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SOIL PROTECTION AND EFFICIENT USE

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Abstract: Soil is an important component of nature, and soils and their biosphere play an important role in human life. Soil formation is a very complex and long-term process. Soil serves as a unique habitat for many organisms. In this article, the author discusses the issues of soil and its protection.

Keywords: Soil, humus soil, relief, habitat of organisms, fertile layer, soil formation, humus, humus content, human activity, ecological significance of soil.

Only 149 million km2 of our planet is land, of which only 19 million km2 or 13% is land suitable for human use. The surface, porosity, and fertile layer of land that has changed during natural and historical processes is called soil. Soil, as an important component of nature, is formed as a result of the complex interaction of factors such as rocks, climate, plants and animals, relief, time, and human activity. Soil formation is an extremely complex and long-term process.

On average, it takes 100 years to form a soil layer 1.5-2 cm thick. The average thickness of the soil is 18-20 cm. In some areas, it can reach from a few millimeters to 1.45-2.0 meters.

The amount of humus, or humus, in the soil is an important component of it and determines almost all its properties. Humus is formed as a result of the complex transformation of the remains of plants and other organisms during soil formation.

It ensures the stability (resistance) of the soil to various external physical, chemical and biological influences. Fertility is an integral property that is inextricably linked to the physical, chemical, agronomic, biological properties and ecological state of the soil. Therefore, the number of factors determining soil fertility reaches several dozen. These include the amount and quality of humus in the soil, the amount and state of moisture, the type, amount and absorbability of nutrients, soil air, temperature, density, porosity, enrichment with various substances, and microbiological state. The role of soils in natural processes and in human life is incomparable.

Soil serves as a unique habitat for many organisms. In particular, the life of lower organisms and insects, as well as many animals, is closely related to the soil. Up to 1.5 million simple organisms such as amoeba, infusoria, algae, and up to 3 billion microbes and bacteria can live in one gram of soil. Soil is an important component in almost all processes occurring in the biosphere. It plays a leading role in the cycle of biological (small) matter, ensuring the stability of the ecosystem and the biosphere. One of its ecological significance is that it plays a key role in the self-cleaning process in the biosphere, is a natural, universal, biological adsorbent and neutralizer for many substances that pollute the environment.

Although there are currently methods of growing plants without soil, such as hydroponics, acroponics, and plastopons, science is not able to offer an artificial one instead of natural soil. Therefore, the protection and rational use of soils is one of the most urgent environmental issues. From an ecological point of view, soil belongs to the group of finite, renewable

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resources, that is, if appropriate favorable conditions are created, the possibilities of using soils are unlimited. When we say land or land resources, we mean any surface (area) of land. However, in a number of scientific literature, including ecology, land and soil are used as closely synonymous terms. Many human production activities are directly or indirectly related to land resources.

Especially in the agricultural sector, where the most important material resources necessary for a normal life of mankind (food, clothing) are created, land acts as the main subject of production and means of production. It plays the role of a spatial basis for almost all sectors of the national economy. The potential for expanding fertile lands in the world is also not very large. According to data, the area of land suitable for agriculture can be increased to 2.5-2.7 billion hectares, but this requires a lot of effort and money. According to the UN, currently each person on our planet (per capita) has an average of 0.3 hectares of arable land, and according to experts, at the current level of development, one person needs an average of 0.4-0.5 hectares for growing food and another 0.1 hectares for housing and communications.

Our republic is an agrarian country, more than 60% of the population lives in rural areas and is engaged in agriculture. 3/4 of the gross national product is also created in this area. The total area of our republic is 44.7 million hectares, of which 31 million hectares are used in the agricultural sector. However, the main part of them (26.5 million hectares) is located in desert-desert (arid) regions, which are low-yielding, poorly supplied with water, and unsuitable for intensive farming. Therefore, they are currently used mainly as local pastures. 13.7 million hectares are highlands, occupied by water bodies and other similar lands unsuitable for farming. Anthropogenic impact on soils and its ecological consequences.

Soil is a somewhat stable system, but it is very sensitive to chronic and strong anthropogenic impacts. Humans exert pressure on the soil through its use, i.e. plowing, planting, watering, animal husbandry, the use of technical means, the use of mineral fertilizers and pesticides. The basis of current environmental problems associated with land resources is the decrease in the amount of food products and agricultural raw materials per capita and the deterioration of the ecological state of soils. The main reason for such negative processes is the increase in soil degradation and the reduction of the area of agricultural land.

Soil degradation refers to the deterioration of soil properties as a result of negative anthropogenic impacts such as erosion and deflation, secondary salinization, pollution, impoverishment, waterlogging, poisoning, and as a result, a sharp decrease in productivity and a complex process that is economically dangerous. Thus, degradation is a complex process that is ecologically and economically dangerous. Currently, 7 million hectares of arable land are lost annually worldwide due to degradation and other reasons. In addition, millions of hectares of fertile land are allocated annually for non-agricultural purposes such as the construction of industrial enterprises, reservoirs, mines, roads, pipelines, electricity and communication networks, airfields, and settlements.

According to the UN, 300 thousand hectares of arable land are used annually in the world for the construction of cities and roads alone. Soil erosion is the process of washing away, blowing away and eroding the surface fertile layers of the soil under the influence of water, wind and other anthropogenic influences. The erosion process has a very strong negative impact on the soil. As a result, the amount of humus and small colloidal particles that determine many of the properties of the soil decreases, as a result of which a number of agro-ecological indicators of

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the soil deteriorate, such as porosity, water retention and transfer, thermal, density, nutrients, biological activity, self-cleaning and restoration, and its productivity decreases significantly.

