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ADVANTAGES AND TASKS OF REMOTE SENSING LAND OF DEHKANS AND FARMERS

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Abstract: *in countries around the world, land monitoring is carried out using modern geographic information systems and unmanned aerial vehicles, even on agricultural land and on small farms. In particular, monitoring of agricultural land in the republic is carried out using modern geographic information systems and drones. However, on small plots of land (farms and yards) modern innovative methods are not used. Therefore, the achievement of high accuracy in monitoring of farmers and horticultural enterprises is much lower. To do this, monitoring the use of farmland requires the formation of an effective and efficient mechanism. In this regard, the article develops proposals and recommendations to improve monitoring of the use of existing land by farmers and farms of the country.*

Key Words: *GAT, drone, ARGIS, strategy, exporter, modernization, concept, monitoring.*

1. INTRODUCTION:

"... Cooperation between farmers and landowners, who account for more than 70% of gross agricultural output, and between processing, processing and exporting enterprises is underdeveloped ..." [1]. This shows that today we do not adequately assess the potential of farmers and horticultural farms, which have a large share in the production of agricultural products. Of course, the necessary measures and measures to be taken in this regard, the practical solutions to be taken are important.

The scientific approach and the use of modern methods in solving these problems, as well as the modernization of the industry will have some effect in solving problems in this area. In addition, Annex 1 to the Decree of the President of the Republic of Uzbekistan dated June 17, 2019 PF-5742 "On measures for the efficient use of land and water resources in agriculture" in the "Concept of efficient use of land and water resources in agriculture" Monitoring the use of land and water resources through geographic information systems, extensive use of remote sensing systems. This shows that the use of modern information technologies in the efficient use of land of farmers and horticultural farms is an effective tool in solving the problems that need to be addressed. Monitoring of lands of farmers and horticultural farms, which are the main link in the cultivation of agricultural products, their technical improvement is impossible without modern technologies. In particular, modern geographic information systems and technologies (GAT) and remote control devices are one of the main tools to be used in this regard today.

At present, the lack of proper monitoring of small plots of land, the lack of a mechanism for redistribution of small plots of land, the inability to organize the rational use of land allocated to small plots, indicate the existence of reserves for further development of these farms.

2. LITERATURE REVIEW:

Applied research aimed at improving the toolkit of digital electronic maps - the basis of efficient agricultural production was carried out by: Debolini, M. et. al (2013); Williams, C. L. and et. al (2008); Patel, N. R., Zoning, A., & Patel, N. R. (2002); Hiloidhari, M., Baruah, D. C., Singh, A., Kataki, S., Medhi, K., Kumari, S., Thakur, I. S. (2017). Issues of digital electronic maps in agriculture are reflected in the works of the following scientists: Musaev (2019); Rakhmonov (2018); Narbaev (2019 a, b); Durmanov et al. (2019 a, b); Babazhanov (2019). The main goal of the study was to develop the theoretical and methodological foundations of cadastral valuation of land, assessment of the land resource potential of agriculture in the Republic of Uzbekistan in the context of intensive land use of electronic agricultural maps.

3. METHOD:

Research methods to solve the set tasks used a systematic approach, monographic observation, an abstract approach, methods of numerical modeling, etc. The research was carried out using actual data from the National Center for State Cadastre, Geodesy and Cartography, the State Committee of the Republic of Uzbekistan on Land Cadastre, State Committee of the Republic of Uzbekistan on Statistics.

4. FINDINGS AND DISCUSSIONS:

Based on the above, the object of research was the creation of an electronic map of the state of agricultural lands using geo-information systems of lands of farms in Koshrabat and Ishtikhon districts of Samarkand region in the monitoring of farmland. In this sense, the use of digital technologies in determining the condition of farmland and horticultural lands is one of the most effective and rapid methods today. Because geoinformation technology (GAT) allows electronic mapping of various statistical data using its own software. Today, high technologies are being rapidly introduced in agricultural production. In this sense, the data in the GAT are divided into two types. Geographical and attribute data. Geographic information provides us with complete information about the location of objects in describing or visualizing a particular process. Modern electronic mapping tools, on the other hand, are one of the most advanced tools available today for directly linking and mapping tabular data or statistics to maps [5].

Among other modern technologies, Earth Remote Sensing (EMZ) technologies are being used in agriculture. Use of satellite imagery and drones. Such data are more reliable and are important in reflecting the condition of agricultural lands and plants.

