ISSN NO: 2770-0003
November 2025

Geoinformation And Analytical Control Of Agricultural Land Use And Crop Placement

Abdullayeva Maxfuza Tulqinovna
Doctor of Philosophy (PhD) in Agricultural Sciences, Senior Researcher
State Scientific Design Institute «Uzdaverloyiha»
https://orcid.org/0009-0000-6004-6260
E-mail: maxfuza85@mail.ru

Abstract

The article highlights the importance of digital management in the placement of crops, the application of a crop rotation system and the efficient use of water resources in agriculture. The role of the "CropAgro" information system in automating agrotechnical processes, ensuring environmental sustainability and increasing yields will be analyzed on a scientific basis. It will be shown that the use of the system will lead to an increase in production efficiency and a reduction in land degradation.

Keywords: agriculture, "CropAgro", crop rotation, crop placement, water supply, productivity, digital monitoring, agroecosystem.

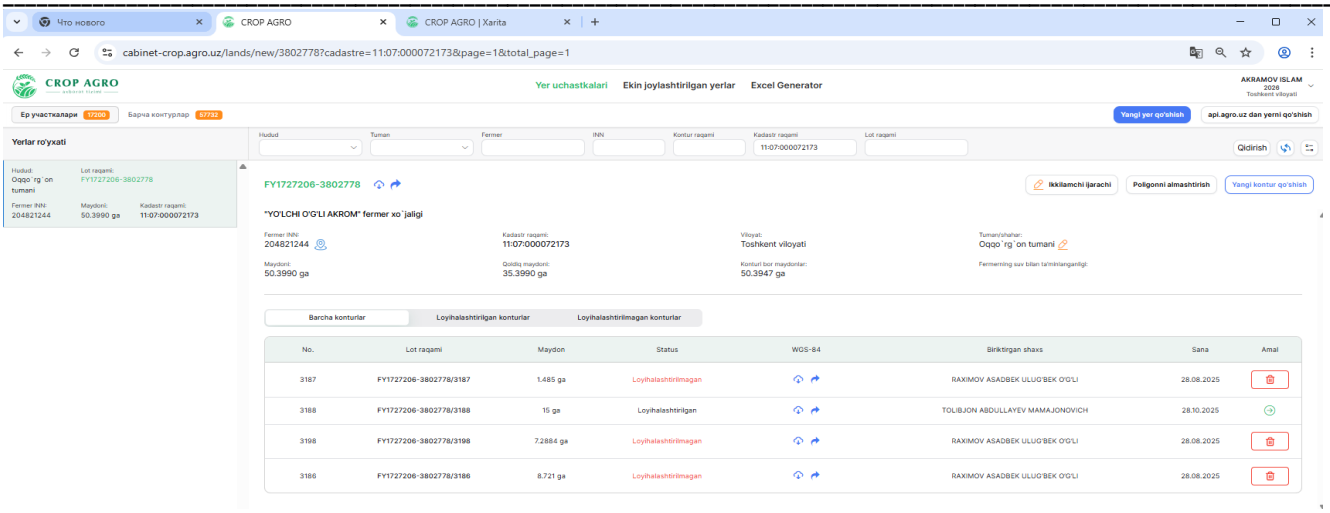
Rational use of land resources in agriculture, scientifically based crop placement and increased production efficiency are among the main factors of agricultural sustainability. In modern conditions, factors such as global climate change, water scarcity and food insecurity require further improvement of the agricultural management system. At the same time, the introduction of digital technologies, in particular information systems, is becoming important.

In the implementation of the agrarian policy pursued by the government to further accelerate and develop agricultural production in the Republic of Uzbekistan, land accounting is of great importance, and its implementation within the framework of time requirements based on the use of Gat technologies. Crop monitoring is the measurement of the areas sown by agricultural crops based on crop placement indicators, as well as monitoring the timely implementation of agrotechnical measures related to land cultivation carried out on arable land[3, 5].

Improper use of agricultural land, in particular intensive farming, monoculture and land reclamation, also worsen the condition of the land and reduce its fertility. The reduction and degradation of the land stock can negatively affect the economic, social and environmental condition of the region. Therefore, comprehensive measures must be taken to solve this problem [7].

