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Improvement of The Methodology for Inventorying Degraded Reclaimed Lands

Atakulov To'xtamurod Umarovich
PhD in Agricultural Sciences, "Uzdaverloyiha" Scientific Researcher (DSc Candidate), Uzbekistan

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Abstract: The proposed methodology for increasing the efficiency of monitoring degraded reclaimed lands defines a unified approach and structure for conducting agricultural land monitoring in the country.

Keywords: Reclaimed lands, inventory, land types, monitoring methodology, preparatory work, field observation, office-based analysis, review and approval of project results, presentation of project outcomes.

Introduction: Globally, scientific research is being conducted to develop new scientific and technical solutions for the inventory of irrigated agricultural lands. Special attention is given to studies aimed at developing various approaches and mechanisms for inventorying reclaimed agricultural lands. In particular, improving methods for applying innovative technologies in the inventory of degraded reclaimed lands is one of the key tasks.

The project work on inventorying degraded reclaimed lands is carried out within the administrative boundaries of districts (cities) in accordance with administrative-territorial divisions. This is implemented by the "Uzdaverloyiha" State Scientific and Design Institute and its regional branches, based on the requirements of Resolution No. 22 of the Cabinet of Ministers of Uzbekistan, dated January 14, 2022. The inventory is conducted using the data from the State Land Cadastre, which includes information on land types, areas, land users, and tenants for irrigated agricultural lands.

Based on the results of the project work on inventorying degraded reclaimed lands, data on the area, type, contour, boundaries, and legal ownership of agricultural lands are recorded in the Institute's Land Information System portal.

To ensure the effective organization and timely, high-quality execution of the inventory process for degraded reclaimed lands, a Working Group is established by order of the district (city) mayor. The Working Group is led by the Deputy Mayor in charge of agriculture and water management. The Working Group includes the heads of the District Agriculture and Water Management Departments, the head of the Land Management and Monitoring Division of the District Agriculture Department, the head of the District (City) Branch of the State Cadastre Chamber, the head of the District Branch of the Uzbekistan Farmers, Dehkan Farms, and Household Landowners Council, as well as representatives of the "Uzdaverloyiha" Institute and its regional divisions, which are responsible for executing the project work.

The project work for the inventory of degraded reclaimed lands is coordinated by the Working Group established at the district (city) administration. The inventory process for these lands is carried out in the following stages:

- Preparatory work;
- Field survey work;
- Office-based (cameral) work;
- Review, agreement, and approval of project results;
- Presentation of project results.

Preparatory Work:

As part of the project work for the inventory of degraded reclaimed lands, the following documents and materials are collected, studied, and analyzed during the preparatory stage:

Land reports based on the administrative territory of

the district (city);

Information on the use of degraded reclaimed lands according to their specialization, their condition, and details about land users and tenants;

Satellite images and cartographic materials;

Factors affecting the changes in the reclamation status of degraded lands, the implementation of reclamation measures, water supply conditions, and information about lands that have been withdrawn from agricultural use;

Data on the condition and areas of perennial plantations (orchards, vineyards, mulberry groves, and other tree plantations);

Information on the placement of agricultural crops;

Data on the normative value of existing agricultural lands used by agricultural producers;

Archival materials from the Institute and its regional branches regarding previous inventories of agricultural lands;

Information on unallocated degraded reclaimed lands that have not been assigned to farmers or other agricultural organizations;

Availability of electronic digital maps of degraded reclaimed areas within the administrative boundaries of the district (city) at scales of 1:10,000 (1:25,000);

Other relevant documents and materials concerning degraded reclaimed lands.

Field survey work: Field survey work is carried out by specialists from the regional branches of the Institute, together with specialists from the District Department of Agriculture and land users or tenants. If necessary, experts from the Water Management Departments and other relevant organizations may also be involved.