Satellite imagery allows not only to create a visual map of the land, but also to determine their actual use, as well as to identify unused land plots or areas of misuse of agricultural land. Erosion, swamping, soil erosion, and other degradation conditions can be observed using satellite imagery. Such an analysis helps to plan agriculture at the state level [4].

Observations and analyzes through constant satellite imagery can greatly help to qualitatively assess the germination and ripening of the crop, early detection of diseases. Based on the results of remote sensing data processing, it is possible to develop a variety of maps on the condition of crops on farms and backyards, as well as recommendations for the differential application of mineral and organic fertilizers. This allows remote monitoring of all processes on these farms, as well as ensuring the projected efficiency.

The main threats to farmers and horticultural farms are natural disasters such as drought, pests. History is well aware that such natural disasters have led to terrible famines. Of course, even today we cannot compete with nature, but we can be prepared for the unexpected and stabilize irrigation and reclamation.

There are almost no barriers to the use of satellite data at the farm and farm level. Today, it is possible to take free and freely distributed images in the size of 10-30 meters from space every week. Free images are provided by the U.S. National Geological Survey, NASA, or the European Space Agency.

In this way, farmers and horticultural farms can use special web services to quickly monitor the condition of crops. They allow for quick tracking of agricultural crops and are becoming increasingly popular today. However, the introduction of space technology in agricultural production at the state level requires political will. Technically, we have all the data from the available satellite, without which it is impossible to make an inventory of agricultural land across the country.

Below, we conducted the Normalaized difference vegetation index (NDVI) using remote sensing methods of agricultural lands in Koshrabat and Ishtikhon districts of Samarkand region.

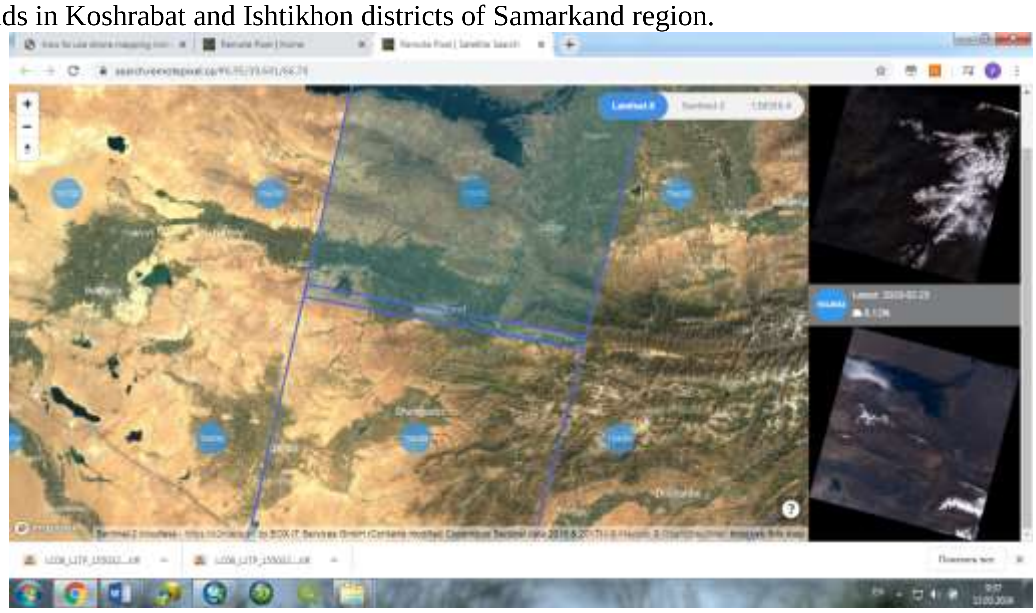

Figure 1. The process of downloading satellite images from remotpixel.ca

Coefficient and indexing of image ranges The most common operation is the application of remote sensing in images for geological, ecological and agricultural purposes.

The following example represents the concept of spectral coefficient. Healthy vegetation returns strongly in the near infrared part of the spectrum, while in the visible red part it is strongly absorbed. Other surfaces, such as soil and water, have almost the same reflectivity in the near-infrared (NIR) and red parts. Therefore, when the IRS LISS-IV range 4 (NIR 0.76–0.86 cm) is divided into image range 3 (Red 0.62–0.68 cm), the resulting coefficient is much greater than 1.0 in vegetation and 1.0 in soil and water. around.

