Physical And Geographical Features Of Functioning Of The Jizzakh Reservoir

Abdullaev I.Kh., Karimov I.E.

shakhlooblokulova@gmail.com

Abstract: This article discusses the issues of construction and operation of hydraulic structures in Uzbekistan, in particular, the Jizzakh reservoir, its physical, geographical and hydrometric characteristics.
[Abdullaev I.Kh., Karimov I.E. **Physical And Geographical Features Of Functioning Of The Jizzakh Reservoir.** *Rep Opinion* 2019;11(10):14-18]. ISSN 1553-9873 (print); ISSN 2375-7205 (online). http://www.sciencepub.net/report. 3. doi:10.7537/marsroj111019.03.

Keywords: Physical; Geographical Feature; Functioning; Jizzakh, hydraulic structure, reservoir, bowl, level, landscape, technogenic system, anthropotechnical system

The current state of the environment depends on many global, regional and local factors. One of the factors of local environmental changes is the construction and operation of hydraulic structures, which are reservoirs. In the scientific and geographical literature, the use of large reservoirs and their impact on the environment are quite widely and comprehensively disclosed.

The construction and operation of large and medium-sized reservoirs, with a volume of regulation of water flow, energy and transport issues of the economy of more than 100 million cubic meters, is mainly associated with large regions. Such reservoirs are the world's largest hydraulic structures built in Zimbabwe (Kariba reservoir with a volume of 180 billion m^3), in Russia (Bratsk reservoir with a volume of 169 billion m^3), in Egypt (Nasser reservoir - 157 billion m^3), in Canada (Manikuagan reservoir - 141 billion m3), etc. [3].

At the same time, scientific studies related to the impact on the nature of the surrounding territories, medium and small reservoirs, with a volume of up to 100 million cubic meters of water, are not carried out or insufficiently consecrated in the periodical literature. The influence of small reservoirs on global changes in the natural environment is not taken into account, special hydrological, meteorological, ecological and geoecological studies of the nature of the territories adjacent to them are not conducted. At the same time, any change in even one of the factors influencing natural complexes or elements of the environment in a peculiar way affects the landscape-ecological situation of the territories adjacent to the water body. Perhaps in temperate regions, with good moisture and a large amount of precipitation, their impact on natural processes is not great.

But in areas with a large lack of water resources, with an arid climate, the creation of even small reservoirs with a small area and volume leads to a change in some natural factors, and sometimes to the formation of new, hitherto unknown types of this territory of hydrogenic landscapes. In this regard, this article discusses some issues of the construction and operation of reservoirs in Central Asia, in particular in Uzbekistan, as an example, some physical, geographical and hydrometric characteristics of one of the small reservoirs of Uzbekistan are proposed.

In Central Asia, in particular, in Uzbekistan, a lot of large ones have been built and the construction of medium and small hydraulic structures is still underway. There is a sufficient number of large and medium reservoirs with a volume of 0.5 to 7 km^3. Some large reservoirs have a great impact on the economy and the economy of even several countries of the region, such as the reservoirs of Central Asia, such as Toktogul in Kyrgyzstan, Chardara in Kazakhstan, Tuyamuin in Uzbekistan and Rogun in Tajikistan, which is under construction. Their influence on the natural environment is also quite well consecrated in the scientific and periodic literature.

Today in Uzbekistan, a large number of small reservoirs are being built and were built, the volume of which does not exceed 100 million m^3. Their construction and operation are mainly associated with the development of agriculture and small energy. They do not occupy vast spaces, do not have a big impact on the nature of the whole region. At the same time, each reservoir has its own unique feature and influence on the nature of the territory where it functions.

In Uzbekistan, in particular, in the Jizzakh region, 7 reservoirs have been built and are functioning, of which 6 are small reservoirs.

Reservoirs of Jizzakh region

Table 1.

№	Reservoir	Area, km^2	Volume, m^3	River basin
1	Arnasay	249	730	Syr Darya
2	Jizzakh	13,8	100	Sangzar Zarafshan Syr Darya
3	Zaamin	9,3	52	Zaaminsay
4	Karaultepa	7,53	53	Sangzar Zarafshan
5	Khojamushkent	0,45	8	Hojamushkentsay
6	Navka	0,60	6	Navkasay
7	Sarmish	0,13	4.3	Sarmishsay

One of the most important hydraulic structures for the Jizzakh region is the Jizzakh reservoir. Built in the second half of the last century, it functions perfectly to this day, performing an important function of supplying agricultural land to the region. The reservoir created in the natural lowland of Yailmasay not only serves as a water supply for agricultural land, but also serves as a catchment area for spring floods and mudflows coming from the northern and north-eastern spurs of the Adyr part of the Malguzar Range.

The construction of the reservoir began in 1963 and was completed in 1968. But it fully began to function in 1973, as high-water 1968-1971 were very dangerous for the reservoir, and hydrological processes that took place during these years influenced the operational mode of its use. In this regard, 1973 is considered the year of normal full functioning of the reservoir.

