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UNDER THE CURRENT CLIMATE CHANGE AND ECOLOGICAL SITUATION, EFFICIENT USE OF WATER RESOURCES OF SURKHANDARYA REGION

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Abstract
The role of water resources in the economic and social development of the Surkhandarya region, which is located in an arid climate region, is highlighted, and the main attention is paid to the Topalang reservoir built in the northeastern region of the region and the work carried out in terms of the deployment and development of the production forces of the region, in the fields of electric power, and the safety of the dam, as well as, their importance in providing the population with clean drinking water is detailed.
Key words: arid climate, water resources, production forces, hydrotechnical facilities, fresh water, economic and social development, recreation, electric power, Topalang reservoir, agriculture.

Introduction

At the time when climate warming and the development of desertification are taking place on a global scale, efficient use of water resources in Uzbekistan plays an important role in the economic and social development of the country. meeting the needs of the working industry for raw materials, regionally correct placement and development of productive forces is directly related to water resources, which is especially evident in the Surkhandarya region, which is considered to be a region with an arid climate. The natural and economic geographical conditions and factors of the Surkhandarya region, which are different from other regions of the country, the extreme character of the agro-climatic resources, which are extremely necessary for agriculture, the specific aspects of the opportunities for the development of economic sectors, especially the agro-industrial complex, require the efficient use of water resources. [8]. In order to effectively use the available water resources, it has become an urgent issue to build hydrotechnical structures of various types (reservoirs, irrigation-melioration structures, etc.). For this reason, the Topalang reservoir was built in the northeast of the region.

The Main Part

Surkhandarya region has extreme climatic conditions, and due to its location in the southernmost part of Uzbekistan, the relatively high amount of solar energy falls on the surface of the earth, and the low amount of precipitation makes agriculture considered the leading field of agriculture. requires watering.

The region is poor in hydrographic networks, and due to the lack of existing rivers and sharp seasonal changes in the flow of rivers, as well as the fact that two-thirds of the territory is occupied by mountainous areas, large floods in the spring months naturally occur in the large rivers (and streams) of the region. in order to efficiently use its water throughout the year, it has put curbing (regulation) on the agenda. In particular, the development of desert and mountain slopes required the development of engineering works, that is, the additional construction of water reservoirs and irrigation networks.

The South Surkhan Reservoir meets the water needs of the central, southern and southwestern regions of the region. In the northern group districts of the region, the need for water was not well met. Especially in the northern districts, the expansion of the area of irrigated agriculture, assimilation of mountain slopes naturally required the regulation of water resources available in this area. For these objective reasons, the construction of the Topalang Reservoir, which is the second largest in the region, began in 1982 and was put into operation in 1986. Its design capacity is 500 million cubic meters, and its useful water capacity is 450 million cubic meters. [5]. Topalang Reservoir is one of the largest reservoirs in the mountainous regions of Uzbekistan. It was built on the eastern slope of the Hisar mountains, crossed by the north and northwest of Surkhandarya region, in the Topalang riverbed. Its height above sea level is 880 meters, the height of the reservoir dam is 165 meters and another 22 meters of underground foundation, the total is 187 meters, this hydrotechnical structure is of strategic importance.

With the commissioning of the Topalang reservoir, major changes took place in the region's water management in its irrigated zone. Including 9.6 thousand hectares of land in the Dashnobad and Gazarak massifs located in the northern part of the region, 40 hectares in Sherabad, Bandikhon, Kyziriq, Altinsoy districts. 1,000 hectares of land were supplied with water. Water supply of 60,000 hectares of land in Sariosiyo, Uzun, Denov districts was improved, and the geography of gardens and vineyards in the farms affected by the reservoir was expanded. Also, in the northern and central part of the region, many irrigation-melioration facilities were built, the existing canals, namely Hazarbog, Oqkapchigai, Khairabad, Topalang, Karatog, Chilmirob, Karaariq, Ayborak, Tangimush, Hasankhan and the like. some other canals were renovated, their water carrying capacity was increased.

There are three irrigation systems in the province: Topalang-Koratog, Surkhan-Sherabad, Amu-Zang. The source connecting all three irrigation systems is the South Surkhan reservoir located in the heart of the valley. The main resource that can support the South Surkhan Reservoir and irrigation systems of the entire region through it is the Topalang Reservoir, which means that the South Surkhan Reservoir was built 60 years

ago. The useful water capacity is decreasing year by year due to silting, therefore it is possible to get additional water only from Topalang Reservoir; secondly, the South Surkhan Reservoir always received additional water from the Amudarya through the Amu-Zang irrigation system at great expense. With the commissioning of the Topalang reservoir, the consumption of Amu-Zang will decrease, Amu-Zang will use the water of the canal for its territory; thirdly, the Surkhan-Sherabad irrigation system, which receives water from the South Surkhan Reservoir with the help of pumps, is now able to receive water from the Topalang Reservoir naturally; fourthly, the life of the Southern Surkhan Reservoir will be extended due to the fact that the muddy sediments flowing from the water of the Topalang River will now remain in the Topalang Reservoir, and the life of the South Surkhan Reservoir will be extended, and the water source that can support it in the cheapest way and Topalang reservoir is considered.