Therefore, it is much easier to distinguish vegetation from other types of land cover. We can also identify unhealthy and low-growing areas with low near-infrared reflectivity from having a lower coefficient than healthy vegetation. Another advantage of spectral coefficients is that we take into account relative values rather than absolute brightness values, resulting in reduced topographic effects. Therefore, the absolute reflectivity of forest-covered slopes will vary depending on the direction of sunlight fall. Many complex coefficients have been developed to assess vegetation conditions, including the difference and sum of the spectral ranges of different sensors. One of these is the NDVI-Normalized Vegetation Difference Index, which is widely used to monitor vegetation conditions. Output images obtained using indices were created at a variable point in order to maintain all numerical accuracy [3].

In Figure 1, satellite imagery is downloaded from remotepixel.ca with a satellite image of the area based on the research object.

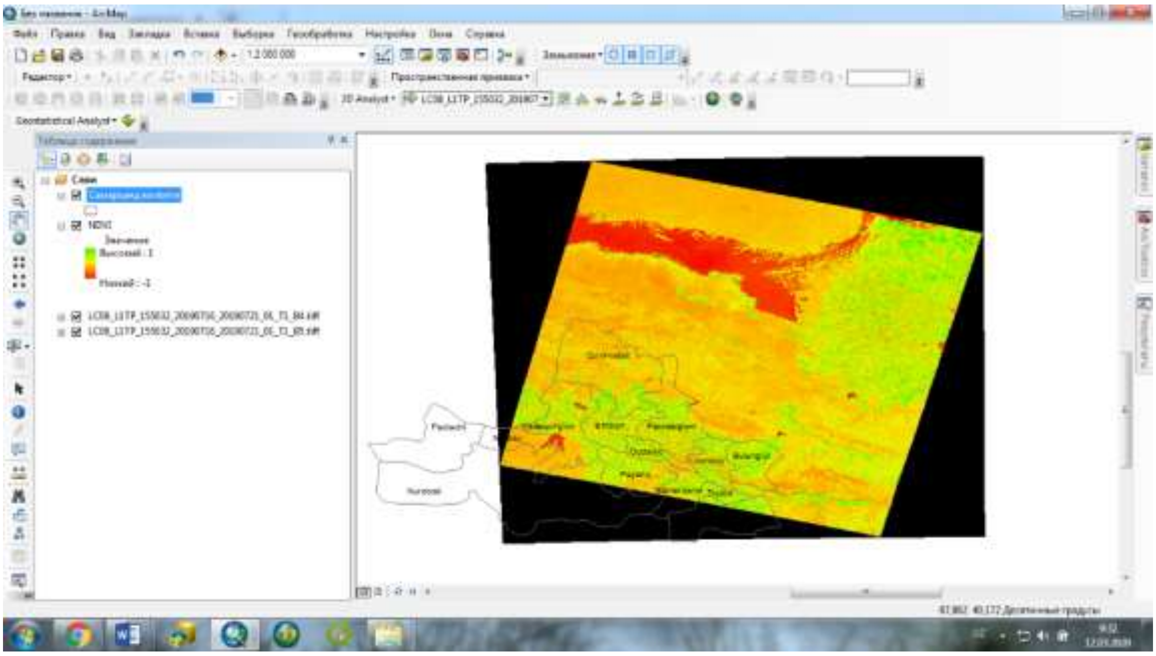

Figure 2. NDVI process NDVI process Land cover change index

His calculation is based on comparing the NDVI values of the current imaging period with the previous one. This is a classification of data on the type and intensity of continuous changes in photosynthesis. Its use allows to identify different trends in the condition of crops of agricultural lands, and its main purpose is to identify areas of damage caused by natural factors, as well as to monitor the harvest.

Coefficient and indexing of image ranges is the most common operation of remote sensing in geological, ecological and agricultural images.

Vegetation Difference Standardization Index (NDVI).

(DNNIR □ DNR) / (DNNIR □ DNR) [3].

NDVI shows a high value (+ ve) for thick vegetation, a very low value (-ve) for water, cloud, snow, and an average value (close to 0) for mountain, dry soil.

The value of the NDVI index is calculated in the range of -1 to +1, and in the analysis of plants, the index receives only positive values: the greater the green mass of plants during the measurement, the closer the value of NDVI to the unit. However, the NDVI indicator is a very relative value that does not show the absolute values of the green leaf biomass. This indicator allows an approximate assessment of how well or poorly the crops are growing. NDVI is absolutely ineffective in images taken during the non-vegetative period. Therefore, the NDVI analysis gives a good result for the plant species and its photosynthesis process at its most intense. In our example, the process of photosynthesis of grain was studied. The best time for this process is May, when the photosynthesis process of the grain is most active. For cotton, the second half of June is the best time.

