THE ESSUIES ON THE APPLICATION ANTI-EROSION MEASURES IN LAND MANAGEMENT PROJECTS

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ABSTRACT
The issues of taking into account the factors that affect to the development of land management projects for areas subject to erosion, the choice of land composition and crop rotation systems, their placement on the territory with consideration for erosion hazard, the design of the irrigation plots taking into account the relief, and the use of water-saving technologies are considered and substantiated in this article.

Keywords: land management, project, erosion, irrigation area, water-saving technologies.

Introduction. Special attention is paid to the effective use of available land resources to ensure food security in the world, to the implementation of targeted scientific research aimed at improving methods for organizing optimal use of agricultural land in areas where there is a risk of erosion, in land management projects [3]. One of the important tasks in this regard, including the composition of land types required for land users, and methods aimed at optimizing them, as well as improving the work of land management projects based on them.

Object and methods of research. The research was conducted on eroded lands of Kashkadarya region and was aimed at improving irrigated areas, creating and exchanging arable land, taking into account the level of land erosion in agricultural enterprises. The study used a wide range of monographic research and experimental design methods.

Research results and their discussion. Everyone knows that the natural and economic conditions of Kashkadarya region have more specific features than in other regions. These characteristics, in turn, allow the region to grow a variety of agricultural crops and produce better agricultural products. To do this, first of all, you will need to know the state of rational use of land resources in the region.

Based on the developed and recommended methodology, the experimental land project has been developed for Yusupov massif in Nishan district. The massif land fund is presented below (Table 1).

Table 1

Massif of land fund named after U.Yusupov

№	Land types	Total area, hectare	Eroded area , hectare	Including	
				In relation to the total area , %	With respect to agricultural lands , %
1	2	3	4	5	6
1.	Driving lands	3055.62	650.5	74.75	91.21
2.	Trees, total: Including: gardens vineyards mulberry	70.61 25.81 7.8 37.0	 24.0	1.73	2.11
3	Abandoned (gray) land	108.1		2.64	3.23
4	Pastures	116.06		2.84	3.45
	Total agricultural land	**3350.39**	**674.5**	**81.96**	**100**
5	Landscaping	174.1		4.26	
6	Trees that protect the fields	15.1		0.38	
7	Drainage, canals and ditches	369.3		9.03	
8	Roads	70.9		1.73	
9	Buildings and squares	100.8		2.47	
10	Lands not used in agriculture	7.1		0.17	
	Total massif lands	**4087.69**	**674.5**	**100.0**	

In 2020, a total of 50 farms operated in the massif, including 40 cotton-grain, 2 grain-vegetable, 3 horticultural, 5 livestock.

One of the main tasks of creating internal land plots in an agricultural enterprise is the organization of land types and their crop rotation. The organization of land types and crop rotations requires solving a number of internal related issues [1,2].

The main purpose of organizing land types and crop rotation is to increase the intensity of land use and the efficiency of cultivation, taking into account the economic interests of landowners and land users. In this case, it is necessary to strictly comply with environmental requirements, since otherwise the soil fertility will decrease, and erosion and degradation processes will develop in it.

