

The Importance of Water Resources in the Development of Agriculture in Surkhandarya Region and Issues of their Effective Use

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Abstract:

The importance of water resources in the development of agriculture in surkhandarya region and issues of their effective use, food products, water and land resources, rational and efficient use.

Keywords: Geography, population, convenient geographical location,

INTRODUCTION: As the world's population grows, its demand for food will increase, which in turn will determine the urgency of developing the agricultural sector and improving its regional structure. "By 2050, the world's population will exceed 9 billion. , at a time when rapid urbanization is expected to concentrate 70 percent of the population in cities (currently 51 percent), it will be necessary to double global agricultural and food production to feed the world's population. ».

In arid climates, the economic development of any region depends on the level of water available for irrigation and consumption. The area of irrigated land in Surkhandarya region is 529 thousand hectares, but only 324.6 thousand hectares are irrigated. Figures show that 60% of irrigated land is used. This is due to lack of water and inefficient use of available water resources. At the same time, the expansion of irrigated lands and the growing population are having a significant impact on the water regime [6].

The ongoing economic reforms in our country require the rational and efficient use of natural resources, in particular water and land resources. In the Republic of Uzbekistan, agricultural production is mainly carried out on irrigated lands. Irrigated agriculture is the main producer and largest consumer of water in the agricultural sector. About 92% of water resources in the country are used in agriculture. More than 97% of irrigated agriculture is cultivated [7].

MAIN PART: Surkhandarya region, located in the southernmost part of the country, was founded on March 6, 1941. Its area is 20.1 thousand square meters. km, which is 4.5% of the total territory of the Republic of Uzbekistan. As of January 1, 2021, the province has a population of 2,681.0 thousand people or 7.8% of the country's population. This shows that the demographic potential of the region is 1.7 times higher than its area. In the territorial division of labor of the Republic of Surkhandarya region is distinguished by its agro-industrial complex, in particular, the cultivation of cotton and grain, vegetables, livestock. It is known that Surkhandarya region is one of the two regions of the country bordering on three countries [9]. The fact that the bulk of the region's water resources are generated in neighboring countries creates difficulties in water management. As a management structure, water management has the following characteristics:

- a large amount of colorful information on the state of water resources;

- large number of governing bodies and information sources and their large area;
- abstract features of hydrological information [8];
- Conflict of management requirements of participants in water management;
- Lack of uniform economic criteria for the use of water resources.

If we consider the Surkhandarya basin as a living organism, the blood flowing in its body is the water resources of the Surkhandarya oasis. The Topalangdarya and Karatagdarya, Topalang and South Surkhan reservoirs are unique among these water sources [10]. The people of Surkhandarya have long lived along rivers and streams, engaged in animal husbandry and agriculture.

Since the 1990s, due to water shortages in the Republic of Uzbekistan, including in the Surkhandarya basin [11], the development of lands for irrigated agriculture has almost stopped (Table 1).

Dynamics of development of irrigated lands in Surkhandarya region (thousand hectares).

Table 1

01.01.1995		01.01.2000		01.01.2001		01.01.2013		01.01.2020	
Total area	Irrigated lands	Total area	Irrigated lands	Total area	Irrigated lands	Total area	Irrigated lands	Total area	Irrigated lands
2059,9	327,7	2009,9	328,2	2009,9	324,6	2009,9	326,0	2009,9	324,6

Surkhandarya is the hottest, subtropical region of the Republic. If in Samarkand, Fergana or Tashkent oasis cotton is irrigated 6-7 times during the growing season, in Surkhandarya it is necessary to irrigate 8-9 times. That is why the amount of water consumed per hectare is large here [12]. That is why water conservation and the use of advanced irrigation technologies are important issues. If we look at the scientific literature, we can see that the main ways to increase water supply are:

- Reduction of water consumption;
- Improvement of irrigation systems;
- Use of advanced technologies in irrigation;
- Efficient use of atmospheric precipitation;
- Use of mountain water through construction of reservoirs;
- Economic evaluation of water;
- Purification and reuse of mineralized water.

The use of advanced technologies in irrigation of these roads is now widely used in practice [14]. There are several types of water-saving technologies and we will introduce drip irrigation below [13].

CONCLUSION: In the drip irrigation method, water is transferred to the root layer of the plant in the form of small (drops) along the irrigation field, using specially distributed pipes and through droppers installed on them. There are several advantages to this method [15]:

Advantage 1: Increased crop yield and improved crop quality. Unlike other irrigation methods, drip irrigation creates an optimal aquatic environment for the plant in the soil layer where the root of the crop develops. As a result, due to optimal irrigation and nutrition, the yield in vineyards increases by 25%, and in annual crops such as cotton and vegetables by 60-120%. The ripening of the cotton crop is 10-15 days early and one-time. Drip irrigation of vegetable fields completely eliminates the risk of flooding and crop failure [16].

