**A Study of The Impact of Soil Quality on Agriculture Practices:**

**A Geographical Study**

**ABSTRACT:**

In this research article, a geographical study of the effect of soil on agriculture has been done. Any part of the Earth's surface that is not covered by water is called land. Land refers to the surface, characterized by its constituent soil, vegetation and landscape shape. Land is an economic commodity that has value, and its ownership can be bought, sold, and transferred. It is an invaluable asset to the nation. Land is measured in units of area such as acre, hectare, bigha, or nali. Land is one of the three natural resources; the other two are water and air, which are essential for the existence of life on this earth. Land is an essential resource for essential human activities. It provides the basis for agricultural and forestry production, water harvesting, recreation, and housing. That is why every citizen of a nation takes pride in his motherland and is responsible for its protection. Apart from agriculture, land has many uses such as forests, pastures, recreational facilities, outdoor structures, roads, etc. Land is the most valuable resource for a farmer's sustainable livelihood. He ploughs the land and grows food crops, fruits, vegetables, and other crops on it. Depending on the nature and use, there are many types of land, such as agricultural land, on which seasonal, annual, or perennial crops such as orchards are planted.

**Keywords:** Soil Quality, Agriculture Practice, Sustainable livelihood, Water harvesting, Organic Matter.

**Introduction**:

Soil is the upper layer of the earth which provides a natural medium for plant growth. This upper layer of the earth is a vast mixture of mineral particles and organic matter which has been formed over millions of years and it is impossible for life to have come into existence on this earth. As an integral component of the soil, soil is a component of the life supporting system. The usefulness of soil depends on the type of soil. For this reason, the public does not believe in any difference between soil and clay, but scientists believe so. As a vegetation on a land, you may see clay at first glance, but in dense forests, this type of soil is called clay. The soil is not visible because the soil surface is covered with moist leaves. Soil is an important resource for supporting plant growth. Soil of different fields may differ in their nature, characteristics and productivity according to their soil and management. But they all play equally important roles in agriculture and food security, forestry, environmental protection and quality of life. Soil may be defined from the point of view of its utility to agriculture. “Soil is a natural substance formed as a result of the weathering of rocks, having physiological, chemical and geologic properties and providing a medium for plant growth and development.”

**Factors causing decrease in soil fertility**

**1. Improper and unbalanced use of chemical fertilizers:**

Improper and unbalanced use of chemical fertilizers in agriculture is adversely affecting the fertility of soil. Chemical fertilizers are becoming so unbalanced that side effects are visible. Nitrogen, phosphorus and potash, the three main nutrients for plants, are being used in irregular proportions in many agricultural areas of the country. In our country, the ratio of nitrogen, phosphorus and potash in the last few years has been 9 : 3 : 1, which is very unbalanced. Mainly, nitrogen, phosphorus and potash are used in irregular proportions in the soil. Due to the increasing use of chemical fertilizers that provide nitrogen to the crop, some ferrous and micronutrients are being reduced in the soil, which has an adverse effect on the physical, chemical and organic properties of the soil. At the same time, the quality and yield of crops are also decreasing.

**2. Faulty irrigation system** -:

Reduction in soil fertility is a matter of concern in our country. Faulty irrigation system directly or indirectly causes The farmers are responsible for this. Today, farmers are using irrigation water in many parts of the country without any understanding. As a result, not only the production rate in agriculture increases, but the fertility of the soil is also adversely affected. Irregular and uncontrolled use of irrigation water leads to problems like stagnation of water, salinity of soil, loss of nutrients, decrease in soil fertility and soil erosion. The physical condition of that part of the field where irrigation water remains filled for a long time gets deteriorated. Soil Structure soil is severely deformed. Ultimately, productivity and fertility of soil is significantly reduced.