Figure 1. Jizzakh reservoir (east coast)

In the Yailmasay Valley, in a natural lowland, a dam 26 meters high was built. The length of the dam was 5.5 km, which today is one of the longest dams in Uzbekistan. Today, about 87 million m^3 of water is collected in a natural and man-made bowl with a volume of 100 million m^3. Locals call the reservoir "Jizzakh Sea". With an average depth of 12 m, the maximum depth of the reservoir is 26 m, the area of the reservoir is 12.7 km^2, and the maximum width is 5.1 km. The reservoir is bulk, two channels with a capacity of 25m^3/s are carried into it, and an outlet channel with a capacity of 10 m^3/s is built, [2].

Figure 2. Dzhizak reservoir (convex channel)

The Jizzakh reservoir provides water for 15,340 hectares of irrigated land and is an additional auxiliary reservoir for 12,000 hectares of land in the Jizzakh region. For a more complete familiarization with the reservoir as a hydraulic structure, its hydrological and hydrometric parameters are given below:

- Working project level - 372.55 m;
- Dead level - 356.50 m;
- The volume of the reservoir is 100 million m^3, the usable volume, taking into account siltation, is 82.55 million m^3;
- Given the siltation, the useful volume of the reservoir is 96 million m^3, taking into account the siltation of 80.55 million m^3;
- The volume of the meter level is 4 million m^3, taking into account the siltation of 1.65 million m^3;
- The working surface area of the reservoir leaves 10 km^2, and the area of the dead level is 0.41 km^2 [4].

The graph of changes in water volume in the Jizzakh reservoir
for the period 1999 - 2019 (million m^3)

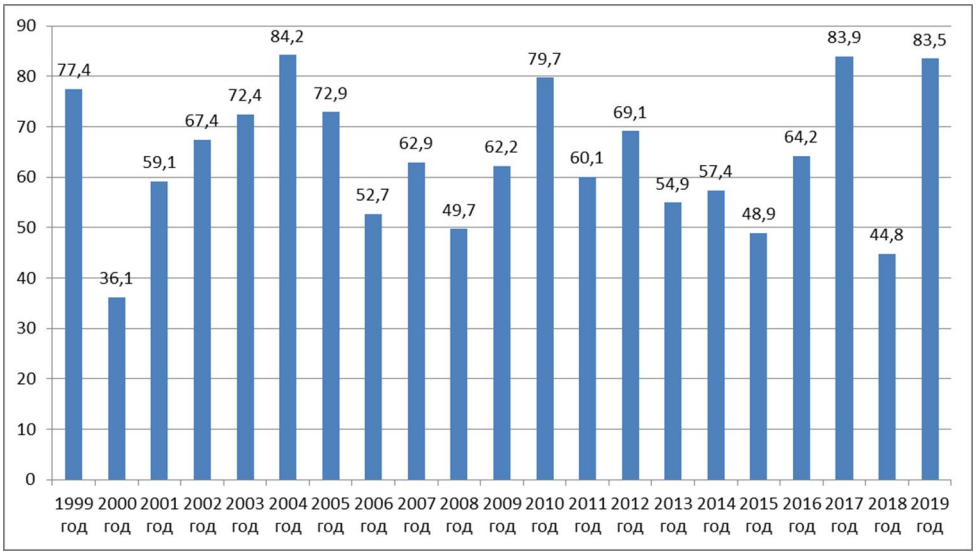

Table 2

The main landscape-forming elements of the reservoir as a hydraulic structure are: a dam, outlet waterworks, a drainage system of the dam, inlet and outlet channels, access roads and a control center. Each of these systems is one way or another an environmental impact factor and forms a certain type of hydrotechnogenic landscapes. The reservoir as a hydraulic structure affects natural processes, forming hydrogenic and hydrotechnogenic types of landscapes.