The "CropAgro" information system, as a modern digital platform that allows planning acreage, observing crop rotation, monitoring water supply and yield indicators, occupies an important place in the modernization of agricultural management. The regulatory legal requirement establishes that by the autumn of each year, based on the results of the placement of agricultural crops, a package of proposals for the formation of agro-economic specialization of territories and massifs is developed and submitted to the Ministry of Agriculture of the Republic of Uzbekistan in accordance with the established procedure[1, 2].

ISSN NO: 2770-0003
November 2025



"CropAgro" axborot tizimining agrar boshqaruvdagi funksional roli. "CropAgro" information technology is a comprehensive platform designed to collect proposals from land users, electronically place crops, control crop rotation, process data on water supply, and generate agroeconomic reports. The implementation of the system leads to the following scientific and practical results:

- automation of crop placement based on scientific criteria;
- management of water resource allocation based on specific models;
- electronic monitoring of soil fertility reduction;
- reducing the risk of crop rotation disruption;
- improving the reliability of yield forecasting.

The use of digital control minimizes subjective factors in the agricultural system and increases production efficiency.

The "CropAgro" information system allows you to create an accurate electronic placement model based on these parameters. In particular, the rational placement of crops is based on the following main criteria:

a) natural and climatic conditions of the territory: geographical location, geomorphological and lithological structure, hydrogeological and climatic conditions, soil fertility (bonus score) and land reclamation status;

the sum of useful temperatures, precipitation, the state of hydro-reclamation systems and groundwater, the likelihood of frost and drought, water and wind erosion;

the correspondence of the duration of the growing season of agricultural crops to a specific territory;

b) provision of the territory with necessary resources: availability of land with the possibility of growing (producing) agricultural products;

provision of land with water, necessary agricultural machinery and labor resources;

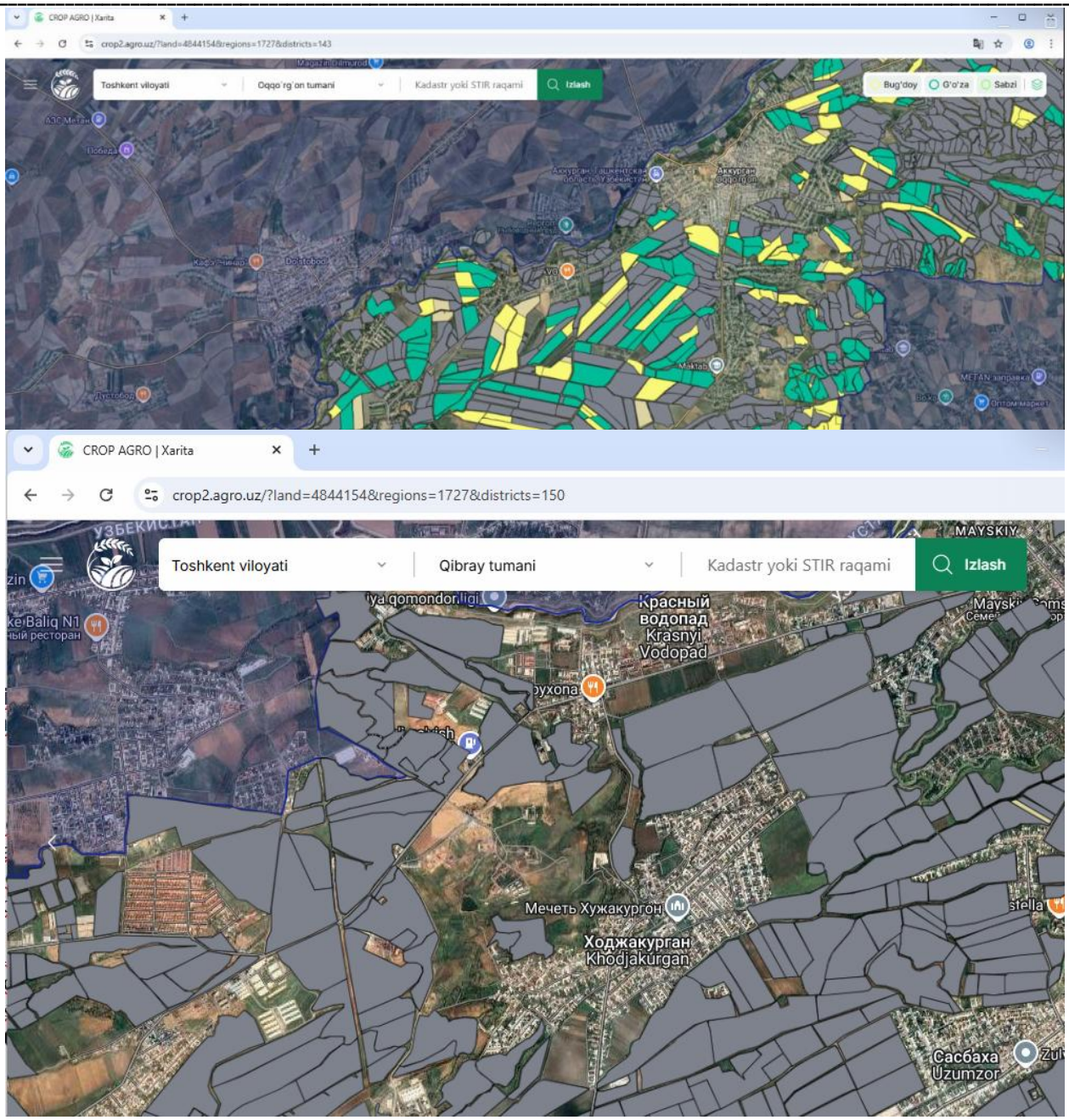
availability of special opportunities to increase the productivity of a particular type of agricultural crop;