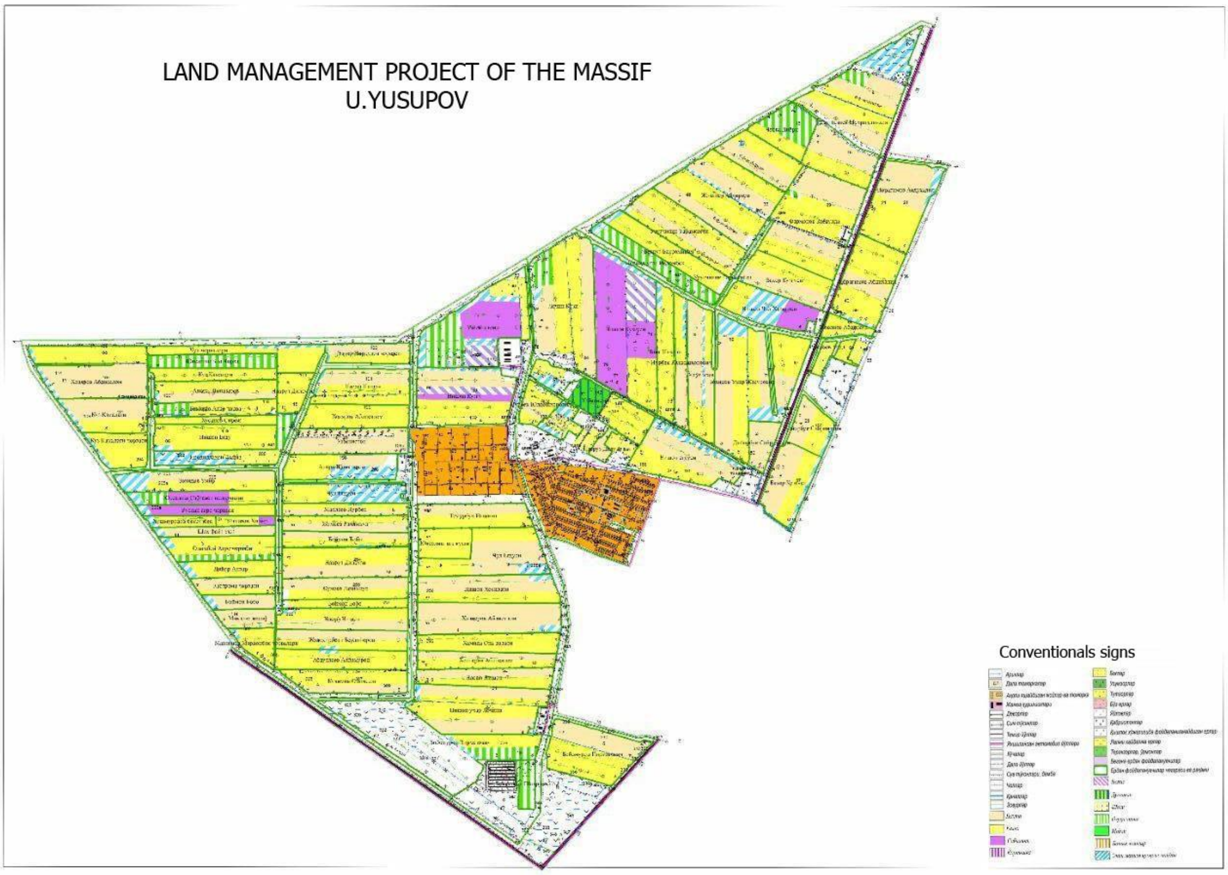

Figure 2. Formation of the internal land use project of U. Yusupov massif

Based on the above requirements, the composition of types of land for farming was determined, their areas were determined and located on the territory.
After the placement of land types and crop rotation areas in the territory of the massif, the territory of each alternating sowing massif was established, in which irrigation (working) plots, fields, field roads, shelter trees were placed.

Because the massif is located in a saline area, drainage in these lands should be located between two adjacents of irrigation ditches that operate permanently or temporarily. Therefore, this scheme of connecting the drainage network with the irrigation network was used in this project.

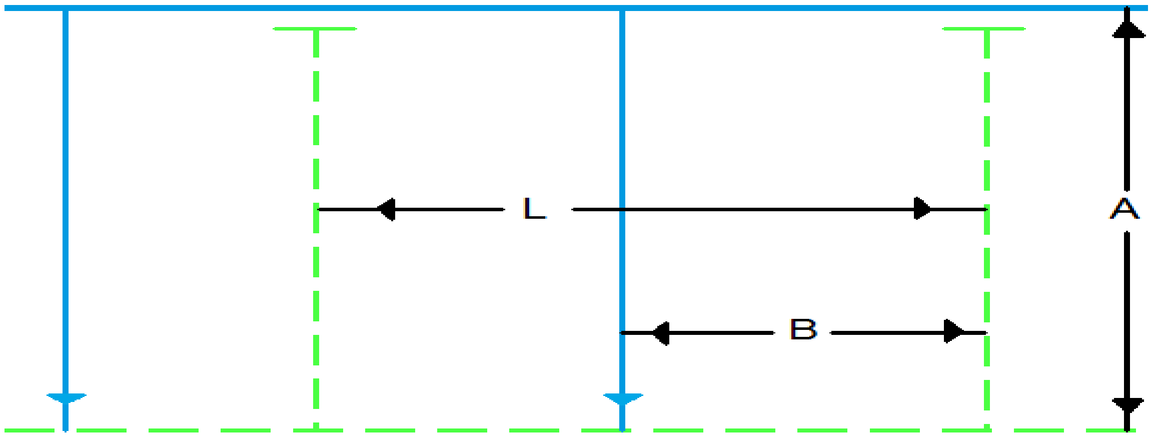

Figure 3. The scheme of connection of a permanent collector - drainage network with an irrigation network

Table 2 on recommendation of V.M. Legostaev, the approximate distances between the drains for cotton farms are indicated.

