

## Economic analysis of the implementation of space monitoring in reservoirs

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**Abstract:** *This article presents the directions of spatial monitoring of the dynamics of siltation of water bodies, the level regime, water area and the identification of illegal construction sites.*

**Key words:** *space monitoring, remote sensing, aerospace technologies, geographic information systems, space services, economic sectors.*

**Introduction.** Rivers drain a certain amount of solid particles in natural conditions. These particles move by crawling in a suspended state or at the bottom of the trough in a stream of water depending on their size. Taking these into account, the leaks are divided into two types: hanging and underwater leaks. The drains sink in the reservoir partially or completely losing their hanging state and slowly fill its capacity. The process of filling the reservoir with leaks is called fuzzy pressing.

The process of sinking streams in the reservoir and the appearance of a muddy fold depends on the size and shape of the reservoir, the stagnation of its banks, the mode of river flow, the granulometric composition of the streams brought by the river, the order of filling and emptying of the reservoir with water and a number of other factors.

When designing any reservoir and using them in practice, several characteristic water levels are envisaged. These include:

- water level in moderation;
- water level of useless volume. In relatively large reservoirs, it will not be possible to practically use a certain amount of water. This amount of water is called the useless volume of water;
- working water levels. Refers to the water level range of the useless volume with the water level in the norm;
- highest Project water level. The water collected in the reservoir does not cause any damage to its dam until it reaches this level. Water level that can be allowed or raised. It is extremely dangerous to keep the water level long, compromising the strength of the dam. Depending on the water levels, the full water capacity of the reservoirs will be useful and, as mentioned above, will consist of useless volumes.

In accordance with the decree of the Cabinet of Ministers of the Republic of Uzbekistan dated May 20, 2022 No. 274 "on measures to further improve the activities of the space research and Technology Agency", the implementation of space monitoring work is carried out by providing the state and governing bodies with space images,

as well as by applying space technologies, in order to establish the effective use of the results of space activities in the field of Defense and security, the Center for space monitoring and geoengineering technologies was established in the Uzbekkosmos system of the Space Research and Technology Agency under the Cabinet of Ministers.

According to the "road map" of the projects of the Center for space monitoring and geoengineering technologies, approved by this decision, by the end of 2022, space monitoring of the dynamics, water level regime and aquatoria of mudflows of chimneys and South-Surkhan reservoirs in the field of water management, including, on the basis of the results of the monitoring, foreign experience was studied and cooperation relations were established with a number of organizations as part of the task of providing analytical information on illegal construction sites to competent state bodies. In particular, relations have been established with the World Bank Water Resource Management Project, The National Company "Qazaqstan gharish sapari" of the Republic of Kazakhstan, the Finnish company "ICEYE", the Central Asian regional representative office of the International Water management institute, UZGIP LLC (formerly "Sredazgiprovodkhlpok") Institute and the Research Institute of irrigation and water problems.

On July 26-29, 2022, Space Research under the Cabinet of Ministers of the Republic of Uzbekistan took place on the territory of this reservoir due to the fact that the Chimqurgan reservoir, located in the Qamashi District of the Kashkadarya region of the Republic of Uzbekistan, fell below the dead volume

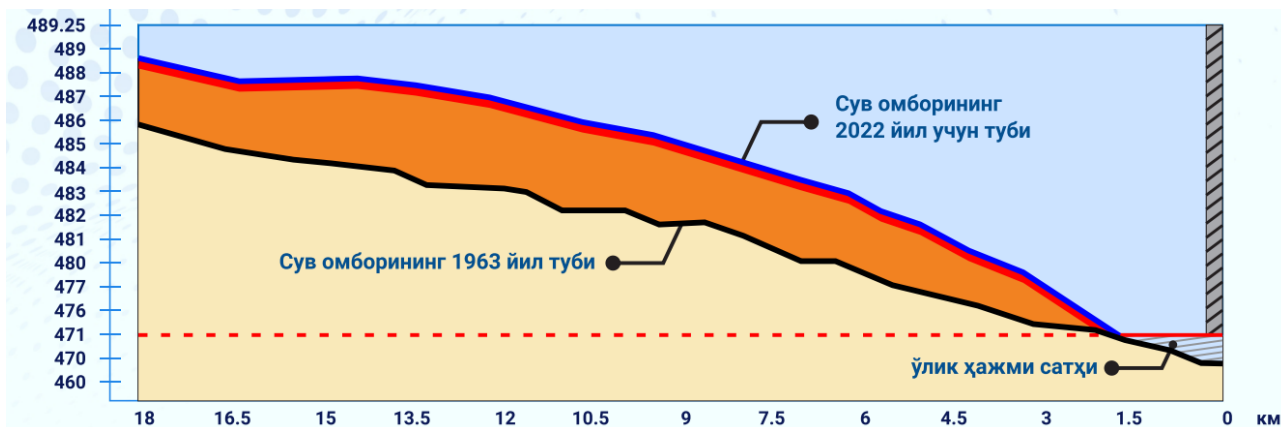
and research and measurement was carried out by specialists from the technology agency and the Center for space monitoring and geoengineering technologies.

