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COMPOSITION OF SOILS OF BUKHARA REGION, THEIR AMENITIES

(on the example of Jondor district)

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Abstract: The article discusses the agricultural land areas of the Bukhara region, their improvement in productivity, land resources in the desert area, their reclamation, land reclamation, irrigation networks, land quality, crop rotation and obtaining high yields from them.

Keywords: Irrigation, land reclamation, salinization, irrigation networks, land quality, crop rotation, phyto-ameliorative plants, ecological situation.

The Strategy of the President of the Republic of Uzbekistan on the modernization and accelerated development of agriculture stipulates the deepening of structural changes and the consistent development of agricultural production, further strengthening the country's food security, further expanding the production of environmentally friendly products, significantly increasing the export potential of the agricultural sector; further improving the reclamation of irrigated lands, developing a network of reclamation and irrigation facilities, introducing intensive methods, primarily water and resource-saving, modern agrotechnologies, into the agricultural production sector, and taking systematic measures to mitigate the negative impact of global climate change and the drying up of the Aral Sea on agricultural development and the livelihoods of the population. Land used in agriculture, especially irrigated land, is undoubtedly an invaluable treasure of all peoples and an important source of living conditions. The use of these lands, the expansion of their land fund has always been a major issue for humanity. Land reclamation is a Latin word, which means "Melio" - improvement. Land reclamation is understood as a radical improvement of soils. More than 50 percent of irrigated areas in our republic need to be treated against salinization. Soils need reclamation measures against dehumification, compaction, alkalization, salinization, and others. This situation is even more observed in the Jondor district of the Bukhara region. In Bukhara, 77.8 thousand hectares of abandoned land have been developed. Based on the instructions given during the visit of the President of the Republic of Uzbekistan to the Bukhara region and at the extraordinary session of the regional Council of People's Deputies, it was decided to implement radical changes and consistent reforms in agriculture.

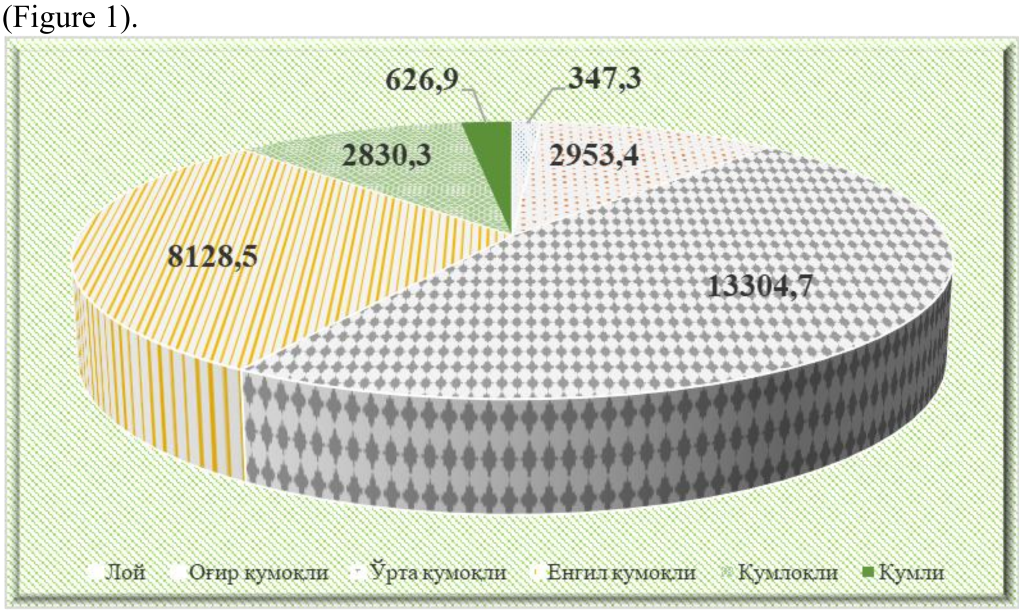
In particular, a draft resolution was recommended to establish the Bukhara Scientific and Practical Center for the Development of Desert Lands, which will bring 77.8 thousand hectares of desert lands out of use in the region into use. It is stipulated that a targeted program of land works and land development activities will be implemented on the basis of market principles, with the involvement of the private sector.

