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**Soils of andijan region and practical value of using them and  
problems of protection**

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**Abstract**

***This article covers the types of soils, their biological, chemical, physical properties, grain properties, geographical distribution, their use and protection in the field of agriculture in the Andijan region. The article provides a separate analysis of the soil in the districts of the region and provides information on their characteristics***

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## Introduction

Soil science - the science about soil, that studies its origin, development, composition, characteristics, geographical distribution, productive use and productivity, and other qualities.

According to the definition of soil, the rigid layer of the lithosphere is formed by the change of the surface layer under the influence of water, air and living organisms, which is composed of genetically interconnected horizontals, maternal soil, surface and fertile layer of the earth's crust. The most important feature of soil that differs from other rocks is its productivity. The main factors that make up the soil are climate, soil maternity, plants, animal world, relief and geological age of the region and human economic activity.

Because of factors such as climate, plant, animal world, relief, the impact of the soil on the process of soil formation varies in different regions, in particular in the natural zones.

Human activity also affects some of the processes of soil formation, including soil treatment, improvement of its meliorative state, putting organic fertilizer and other processes, directly affecting the soil.

Appearance and development of our country's natural components, geographical distribution and properties are not identical in all its parts, the relief is complicated, variety of origin of mountainous rocks and their lithological structure and variety of hydrological condition, continental climate of arid type and distribution of plants, their amount cause appearance of soils.

## Main part

The difference between natural elements in the plains and the mountainous part of Uzbekistan is very large, and their soils completely differ from each other, therefore, in the flat part of the country there are zonal features of the soil, and desert-like soils are formed, and the elevation in mountainous zones has resulted in the formation of soil types.

Because of the presence of low remaining mountains, high altitudes, hills and hilly areas, hollows and valleys, the process of soil formation is different from each other in our country. As the territory of our country is hot, dry, sunny, the process of soil formation is slow. Summer is droughty, because of high temperatures, evaporation is 15 to 20 times higher than that of precipitations, resulting in saline soils accumulation of various salts in the soil.

Dark brown automorphic soils are found on the plains where there are underground waters of our country located deep under them, virgin soils are spread on foothills and hills, brown and light brown soils are found in mountainous areas. On the contrary, there are hydromorphic soils - grassland, swamp, wetland, and soils where groundwater is near the surface.

In the Andijan region, ten types of soils have been spread in relation to the natural conditions, climates, the structure of the earth, the state of groundwater and the activities of the population. Almost all of the existing soils in the region are cultivated and processed with high productivity. Our country is divided regionally into three parts: altitude zones; desert zones; zones of irrigated soils.

The soils of the height zone include dark-brown, typical gray, light-brown soils, which are mainly located in the east of Kurgantepa district, at the height of 1,350 meters at Qoratag near the town of Khanabad and 800-1200 meters in the south of Marhamat district. The humus content in the top layer of dark-brown soil reaches 2.3-3%, and the thickness of the plants grows to 4.5%. The penetration layer has a thickness of 120-130 cm. It is softer than light and typically greasy soils that are well-washed, with no saline soils, the gypsum layer is less than 2.0-2.5 meters below the soil and does not affect the composition of the soil.

Dark brown soil is less common and typically less than 2.33% of the country's land fund.

## Analyses

One of the soils extending along the highlands is typical gray soil; this type of soil is spread in the hills of Otchopar, Andijan district, in the valleys of Marhamat district, in the foothills of Bulakbashi district and does not occupy large areas.

Typical gray soils are found mostly in the altitudes of 300-400 meters up to 800 meters above sea level, in mountain plains, hills and low mountains, in the high rivers. Typical rocky forming virgin soil is primarily limestone and lyophilic bedding. Typical virgin soil differs from the light virgin soil by the amount of humus, the thickness of the protective layer and slightly saturated.

The humus content in the top layer of typical virgin soils varies from 1.5% to 2.5%, and to some 2.88% in some areas. In addition, the layer holding humus is thick and is 60 to 70 cm, and in some areas it also occurs at a depth of 90-100 cm.

Typical virgin soil is carbonate relative to the soil, and the saline and gypsum layer is deeper than the soil, where it is irrigated and cultivated in most of the typical virgin soils, and dry plants are sown on the hills and slopes.

Light color soils which are typical for the region of highlands are spread in foothills of absolute height 250-400 m. in Asaka district of Andijan region. In these places, soil-forming rock here are alluvial-prollyuvial deposits. Light virgin soil is characterized by the top layer of typical light virgin soils, with low mulch content, poor humus content, low viscosity of the protective layers, and close proximity to the carbonate layer.

If the amount of humus in the light color virgin soil is 1.5-1.7% at the depth of 13-15 cm in depth, the humus drops to 100 cm and the value of humus drops to 0.1-0.35%. There is also a variety of saline soils that are exposed to light virgin soil. Farming activities are performed in the most part of light color virgin soil while the less part corresponds to the lands of dry plants.

