of this soil it have deficient in phosphate as well as potas.During the rainy season, most peaty soils are flooded, but as soon as the rains stop, they are turned over to paddy farming.Normally, these soils are thick and dark in colour. They are alkaline in several locations also.

1.2.4. Forest soil

Forest soils are generated in forest environments where sufficient rainfall is available, as the name implies. The structure and texture of the soils varies depending on the mountain environment in which they are generated. On the valley sides, they're loamy and silty, while on the top slopes, they're coarse-grained. They are denuded, acidic, and poor in humus content in the Himalayan snow-bound zones.This soil are also known to be heterogeneous soil. The humus content of forest soils is extremely high. Potash, phosphate as well as lime are all inadequate. For big yields, they need a lot of fertiliser.They're ideal for tea, coffee, spice, and tropical fruit crops in the peninsular forest region. The Himalayan forest region grows wheat, maize, barley, and temperate fruits.

1.3.Major Problems of Soil in India:

The biggest problem in India's soil is soil degradation. Lateritization, alkalization, and salinization of the soil, as well as soil erosion (loss of top soil), are all factors that lead to a reduction in soil quality. Soil degradation is the result of natural processes as well as human activity. Poor cultivation methods, overgrazing Deforestation, shifting cultivation, rivers, and top soil removal for industrial purposes are the main causes of soil erosion.

1.4.Soil Erosion

Soil erosion is the process of destroying the soil cover. Simultaneously, soil formation and erosional processes caused by running water and wind occur. In general, though, these two processes are in equilibrium. The rate of fine particle removal from the surface is the same as the rate of particle addition to the soil layer. Natural or human forces can sometimes upset this balance, resulting in a faster rate of soil loss. To a large extent, human activities are also to blame for soil erosion. As the human population grows, the demand for land grows as well. For human settlement, gardening, grazing animals, and a variety of other purposes, forest and other natural vegetation are eliminated. Erosion by running water is more prevalent in areas with strong rainfall and steep slopes. Water erosion, which is more dangerous and occurs in many places of India, primarily takes the form of sheet erosion and gully erosion. Sheet erosion occurs on level ground after a strong rain, and the soil loss is not readily apparent. It is, however, damaging because it eliminates the finer, more fertile top soil. Soil erosion is a major issue in Indian agriculture, and its consequences can be seen in other areas as well. Eroded materials are moved down rivers, reducing their carrying capacity and causing floods and damage to agricultural regions on a regular basis. Soil erosion is caused by a variety of factors, including deforestation. Plants prevent erosion by keeping soils linked via root locks. Every year, India loses millions of tonnes of soil and its nutrients to soil degradation agents, lowering our national production. As a result, it is critical to take quick action to reclaim and conserve soils.

1.5. Soil Conservation

If humans cause soil erosion and weariness, it follows that humans can also prevent them. Nature has its own set of rules for sustaining equilibrium. Humans have ample opportunity to build their economies withSoil conservation entails using a variety of methods and techniques to maintain soils healthy[6]. Soil conservationists work to keep soil rich and productive while also protecting it from erosion and decay out disrupting the ecological equilibrium provided by nature. Soil conservation is a technique for preserving soil fertility, preventing erosion, and improving damaged soil conditions.

2. LITERATURE REVIEW

M.S. Sirsat et al. discussed the Classification of agricultural soil parameters in India[7]. Agriculture, which is hampered by inadequate soil fertility, is one of the backbones of the Indian economy. Chemical soil measurements are used in this study to classify a number of

important soil parameters.Classifying these soil properties permits trained professionals to save time developing costly chemical analyses.

Dr. Supriya et al. explained the types of Indian soil and problem related to it as well as how to minimize this problem[8]. In this paper author explained all the categories of soil such as: red soil, Desert soil, forest soil, alluvial soil, peaty soil, etc. The problem related to the corrosion and method to solve these corrosion impact on soil.

Safdar B et al. discussed theSoil and Water Conservation[9]. Conservation of soil and water resources is critical for agriculture's and the environment's long-term viability. Because of the ever-increasing population and the resulting increased demand for food, fiber, and shelter, soil and water resources are under severe strain. In this paper author discussed all about the conservation of water and soil.

Shahid Ali et al. discussed all about the Indian soils: classification and identification[10]. Soil is the top layer of the earth crust. It's like a blanket over the earth surface. Parent material, and biodiversity, time, temperature, including human activities, are all important elements in soil formation. India is a diversified country with a wide range of terrain characteristics, landforms, climatic zones, and plant varieties.

3. DISCUSSION

Finally, India offers a diverse range of soil types, ranging from highly productive alluvial soils to infertile salty and alkaline soils. The parent rocks, terrain,climatic conditions, relief characteristics, and natural vegetation all have a role in the creation of diverse soil types. Among India's several soil types, fertile alluvial soils cover the most land.Soil is a mixture of rock debris and organic compounds that forms on the surface of the earth. Relief, parent material, climate, vegetation, and other life-forms, as well as time, are all important elements in soil formation. For future prospectus theconservation of soils from the corrosion it very important because the life of human being dependent only on the food. These food are grow and developed on the outer most part of the earth crust is called soil. For the good quality of the food as well as the increasing the food production of crops the management of this soil is necessary aspects.

4. CONCLUSION

There are various type of soils are found in India and this soils are classified on the basis of colour and their formation. Agriculture is completely reliant on the land and its condition. If the soil quality is good, agricultural production rises, and farmers' income rises with it, as does the economy. Soil is generated continually, but it takes time because rocks break down due to weathering, which is a biological, chemical, or physical process. The accumulation of material generated by the movements of wind, gravity, and water aids soil formation; these processes can take tens of thousands of years to accomplish. Soil play an important role in farming sector. Soil has blanketed the earth's surface like a blanket. As a result, it connects the rocks inside and the people who live on the planet in a methodical way. It acts as a conduit for the survival of plants and animals. Rocks are used to make soil. Rocks break due to a variety of natural phenomena such as earthquakes, flowing water, wind, ice, and biological elements.Big rocks are transformed into lovely pebbles. Pebbles decompose into sand, which then decomposes into clay. Soil is made up of sand, clay, and various organic components.

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