The territory of Bukhara region, due to the interaction of geomorphological, lithological, hydrogeological and climatic conditions, has undergone various directions of soil formation processes in the region. There are 276.3 thousand hectares of total irrigated lands in the region. Of these, 42.1 thousand hectares are non-saline, or 15.2 percent, and 234.2 thousand hectares are total saline lands, or 84.8 percent. In Jondor district, there are 33.0 thousand hectares of total irrigated irrigated lands, of which 3.1 thousand hectares are non-saline, or 9.5 percent. Total saline lands are 29.9 thousand hectares, or 90.5 percent. One of the ways to restore degraded lands that are not used due to high salinity levels is the cultivation of alternative crops. The mechanical composition, humus content, and salinity level of soils in the Jondor district of Bukhara region are shown in the table below. According to the results of the studies, the soils distributed in the district are considered to consist of light loamy, medium loamy, and sandy soils according to their mechanical composition. Also, according to the humus content, they are considered to be moderately low, low, and very low. According to the results of the studies, the soils distributed in the district are considered to consist of light loamy, medium loamy, and sandy soils according to their mechanical composition. Also, according to the humus content, they are considered to be moderately low, low, and very low. Jondor district of Bukhara region is one of the most difficult districts in terms of water conditions and waterways. In the district, water is pumped from the Amudarya through pumping stations 1, 2, and 3 and supplied to the cultivated areas.

The irrigated lands of Jondor district are mainly grassland, barren grassland, desert, swamp, meadow alluvial soils, and partly loamy soils. Of the 28,191.0 thousand (as of 2020) hectares of arable land used for intensive farming in the district, 49.1 percent are grassland, 12.7 percent are barren grassland, 15.6 percent are desert grassland, 0.6 percent are swampy grassland, 19.9 percent are meadow alluvial, and 2.1 percent are loamy brown soils. Irrigated meadow soils - distributed in all massifs of Jondor district Meadow soils have an ancient past, but in recent decades they have been newly formed in some places as a result of the evolutionary change of barren and barren-meadow soils. Sedimentary waters are located at a depth of 1.5-2.5 m. Their highest location is observed after leaching of soil salts and irrigation during the growing season. The close location of mineralized sedimentary waters creates conditions for the development of secondary salinization in soils. When developing and using these soils, they must be provided with a sufficiently functioning collector-drain. Irrigated meadow soils are the most common soils in the irrigated land fund of our Republic. In the morphological section of these soils, an arable layer 28-32 cm thick is distinguished. According to its mechanical composition, it varies from heavy loams to sandy loams. The arable subsoil is formed only on soils that have been irrigated for a long time. Often, an agroirrigation layer is distinguished on soils that have been irrigated for a long time, but it is not very thick. Irrigated meadow alluvial soils—Sedimentary waters are located at a depth of 1-2.5 m. Their highest concentration is observed after soil salt leaching and irrigation during the growing season. The close proximity of mineralized seepage waters creates conditions for the development of secondary salinity in soils. When developing and using these soils, they must be provided with a sufficiently functioning collector-drainage system.

Irrigated meadow-marsh soils were formed in local lowlands and around lakes in conditions where the groundwater level was close to 1 meter. Irrigated meadow-marsh soils occupied small areas. The upper part of the profile of these soils consists of a mechanical composition ranging from heavy loam to loam. Newly irrigated meadow soils are widespread in the district, mainly light, heavy, medium loam, sandy loam, sandy and partly clayey, according to the mechanical composition of the above-mentioned soils, it was noted that 347.3 ha are clayey, 2953.4 ha are heavy loamy, 13304.7 ha are medium loamy, 8128.5 ha are light loamy, 2830.3 ha are sandy loamy and 626.9 ha are sandy.

(Figure 1).



1- Mechanical composition of irrigated soils distributed in Jondor district of Bukhara region in hectares.

It was observed that the soils distributed in all massifs in Jondor district are mainly provided with humus at a very low level (up to 1 percent, 24899.1 hectares), (up to 1.1-2.0 percent, 3292.0 hectares).

It was observed that the areas of the soils distributed in the district provided with humus up to 1 percent are 88.3 percent, and the areas of 1.1-2 percent are 11.7 percent. This requires the rational use of local and non-traditional fertilizers. Irrigated meadow alluvial soils are distributed in the Zarafshan massif of this district. According to the data of the soil section taken from the area where irrigated meadow alluvial soils are distributed, it was observed that humus in the arable layers is 1.01%, and in the sub-arable and lower layers its content fluctuates between 0.93% and 0.67%. Also, in this section, mobile phosphorus fluctuates from 6.7 mg/kg to 3.5 mg/kg, and exchangeable potassium fluctuates between 190 mg/kg and 115 mg/kg. It was observed that the content of humus and nutrients in the irrigated meadow alluvial soils distributed in the following massif is very low in mobile phosphorus and slightly high in exchangeable potassium.