Table 2

Approximate distances between drains at a depth of 2-2.5 m *

The level of soil salinity	**Depth of groundwater, m**		**The distance between drains, "L", m**		
	Before watering and washing	**after washing the saline**	**Heavy mechanical content soil**	**Medium mechanical content soil**	**Light mechanical composition soil**
1	**2**	**3**	**4**	**5**	**6**
Less	2-3	1-2	The device of private collectors is located at low levels		
Medium and strong 400-600	2-3	1-2	250-300	300-400	400-600
Weak 500-600	1-2	1-2	300-400	400-500	500-600
Medium and strong 300-400	1-2	1-2	200-250	250-300	300-400
Weak 250-350	0-1	1-2	150-200	200-250	250-350
Medium and strong 200-300	0-1	1-2	100-150	150-200	200-300

Using Tab. 2, the distance between the drains was determined and the width of the irrigated area (V = L / 2), then its area was calculated according to the following expressions:

$$P = \frac{B^2 K}{10000} \qquad (1)$$

Where: K is the ratio of the field length to the width

$$(K = \frac{A}{B}) \qquad (2)$$

Based on this formula, using the data in Tab. 2, the optimal dimensions of irrigated fields with different levels of salinity, depth of groundwater and mechanical composition of the soil were determined (Tab. 3).

Table 3

Optimal dimensions of irrigated fields

The level of soil salinity	Depth of groundwater, m		Optimal size of irrigated fields, hectares		
	Before watering and washing	After washing the saline	Heavy mechanical content soil	Medium mechanical content soil	Light mechanical composition soil
1	2	3	4	5	6
Less	2-3	1-2	16-36		
Medium and strong 400-600	2-3	1-2	4,1-5,9	7,2-10,4	16,2-23,4
Weak 500-600	1-2	1-2	7,2-10,4	11,3-16,3	16,3-23,4
Medium and strong 300-400	1-2	1-2	2,8-3,4	4,1-5,9	7,2-10,4
Weak 250-350	0-1	1-2	1,8-2,6	2,8-4,1	5,5-8,0
Medium and strong 200-300	0-1	1-2	1,0-1,5	1,8-2,6	4,1-5,9

The size of irrigated areas in the areas that are dangerous for erosion is affected by the erosion protection conditions of this territory. In case of wind erosion, the range of distances in the area of protective forest belts has a limiting effect, and in the case of irrigation erosion the permissible length and flow rate of irrigation furrows [11].

The results of our research to determine the optimal size of irrigated areas on land subject to irrigation erosion are presented in table 4.

Table 4

Recommended optimal areas of the irrigated fields

Mechanical composition of soil,water permeability	**Water consumption of site water distributors, l/s**	**areas of irrigation fields, hectares**			
		0,01	0,007	0,002	0,005
1	**2**	3	4	5	6
Sand and light sand are strongly permeable	200	18,0	18,0	18,0	18,0
	250	21,0	22,5	24,0	22,5
	300	24,0	27,0	30,0	27,0
Light strong sand, high permeability	200	18,0	18,0	18,0	22,5
	250	22,5	24,0	27,0	30,0
	300	27,0	30,0	27,0	30,0
Medium sand, moderately permeable	200	21,0	15,0	18,0	27,0
	250	26,2	22,5	27,0	27,0
	300	31,5	30,0	27,0	36,0
Heavy soil, low water permeability	200	18,0	18,0	12,0	21,0
	250	24,0	27,0	24,0	21,0
	300	30,0	27,0	24,0	31,5

According to the experts [4,5,6,9,10], in some cases, the decrease in crop yields along with their simultaneous enrichment is associated with the problem of water scarcity. To mitigate this situation, it is necessary to introduce energy-saving technologies in the irrigation system and prevent water waste.

The advantage of drip irrigation technology is that with this method of irrigation, the soil moisture and the amount of water supplied to create it are controlled, and the water is evenly distributed throughout the field in accordance with the specific time needs of each crop. Unlike other irrigation methods, drip irrigation creates a water-physical environment that is optimal for the plant in the soil layer in which the root of the crop develops [7,8].

The advantage of drip irrigation is shown primarily in the protection of water resources, in stopping irrigation erosion, and in stopping secondary salinization. The peculiarity of the irrigation regime in this allows it to be used even on land where the slope is relatively high. The most important thing is that the field soil does not harden, since water is supplied to the plant using hoses during drip irrigation, as a result of which there is no need to process the gaps between the rows. A field where the soil does not harden is of high quality and easy to plow at the end of the season. Since the fertilizer is supplied with water, there is no need to use fertilizing methods. As a result, the materials for labor and side lubrication are saved. The manual labor of field workers is sharply reduced. In 2019, the water-efficient drip irrigation was used on 42.0 hectares of the land in Z. Farmonov massif.

