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THE UTILIZATION OF LANDS UNDER RECLAMATION CONDITIONS IN AGRICULTURE

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Abstract

This study analyzes the quantitative and qualitative changes in land under reclamation conditions. The research examines key indicators such as soil salinization, moisture regime, and productivity. Factors affecting land degradation, including the efficiency of irrigation systems and climate change, are assessed. Additionally, recommendations and proposals have been developed to improve the effectiveness of reclamation measures and ensure the ecological sustainability of the land. The research results serve as a scientific and practical basis for increasing agricultural productivity and the efficient use of water resources.

Keywords: *monitoring, reclaimed lands, salinization, waterlogging, degradation, land fund, erosion, soil fertility, irrigation system, bonitation.*

Introduction. In our republic, systematic measures are being implemented to ensure the rational and efficient use of land resources, properly organize land management and land monitoring, and develop a control system for agricultural lands based on digitized information gathered through land monitoring. As a result, significant progress has been achieved.

The Presidential Decree of the Republic of Uzbekistan No. PF-60, dated January 28, 2022, "On the Development Strategy of New Uzbekistan for 2022-2026," outlines important tasks, including conducting an inventory and developing an electronic database for monitoring its implementation.

Additionally, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 22, dated January 14, 2022, "On Implementing Monitoring Activities on Agricultural Lands, Protecting Lands, and Regulating Land Management Activities," as well as other relevant regulatory and legal documents, establish specific responsibilities. This research contributes to the fulfillment of these tasks to a certain extent.

A theoretical analysis of the current state of agricultural land use, particularly irrigated farmland, reveals that several key factors contribute to the degradation or withdrawal of these lands from agricultural circulation, leading to their conversion into wasteland, remaining unused, or transitioning to other land categories. The primary reasons for this include:

1. Reallocation of Agricultural Land for Non-Agricultural Purposes. The allocation and redistribution of agricultural land, especially irrigated farmland, for non-agricultural purposes is a legally regulated process. This is driven by the increasing population and the growing demand for various sectors of the economy to develop accordingly. Consequently, there is a constant need to allocate land to meet these demands, leading to the withdrawal of a portion of agricultural land from circulation. However, it is essential that only non-productive, low-yield, and unused agricultural lands are designated for such purposes.

2. Water Supply Deficiency Due to Limited Irrigation Water

A significant portion of Uzbekistan's irrigated farmland depends on transboundary water sources for irrigation. However, in recent years, there has been a noticeable decline in the availability of irrigation water from these sources, leading to a reduction in the allocated water volume for the country. As a result, various challenges have emerged in ensuring a stable water supply for existing irrigated lands. To mitigate this issue, it is crucial to widely implement water-saving technologies in agriculture and explore internal resources to improve irrigation water supply for crops.

3. Deterioration of Internal Irrigation Canals and Flume Systems. Due to the poor condition of internal irrigation canals and flume systems, water often fails to reach irrigated fields. The agrarian land reforms that began in the 1990s and continue today led to the dissolution of large agricultural enterprises and the establishment of new types of individual farms and farmer cooperatives. This continuous restructuring left many irrigation canals and related hydraulic structures abandoned. The Water Consumers Associations (WCAs), created to address this issue, have not been effective in ensuring the proper maintenance and functioning of irrigation systems. As a result, irrigation canals and flumes were neither repaired nor cleaned in time, leading to their degradation and collapse. For example, in Kashkadarya province alone, 54,011 hectares of irrigated farmland have been lost from agricultural circulation due to these issues.

4. Deterioration of Land Reclamation Leading to Agricultural Land Withdrawal. The condition of irrigated agricultural lands significantly depends on their reclamation status. The effective functioning of collector-drainage networks in irrigated areas plays a crucial role in maintaining land usability. Timely maintenance of these networks helps lower the groundwater table and reduce soil salinity, creating favorable conditions for efficient land use. Neglecting these measures leads to land degradation, reducing the area available for agricultural activities.

5. Soil Erosion. Soil erosion in irrigated areas has a significant negative impact on land use. It manifests in two forms: wind erosion (deflation) and water erosion. Wind erosion primarily occurs in flat regions with strong winds, while water erosion is more common in hilly and uneven terrains. In areas where erosion processes persist over time, irrigated farmland can be lost from agricultural circulation. To prevent such situations, specific anti-erosion measures must be implemented in high-risk regions.

6. Declining Soil Fertility. Soil fertility is the key factor determining agricultural productivity. Improving soil fertility directly contributes to increased crop yields. Despite large-scale efforts over the past 25–28 years to improve the reclamation status of irrigated agricultural lands, including crop fields, the average soil fertility index across the country remains around 54 points. Therefore, increasing land productivity through advanced technologies and agro-technical measures, promoting water-saving irrigation methods, and expanding and improving farmland through public-private partnerships remain critical issues in modern agriculture.

Moreover, maintaining and continuously improving soil fertility is a key factor in increasing agricultural production. The decline in soil fertility and the deterioration of its

ecological condition lead to higher resource consumption per unit of irrigated land, resulting in a sharp decrease in agricultural income.

