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DEVELOPMENT OF DESERTIFICATION PROCESS AS A RESULT OF SOIL SALINIZATION IN THE ZARAFSHAN RIVER BASIN

Abstract: The article examines the impact of salinization on desertification in the Zarafshan River basin as a result of improper soil cultivation and irrigation without observing agricultural practices. Desertification is one of the global problems in the world. The main causes are natural and anthropogenic factors. Currently, desertification is occurring more as a result of anthropogenic factors. In this article, the soil fertility of the Zarafshan basin as a result of anthropogenic factors is analyzed in the district section. The soil salinity table is given in the district section. Soil salinity is observed more in the lower part of the Zarafshan basin. One of the main reasons for this is the location of the river in the lower part, that is, the relief features, as well as the close location of groundwater to the surface.

Keywords: Water erosion, soil erosion, ravine, salinization, desertification, pesticides, vegetation, mountains and plains

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РАЗВИТИЕ ПРОЦЕССА ОПУСТЫНИВАНИЯ В РЕЗУЛЬТАТЕ ЗАСОЛЕНИЯ ПОЧВ В БАССЕЙНЕ РЕКИ ЗАРАФШАН

Аннотация: В статье рассматривается влияние процесса засоления на опустынивание в бассейне реки Зарафшан в результате неправильной обработки почвы и орошения без соблюдения агротехнических правил. Опустынивание — одна из глобальных проблем мира. Основные причины — природные и антропогенные факторы. В настоящее время опустынивание в большей степени происходит в результате антропогенных факторов. В

данной статье в районном разделе анализируется плодородие почв бассейна реки Зарафшан в результате воздействия антропогенных факторов. В районном разделе приведена таблица засоленности почв. Засоленность почв выше в нижней части бассейна Зарафшан. Одной из главных причин этого является расположение реки в нижней части, то есть особенности рельефа, а также близкое расположение грунтовых вод к поверхности..

Ключевые слова: Водная эрозия, эрозия почвы, овраг, засоление, опустынивание, пестициды, растительность, горы и равнины.

Relevance. Today, in order to meet the needs of the population and sectors of the national economy for land resources, the process of developing new lands and more intensive use of developed lands is intensifying in the world. This leads to a change in the natural landscape composition of the land fund, a decrease in biodiversity, and its deterioration from its optimal state under external anthropogenic pressure. The UN Sustainable Development Agenda until 2030 sets the tasks of “Protecting and restoring dryland ecosystems, rationally using them, rationally managing forests, combating desertification, halting land degradation and preventing biodiversity loss”. These tasks require research on rational land use, especially in regions with limited land resources. One of the negative processes that is rapidly occurring in our environment is desertification. In the world, the increase in the greenhouse effect, global climate change, ozone layer depletion due to industrial emissions, environmental pollution, loss of biodiversity, deforestation by humans, soil degradation and increasing soil salinization are all closely linked to geocological situations, and as a result, the pace of desertification is increasing rapidly. Due to salinization and weathering of the soil layer, soil fertility is decreasing and becoming unsuitable for agricultural use.

Main part. Every year, the area of unusable land excluded from agriculture is about 7 million hectares. Such unusable land, unfortunately, is also observed in our homeland. One of the biggest reasons for this is the human factor not only in our

country but also in the world. Man has been using the soil incorrectly to meet his needs throughout his activities. The composition of the soil has a strong impact on its fertility, properties and characteristics. With the introduction of market reforms in our country, the influence of society and people on the land, that is, the feeling of ownership of its management, has increased, and the attitude towards the land has changed significantly. In order to get more yield in agriculture, it is necessary to use organic fertilizers as much as possible instead of chemical minerals and strong pesticides, and to increase the yield through agrotechnical treatment of the soil.

It is advisable to use modern and advanced technologies in agriculture. Currently, in our country, due to the application of strong pesticides to the soil in certain years in order to increase the yield, the composition of the soil is changing. As a result, the productivity of plants is decreasing year by year. If we analyze the above issues, we can see that we have few experienced specialists to maintain soil fertility..

Not only in the whole world, but also in our country, the rapid development of urbanization, the construction of large cities, factories and enterprises that emit harmful waste, and as a result, pollution incidents that damage the environment, are also having an impact on soil properties. In our country, due to improper agrotechnical measures, the soil composition is deteriorating, its fertility is sharply decreasing, and erosion is occurring. Soil is a unique gift of nature. Despite the fact that the soil has the property of self-recovery, the deterioration of the soil composition and its deterioration are often observed in comparison with the restoration of the soil. According to the data collected by scientists, every day, 3.5 thousand hectares of fertile land become unusable as a result of erosion. As a result of water erosion alone, soil properties are deteriorating in the mountainous and foothill regions of the Zarafshan basin. If we look at the plains and lowlands, soil fertility is decreasing due to the blowing away of the fertile soil layer due to the process of wind erosion. Many measures have been developed to prevent water

erosion and wind erosion. Including the use of all agrotechnical measures such as dense planting of plants and the formation of forests, planting plants in a stepped form on mountains and mountain slopes. As a result of excessive irrigation of irrigated lands in the Zarafshan basin, salt compounds dissolved in groundwater have emerged on the surface and are being damaged by varying degrees of salinization. Soils are divided into non-saline, weakly saline, moderately saline, strongly saline and saline soils according to salinity. These are located in geochemical landscapes of various categories. The causes of the occurrence of saline soils are very diverse. One of them is the parent rock, which is widespread in arid regions, which stores salts in various forms. The secondary salinity of the salinization process is very dangerous for the soil cover and the plants growing in it, causing irreparable damage. In order to prevent salinization, today, ditches and ditches are being dug to improve drainage, and as a result, groundwater is being prevented from emerging above the ground.