Erosion affects not only the agricultural sector, but also water management, water transport, fisheries and energy sectors, as a result of silting of water bodies and irrigation networks, pollution, and deterioration of water quality.

As a result, the soil does not have time to recover, as a result, the degradation process accelerates, and productivity decreases. Depending on the type of factors causing the erosion process, it is divided into such types as water erosion and wind erosion (deflation). Depending on the degree of erosion, that is, how much the humus layer has been reduced under the influence of erosion, the lands are divided into weak, medium and strong eroded types. Depending on the occurrence of erosion and deflation processes, the following natural and anthropogenic factors are responsible:

Natural factors include the unevenness of the earth's surface relief, i.e. the presence of lows and highs, slopes and slopes, frequent strong winds, the susceptibility of the soil to erosion or deflation due to its properties, insufficient vegetation cover on the soil surface, the amount of precipitation and the nature of its precipitation, etc. Anthropogenic factors - use of sloping lands without taking sufficient measures against erosion, failure to manage irrigation and rainwater at the required level, plowing, cultivating and over-irrigation of lands along slopes, planting heavily cultivated water-logged crops on sloping lands, reducing the amount of humus and many other nutrients in the soil, excessive loss of plant cover, improper cultivation of lands prone to deflation and leaving them open, improper grazing of livestock, failure to strictly comply with environmental requirements when constructing various economic buildings and structures, etc. There are types of water erosion that occur in the horizontal and longitudinal directions.

The erosion process begins when the slope is higher than 0.5-1.0. Erosion that occurs along a horizontal surface is called the washing of soil from sloping surfaces at a relatively uniform speed under the influence of water. In this type of erosion, as a result of the continuous washing of soil, a large amount of soil mass flows away from the surface of the earth with water. As a result, the soil gradually loses its fertility. Longitudinal erosion is the erosion of soil in a longitudinal (vertical) direction due to the formation of a strong flow of precipitation or irrigation water in a narrow area on sloping lands. This often results in the formation of ravines, therefore this type of erosion is also called ravinement. As a result of ravinement, large solid land areas are divided into several small pieces.

As a result, it becomes difficult to use machinery and carry out other agrotechnical measures. Ravines can grow from 1-3 m. to 8-25 m. per year, depending on soil-climatic and anthropogenic conditions, and sometimes even faster.

Taking into account all categories of land in our republic, erosion occurs in 50% of the foothills, almost all of the desert-desert meadows, which cover more than 22 million hectares, are affected by deflation. There are also types of erosion such as irrigation erosion, pasture erosion, mechanical erosion, abrasion, industrial erosion. Irrigation erosion occurs due to improper irrigation of land on sloping areas. Irrigation erosion is widespread on 700 thousand hectares of irrigated lands in our republic. In such areas, a decrease in the yield of cotton, grain and other crops by 10% to 60% is observed.

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Irrigation erosion is more common in mountainous, foothill and foothill slopes, that is, in irrigated regions with gray soil. Areas subject to such erosion are widespread in the Fergana Valley regions, the foothill regions of Tashkent, Samarkand, Kashkadarya and Surkhandarya regions, causing great damage to the economy and ecology of our country. Pasture erosion occurs as a result of excessive grazing of livestock and insufficient conditions for the restoration of vegetation cover in pastures and meadows. In this case, the productivity of pastures decreases sharply and the functions of ecosystems characteristic of such regions are disrupted. The erosion of the shores of water bodies such as seas, rivers, lakes and reservoirs under the influence of water waves is called abrasion.

In this process, negative situations such as reduction of land areas adjacent to water bodies, decrease in productivity, destruction of various industrial facilities occur. In the process of constructing roads, pipelines, electrical and communication networks and other industrial facilities, the soil layer is eroded and destroyed, which is called industrial erosion. This process occurs due to insufficient compliance with construction regulations in highly industrialized regions. In the process of deflation or wind erosion, a phenomenon such as water erosion also occurs, that is, the most fertile layers of the soil are eroded, but here the main eroding force is not water, but wind flow. Deflation is most common in areas with frequent winds, light dry soils, and poorly developed vegetation.

There are two types of it: daily deflation, which occurs continuously over a relatively long period of time, and dust storms, which occur quickly and strongly in a short period of time. The speed of daily deflation is somewhat slower, and it is difficult to drain. In some cases, it can also be caused by the blowing of salts by the wind and the richness of the soil-forming rocks in easily soluble salts. The composition of salts that cause soil salinization is often sulfate, chloride, and carbonate salts of sodium, calcium, and magnesium. For example, even in weakly saline soils, the yield of corn decreases by 40-50%, and wheat by 50-60%, and its quality deteriorates.

The harmful effect of soil on buildings and structures is increasing. The amount of salts in drinking water, food products and air increases, which negatively affects humans and other organisms. All this ultimately leads to a deterioration in the general ecological situation of the territory. In many countries of the world, especially in arid regions of Asia and Africa, soil salinization is one of the main agro-ecological problems. Due to salinization on our planet, 200-300 thousand hectares of irrigated land are out of use every year, becoming a source of environmental pollution.

The sharply continental hot, dry climate of our republic, high evaporation of moisture from the soil surface, specific hydrogeological and geomorphological conditions create favorable conditions for the process of salinization in a number of regions. For example, in the texas and partially foothill regions, saline groundwater is located close to the ground surface, and evaporation of moisture from the surface is on average 3-8 times higher than annual precipitation.

Although this is, of course, one of the necessary factors for human development, their irrational use causes serious environmental problems associated with the pollution of soil, water, plant and livestock products.

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