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Complex Assessment of Land Resources of Karakalpakstan Using Ecological Indicators

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Abstract: ***The article discusses the issues of a comprehensive assessment of land resources in Karakalpakstan using environmental indicators. When solving land and water problems within the irrigated zone, it is necessary to take into account the existing natural and economic zoning with the allocation of the southern, central, northern parts of Karakalpakstan. Taking into account various reclamation characteristics, a schematic map of the territory of Karakalpakstanwas compiled.***

Keywords: Karakalpakstan, land resources, indicators, map, Aral region.

1. Introduction

The problem of environmental disaster in the Aral Sea basin is global in nature and its solution is urgent. Given that the extreme ecological situation in the Aral region has a negative impact on the natural habitat and living conditions of millions of people not only in the Aral Sea basin, but also in other regions of our planet. Its consequences are still the main factor destabilizing the environmental situation in the region. The most important everyday tasks are to assess the development of the situation and the implementation of environmental measures [1].

The Republic of Karakalpakstan is located in the northern part of Uzbekistan and for the most part occupies the Amudarya deltas and Ustyurt. Karakalpakstan is rich in land resources. The total area of arable land is about 2 million hectares, which is almost 4,7 times larger than the existing irrigated area. Large reserves of irrigated land are located mainly in the northern regions, including the lands of the Amu Darya delta, mainly along the channels of the Kuanyshzharma and Kegeyli canals, which include the Chimbay massif and the Daukara lowland, as well as the lands of the Kungrad and Shumanai districts.

The Republic of Karakalpakstan has huge areasirrigated lands, but their development requires major reclamation work, in particular, the construction of a collector-drainage network. In the future, for irrigation it is recommended to use landmasses with lightly salted meadow, meadow-bog and desert-takyr soils, as well as meadow-solonchak lands within the irrigated zone [2, 9].

Land and water resources are of great strategic importance in ensuring the sustainable development of the Republic of Karakalpakstan. The main solution to land and water problems at the level of the Amudarya basin is the entry into the lower reaches of the river of a guaranteed volume of river runoff, sufficient to irrigate all sown crops.

When solving land and water problems within the irrigated zone, it is necessary to take into account the existing natural and economic zoning with the allocation of the southern, central, northern parts. As you know, the southern zone, in comparison with the northern and Primorsky, is characterized by more favorable natural conditions for the cultivation of crops and the saturation of labor resources [1, 2, 7].

2. Material and Methods

For practical use, a schematic map “Assessment of the lands of the Republic of Karakalpakstan by the degree of their favorableness for use in agriculture” was compiled, the following factors were taken into account: the degree of salinization of irrigated lands, crop yields, length of collector-drainage network, etc. [6]. When assessing the ecological state of land resources, 14 geoecological indicators were used. When solving problems solved within the irrigated fields, it is necessary to carry out their certification, using the data of the "agroecological field passport" can significantly increase their productivity. When compiling an “agroecological field passport”, it is necessary to take into account various agrophysical and agrochemical characteristics of irrigated soils [4, 5].

3. The discussion of the results

The most important solution to land-water problems within the irrigated zone of Karakalpakstan is the correct and scientifically-based placement of the cultivation of various crops, depending on the natural features of various natural and economic zones, consisting of southern, central, northern [3]. The main solution to land-water problems within the irrigated fields is the certification of fields, using the data of the «agroecological field passport» can significantly increase its productivity. If necessary, the passport can be supplemented with new information, recommendations aimed at improving the productivity of this land.

The content of the agroecological passport of the irrigated field [7]:

1) Topographic (sometimes schematic) map of the field indicating the area occupied by arable land, roads, irrigation and collector-drainage networks, available buildings;
2) The applied and recommended layout of irrigated areas for the vegetative period. They are compiled taking into account the following data: surface slopes, fine earth thickness, the presence of pebble, the level of occurrence and the magnitude of groundwater salinity, the width and

length of irrigation furrows, and the flow rate of water supplied to the furrow.

3) The main agrophysical and agrochemical characteristics of soils. So, the mechanical composition of the soil reflects the morphological structure of the site profile and the physical and physicochemical properties of the soil associated with it. Information on the mechanical composition helps to determine the degree of complexity of mechanized tillage. Its structure and moisture capacity, which is especially important when choosing irrigation rates.
4) Maps of soil availability with humus, nitrogen, phosphorus and potassium, salinity and mechanical composition for arable (0-30 sm) and subsurface (30-100 sm) horizons. Knowing the degree of provision of the field with humus, soluble forms of nitrogen, phosphorus and potassium allows you to assign a reasonable rate of fertilizer applied, and at the same time achieve equalization of fertility throughout the field.If necessary, the passport can be supplemented with new information, recommendations aimed at improving the productivity of this land.

An agroecological passport is a set of agroeconomic information about a site that allows farmers to choose the right solutions when performing land reclamation work on the site, conduct an objective analysis of the dynamics of agricultural production and improve the culture of agriculture [1, 5].

Information on the distribution of irrigated areas by the degree of salinization of soils for different years is presented in Fig. 1 and in table 1.

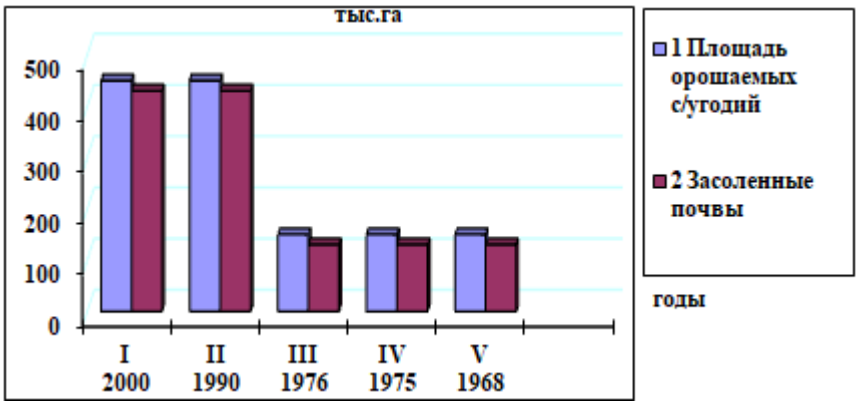

Figure 1: Irrigated areas in Karakalpakstan

The above figures show that over the past 32 years (1968-2000), the proportion of salinized soils in varying degrees in this region has not changed (2) and amounts to 87-93% of all agricultural land (1), and by 2009 The area of medium and highly saline soils increased.

Table 2: Dynamics of the areas of the Republic of Karakalpakstan by the degree of salinization of soils, ha /%

Years		Salinity			
	area	non-saline	slightly saline	medium saline	Strong saline and salt marshes
1968	153300 100	7200 4,7	22500 14,7	35900 23,4	87700 57,2
1975	187800 100	11520 6,1	122224 65,1	54,056 28,8	-- --
1976	19879 100	14855 7,5	124986 62,9	54191 27,2	4758 2,4
2009	504533 100	11460 22,2	164249 33,5	165760 33,8	53262 10,5

Given the various reclamation characteristics (degree salinity of soils, depth of groundwater, drainage and crop yields) a schematic map was compiled on the territory of Karakalpakstan, taking into account the degree of favorable land for agricultural use [9].

Thus, among the many environmental problems of this region, environmental priority problems are identified - the problems of rational use of land and water resources, and ways to solve them at the basin, regional and local levels are also considered. Assessment of the ecological state as land resources was carried out using environmental indicators proposed by the State Committee on Ecology and Environmental Protection of the Republic of Uzbekistan.

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