During the field survey, electronic digital maps of degraded reclaimed areas at a scale of 1:10,000 are updated to reflect the following:

Relevant changes, including topographic elements of the area, as well as the boundaries of existing rural settlements, construction sites, agricultural and other land types, infrastructure facilities, and more;

Unused irrigated agricultural lands within the area that are not in use by legal or physical entities and their current status;

Lands that have been reintroduced into agricultural use over the past year and their actual condition;

Agricultural lands currently under cultivation but in poor reclamation condition, along with the reasons for land degradation;

Lands that have been withdrawn from agricultural use and the reasons for their abandonment;

Lands occupied by perennial plantations (orchards, vineyards, mulberry groves, and other tree plantations) that have become unproductive, along with the reasons for their deterioration.

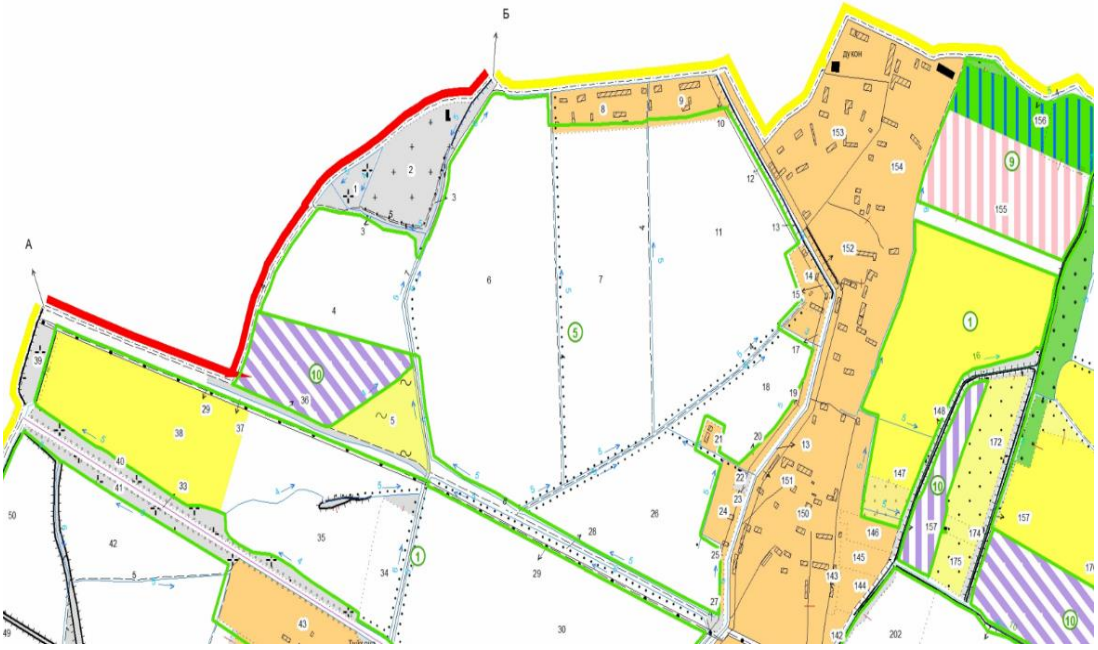

Figure 1. The above-mentioned actions are mapped as follows.

During the field survey process, the actual usage status of lands with poor reclamation conditions is also reflected in electronic digital agricultural maps.

In areas where the district (city) does not have an electronic digital agricultural map, survey work is carried out using remote sensing materials. If necessary, maps and materials are prepared using unmanned aerial vehicles (drones), and electronic

digital agricultural maps are created in accordance with the established procedure.

If ambiguities arise in the land types and areas used by land users and tenants based on the research and analysis conducted during the preparatory work, these cases are re-examined in the field by specialists from the Institute or its regional divisions.

If cases of non-agricultural use of irrigated agricultural lands are identified during the field survey, these cases are recorded on-site with the participation of the specialist performing the project work and a representative of the district Agriculture Department. The collected documents are then consolidated through the regional division of the Institute and submitted to the district Working Group for review and appropriate decision-making. Information on identified cases may be submitted to the district (city) Working Group multiple times until the completion of the project work.