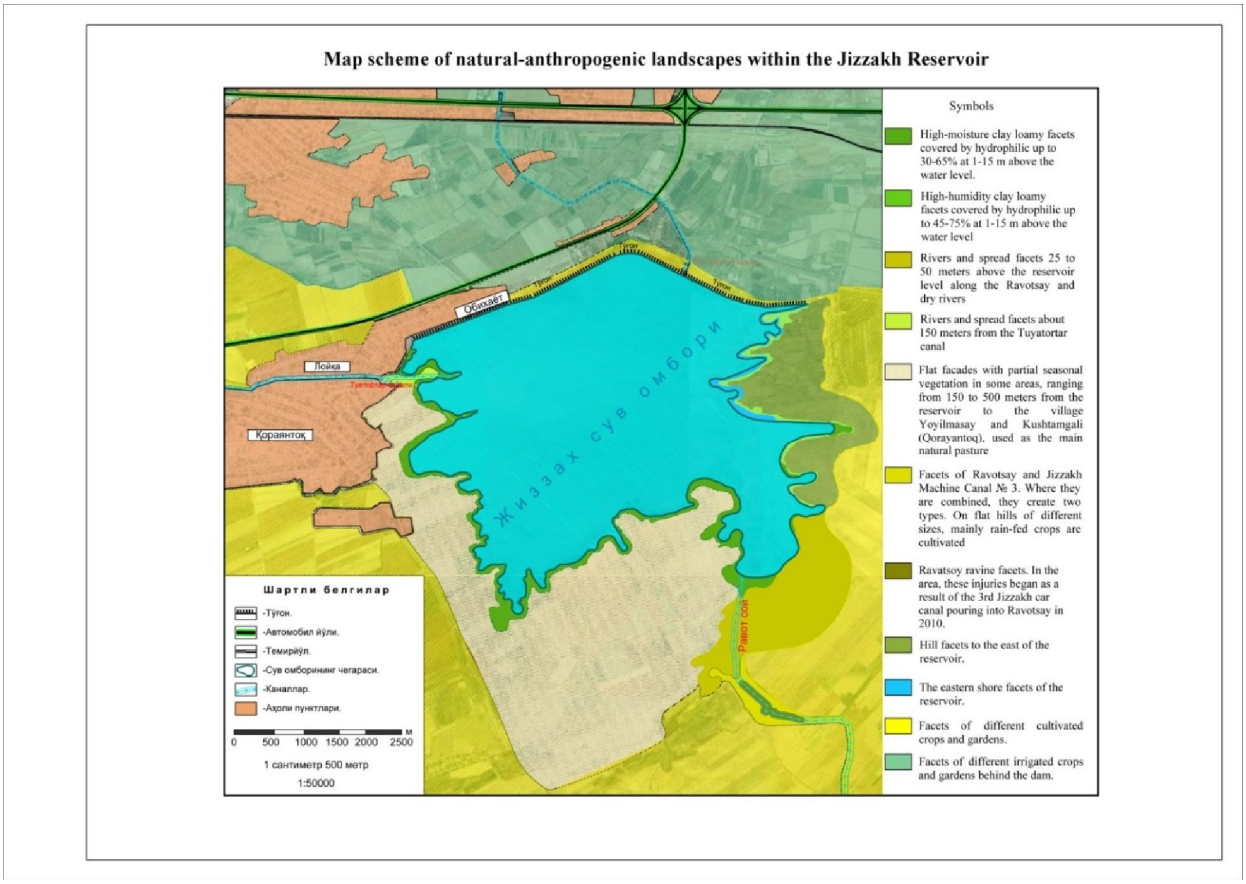

Figure 3. A map of the zoning of natural-anthropogenic landscapes of the influence zone of the Jizzakh reservoir

The main hydrogenic types of landscapes are the reservoir bowl itself, coastal marshy areas, erosion basins, abrasion banks and lowlands. Their formation and dynamics depends on the water level of the reservoir and the water content of the year. At the same time, the formation and functioning of hydrotechnogenic landscapes (dam, drainage system, canals, discharge systems) depend mainly on anthropogenic factors, for example, from the activities and management of this system by man.

The Jizzakh reservoir, being a small-sized reservoir, has an effect on small territories in the immediate vicinity of the reservoir. The zone of its direct influence does not exceed 500 meters, which stretches ribbon-like along the coastline. Sometimes the direct influence of the reservoir, especially in its southern part, does not exceed 100 meters. This can be traced by the manifestation of physical and geographical processes (ravine formation, groundwater output, flooding), by plant associations and soil cover.

Microclimatic changes can be traced up to 5-10 km, depending on the topography of the territory. It is expressed in the formation of fogs and in an increase in their quantity per year, in the manifestation of a coastal breeze, especially in the summer period, in increased humidification of surface air [5].

There is a change in the vegetation in the vicinity of the reservoir. In place of xerophytic vegetation (camel thorn, wormwood, various species of hodgepodge), hydrophytic species are formed (reeds, sedge, willow grasses in places), and marsh vegetation is forming. But all these processes, one way or another, depend on the water level in the reservoir, which is regulated by man.

It can be said with great certainty that the formation and dynamics of the main natural processes and phenomena near the reservoir mainly depend on human activity and the person is responsible for all the processes occurring in this anthropotechnical system, which is the reservoir and the zone are of its direct influence [1]. In this system, all natural and anthropogenic processes and phenomena are associated with an anthropogenic structure, which is controlled by a person, which means that the main responsibility for all changes in the environment is borne by a person, his conscious activity. The study and management of these processes is an important task of modern geographical science, in particular its

narrow direction, which is anthropogenic landscape science.

The list of used literature:

1. Abdullaev I., Karimov I., Holmirzaev J. Geographical aspects of the Jizzakh reservoir and its rational use. Geographical Society of Uzbekistan Volume 52. Tashkent-2018 169-171 p.
2. Abdullaev I., Karimov I. Reservoirs and their description. Problems in geography and geography education. Scientific-practical conference. JDPI. Jizzakh - 2018. 126- 128 b.
3. Voropaev G.V., Avakyan A.B. Reservoirs and their impact on the environment. M., "Science", 1986, 364 pp.
4. Technical report of the Jizzakh reservoir survey. Tashkent, 2014, 36 p.
5. Karimov I., Abdullaev I., Yakubzhanova G. Influence of reservoirs on the environment. Electronic collection of articles "Teacher Almanac" No. PV 2125 dated 04/14/2019. Russia, Lipetsk.

10/9/2019