INTERNATIONAL JOURNAL OF RESEARCH CULTURE SOCIETY ISSN: 2456-6683 Volume - 3, Issue - 10, Oct – 2019
Monthly, Peer-Reviewed, Refereed, Indexed Journal Scientific Journal Impact Factor: 4.526
Received on : 28/09/2019 Accepted on : 20/10/2019 Publication Date: 31/10/2019

The benefits of using modern technology in monitoring agricultural land

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Abstract: *This article describes the advantages of using modern technologies on the territory of the Republic of Uzbekistan for monitoring agricultural land by using modern unmanned aerial vehicles produced in developed countries. The focus is on measuring land by using unmanned aerial vehicles, entering data into an electronic database, and aerial photographing of land..*

Keywords: *Agricultural land, land monitoring, remote sensing (RS), aerial photographs, space images, cartography, unmanned aerial vehicles (UAV), aerial photography.*

1. INTRODUCTION:

The main tasks of monitoring the land of the Republic of Uzbekistan are as follows:

- organization and implementation of an observation system for the timely detection of changes in the state of land resources, their assessment, forecasting negative processes and developing recommendations for their prevention and elimination;
- maintaining the state land cadastre, land using, land management, optimal and targeted use of the land fund, land protection, and the provision of state oversight bodies over state control of land administration with other land management functions.

The following information is used in obtaining the necessary information during land monitoring:

- remote sensing (aerospace surveying and observation);
- ground survey and surveillance;
- foundation materials [2].

2. MATERIALS AND METHODS:

The using of modern technologies in the agro-industrial complex of many countries of the world, which allows to determine the area of crops and crop yields, starting from the level of states and regions and up to individual farms. The calculation results are used for tax control of producers, development of a flexible system of prices and quotas, planning of export-import operations and other actions.

In accordance with the Resolution of the Cabinet of Ministers dated August 31, 2016 No. 287, the Charter on the operation of drones (unmanned aerial vehicles) in civil and state aviation of the Republic of Uzbekistan was approved.

In accordance with the Decree of the President of the Republic of Uzbekistan dated May 31, 2017, DP - 5065 and the Resolution of the Cabinet of Ministers dated March 14, 2017 No. 258-F "On monitoring agricultural lands, developing and updating technical and technological developments in the field of terrain mapping", widely introducing the use of modern unmanned aerial vehicles in Uzbekistan, produced in developed countries[3].

3. RESULTS:

Unmanned aerial technology has existed for a long time. Initially, these were complex and expensive systems used in hostilities. However, over the past decade, real progress has been made in this area, as well as the development of computer systems, the development of satellite navigation systems (GPS / GLONASS) and, most importantly, the fact that these technologies are very convenient in all areas. Today, modern unmanned aerial vehicles are widely used in agricultural development.

The President of the Republic of Uzbekistan Sh.M. Mirziyoyev got acquainted with the presentation of work on monitoring the agricultural lands of the Tashkent region. In particular, in the presentation, special attention was paid to measuring land areas by using unmanned aerial vehicles, entering information into an electronic database, and aerial photographing of land areas.

Compared the results of measurements of land using an An-2 brand aircraft and unmanned aerial vehicle. It turned out that it takes 20 hours to examine a territory of 100 hectares by using an airplane, while it takes 14 hours to

examine an analogous area using an unmanned aerial vehicle. In addition, the possibilities of processing the fields with an agrodron, Mounted fan sprayer with a spray gun and an airplane were highly appreciated. (Table) [4].

Table. 1

Comparative analysis of monitoring the area of agricultural land

№	Action names	(An-2) State of practice		(Unmanned aerial vehicle) Using quadrocopters	
		Unit of measurement (hour)	Unit of measurement (sum)	Unit of measurement (hour)	Unit of measurement (sum)
1	Land measurement (in how many hectares)	20	-	4	-
2	Comparison of measurements with a map	1	-	30 minutes	-
3	Entering information into the database	2	-	31 minutes	-
4	Calculation of measurement results	1	-	32 minutes	-
5	Aerial photography of land	1	-	2	-
6	Separation of cultivated areas by type and monitoring	1	-	32 minutes	-
	Total:	26	-	8	-

*** The size of the fund of expenses of the An-2 brand aircraft on average per 100 hectares of area.**

Today, on the territory of Uzbekistan, control and monitoring of agricultural land is carried out by using unmanned aerial vehicles produced in advanced countries of the world. An example is the unmanned aerial vehicles used at the republican level, such as the PTERO J1 and one of the modern technologies PHANTOM 4 PRO.

4. CONCLUSION:

In conclusion, we can say that today, the use of drones gives effective results in measuring areas in the process of monitoring agricultural land, in land inventory, in establishing inefficient land use according to the results of the inventory, as well as in detecting illegal buildings on land plots. This method has proven to be highly effective compared to traditional methods of measurement and observation, such as theodalite, tachyometric and menzula fieldwork.

The benefits of using drones are as follows:

- Profitability (efficiency);
- Flying at low altitudes and shooting at close distances;
- High-quality terrain shooting;
- The possibility of non-harming the life and health of the pilot.

Today, one of the main advantages of using aerial surveys in monitoring agricultural land is the ability to obtain these areas with high definition today.

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