In the Andizhan region there are also habitats of hilly zone, which are generally aluuvial and open rocks and sand and gravel deposits. These types of soils do not occupy a large area, mainly in the surroundings of the Ekin-Tikin, Dogen, Besh-Vynak villages of Andijan region and the Asaka reservoir of the Asaka district. Depending on the geomorphological and hydrological characteristics of the area, the soils are more semi-hollow, grass-green, and hydromorphic soils.

One of the soils found in the desert zone is the gray soils, which occupies a small area, mostly prevalent in the northwestern Ulughnor district - in the Andijan massif.

As the majority of irrigated areas occupy a large area in Andijan region, cultivated soils are spread, one of which is typical virgin soil. It is mainly concentrated in the central and northern parts of Jalakuduk district, in the south of Ayim, Beshtol, in the southern part of Kurgantepa district, in the central and northern parts of Marhamat district, in the southern part of Andijan district. This type of soil is common in mountainous plains, hills and low mountains, in high-water beds of rivers from 300-400 meters up to 800 meters above sea level. Typical rocky soil forming is primarily limestone and lyophilic bedding. Typical virgin soils differs from light virgin soil by the large amount of humus content in the soil, the thickness of the protective layer and slightly saturated soil.

## Research discussions

The irrigated soils are widespread, which has been watered for many years and processed mineral fertilizers, enriching its composition, changing its natural state, ie its physical and chemical state, with a layer of 1-1.5 meters thick almost the same cultural layer appeared. In humid soils the humus content reaches 1-2% in the upper layer.

In the lower part of the region, where irrigated soils are scarce, the soil has been damaged due to the incomplete adherence to the agrotechnical regulations in areas where the flow of gravel is difficult to move.

In the irrigated soils, the glacial soils are found in the northwest of Pakhtaabad and Izboskan districts, at the altitude of 250-400 meters above the Uchkuza, Miyon, Dzhogdoguz, Tuyachi, Logumbek villages, Hortum, Otchopar, Zavrak, Chilonmozor, Guliston villages of Andijan district. The soil-forming genus is alluvial and prollyuvial deposits of the cones of the genus.

One of the most common types of soil in the region is virgin-ground, ground-virgin soils. These soils are mainly concentrated in the valleys of the river. Virgin-ground, ground-virgin soil is included in hydromorphic soil types. Ground-virgin soils grow in thick grassy vegetation on the upper part of the ground, moistened with rising waters of 1-3 meters deep. This, in turn, leads to humus content of 2.5-3% in humus ground soils and up to 4.5-5% in humus in staured light soils.

Swampy-greening soils are also found in places where the ground virgin soils are scattered and where the relief is slightly wet.

Among the soils of our country, grassland alluvial soils are widespread, they are mainly found in plains. This type of soil is widely spread in the territory of Ulughnor, Boz, Baliqchi, Shahrikhan districts, and also occupies large areas in Izboskan, Pakhtaabad, Kurgantepa districts. The salty alluvial soils occupy more considerable area than the other types of soil in Jalakuduk and Hodjaabad district and constitute a large part of the agricultural land. In the remaining areas of the region, the share of this soil is not so large.

Ground-grass alluvial soils are found only in Kuyganyor area of Andijan district, which has lost its significance in agriculture as it was given out to the population as gardens.



Based on the analysis of the geographical distribution of the soils of Andijan region, the analysis of the state of the affected areas by natural conditions, human factors, and the quality of irrigated soils can be summarized as follows: in terms of physical, chemical, and biological properties of the existing soil 1) the soil well-valued is 2.7% from 100%, 2) the best is 39.6%, 3) the average is 37.9%, 4) lower than the average is 19,7%, and 5) the worst is 0.1%. This shows that the quality of soil resources existing on the territory of the region, according to their quality indicators, is very high in comparison with other regions of the country.

Secondly, the classification of irrigated soils according to the mechanical composition (in relation to 100%) is as follows: The heavy sandy and clay soil in Andijan region is 32.5%, medium sandy soil is 59.0%, light sandy soil is 8.2%, fully sandy soil is 0.3%, it can be seen that the soil of the district is composed primarily of pure soils that have the potential to produce agricultural products, with a high content of mechanical properties, mainly to develop irrigated agriculture. It can be seen in the example of Ulugnor district that the mechanical composition of the soil is not the same in all the districts. Sandy and clayed soils here are 7.3%, medium sandy is 14.0%, slightly sandy is 36.7% and fully sandy soils is 42.0%. This feature of the mechanical composition of soil causes specific problems in the area of agriculture. In particular, the degree of soil salinity is high. As a result, soil needs to be washed off with saline content, and the other requires plenty of water to irrigate the crops, as during most irrigation the water is absorbed and evaporated. Thirdly, the amount of humus decreases, resulting in soil granulosity and fertility, and requires a large number of mineral fertilizers.

Although the mechanical composition of the irrigated soils in the region does not differ significantly from the districts, the geographical location of the region varies depending on the natural conditions, hydrological and geomorphological features.