Within its authority, the district Working Group reviews the submitted documents and submits proposals to the district (city) governor on resolving the issues. The Working Group also provides relevant information to the inspection authorities responsible for state control over the protection of agricultural lands.

Office Work (Cameral Work): All data identified during the fieldwork is entered into an electronic map using the ArcGIS software, and attribute data is completed in the following format:

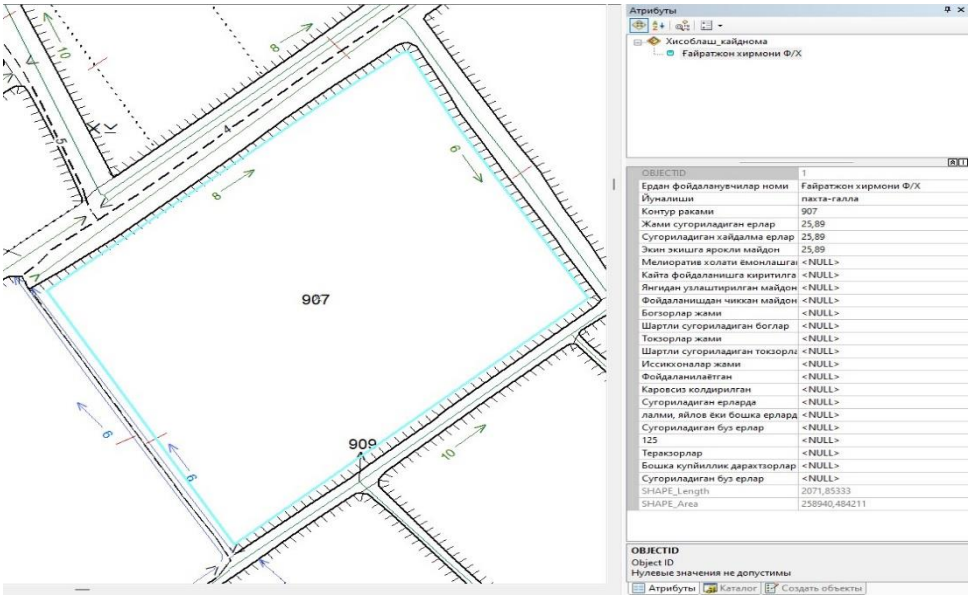

Figure 2. Uploading all data identified during fieldwork into the ArcGIS software.

Based on the results of the conducted survey, land management project documents and materials are formed in the following order:

- Information on irrigated lands that have been reintroduced into agricultural use and newly developed over the past year.
- Information on lands that have been removed from agricultural use and the reasons for their exclusion, as well as information on irrigated lands with poor reclamation conditions.
- Information on cases of using irrigated lands intended for agriculture for other purposes.

Based on the results of field surveys, a protocol in two copies is prepared on-site for each area regarding the surveyed lands with poor reclamation conditions. This protocol is signed by the district agricultural department's land surveyor, the chief project engineer of the Institute's regional division, and the specialists who conducted the project work.

The explanatory note of the project work includes recommendations and proposals for improving the efficiency of land use in areas with poor reclamation conditions, as well as land occupied by perennial plantations (orchards, vineyards, mulberry groves, and other tree plantations).

The records of the actual land types and plots used by land users and tenants, including peasant farms, are compiled in the following sequence:

- Lands allocated to farming enterprises.
- Lands of other agricultural enterprises (clusters, agro-firms, enterprises, organizations, societies, and cooperatives).
- Lands of research institutions and educational-experimental farms in the agricultural sector.
- Lands of subsidiary agricultural farms.
- Lands of peasant farms (total area by contour).
- Unused lands not allocated for agricultural purposes and irrigated lands designated for agriculture

under the jurisdiction of district (city) administrations.

Based on the results of the field survey, all land users' and tenants' land plots and types, as well as irrigated lands reintroduced into agricultural use over the past year, agricultural crops currently cultivated on lands with poor reclamation conditions, lands removed from agricultural use, and lands occupied by deteriorated perennial plantations, are updated in 1:10,000 scale electronic digital agricultural maps using the following conventional symbols.