c) demand for manufactured products in domestic and foreign markets: the level of satisfaction of domestic market needs for manufactured agricultural products and demand in the foreign market;

offers from exporting and processing enterprises, agro-clusters (cooperatives) for the purchase of agricultural products.

Geo-information and analytical control of the use of agricultural land and crop placement "CropAgro" information system (Pictures 1 and 2).

ISSN NO: 2770-0003
November 2025



Agroeconomical normative data on cotton yield, calculated on the basis of normative yield indicators (c/ha) according to the soil bonus score, are transmitted to the information system of the Commodity and Raw Materials Exchange of the Republic of Uzbekistan JSC through the "CropAgro" information system using electronic integration. The analysis of irrigated and fallow lands is carried out by the territorial divisions of the Uzdavierloiha Scientific Design Institute of the Ministry of Agriculture on the basis of topographic and cadastral maps on a scale of 1:10 000, and each crop is visually displayed in the geographic information system (GIS) using geocoded symbols (Picture 3).

The following agrotechnical and monitoring measures are regularly analyzed to ensure the implementation of decisions made on the placement of agricultural crops on irrigated and fallow lands for the next year's harvest:

• compliance of the types of crops in the established contours with agrotechnical requirements;
• compliance with the agricultural crop rotation system (crop rotation turnover);
• implementation of modern water-saving irrigation technologies (drip irrigation, aerosol irrigation, micro-misting, etc.) in areas with limited water resources;
• control of the placement and dynamics of crop planting by farmers and dehkan farms in accordance with the parameters of export contracts.

ISSN NO: 2770-0003
November 2025

An integrated system for monitoring the location of crops and assessing their condition is carried out using geographic information systems (GIS), remote sensing methods, space and hyperspectral images, and other innovative agroinformation technologies. Thanks to this, efficient use of agricultural land will be ensured, and the system of digital management decision-making in the agro-industrial complex will be improved.

Electronic integration between the information systems “CropAgro” and “Commodity and raw materials exchange of the Republic of Uzbekistan” has an important place in the automation of agro-economic data exchange and accounting, analysis and forecasting of normative indicators of productivity. At the same time, Cadastral and topographic maps of a scale of 1:10 000, created by the territorial units of the institute “Uzdavyerloyiha”, provide clarity and transparency in the use of agricultural land.

In particular, according to the data of Table-1, it is possible to see 96,745 agricultural farms, foreign organizations, Agroportals, and information systems, Agroplatforms, and plans for the cultivation of wheat culture in 2026 in the Tashkent region.

