

ECOLOGICAL AND RECLAMATION STATUS OF IRRIGATED LANDS, ITS IMPROVEMENT, AND SOIL FERTILITY ENHANCEMENT (CASE STUDY OF SURKHANDARYA REGION)

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Abstract. The article is devoted to the study of the problems of the ecological and meliorative state of irrigated lands, their improvement and increase in soil fertility, improvement of mechanisms for restoration and commissioning of degraded irrigated lands in the context of further development and liberalization of the economy of the Republic of Uzbekistan, the formation of specific theoretical and methodological-practical approaches to their solution.

Keywords: land, soil, water, degradation, economic liberalization, mechanism, land assessment, irrigated lands in agriculture.

Introduction. Nowadays, the effective use and monitoring of land resources are important and provide key support for forecasting future trends in agricultural land, including irrigated land, precipitation, water resources and land reclamation. Together, these factors serve as important indicators for monitoring land development, effective use, protection from salinization, investment needs and land use efficiency. Each of these factors in turn affects the future development of lands and their effective use. Their analysis will serve as the basis for forecasting agricultural land for the period 2028–2030. The distribution of the land fund of the Republic of Uzbekistan by category as of January 1, 2025 is presented in the figure below. (Figure 1)

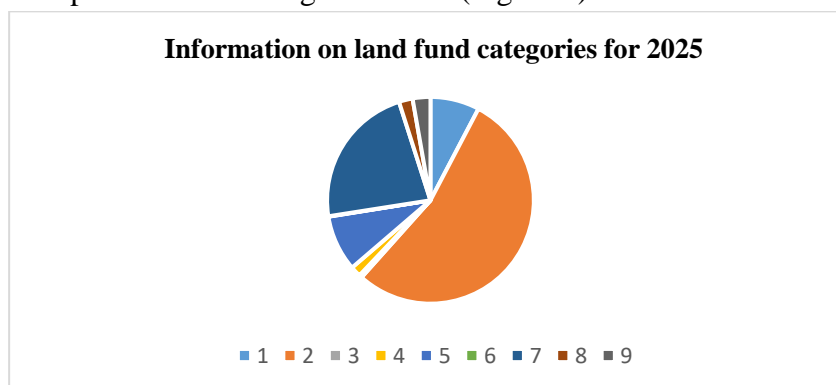


Figure 1: Distribution of the land fund of the Republic of Uzbekistan by category as of January 1, 2025

1. 26,220.7 thousand hectares of agricultural land;
2. Lands of settlements - 221.7 thousand hectares;
3. Lands provided for industry, transport, communications, defense and other purposes amount to 798.9 thousand hectares;
4. Lands for nature conservation, health and recreational purposes amount to 4,258.6 thousand hectares;
5. 32.4 thousand hectares of land of historical and cultural significance;
6. Lands of the forest fund 10,967.7 thousand hectares;
7. Lands of the water fund amount to 1,041.3 thousand hectares;
8. Reserve lands amount to 1,351.0 thousand hectares.

Methodology. Irrigated lands of the Surkhandarya region are divided into 3 categories according to hydrogeological and geomorphological conditions, genesis, direction and intensity of salinization, quantity and reserves of easily soluble salts in soil layers: good meliorative state (saline); average meliorative state (freshness-freshness); The state of meliorative soils can be divided into poor (saline).

The first group includes good, favorable lands of the northern part of the region, where typical and light gray soils are widespread, semi-hydromorphic and hydromorphic regimes of their gray-cereal, cereal, gray-cereal and marsh-cereal soils, Uzunsky, Saryosiyonsky, Altynsaysky, Kumkurgansky districts, the second group includes good, satisfactory lands of the central part of the region, where "transitional" gray-barrel, as well as infertile, sterile, partially typical and light gray soils and their hydromorphic variants are widespread, Denauskyy, Shorchinsky, Zharkurgansky, Baysunsky districts, and, finally, the third group includes bad, unfavorable lands of the southern part of the region, where infertile-cereal, gray-brown-cereal, sandy-desert, desert-cereal and marsh-cereal soils are widespread. These include the territories Bandikhonsky, Muzrabotsky, Angorsky, Kyzryrsky and Sherabadsky districts.

In terms of melioration of irrigated, as well as irrigated reserve and fallow lands in the agro-landscapes of the region, for each group of lands a complex, unique set of measures is required to restore and increase soil fertility, desalinize saline soils and a system of individual measures that best meet the conditions of "melioration" depending on the terrain, geomorphological and lithological structure, hydrogeological and soil-climatic conditions of the region.

Results and discussion. According to the analysis of the results of soil-reclamation and monitoring studies, due to the strong drainage of the foothill and foothill plains of the northern part of the region, the depth of non-mineralized (0.6-1.0 g / l) groundwater from 3-4 to 10-15 meters and their good supply with groundwater, this region is characterized by irrigated automorphic typical and light-colored sierozems, as well as semi-hydromorphic and hydromorphic-meadow-gray, gray-meadow, meadow, and in places marsh-meadow soils, which are not saline, but practically "desalinated" and "saline". Irrigated soils of this region do not require a set of measures for desalination, including additional collector-water networks. It is desirable to maintain the condition and fertility of the soils by timely implementation of high-quality agrotechnical and irrigation anti-erosion measures.