After the soil becomes unsuitable due to loss of fertility, desertification is rampant in these areas. In areas where desertification is taking place, a sharp decline in economic potential is taking place. It is no secret to us that our economy is closely linked to the agricultural sector of our country. According to the accounting records, irrigated lands are 100 times more productive than natural pastures, yielding 7-8 times more than lands planted with grain crops. As a result of improper use of the soil and the decrease in its fertility, these indicators are decreasing year by year. The population of the Zarafshan basin has long been engaged in irrigated agriculture and has grown mainly cotton and wheat crops, which deprives it of the opportunity to plant repeated crops. In the most developed districts of Samarkand region, located in the middle reaches of the Zarafshan River, including Pastargom, Kattakurgan and Akdarya districts, there is no control over the use of wastewater. As a result of excessive irrigation of fields, very large ravines are formed. Also, the abundance of gypsum, $MgSO_4$, dolomite in the saline-alkali soils of the desert region was noted by Kamilova O.K., Isakov V.Yu.

If we look at the distribution of gypsum content in the soils of the area we are studying along the soil cross-section, we can observe that the lower layers increase until the middle of the soil profile, and then decrease to a certain extent. In the lower part of our region, due to the low rainfall, high temperature, mineralized sulfate, hydrocarbonate and close-to-surface conditions of groundwater, salts evaporate from groundwater through capillaries and settle at different depths depending on their solubility. When studying the soil composition of the Karman and Konimeh districts of Navoi province, located in the lower reaches of the Zarafshan River, it was found that they are mainly heavy deposits with a high content of sand and clay. Due to the rise of groundwater to the surface, strong salinity is observed in the soil layer. As groundwater approaches the surface, the process of evaporation and salt accumulation accelerates. Groundwater is close to the surface at a depth of 2-3 meters, causing the highest soil salinity in arid climatic regions.

Table 1.

**Percentage of saline lands in Navoi region and districts
(Fraction in hectares, denominator in percent)**

T/R	Regions	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1	By region	98,4	98,4	98,3	98,3	97,6	98,3	93,4	93,3	91,7	89,5
		83,0	83,0	82,9	83,1	82,3	82,9	78,8	78,7	77,3	75,5
2	Karmana	18,8	18,8	18,8	18,8	18,8	18,8	17,6	17,1	16,7	16,2
		100	100	100	100	100	100	88,8	85,5	83,5	81,1
3	Konikmekh	5,06	5,06	5,06	5,06	5,7	5,7	5,4	4,6	4,5	4,4
		86,0	86,0	86,0	86,0	96,9	96,9	91,8	78,2	76,5	74,8
4	Kyzyltepa	31,2	31,2	31,2	31,2	31,2	31,2	30,1	29,6	29,3	28,8
		96,9	96,9	96,9	96,9	96,9	96,9	93,5	91,9	90,9	89,4

5	Navbakhor	22,9	22,9	22,9	22,9	22,9	23,1	22,1	21,5	21,5	20,3
							96,0				
		95,2	95,2	95,2	95,2	95,2	4	91,9	89,3	89,3	84,4
6	Khatirchi	20,2	20,2	20,2	20,2	21,1	21,7	20,5	20,3	20,3	19,7
		55,4	55,4	55,4	55,4	58	59,6	56,3	55,8	55,8	54,1

Conclusion. If we analyze the soil cover of the Karmana, Konimekh, Navbahor, Kyzyltepa, Khatirchi districts of Navoi region based on the collected data, we can see that the soil cover is being damaged by salinization from year to year. If we analyze this table, we can see that soil salinization is strong in the lower reaches of the Zarafshan River. The following recommendations have been developed to prevent soil salinization. Use modern irrigation methods, namely, proper irrigation, drip and sprinkler irrigation, control the amount of water, improve drainage around the cultivated areas, leave one furrow dry between furrows, and irrigate through the next one. Correct application of fertilizers: for plants to absorb fertilizers well, mineral and organic fertilizers should be applied together. It is beneficial to apply mineral fertilizers after irrigation, not during irrigation. Controlling the amount of nitrogen and applying more organic fertilizers than mineral fertilizers allows for less use of mineral fertilizers, planting rows of trees at the edges of fields, drainage of cultivated areas, and a favorable climate for maintaining the water-salt balance in the soil.

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