**3. Deep Cropping System/ Improper and Excessive Soil Development -:**

Currently, under deep cropping system, soil is not able to get sufficient water for the permitted amount. Which is adversely affecting the crop yield. After every crop, there is a loss of nutrients in the soil, which is very important to compensate otherwise the fertility and productivity of the soil decreases. The ratio of nitrogen, phosphorus and potash in the soil should be reduced for high yielding crops. The crop loss is increasing due to continuous cultivation of hybrid varieties of vegetables and crops. Crops require varying amounts of different nutrients. The deficiency of one nutrient cannot be compensated by the deficiency of another. Under rice-cow crop rotation in North West India, not only the amount of organic carbon in the soil is reduced, but some fine nutrients like nitrate, iron and sulphur are also reduced.

**4. Increasing use of agricultural chemicals in farming -:**

Over the last several decades, excessive and unbalanced use of toxic agricultural chemicals such as herbicides, insecticides and plant regulators has adversely affected the fertility of the soil. Weeds, insects and rodents are controlled by the use of appropriate chemicals, but these toxic agricultural chemicals adversely affect the physical, chemical and organic properties of the soil, which reduces the fertility of the soil. Today, due to lack of proper knowledge of the farmers regarding the use of these chemicals, fertile land is turning into barren land. At the same time, fertilizers and fertilizers are also increasing. Due to the use of cheap agricultural chemicals, the fertility of the soil is decreasing.

**5. Irrigation water having low quality -:**

Irrigation water is a very harmful tool in farming, due to which the ratio of water and yield is getting imbalanced. It is good to see and drink the water of the stagnant fields, but in reality it can be harmful for the health of the soil and crops. Due to the continuous use of such water till the time of crop production, first the yield starts decreasing gradually and later the soil becomes barren.Saline or saline water Irrigation with saline water has adverse effect on the physical, chemical and organic properties of the soil. Thus, the fertility of cultivable land is continuously decreasing due to the use of saline and low quality water. Germination of crops is reduced if saline water is irrigated for a long time. In the initial stage of plants, growth is reduced and the plants remain small. Hence, low quality water is harmful for the fertility of soil.

**6. Excessive exploitation of surface and ground water -:**

Due to permitted and excessive exploitation of surface and ground water in the affected areas, water is continuously getting depleted which is The fertility of the land and the productivity of the crops are being adversely affected. Indiscriminate irrigation and increasing irrigation in crops not only leads to wastage of water but also increases the cost of production. In the present environment, due to heavy cropping system and mechanization, the pressure on the land has increased so much that the land is becoming unusable. The world is getting weaker. Traditional irrigation systems are being used in farming in which the fields are filled with irrigation water. Due to this a lot of water is wasted or gets wasted by seeping into the soil.

**7. Use of organic fertilizers is decreasing -:**

Nowadays the number of livestock in agriculture is decreasing. Earlier, farming was dependent on animals. Due to mechanization of farming, there is no proper pairing of fertilizers in the entire village. Due to which, a lot of cow dung and animal excreta is being used in the fields, which results in reduction of bacterial content in the soil. Apart from this, the inclusion of humus and crop residues in the crop cycle is being done less. Farmers are using the leaves of multipurpose plants as fuel instead of manure. In modern farming, the combination of organic fertilizers and chemical fertilizers is increasing. Instead of compost manure and green manure, the use of single element fertilizers is increasing, Which has a direct impact on the fertility of the soil. Thus, due to the decrease of bacterial matter in the soil, the number of many beneficial bacteria is decreasing. These beneficial microorganisms actively participate in soil decomposition and degradation, which ultimately are fatal for the fertility of the soil.

**8. Deterioration level of agricultural land:**

In tractor and heavy machinery farming, the fields are not protected, due to which most of the rain water is washed away and becomes useless. At the same time a large part of the nutrients given to the crops also gets washed away by rain water. Due to the mechanization of agriculture, the farmers are not able to get water from the fields. The soil surface is getting eroded due to which irrigation water and nutrients are not distributed equally across the field. Most of the farmers ignore the importance of field alignment, so that the soil fertility and productivity are not uniform across the field.