As of January 1, 2024, in the Republic of Uzbekistan:

• The total arable land area: 4,028.6 thousand hectares

• The total area of irrigated cropland: 3,245.1 thousand hectares

• The total area of land with poor reclamation conditions: 415.8 thousand hectares

The reduction in irrigated farmland is influenced by several factors. Alongside the allocation of land for non-agricultural purposes, other contributing factors include the deterioration of land reclamation conditions, which leads to the conversion of cropland into other land types, the establishment of tree plantations on arable land, and the chronic underutilization of fields due to water shortages. Both natural and anthropogenic factors play a significant role in this process (Figure 1).



Figure 1. Khujayli district, "Karakalpakistan" region, "Kulab" OFY. The district administration's reserve land area is 648-B, with 6.4 hectares of land that have been out of agricultural circulation for 40-50 years due to poor soil conditions.



Figure 2. Khujayli district, Aibek region, Samankul OFY "Khujayli Makhliyo" farm. The farm has a total area of 87 hectares, with contour numbers 279-271-155-152-154-269. Of this, 75.5 hectares are arable land, and 30 hectares are planted with wheat in the cotton-grain direction.

Results and Observations. According to the analysis of monitoring data over the past 15 years, it has been observed that between 2010 and 2016, the area of land with poor meliorative conditions increased by 36,000 hectares in our country. In contrast, between 2017 and 2024, this area decreased by 6.5 thousand hectares.

Based on the analytical monitoring data, in 2010, 1,000 hectares of forest land had poor meliorative conditions, and by 2024, this area increased to 1,800 hectares (Table 1).

When analyzing the changes in the composition of land categories with poor meliorative conditions in 2024, it can be observed that the agricultural land area is 33.5 hectares, forest land is 0.8 hectares, and water fund land is 0.1 hectares, while no significant changes have been detected in the composition of reserve land (Table 1 and Figure 1).

It is well known that in agriculture, the development of farming, improving the fertility of eroded soils, and enhancing the meliorative condition of soils through the use of modern innovative technologies is one of the key tasks. Therefore, to restore soil fertility in such farms, it is necessary to use intensive farming systems and new modern innovative technologies. Based on the above, field experiments were conducted using effective innovative methods to restore the fertility of irrigated soils affected by erosion and to increase cotton yields.

The quality of land is determined by factors such as soil salinization, the level of nutrient supply to the soil, the relief of the area, the meliorative condition of the land, and others. The quality assessment of more than half of irrigated lands, i.e., their bonitet, is considered to be relatively high. In the salinization of irrigated soils, the impact of anthropogenic factors is greater than that of natural factors.

One of the key components of the state land cadastre is the soil quality assessment (bonitet) which holds significant importance. Currently, evaluating the quality of irrigated lands in the republic and, based on this, determining the productivity of agricultural crops, as well as utilizing bonitet data for various purposes, is one of the pressing issues.

One of the methods for assessing land quality, based on the characteristics that determine soil fertility, is evaluating its natural fertility (bonitization). Determining the natural fertility of land involves assigning a comparative score based on the most important agronomic characteristics of the land, which plays a crucial role in state land cadastre activities. The primary goal of bonitization is to show, based on the relative and stable characteristics of soil fertility, how much better or worse one type of soil is compared to another.

According to official data, 47% of irrigated lands in the republic are salinized to varying degrees. The area of land affected by water erosion is 628.4 thousand hectares, making up 14% of the total area of irrigated lands, of which 4.5% is moderately to heavily eroded. Additionally, 700.0 thousand hectares of land have been affected by wind erosion to varying degrees.

Under the influence of human economic activities, the improvement of the meliorative state of the land, the implementation of optimal agronomic measures, and the proper application of organic and mineral fertilizers can lead to an increase in the productivity and quality of the soil.

In the monitoring process, the area of salinized land, as of 2024, was analyzed. In the Republic of Karakalpakstan, the salinized land makes up 71.2% of the total irrigated land area; in Bukhara region – 47.9%; in Kashkadarya region – 43.3%; in Jizzakh region – 72.0%; in Navoi region – 74.5%; in Surkhandarya region – 28%; in Syrdarya region – 95.0%; and in Khorezm region – 99.2%.

Conclusion

Today, many decrees, orders, and decisions have been adopted by the President and Government of the Republic of Uzbekistan aimed at improving the meliorative-ecological condition of the land, preserving and enhancing soil fertility. Furthermore, state programs have been approved and are being implemented. As a result, the ecological-meliorative state of irrigated lands is improving, and their fertility and agricultural crop yields are rising. However, despite these efforts, negative processes on irrigated and rain-fed lands have not been fully eradicated. The main causes of this situation are negative processes affecting soil fertility, such as secondary salinization and erosion. These phenomena are linked to natural factors (hydrogeological conditions and landscape structure) and anthropogenic factors (failure to implement agronomic and agromeliorative measures at the required level). Such lands require continuous meliorative measures, as otherwise, even after significant effort and investment to restore their fertility, they could lose it again in a short period of time.

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