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ASSESSMENT OF THE EFFICIENCY OF WATER RESOURCES USE BASED ON INFORMATION TECHNOLOGY DATA

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Taking into account the limited land and water resources and the constant growth of the region's population, a stable supply of food to the population and exports will be achieved through the rational use of agricultural potential and policy. It is to save water resources that agricultural clusters based on digital technologies are considered one of the main strategic directions.

This requires new innovative approaches, such as improving the structural mechanisms for managing irrigation systems, introducing automated information systems with a modeling subsystem that ensures the efficient use of water resources. We will determine how much water savings can be achieved by using modern digital methods of automated information systems using the following mathematical model:

$$\sum_{i=1}^{n} \mathrm{Q}_i = \mathrm{AC} + \sum_{i=1}^{n} \text{ҚX}_i$$

Where: Q_i – amount of total water consumed;

AC – the amount of water used for the population and industrial enterprises; value variable from water consumption standards depending on changes in population and number of industrial enterprises;

$ҚX_i$ – amount of water used for agricultural irrigation;

n – number of irrigation methods;

i- irrigation methods (in modes).

The daily water consumption of the population and industry in the Jizzakh region is 112,000 m3, and the annual amount of water is 112,000 * 364 = 40,768,000 m^3. Annual water consumption for irrigation in agriculture is 3102500000 m^3.

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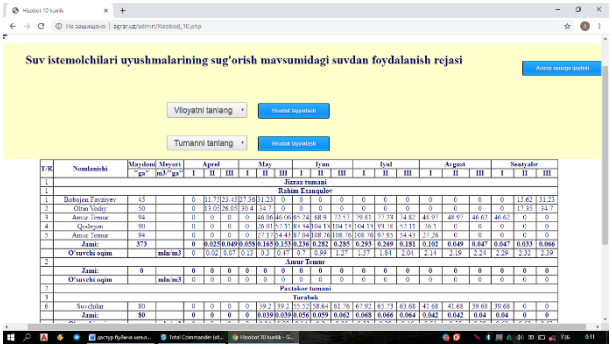
$$\sum_{i=1}^{n} Q_i = 40.768.000 + 3.102.500.000 = 3.143.268.000 \text{ m } 3$$

The above analysis shows that the total annual volume of water in the region in the traditional way is 3 143 268 000 m ^{3}.

If we save the total annual water consumption in agriculture by an average of 40%, we can see the results of the ongoing experimental work in the irrigation department of the Sh. Rashidov district: the cultivated area in the region is 32 thousand hectares, in the growing season of 2018, 232 million m3 of water were consumed by traditional method, 140 million m^3 by drip irrigation method and 92 million m^3 of water saved. If we take this figure per 1 hectare, then 2500 m3 of water is saved.

The analysis shows that the total water consumption for traditional irrigation of agricultural crops in the region is 3102.5 million m3, and when using drip irrigation, water savings are 40%, i.e. 1241.5 million m3 of water. If we calculate the results obtained in the region throughout the republic, it becomes clear that the use of modern technologies will save water resources, which is a big problem in the country.



1- size Developed software (database)

The main goal of solving the above mathematical expressions is to create a database for the development of scientific and practical proposals and recommendations for the rational use of water resources when irrigating crops using various technological irrigation regimes and to educate the mechanism of operation of this database.

When analyzing the choice of crop types and their water consumption needs, it was found that the republic does not have enough water resources to irrigate crops at

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the level of demand. To address this issue in practice, we have developed a variant method for conducting a comparative analysis of a set of crop types and their corresponding water consumption and gross income from them.

1- table

The amount of water allocated to the types of crops in the adopted options[1]

Types of crops	Watering quantity per 1 ga	Options									
		1	2	3	4	5	6	7	8	9	10
Cotton and industrial crops	6800	6800	20400	27200	6800	6800		13600	20400		
Forage crops	9400	9400	9400	9400	9400	9400					
Corn	6300	6300	6300	6300	6300	6300		12600		6300	
Vegetables, potatoes	12200	12200	12200	12200	24400		12200			12200	12200
Melons	4400	4400	4400	4400			4400	4400	4400	17600	8800
Perennial trees	4800	4800	4800			4800	4800	4800	9600	4800	19200
Corn	4500	4500			13500	18000	18000	4500	4500	4500	4500
Garden	7115	7115					7115	7115	7115		
Total amount of		**55515**	**57500**	**59500**	**60400**	**45300**	**46515**	**47015**	**46015**	**45400**	**44700**

[1]Разработано автором, на основании нормативных документов.

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water consumed (m^3)											

Based on the data for all the options discussed above, you can see how close the crops' water requirements are to the established limit. At the same time, it is advisable not only to save water resources, but also to improve the harvest, taking into account the real incomes of the population in the regions. In the table data, each option was analyzed accordingly, taking into account the same sown area. However, as the number of crops decreases, the area of the remaining crops increases, so the total area is considered constant, and the total water consumption is 55.515 m^3. We select all types of crops and a limit in relation to this quantity, i.e. the limit will be less than the required quantity as stated above (46.000 m3). In addition, crop yields in the options and the market price of the crop were analyzed.

Our proposed method for systematic analysis of the considered options is based on the fact that in all options, first of all, it is possible to analyze the set of crop types that can be selected around water limit indicators, and how stable the resulting gross income is. Thus, in the chosen option, it is possible to select types of crops and conduct a general comprehensive analysis of gross income accordingly, and on the basis of these analyzes to scientifically substantiate the policy of rational use of water.

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