The described territory has been subjected to varying degrees of irrigation erosion due to the fact that the northern region mainly has moderate or strong slopes. Therefore, the main attention should be paid to the prevention of irrigation erosion, namely the length of the canals,

their placement relative to the slope, as well as the volume and speed of water flow in them. The use of polymer compounds (K-4, K-6, K-9, CMC), which strengthen the structure-forming soil aggregates, gives positive results in the prevention of soil erosion.

In the direction from the northern foothills and submountains to the southern desert zone, the movement of groundwater is impeded, they rise closer to the surface, the level of mineralization increases, as a result, the process of salt accumulation and secondary salinization is activated. In terms of the speed and degree of salinization, these massifs represent an intermediate area between the gray earth zone and the desert zone.

The central part of the region is made up of soils of the second group, "saline", mainly slightly, in places moderately saline, "transitional" meadow-gray, gray-meadow, meadow, gray-bare earth, infertile, putrefactive-meadow soils.

It is a fact that the weak, and in places moderate salinity of the central part of the region and its increased susceptibility to salinization, it is extremely important to regularly carry out measures to prevent salinization in these areas, including the correct implementation of irrigation measures, preventing excessive water consumption against the background of rising groundwater levels, irrigation taking into account the water needs of agricultural crops, strict adherence to irrigation standards, repair and re-equipment of all types of irrigation networks and, most importantly, regular maintenance of existing collector-drainage network.

The sub-desert zone of the region, barren-meadow, brown-brown-meadow, sandy-meadow, desert-meadow, meadow-saz, swamp-meadow soils make up the third "saline" group of highly saline soils.

The irrigated lands of this group mainly have medium and heavy sand and clay mechanical composition. The reclamation condition of the soils of this zone is severe.

The main areas of the land in this zone require radical melioration measures. In this case, it is necessary to change the hydromorphic water regime formed in the territory of the zone to the semi-hydromorphic water regime, to reduce the level of groundwater, and for this purpose, the relative length of existing and newly constructed ditch networks should be at least 70-80 pogs per hectare. meter delivery is one of the first tasks.

Paying special attention to salt leaching works, following the developed scientifically based recommendations, and conducting them in several stages during periods when the groundwater level is maximally reduced and the soil temperature is relatively high (in the first half of autumn and winter), taking into account the mechanical composition of the soil, water permeability, salinity level, types of salinity (salt content), and water supply level, on qualitatively leveled areas with a floor area of 0.01-0.02 hectares against the background of effectively working wells, will give the expected results.

For the productive and efficient use of land, it is extremely necessary to carry out an annual inspection of the irrigated agricultural fields, first of all to identify the areas that need to be rehabilitated, and to carry out hydrotechnical, agrotechnical, and agromeliorative measures that optimize the condition of the soil and ensure high productivity.

Strong dusty winds blowing from the southwest to the northeast are frequent in the region and last for 2-3 sometimes 4-5 days. Especially during the hot and very dry summer heat wave (20-35 days) called "Garmsel" in the sands of the steppes of Turkmenistan and Afghanistan, which negatively affects crop yields, animal and human health, the winds that last 3-5 hours a day scorch

the crops. This wind, known as the "Afghan wind", especially damages cotton, fruit trees, melon crops, and corn.

Against wind deflation erosion, high-growing, non-selective soil, drought-resistant, can grow even in saline, groundwater-rich lands, and can grow quickly from roots, buds, cuttings, and seeds. It is necessary to build rows of trees that break the force of the wind, such as fir, potta, birch, wild persimmon, and chestnut. Properly constructed hedgerows on a rigorous scientific basis can block the path of wind and heat waves, help reduce their impact dramatically, control the temperature of the air flow near the ground, and increase its humidity.

The soils of the Surkhandarya region have been exposed to the toxic effects of heavy metals in a certain sense, especially the soils of the typical gray soil region have experienced significant pressure. Soils in the region of irrigated pale gray soils are less affected by heavy metals, the soils of the Kumkurgan district are less affected by pollutants. This is due to the fact that the source of the pollution is far away from the Tajikistan aluminum plant. Soils of all studied districts were significantly affected by organochlorine pesticides. It was found that the flow of Surkhandarya underground water has affected the irrigated lands of the southern massifs of Zharkurgan district and the plains and riverside areas of Termiz district, that is, the amount of water-soluble salts in underground water and the process of soil salinization have increased somewhat.

Conclusion. An increase in the content of gypsum and water-soluble salts was observed in the lower layers of irrigated soils of the desert zone of the region. Monitoring studies clearly showed that erosion processes are accelerating in the soils of pasture and alluvial zones and that the amount of humus in the upper parts of the soil layers in these places is decreasing. In conclusion, it can be said that the direct impact of the human factor on the soil covers of the irrigated and alluvial zones of the region has led to changes in soil covers to one degree or another and the acceleration of some negative processes.

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