**9.Increased infestation of worms in soil:**

For the last many years, worms are increasing in soil, as a result of which the fertility and productivity of soil is decreasing. Increased infestation of worms in soil is a big problem which automatically gives rise to various problems. These worms absorb the water and nutrients given to the soil, due to which the quality of the soil, yield and fertility of the soil decreases. Thus the farmers are not getting the expected benefits of their soil. In some of the soils, The presence of toxic elements substantially reduces the number of useful microbes present in the soil, in the absence of which a large part of nutrients and mineral elements are not available to the plants. Ultimately the fertility of cultivable land is reduced.

**10. Soil Erosion:**

Most of the nutrients, organic substances and pesticides in the soil are present in the topsoil. Half of the earth's topsoil has been lost in the last 150 years. Soil erosion due to human activities has increased rapidly. Steamy water erosion in wet areas Sand erosion is the problem of slopes and hilly areas, germ wind erosion is the problem of dry, typhoon prone areas and flat areas. The mechanism of soil erosion includes the amalgamation and stratification of soil particles and transport of soil. The top layer of soil is a very important natural resource. This surface helps plants to grow. During the rainy season, millions of hectares of fertile land are cut off and water is wasted uncontrollably. Every year, several hundred million tons of soil is washed away by rain water, which is reducing the fertility and fertility of the soil. Some farmers directly let the water of canals or wells flow into their fields, which washes away the living particles of soil. Thus, on one hand, fertile land is lost and on the other hand, an important component of agricultural production is lost due to the flow of irrigation water. Due to the negligence of farmers, fertile soil deposited in the fields for hundreds of years is washed away by rain. Such neglect of fertile agricultural land is not good for an agricultural country.

**Soil Conservation:**

The following measures can be very useful for soil conservation.

1. **Tree plantation** – Tree plantation is to reduce soil erosion. Trees not only prevent the upper fertile layer of the soil from being deposited by water or wind flow, but they also help in maintaining the level of water in the soil by better management of water flow.

2. **Restrictions on felling of trees** – Apart from tree plantation, there is a need to control the indiscriminate felling of trees. The importance of trees and forests should be promoted and propagated through awareness campaigns like the Chipko movement.

3. **Contour Farming** by making high ploughing and steep fields.

4. **Flood control** – Soil erosion in India is related to floods. Most of the time floods occur during rainy season. Therefore, drainage system is very useful for storing the rain water.

5. Erosion of soil – Rejuvenation of ravines and ditches is an essential task for solving the problem of soil erosion. Efforts are being made to make the arable soil of Chambal River.

6. Restrictions on human infestation – In the hilly states of north east of India, many houses are covered by forests. and farming, which causes great loss to the forest wealth.

7. The land should be brought under vermiculture.

8. The silty and alkaline soils should be made useful.

9. Special measures should be taken to prevent the cutting of rivers, streams and sea channels.

10. More use of organic manure should be made in vermiculture. Cowdung and green manure should be made popular.

**Suggestions and Solutions:**

In the present environment, due to increasing urbanization, industrialization and modernization, the area of ​​cultivable land is decreasing day by day. There is no possibility of its increase in the world. To supply food grains to the growing population of the country, natural resources are being exploited more than required. The result of which is seen today in the form of decreasing land productivity, drying up of land surface, decreasing water resources, decreasing biodiversity, drought, floods and climate change. If we do not give special emphasis on natural resources especially soil and water conservation, then we will not be able to save our lives. In the future, we may have to face serious food crisis. In this regard, precision farming can play an important role in increasing the fertility and productivity of the soil. Precision farming is a modern concept of agronomy based on information technology which is environment friendly, useful to the farmers and helps in reducing the pressure on natural resources along with possibilities for increasing production. It uses the latest technology like GIS, GPS, Remote Sensing System and information technology to get the locational information of the area. By collecting the information from all the above systems, a series of tools are used to make accurate and accurate calculations. The quantity of the fertilizer is determined. Precision farming is also known as location specific agriculture. It makes extensive use of complex tools. In precision farming, the equipment used such as manure and fertilizers, irrigation, pesticides and herbicides are used only at the location where the crop is to be grown, Where the crop needs them the most.

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