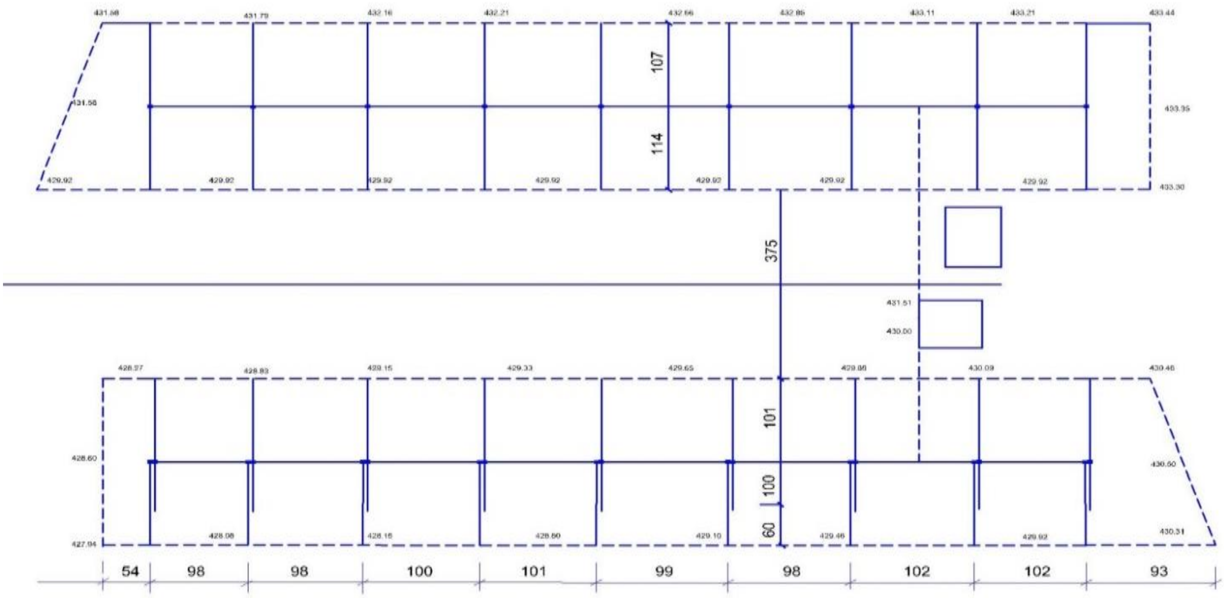

Figure 4. Scheme of application of drip irrigation system on the ground

The effectiveness of internal land management for the farm: is reflected in the environmental, economic and social spheres.

Irrigated lands in Kashkadarya region fall from 5 cadastral zones to 4 cadastral zones. Due to its physical limitations and difficulty of restoration, its economical and efficient use of land is the most important and topical issue. There are 24.4 thousand hectares of irrigated arable land in the region, all of which are in the agricultural sector. The average score quality of soil in the province is 51 points, according to a 1999 survey. This is a decrease of 3.5 points compared to 1991.

In order to overcome the above-mentioned disadvantages, it is important to introduce crop rotation, pay more attention to seed and selection, apply irrigation technologies, improve the efficiency of land reclamation and mechanization in cadastral zones.

Table 5

Comparative data for estimating the location of fields and irrigation plots on the example of Z.Farmonov farm *

№	Indicators	I per year of land formation	II according to the project
1	2	3	4
1	Land use coefficients (LUK)	95.37	98.32
2	Crop rotation area, hectares	90.9	93.75
3	Area under roads, hectares	0.9	0.3
4	Net area of arable land, hectares	90.0	93.45
5	Number of working plots	4	4
6	The average area of the working plot, hectares	22.73	23.44
7	The distance between the longest sections, km	1050	1050
8	Average processing distance, m:	740	860
9	Slope in the working direction, %	13.3	9.1
10	he total area of the rotation lanes, hectares	15.2	8.21

* Calculations 2020 y. done at a price

Conclusion. The above analysis leads to the following conclusions:

1. The quality of land is taken into account according to the characteristics that determine its value as natural resources and means of production. Such characteristics include the description of soils in terms of soil, vegetation and relief structure, the degree of water and wind erosion of the soil, information of waterlogging, salinity, nutrient availability, and so on. These factors should be taken into account when drawing up plans for the efficient use of land resources.
2. Areas with erosion should have their own specialization and concentration of production. Therefore, it is necessary to develop a set of measures for land management to create regional conditions for land use in the territory of erosion zones, rather than on farms, where the organization of production of raw cotton is carried out.
3. In irrigated eroded lands, the area of irrigation plots depends on the slope of the land plot and should be calculated as 6.3-26.7.
4. In saline soils, the size of the irrigated area is affected by the level of salinity of the soil and the level of groundwater. The results of our research showed that they should be calculated for 16.0–36.0 in non-saline soils, 16.3–23.4 in low-salinity soils, and 7.2–10.4 in moderately saline soils.
5. As a result of the use of "water-saving" technologies on the area of 42 hectares in the territory of the farm Z.Farmonov in the massif, water consumption per hectare decreased by 30-40%, production costs by 20-25%. The efficiency rate increased by 22%.

As a result of effective implementation of the above measures, farms using agricultural lands will have the opportunity for sustainable development, and the level of profitability will increase.

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