Advantage 2: Saving water resources for irrigation. In drip irrigation: the irrigation regime meets the water requirements of the plant; transfer of water directly to the root layer of the plant; lack of water evaporating from the soil; since there are no weeds, all the water belongs only to the crop; water does not spread throughout the field and does not seep into the soil; water saving due to non-discharge; Represents the advantages of drip irrigation over other irrigation methods. Also, drip irrigation is used to irrigate crops, not fields.

Advantage 3: Reduced labor and material resource consumption. In drip irrigation, only the part of the field where the crops are located is moistened because the water is supplied to the plant through hoses. In this case, the field soil does not harden, as a result, there is no need to loosen the soil (cultivation) and drainage. The uncultivated field is easily plowed at the end of the season. Since the fertilizer is supplied with water, there is no need to use fertilizing equipment. As a result, labor and fuel are saved [17].

In drip irrigation, the efficiency of irrigation is 90-95% due to the fact that only the area around the roots of the plant is moistened. For other irrigation methods (including tillage and sprinkler irrigation), this figure does not exceed 70-75%.

Examples of the effectiveness of drip irrigation

Table 2

№	Crop type	Water saving, in%	Resource (fuel, reduction of labor costs, in%)	Increase in productivity, in%
1	The garden	60	25	-
2	Cotton	65	60	90-156
3	Vineyard	30	30	25
4	Tomato	54	60	65

Information on cotton fields where water-saving technologies were introduced in the region in 2019

Table 3

Name of regions	Drip irrigation area, hectare	Irrigation area through flexible pipes, hectare	Irrigation with polyethylene film, area, hectare	Total, hectare
Surkhandarya region	2075	3500	1222	6797

Impact of climate change on water flow regimes. Climate change and its various consequences are of great concern to the world community. Because even small changes in climate around the world and in parts of it can upset the balance that has been formed in nature for thousands of years. According to climatologists and hydrologists in Uzbekistan (Ososkova, Hikmatov, Chub, 2005), over the past hundred years, the air temperature in the country has risen by about 1 oC. If the rate of temperature rise continues at this level, in 2030 in the desert and semi-desert regions of Uzbekistan in Samarkand, Navoi, Kashkadarya, Surkhandarya, Tashkent regions in the spring will be 0.2-2.0 oC, 1.5-2.5 oC in summer, 0.5-2.0 oC in autumn, and 1.5-3.5 oC in winter. Such changes affect the annual water content of rivers.

According to hydrometeorological forecasts, in the summer irrigation season of 2021, water resources will be 85-95% in the Vakhsh River and 70-80% in Surkhandarya. These figures are lower than the long-term average. As of March 31, 2021, water reserves in the South Surkhandarya reservoir are 23-52% lower than the norm. Mitigation of the negative impact of water shortages in 2021, sustainable water supply to the economy, rational use of available water resources, introduction of public-private partnership mechanisms for the use of water facilities, repair of collector-drainage networks, improvement of rehabilitation works, as well as implementation of the Resolution of the President of the Republic of Uzbekistan dated February 24, 2021 No. PP-5005 "On approval of the Strategy for water resources management and development of the irrigation sector in the Republic of Uzbekistan for 2021-2023" The following measures are being taken in Surkhandarya region.

Full control over the use of water resources and the release of water is organized according to the water limit set for each region. In addition, in order to prevent water shortages, a total of 18.1 thousand hectares will be used to save 180 million m³, 320 thousand km of irrigation networks will be repaired and 285 million m³, 56.7 thousand hectares will be added. 147 million m³ by agro-technical measures, 234 million m³ by planting low-water crops on 45.7 thousand hectares, 56 million m³ by laser leveling of 14.4 thousand hectares, and the introduction of ICT and digital technologies at 282 sites. It is expected to save 49 million m³ of water. A total of 1,001 million m³ is expected to be saved in the region.

Conclusion. We consider it necessary to take the following measures in the use of regional water resources:

- Efficient use of groundwater in foothills and plains;
- Use of advanced technologies in irrigation (drip irrigation, intravenous water supply through hoses, spray irrigation, etc.);

- Regular monitoring of the level of mineralization of irrigated lands, implementation of land reclamation measures.
- Preventing the discharge of waste from large industrial enterprises in the region directly into water bodies.
- To determine the laws of annual and seasonal changes in river flows and on this basis to develop hydrological forecasts for different periods. Based on the results of hydrological forecasting, it is possible to accurately determine the amount of water consumption in the population, sectors of the economy, agricultural producers and other institutions, which in turn allows you to plan the use of water resources in all sectors of the economy.

Organizational and management mechanisms are also important in the efficient use of water resources:

- Organize interstate (Uzbekistan and Tajikistan), basin and local (irrigation systems and main canals) seminars on efficient and rational use of water resources in coordination with the Ministry;
- Organization of monitoring system;
- Study of public opinion on the efficient use of water resources;

Given the rapid population growth in Surkhandarya region (currently 2.681 million people) and the size of land resources, the richness of climatic resources, the future use of water, climate, land resources of the region on a scientific basis. We believe that a comprehensive long-term plan should be developed.

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