On average, heavy sandy and clay soils constitute 36.9%, while moderately sandy soils are 39.6%, light sand and 16.2% sandy-sand soils are 7.3%. This indicates that the mechanical composition of the soil in the region is very good.

If the classification level of saline soils is analyzed, the lowest salinity of soils observed in Andijan region is 80.8%, in Izboskan district - 81.2%, in Khojabad district - 79.5%, in Kurgantepa - 78.0%, in Asaka district - 70.1%, on the contrary in Ulugnor district this indicator is 3%, in Oltynkol - 18.0%, in Jalakuduk - 20.5%, in Shahrikhan - 33.6% and in Boz - 47.3%, and throughout the region 43.9% of the land area is not saline.

The weak saline soils are 32.9%, moderately saline - 16.2%, and heavily saline soils - 7.0%. One of the most important tasks is to protect the soil in Andijan region and to use them effectively. Soil erosion means disintegration, irradiation, the most fertile upper layers of the soil and atmospheric precipitation of the underground rocks are subdivided into natural and accelerated degradation by irrigation, wind and other degradation processes. Natural soil erosion is relatively slow, and soil is restored in the process of natural production. Rapid soil erosion occurs as a result of humane's wrong use of land in growing cultivated plants during his farming activity, cultivating lands, irrigation, livestock breeding, cutting of trees and construction work without following actions and rules against erosion and it destroys the soil structure and eliminates its soil properties.

Soil erosion is mainly caused by lands whose relief is uneven - high-low and erosion basis is (where there is a significant difference between the height of the sea in a meter at a given location and the altitude above the sea level).

Soil erosion factors are divided into the following types: water, wind, breakthrough, destruction, meadow, and mechanic soil erosion types. The beginning and intensification of water erosion relates to the structure of the relief, and usually erosion occurs when surface degradation is 1-1.50. Water erosion is subdivided into erosion, washing and grinding, according to the method of separation and resettlement of particles. Washing erosion is characterized by the relatively uniform disintegration of the soil layer, caused by the flow of untreated water. Spring erosion is caused by the formation of a deeper pit of the deep spring water floodplain, which can be avoided by typical land treatment. Ravine erosion is one of the types of water erosion, resulting in the accumulation and flow of water flow, vertical shift and washing of soil. Under the influence of water, the crust forms on the surface of the earth, as the time passes the hollows break up and ravines appear.

## Results

In irrigated farming areas in Andijan region, water erosion is found in semi-arid dry lands efficiently provided with moisture, amount of precipitations over 350-400 mm and half provided amount of precipitation is 200-300 mm and in typical dark-brown soils in partially foothills and mountain slopes.

Wind erosion (deflation) is divided into two types: the velocity of the wind is smaller than the wind, resulting from ordinary and high speed winds resulting from the splitting of soil particles. The rocks brought by wind erosion have a great impact on irrigated lands. In the wind erosion, strong winds, irrespective of the relief of the area, are caused by the light mechanical composition and salinity of soils, which do not correspond to the natural conditions of the irrigated land, or the lack of fencing trees.

Soil erosion also includes the following types of production and human activities: Industrial erosion occurs by mining, in particular, through open-pit mining, industrial and road construction, gas and oil pipelines. Ploughed lands, meadow areas are shortened and water reservoirs become muddy due to abrasion - erosion of banks of rivers and other water reservoirs. Extreme cattle pasturing in meadows cause meadow erosion. Mechanic erosion is caused as a result of widely using too heavy technics in treatment of land areas, the soil structure is destructed because of mechanic erosion. Erosion processes connected with water may frequently be encountered in hilly areas of Andijan region. The existence of soil, which is inclined to washing off, with weak mechanic composition and the big slopes of lands in these areas is the reason for this. As a result of big abundance of water running along seedbeds during irrigation period, the speed of the stream washing off the surface of lands, there appear vertical and horizontal ravines. Wind erosion is often found especially in Ulugnar district of the region, it causes movement of all the sand.

## Conclusion

Almost all the above-mentioned soil erosion types are the ones, which are characteristic to the soils spread in Andijan region. It is desirable to make scientific approach to the soil and foresee taking precautions to save them in order prevent them from negative effects.

Saving the soil from erosion has both economic and social importance. Here, irrigational erosion and wind erosion is implied. Irrigation more often causes erosion process connected with ground relief. If the land has slopes, the water runs fast and as a result it washes off the land and there appear vertical ravines, and the wind blows off fruitful maternity of the land. It is desirable to follow agrotechnic irrigation rules and planting fencing trees around the lands under crop in order to prevent such erosions.

Every year plenty of chemical mineral fertilizers and various toxic chemical substances are utilized for the lands under crop with the purpose of getting big harvest from the lands and struggling against pests. The most part of these substances are cumulated in the soil and cause destruction of its composition and pollution.

Industrial wastes and consumer wastes also cause pollution of soil in some extent. It is desirable to organize recycle of wastes to avoid such cases.

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