

**MAINTAINING THE ACCOUNTING OF SETTLEMENT LANDS BASED ON
MODERN TECHNOLOGIES**

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Аннотация. Ушбу мақолада Қорақалпоғистон Республикасининг жанубий туманлари худудидаги аҳоли пунктлари ерларининг ҳисобини юритиш, уларнинг аниқ ер ҳисобини юритишда мавжуд замонавий технологияларни қўллаш, PHANTOM-4 PRO учувчисиз учиш аппарати ёрдамида съёмка қилиш ҳамда дронлар ёрдамида ўтказилган съёмкага сарфланадиган вақт унумдорлиги таҳлил қилиш каби масалалар кенг ёритилган.

Калит сўзлар: қишлоқ аҳоли пунктлари, ерларнинг миқдорий ҳисоби, замонавий технологиялар, геомаълумотлар базасига интеграциялаш, объектларини геовизуаллаштириш, давлат рўйхатига олиш.

Abstract: This article extensively covers issues such as conducting land accounting in settlements in the southern districts of the Republic of Karakalpakstan, using modern technologies in conducting their accurate land accounting, conducting surveys using the PHANTOM-4 PRO unmanned aerial vehicle, and analyzing the time efficiency of surveys conducted using drones.

Keywords: rural settlements, quantitative land accounting, modern technologies, integration into a geodatabase, geovisualization of objects, state registration.

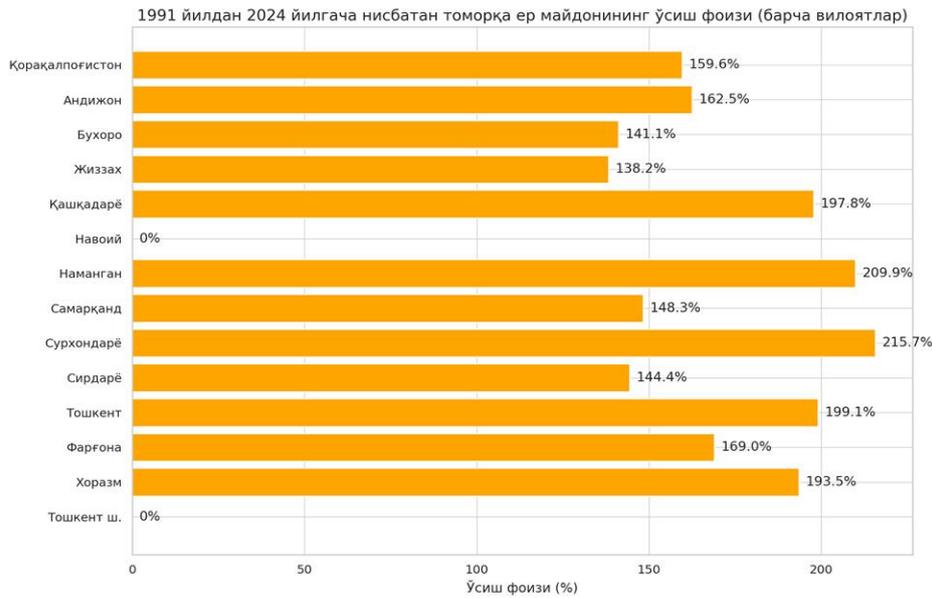
Introduction

A number of scientific and research works have been carried out in the world to develop new scientific and technical solutions for the quantitative accounting of household lands in rural settlements based on modern technologies, and they are still ongoing. In this regard, in particular, taking into account the growing need for household lands in rural settlements, the establishment of restrictions on the allocation of especially intensively used land areas for household purposes, the continuing cases of arbitrary seizure of these lands for civil purposes, and the low level of accuracy of data on the areas of land in settlements require the improvement of land accounting methods. Because improving the method of quantitative accounting of household lands based on modern technologies, while saving time and costs, ensures constant updating of data and is an important link in the implementation of land development, cadastre and land monitoring.

Today, in various regions of our republic-especially in residential settlements-it is necessary to maintain land accounting using modern methods and to generate information based on advanced technologies, to integrate field research results into a geospatial database, to geovisualize settlement objects using interpolation methods, and, in particular, to properly organize the timely state registration of rights to household land plots and improve the methods for maintaining their quantitative records.

Methodology

Over the 34 years since our republic gained independence, the share of arable land in the structure of settlements has increased sharply. This trend is observed, on the one hand, due to population growth and satisfying the needs of families for household plots or the development of urbanization processes in cities, and on the other hand, as a result of a sharp increase in household and field plots of land allocated to rural families in the late 80s and early 90s of the last century. The changes that occurred as a result of these processes are shown in the figure below (Fig. 1).



**Figure 1. Homestead land in rural settlements
Photos of changes in areas (1991-2024)**

The data in Figure 1 shows that the area of household land in rural settlements across the republic has increased by 173.3% over the past 34 years. Such an increase in the area of land in settlements at that time was of great practical importance in providing employment to the rural population and more fully satisfying their needs for agricultural products. We can also see data on the size of household land and its amount per family in the administrative districts of the Republic of Karakalpakstan.