Cases of using land for purposes other than designated are recorded in the report by the project specialist and separately marked with specific symbols in the electronic digital agricultural map.

A database of land types used by land users and tenants is created and analyzed. Changes in the condition of lands with poor reclamation status are recorded in the Ministry of Agriculture's CROP AGRO platform.

Figure 3. Existing Lands with Poor Reclamation Conditions in Tashkent Region.

Review, Approval, and Confirmation of Survey Results:

Based on the final results of the land survey project for identifying lands with poor reclamation conditions, the compiled contour records, tables, updated electronic digital agricultural maps, and other related documents are initially reviewed by the responsible authorities of the Institute or its regional branches. Following the review, a formal inspection report is prepared.

As a result of reviewing the project works conducted for surveying lands with poor reclamation conditions, recommendations for the effective and rational use of land are developed, along with a draft meeting protocol of the Working Group established by the order of the district (city) governor. The Working Group reviews the materials within its authority, and the meeting protocol is approved by the head and secretary of the Working Group.

The following documents are attached to the meeting protocol of the district Working Group:

- Composition of the Working Group providing practical assistance in surveying lands with poor reclamation conditions;
- Records of land types and areas of lands with poor reclamation conditions, categorized by contours;
- Records of land types and areas of land users, tenants, and irrigated reserve lands under the district administration’s jurisdiction, categorized by contours;
- Information on irrigated lands that have been reintroduced into agricultural use or newly developed in the past year;
- Information on lands that have been abandoned from agricultural use, along with the reasons for their abandonment, and data on irrigated lands with poor reclamation conditions;
- Data on existing orchards, vineyards, mulberry plantations, and other perennial tree plantations, their condition, and proposals for their future effective use;
- Information on constructed greenhouses;
- Data on the use of lands with poor reclamation

conditions for other purposes;

- Recommendations for the effective and rational use of lands;
- Maps of lands with poor reclamation conditions;
- Other issues related to the survey.

If deficiencies are identified in the reviewed project work, the executing specialists take necessary corrective actions under the supervision of the relevant responsible authorities of the Institute or its regional branches.

The approved protocol, along with relevant land management project documents and a draft resolution of the district (city) governor, is submitted to the district administration by the Working Group. The district (city) administration reviews the materials on surveying lands with poor reclamation conditions and issues a resolution to organize their effective use.

Presentation of Survey Results: According to the finalized and approved contract, a set of documents is prepared in three copies upon the completion of the work. The original copy and its electronic version are archived in the executing department's records, the second copy is stored in the "UzDavYerLoyiha" DILI archive, and the third copy is submitted to the District Agricultural Departments.

The consolidated results of the survey of lands with poor reclamation conditions, along with their electronic version, are submitted for entry into the Ministry of Agriculture's **CROP AGRO** platform.

The transition to intensive agricultural production methods through the introduction of modern agro-technologies and the provision of farmers with high-performance agricultural machinery is a key direction for ensuring the sustainable and efficient development of the sector.

As seen from the above information, reclamation monitoring plays a crucial role in the rational and efficient use of agricultural land. Implementing land reclamation monitoring allows for:

- Defining measures to prevent soil salinization, waterlogging, and other reclamation issues;
- Ensuring the targeted and efficient use of land by taking necessary actions to improve their reclamation conditions;
- Identifying internal and external factors affecting soil fertility, providing a fundamental database for eliminating these issues and undertaking land restoration efforts.

CONCLUSION

Currently, the system for monitoring and recording the reclamation status of land is one of the key measures that must be implemented in the agricultural sector. The scheme developed by our team integrates the accounting of land with poor reclamation conditions into the CROP AGRO platform through the Land Information System Portal.

It is important to note that conducting real-time online monitoring of reclaimed land and ensuring the prompt updating of ongoing changes is of critical importance in the context of both time and space.

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