According to the project of the Institute "UZGIP LLC" this reservoir was fully commissioned by the "Kashkyovodstroy trust" in 1958, the construction of which began in 1963. According to the project, the full capacity of this reservoir is **500 million. m<sup>3</sup>**, useful water capacity of 450 million. m<sup>3</sup>, the water surface level is **49.2 km<sup>2</sup>**.

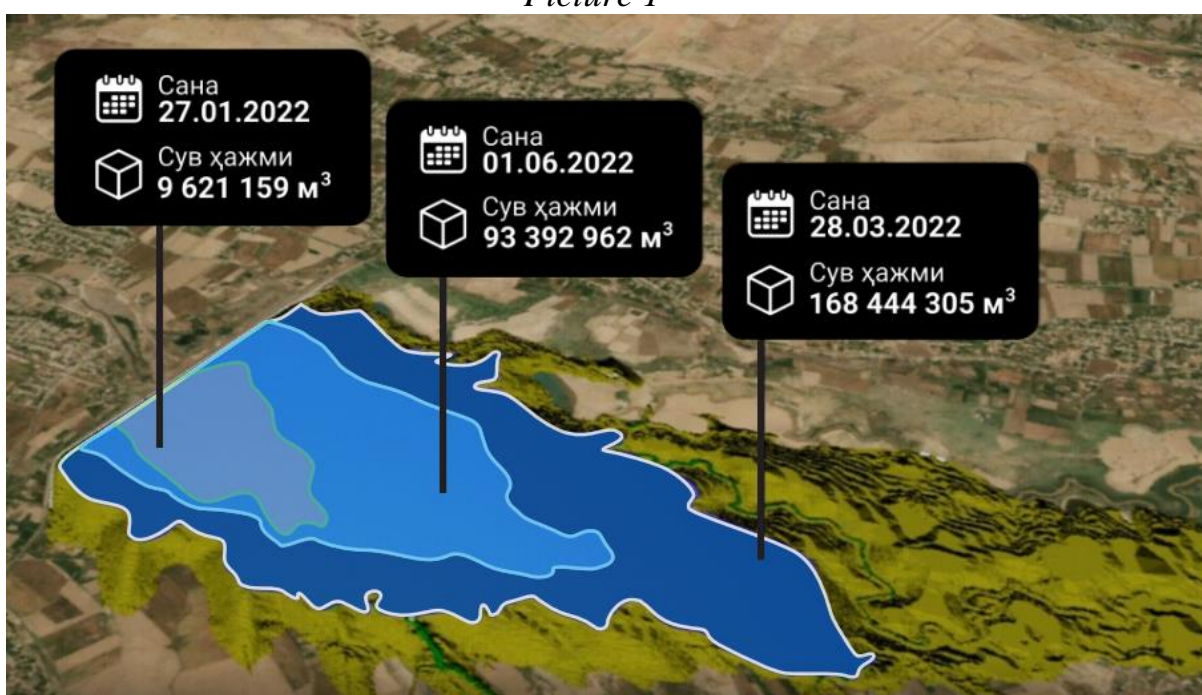
The "chimqurgan" reservoir is today under the Ministry of water management of the Republic of Uzbekistan and covers a total area of **6,164 hectares**, of which **4,920 hectares** are occupied by a water reservoir. Of kashkadarya province **38,000 hectares** of land served in the slaughter.

As a result of the space monitoring carried out, the project has a full water capacity of 500 million.the m<sup>3</sup> equivalent reservoir is known to have been **339,015,710 m<sup>3</sup>** as of August 2022.

From the above, it was found that the overflow of this reservoir with muddy drains amounted to **160,984,290 m<sup>3</sup>**, which is 32.1% of the total capacity of the reservoir. (traditionally obtained data is attached)



Picture 1



Picture 2

Approval of the decree of the Cabinet of Ministers of the Republic of Uzbekistan dated December 11, 2019 on the procedure for determining water protection and sanitary protection zones of water facilities in the territory of the Republic of Uzbekistan is given in Appendix 1 of the decision of the Cabinet of Ministers of the Republic of Uzbekistan on water protection of water facilities in the territory of and the regulation on the procedure for setting sanitary and protection zones Chapter 3 paragraph 18 specifies a water conservation area based on the capacity of the reservoir. Since the "chimney" reservoir is part of the ranks of small reservoirs, the water protection zone is designated as **100-150 meters**.

As a result of space monitoring, we will report the detection of an illegal object with a total of 500 extremes in the water protection zone of the "Chimqurgan" reservoir, including: 291 in khududud, where the water protection zone is set at 100 meters,

<https://confrancea.org>

209 in the area where the water protection zone is set at 150 meters (figure 3-5).

As a conclusion, the implementation of space monitoring in reservoirs promotes the correct distribution of water to agricultural land, providing accuracy of water volume. From this, statistics in economic networks and leads to an increase in the accuracy of analytical data.



*Picture 3*

*Picture 4*



*Picture 5*

#### **List of literature used**

1. Resolution of the president of the Republic of Uzbekistan dated November 12, 2022 “on additional measures for the further development of the Space Network” No. 429. <https://lex.uz/docs/6291454>

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3. Resources of Maxar technologies LLC. <https://resources.maxar.com/>

4. Resources of HEAD LLC. <https://www.head-aerospace.eu/satellite-imagery>