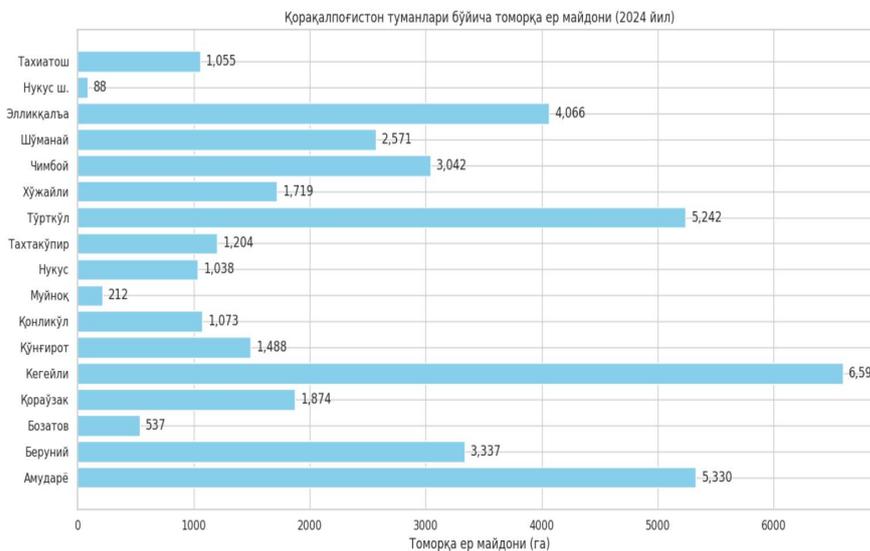


Figure 2. Household land areas in rural settlements by district of the Republic of Karakalpakstan (as of January 1, 2024)

The analysis of the land areas of settlements and the state of their use showed the need to use modern technologies in keeping accurate land accounts within the framework of today's requirements.

Analysis and results

Analysis of the current state of accounting for household land in the land use system of settlements indicates that ensuring their legal and complete registration is of great practical importance for the rational organization of the use of rural household lands.

It is necessary to improve the land accounting system on the basis of the established laws, based on the proposals for the systematic formation and analysis of the geodatabase of the Unified State Cadastre System, the improvement of the address register, and the digitization of land accounting in order to monitor the processes of increase and decrease in household land.

Based on the data available in the national reports on the state of the Republic's land fund, which are formed by the State Cadastre Chamber of the Cadastre Agency, the total number of household land plots, the change in the land areas allocated to household land in the Republic of Karakalpakstan as of January 1, 2024 is shown in Table 1.

1-table

The dynamics of changes in homestead land areas in the southern districts of the Republic of Karakalpakstan (thousand ha.)

№	Districts	1991	1995	2000	2005	2010	2015	2020	2024
		total							
1	Tortkol	6648	6498	6362	6165	5984	5802	5644	5645
	<i>irrigated</i>	5478	5354	5274	5062	4854	4736	4476	4476
2	Beruniy	2958	3243	4283	4331	4331	4330	4470	4470
	<i>irrigated</i>	2256	2458	3092	3160	3160	3160	3252	3252
3	Ellikkala	887	1154	1500	1949	2534	3295	4283	4283
	<i>irrigated</i>	710	923	1200	1560	2027	2636	3416	3416
	Total	10493	10895	12145	12436	12849	13427	14397	14398
	<i>irrigated</i>	8444	8735	9566	9782	10041	10532	11144	11144

From the data in Table 1 above, it can be seen that a certain system was not followed in the accounting of rural settlement lands, as a result of which the figures for 1991-2024 did not correspond to the general trend. These analyses emphasize the need to regulate the accounting of the amount of household lands and their use.

The lands of settlements in the southern districts of the Republic of Karakalpakstan were surveyed using the PHANTOM-4 PRO unmanned aerial vehicle. As a result, the time efficiency of using drones was analyzed.

2-table

Analytical table on the productivity of time spent using drones in the southern districts of the Republic of Karakalpakstan

N	Districts	Number of land plots in settlements	The territory of settlements, ga	Time to shoot drones	
				days	hours
1	Tortkol	19591	5240	24	576
2	Beruniy	15907	3319	15	360
3	Ellikkala	20346	4066	18	432
	Total	55844	12625	57	1368

As a result of the research, it was found that it is possible to completely survey the lands of the settlement in the southern districts of the Republic of Karakalpakstan in 5.1 days using the existing 11 drones.

Conclusion

Accurate and timely maintenance of the quantitative accounting of land areas creates the need to constantly update information on the exact size of household plots (tomorqa) that are located within the boundaries of rural settlements and are used under various legal rights within the composition of the land fund designated for agriculture. This, in turn, is extremely necessary for managing the use of land areas located within the boundaries of specific administrative-territorial units, particularly rural settlements, as well as for preventing problematic situations related to land. Therefore, it is very important to continuously maintain land accounting, especially the quantitative accounting of lands, on the basis of modern technologies.

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