Irrigated meadow steppe soils are distributed in the Mokhonkol massif of the district. According to the data of the soil cross-section taken from the area where irrigated meadow-steppe soils are widespread, it was observed that the humus content in the tillage layers was 0.80%, and in the sub-tilage and lower layers its content fluctuated between 0.79% and 0.55%. Also, in this cross-section, mobile phosphorus fluctuated between 13.8 mg/kg and 6.1 mg/kg, and exchangeable potassium fluctuated between 209 mg/kg and 161 mg/kg. The results of the chemical analysis of the soil sample taken from this massif showed that the humus content in the soil was in the range of 0.51-0.30%, and it was determined that it was provided with very low levels of mobile phosphorus (0-15 mg/kg) and low levels of exchangeable potassium (101-200 mg/kg).

According to the cross-section data taken from irrigated meadow barren soils distributed in the Gulistan massif, the humus content in the haydov layers was more than 1.0%, mobile phosphorus was 19.8 mg/kg, and exchangeable potassium was 182 mg/kg, and their gradual decrease towards the lower layers was observed. According to the results of the analysis of the soil cross-section taken from this massif, the humus content was more than 1.0%, and the content of mobile phosphorus and exchangeable potassium was also low.

Salinity is considered a factor in the fertility and productivity of irrigated lands, as well as the ecological and reclamation status, and this process depends on the relief of the area (massifs), geomorphological and lithological structure, soil-climate and human-economic conditions. In particular, the harm caused by salinization of groundwater to the national economy is extremely great, and in weakly saline lands the cotton yield decreases by 20-30%, in moderately saline soils by 40-60%, in strongly saline soils by up to 80%, and in extremely strongly saline and saline soils, cotton seedlings completely die during the first irrigation, as proven by numerous studies and field experiments. The main reason for this is the "toxic" effect of toxic salts in the soil on plants. Therefore, when assessing the soil-ameliorative condition of irrigated lands, special attention should be paid to the degree and types of soil salinity, the amount of salts in the tillage (0-30 cm) and root layer (0-1 m) of the soil (%) and the reserve (t/ha). The assessment of irrigated soils of the district is shown in the following analyses. Soil assessment is a comparative assessment of soil quality and natural fertility, which is carried out taking into account the properties and characteristics of the soil, which are largely related to crop productivity, and the result is expressed in points. Soil assessment is carried out based on the requirements of agricultural crops, and in irrigated farming it is widely used mainly in cotton and grain growing. For example, the land assessment scores determined taking into account the requirements of cotton are also the basis for assessing soils where other crops in the cotton complex are grown.

The assessment of the fertility and quality indicators of irrigated agricultural land types distributed in the massifs of Jondor district was carried out in 2020, and the average score calculated for the district is 52 points.

In conclusion, the following recommendations are made to improve the reclamation condition of the studied irrigated land areas and to maintain and increase their fertility.

1. Soil salt leaching is an important measure to improve the reclamation condition of the soil. In this regard, it is important to leach soil salt by flooding the plots obtained from plowed and well-leveled areas, bring all existing collector-drainage networks into working condition (cleaning) before carrying out this measure, and

determine the salt leaching standards taking into account the degree of soil salinity, the chemical and mechanical composition of salts, and the water permeability properties. It is advisable to carry out salt leaching in the autumn-winter months.

2. Due to the technical malfunction and extremely low efficiency of the existing collector-drainage networks and vertical wells (boreholes), the most optimal reclamation regime is to replace the hydromorphic water regime that has arisen in the main areas with a semi-hydromorphic water regime. This should reflect the entire complex of measures aimed at maintaining the groundwater level below the "critical" depth (2.5-3.0 m). The use of a semi-hydromorphic reclamation regime in agricultural production will allow irrigated saline soils to be maintained in a favorable reclamation state.

3. Improving the reclamation state of soils scattered throughout the district and increasing their productivity requires a separate complex of measures. On such heavy reclamation soils, deep plowing of the land, the use of local and non-traditional fertilizers in acceptable rates, and high-quality salt leaching work will give good results. To maintain the fertility of such reclaimed soils, it is best to establish crop rotation and crop rotation systems, use fertilizers properly, apply differentiated tillage, and, if necessary, conduct chemical reclamation measures.

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