№	Name of Regions	Wheat is planted	2026- year						
			Wheat loaded			Sent to agroplatforma			
		area, ha	number of farmers	field, ha	%	number of farmers	area, ha	harvest, tn	%
Tashkent region total		**96745**	**2058**	**97078**	**100,3**	**1749**	**87797,6**	**324155,8**	**90,8**
1	Oqqo‘rg‘on district	10700	185	10468,2	97,8	166	9792,7	36032,7	91,5
2	Ohangaron district	4700	293	5341,2	113,6	206	2719,8	9102,3	57,9
3	Bekobod district	12000	244	12065,3	100,5	235	11412,8	40075,9	95,1
4	Bo‘stonliq district	1000	1	1001,9	100,2	1	1001,9	3788,5	100,2
5	Bo‘ka district	14000	369	14001,4	100	354	13387	49079,5	95,6
6	Quyichirchiq district	13700	1	13704,9	100	1	13658,8	51460,2	99,7
7	Zangiota district	500	44	500	100	39	412,7	1596,6	82,5
8	Yuqorichirchiq district	5803	119	5871,3	101,2	108	5368,7	21012,2	92,5
9	Qibray district	874	67	1006,9	115,2	42	516	1893,9	59
10	Parkent district	0	0	0	0	0	0	0	0
11	Pskent district	8000	167	8067,7	100,8	166	7823	28963,4	97,8
12	O‘rtachirchiq district	10100	167	10127	100,3	158	9433,5	35203,6	93,4
13	Chinoz district	7500	89	7500	100	76	6914,1	26037,5	92,2
14	Yangiyo‘l district	7868	319	7422,1	94,3	204	5356,6	19909,5	68,1
15	Toshkent district	0	0	0	0	0	0	0	0
16	Nurafshon city	0	0	0	0	0	0	0	0
17	Olmaliq	0	0	0	0	0	0	0	0
18	Angren	0	0	0	0	0	0	0	0
19	Bekobod	0	0	0	0	0	0	0	0
20	Ohangaron city	0	0	0	0	0	0	0	0
21	Chirchiq	0	0	0	0	0	0	0	0
22	Yangiyo‘l city	0	0	0	0	0	0	0	0

ISSN NO: 2770-0003
November 2025

The implementation of interactive Web-GIS platforms enables real-time tracking, analysis, and evaluation of information on crop areas, plans, and agricultural practices. This automates agroecological monitoring processes, promotes the rational use of water resources, supports agricultural rotation systems, and ensures sustainable yield increases. This will also create opportunities for assessing the condition of agricultural lands using remote monitoring and digital mapping technologies, monitoring compliance with agricultural standards, and making management decisions in the agro-industrial complex based on concrete evidence. Overall, the implementation of geoinformation and digital monitoring systems in agriculture will facilitate the efficient use of land resources, develop scientific analysis and forecasting models in the agricultural sector, and have important scientific and practical implications for improving economic efficiency.

The study's results demonstrate that the implementation of a digital geodata-based management system in agriculture will improve land use efficiency, forecast yield targets, and optimize crop placement. This system ensures the efficient use of agricultural land, enables accurate yield forecasting, conserves water resources, and serves to improve digital management in the agro-industrial complex. At the same time, its implementation reduces the human factor in land resource management and ensures data transparency.

References

1. Resolution of the President of the Republic of Uzbekistan dated March 28, 2025 No. PP-131 “On additional measures to improve the efficiency of land use in agriculture and increase production volumes”.

2. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated August 24, 2020 No. 505 “On approval of the Regulation on the procedure for the rational placement of agricultural crops”.

3. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated January 14, 2022 No. 22 “On approval of regulatory legal acts governing the monitoring of agricultural land, land protection and development”.

4. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated December 23, 2000 No. 496 “On approval of the Regulation on the procedure for conducting land monitoring in the Republic of Uzbekistan”.

5. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated March 28, 2025 No. 191 “On additional measures for the efficient use of land plots of household and dehkan farms”.

6. Turaev R.A. Earth Monitoring / Study Guide. – Tashkent: Lesson Press LLC, 2022. – 161 p.

7. Abdullaeva. Improving the methods of organizing monitoring of agricultural lands based on digital technologies / Monograph. - Tashkent: “PUBLISHING HIGH FUTURE” OK, 2023. - 129 p.