The importance of Topalang reservoir is that the role of pumps in the Surkhandarya irrigation system is still very large, which increases the cost of agricultural crops due to the consumption of electricity, and has a negative impact on income and net profit. The largest pump stations provide water to the south of the valley, i.e. the area of 244.6 thousand hectares. The total irrigated areas of the province are 325.6 thousand hectares. So, it is clear that every drop of water used for cultivated areas is equal to "Diamond". The Topalang Reservoir has 500 million cubic meters of water in the project. after collecting, by increasing the volume of water in the Hazorbag canal, an additional 40-50 cubic meters of water per second will be taken to the Bandikhon massif and poured over the Sherabad canal. In this way, the Sherabad-Mashina highway canal will be supported with self-flowing water. Then 4,320,000 cubic meters of water will flow into the Sherabad highway canal in one day through this canal without a pump. This number is 400 million cubic meters in ten days, or this amount is equal to the volume of water collected in a large reservoir. This will lead to the saving of several billion soums of electricity at the "Sherabad" pumping station. The water of Topalang Reservoir flows by itself without pumps and reaches the fields of Muzrabod District, 200 kilometers away. The role of the Topalang reservoir in the socio-economic development of the region is multifaceted. The purpose of its construction is not only in agriculture, but also the production of hydropower, which is considered the cheapest and most environmentally friendly, is planned, and currently each is 12 megawatts. 2 aggregates are operating. According to the decision of the President of the Republic of Uzbekistan on the "Program of measures for the further development of hydropower in 2017-2021", all measures for the commissioning of the first and second blocks of the Topalang HPP have been implemented, and the first and second blocks of the HPP will have a total power generation capacity of 145-175 megawatts.

Today, 46 percent of the population of Surkhandarya region is not provided with centralized clean drinking water, and 218 water facilities and more than 3 thousand kilometers of water supply networks need repair, and the amount of water mineralization has increased significantly in the southern districts of the region and the city of Termiz. During his visit to Surkhandarya region on June 2, 2021, the President

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of our Republic, Shavkat Mirziyoev, gave instructions on drawing drinking water from the Topalang reservoir. Accordingly, a project was developed in this regard, according to the project, the construction of pressure relief, water purification and distribution facilities was planned in the lower part of the Topalang reservoir. A total of 361 kilometers of pipelines will be laid from there to the water distribution nodes in the districts, and this system will cover Sariosia, Denov, Shorchi, Kumkurgan, Jarkurgan, Bandikhon, Kyziriq, Sherabad, Angor, Muzrabod, Termiz districts and Termiz cities. a total of 1.7 million people will be provided with clean drinking water. The total cost of this project is 138 million US dollars and it is planned to be launched in 2024

If we talk about the level of security of the Topalang reservoir, the height of the reservoir dam is 165 meters, another 22 meters of underground foundation is made, both of them together make 187 meters. In some years, there are cases of a lot of water entering the reservoir, such cases were taken into account during the construction of the dam, and water conduits were placed under the dam, and there is also a channel. In case of excess water, the water is discharged through them. Specialists of the field invited from France conducted inspections on the quality of the dam and gave a positive assessment of the strength of the dam. At present, the dam management is automated, and control, measurement, and monitoring devices imported from abroad regularly monitor the process related to the dam. sensors are installed and they record all the data.

At present, 10 neighborhoods located near the dam have installed loudspeakers that deliver information. The existing seismic station monitors the effect of the earthquake on the dam. It is also planned that the dam will protect the downstream areas from floods and floods.

Conclusion

Placement and development of production forces in Surkhandarya region, which is climatically extremely dry, depends only on the state of water resources and the level of their effective use. The construction and operation of the Topalang reservoir, which is one of the top ten in terms of size in the northern part of the region, has led to major changes in the economic and social development of the region, including:

- the construction and operation of this reservoir led to the improvement of the full water supply of the Sherabad deserts, the improvement of the water balance of farms in the northern, central and southern districts of the region;
- the geography of agriculture in the region has changed radically. Its core industries have gained decisive importance in the national economy of the region. The network structure of agriculture has changed, and the geography of product production has expanded, the volume has increased;
- with the commissioning of the reservoir, a number of new canals were built, the water carrying capacity of the old ones was increased;
- the electric power needs of the northern districts of the region were fully satisfied with the construction and operation of the power station at the reservoir dam;

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- due to the location of the reservoir in a high mountain area, there are opportunities to build many recreational facilities around it;
- With the construction of the Topalang reservoir, the water supply of the irrigated lands has improved, and as a result of the development of many new lands on the mountain slopes, new settlements have appeared;
- with the commissioning of this reservoir, the agro-industrial complex of the region developed, new forms of it were created and acquired special regional production systems;
- due to the improvement of water supply in agriculture, new agricultural enterprises and industrial enterprises processing agricultural products were established;
- There is an opportunity to effectively use ecologically clean water in the Topalang reservoir to provide drinking water to the residents of the region in the future.
- due to the improvement of water supply in agriculture, the gross yield in grain cultivation has increased and the possibility of fully satisfying the population's need for flour and flour products has been created;
- this dam also serves to protect the population from the danger of flooding in the Topalang river basin.

Due to the fact that 70% of the territory of the province consists of mountain and sub-mountain areas, in the future, by building and operating such water reservoirs on mountain rivers, opportunities will be created for the further development of the socio-economic development of the region and the purposeful use of existing water resources throughout the year.

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