Table 1: NDVI value indicators [8]

Object type	Reflection in the red region of the spectrum	Infrared reflection	NDVI value
Dense plant	0.1	0.5	0.7
A rare plant	0.1	0.3	0.5
Open ground	0.25	0.3	0.025
Cloud	0.25	0.25	0
Snow and glaciers	0.375	0.35	-0.05
Water	0.02	0.01	-0.25
Artificial coatings (concrete, asphalt)	0.3	0.1	-0.5

Table 2: NDVI analysis indices of farmland of Koshrabat district

Arrays	Average NDVI indices		
	2013	**2015**	**2019**
Zarmitan	0,43	0,42	0,40
Double	0,46	0,46	0,48
Achil Kadyrov	0,43	0,42	0,40
Jonbuloq	0,48	0,47	0,43
Follow	0,44	0,44	0,44
Pangat	0,48	0,47	0,43
Oqtepa	0,41	0,42	0,40
Average	0,44	0,44	0,42

The calculations in Table 2 show that the average of the values will fall to 0.42 by 2019. If we say based on the value indicators in Table 1, a value of 0.7 indicates thick vegetation coverage. But the changes between 2013 and 2019 show that vegetation cover is declining. Therefore, we can say that insufficient measures have been taken in these areas to increase soil fertility and improve the condition of agricultural lands. This situation can also be seen in the data in Table 3.

Table 3: NDVI analysis indices of farmland of Ishtikhon district

Arrays	Average NDVI indices		
	2013	**2015**	**2019**
Turkiston	0,44	0,48	0,43
Zarbanda	0,42	0,43	0,44
Z.M.Bobur	0,43	0,48	0,43
A.Temur	0,43	0,42	0,40
Mingchinor	0,43	0,43	0,41
A.Yuldashev	0,45	0,46	0,42
M.Jo'raev	0,44	0,44	0,44
D.Ochilov	0,48	0,47	0,43
A.Navoiy	0,41	0,42	0,40
Yangikent	0,43	0,42	0,39
X.Olimjon	0,37	0,38	0,37
The truth	0,46	0,46	0,48
Uzbekistan	0,43	0,44	0,41
Oxunboboev	0,42	0,43	0,44
J.Maxmudov	0,43	0,48	0,43
E.Qoraboev	0,46	0,46	0,48
Work hard	0,43	0,44	0,41
A.Berdikulov	0,43	0,42	0,40

Azamat	0,43	0,43	0,41
Three Heroes	0,45	0,46	0,42
Sh.Rashidov	0,44	0,44	0,44
Average	0,43	0,44	0,42

From the data in the table above, the NDVI analysis of the Massifs in Koshrabat and Ishtikhon districts shows that the situation in the Massifs is very low, which means that the lands of farms and farms in the districts are not used efficiently. Therefore, it is necessary to develop effective measures to organize the efficient use of land in the district, to monitor the development of farmers and horticulture, to ensure their timely use, as well as to carry out control work. In this case, monitoring using modern information technologies, geographic information systems, drones and other modern methods gives good results.

5. RECOMMENDATIONS:

State agrarian policy in the field of land relations must be directed:
- on the formation of an effective management system for agricultural land resources, incl. by dividing and clarifying the functions of federal and regional executive bodies and local government bodies;
-improvement of the regulatory legal framework in the field of circulation and use of agricultural land;
-providing financing for project development territorial land management of agricultural producers at the expense of the federal budget;
-organization of land management work in agriculture (inventory of land, streamlining the boundaries of land plots, their cadastral registration);
-organization of the rational use of agricultural land based on zoning of rural areas, on-farm land management, quality control of land and their use;
- creation of an information base on agricultural lands destination, taking into account the composition of their lands, and not only as a whole by category;
-provision of training, retraining and improvement qualifications of land management personnel, based on the need to perform all land management work on agricultural land;
- development of scientific research on regulatory issues land relations, monitoring of their use and protection;
- creation and development of arbitration courts to resolve land disputes.

6. CONCLUSION:

A layer-free object-oriented approach to displaying objects on a digital map is more promising. Accordingly, objects are included in classification systems that reflect certain logical relationships between object areas. But the object-oriented approach is closer to the nature of human thinking than the layered principle.

Using satellite imagery on farms and backyards, it is possible to monitor erosion, swamping, and soil erosion and other conditions.

The modern method of creating maps of peasant and farm lands is of great importance in the effective visualization of quality and accurate data of peasant and farm lands.

Systematic organization of visualization of data of farmers and farms through maps and the organization of GAT laboratories is an effective tool for visualization of data of farmers and farms.

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