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Issue Article

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GEOECOLOGICAL PROBLEMS CAUSED BY ANTHROPOGENIC ACTIVITY AT THE VARZIK RESERVOIR

Abstract: *The article presents the effects of the shortcomings in the use of reservoirs on the geoecology of the reservoir surroundings. The causes of water body pollution, the prevention of the negative consequences of these processes for representatives of the flora and fauna, a number of ways to protect them, and the analysis of the main causes of water pollution were considered. Also, taking into account the natural geographical conditions, microclimate, and some parameters of the reservoir, problems arising in the use of the reservoir are described.*

Key words: *Varzik reservoir, anthropogenic factor, geoecological problem, Chust, Govasoy river, euphotic zone, agricultural technology, melioration, pesticides.*

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Introduction

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The well-known politician and thinker Mahatma Gandhi expressed the following thoughts about the preservation of nature's blessings and their rational use. "Earth, air, soil and water are not an inheritance from our ancestors, but a debt from our children. So we have to give them at least as much as it was given to us." In fact, if we consider what substances exist in the human body, it can be seen that more than half of it consists of water, which affects the biochemical processes of the body. We actively use water throughout our lives. But, unfortunately, the quality of consumed water is changing from year to year. Over the years, a large amount of drinking water supplied to the population does not meet sanitary standards in terms of quality. Although the quality of underground water is higher than the content of open reservoirs, this water passes through a "filter system" through sand, clay, stones and other rocks. But such cleaning is not able to remove all harmful substances [11].

Natural and economic problems of water reservoirs can be cited as the main factors among the various components that influence the change of nature. After all, reservoirs cause various overlapping problems in water-related economic sectors. Water pollution poses a serious threat to many water bodies on earth and the surrounding areas. Pollution of waterways by direct anthropogenic factors affects not only animals and plants but also changes in the ecosystem. Waste, heavy metals, and harmful substances can cause irreversible damage to the composition of the ecosystem.

Literature review.

The analysis of the relevant scientific literature and information resources shows that a number of studies have been carried out in our Republic on the geographical research of the Varzik reservoir and its

changes. In particular, its natural geographical features and changes observed in it as a result of anthropogenic influence E.A.Toshpolatov, T.S.Tillayev, A.R.Kuzmetov, Kh.Kh.Abdinazarov, S.U.Isroilov, I.Kamolov, B.A.Kamalov, K.M.Boymirzayev, A.S.Baratov, E.A.Soliyev , I.R. Soliyev and others. Regarding changes and technical safety of the water reservoir, M.R. Bakiyev, A.A. Yangiyev, O. Kadirov, N. Karimova, I. U. Majidov, B. Nosirov, R. Khojaqulova, M. Ramatov, Z. Khusanhojayeva and others have done research. However, factors such as climate change, population growth, and increasing demand for resources in recent years show the practical importance of researching the geoecological situation in this area.

Research Methodology.

The expedition, geophysical, observational, statistical, and comparative research methods, as well as hydrological analysis, systematic, ecological, and landscape approaches to the problem were used in conducting this research.

Analysis and results.

Water reserves on the planet are not the same. While some parts of the world have sufficient water bodies, other places can be seen to have large-scale water shortages. Since surface water is the source of water for many settlements, the main cause of water pollution is anthropogenic activity. Varzik Reservoir is located 2 km southeast of the town of Varzik, Chust District, Namangan Region, at an altitude of 850 meters above sea level. (Figure 1). The village of Varzik is geographically located in the foothills.

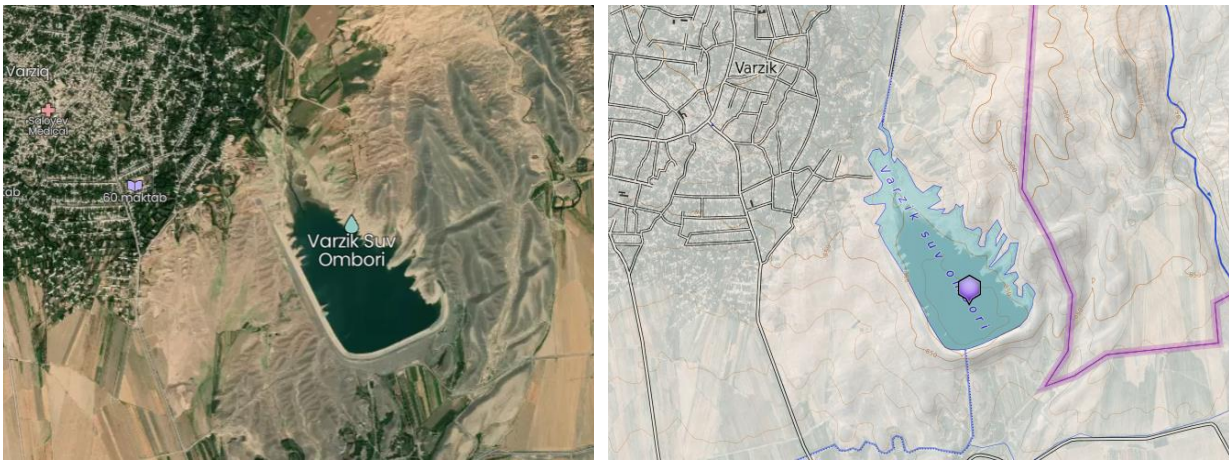

Figure-1. Aerial photo of the Varzik reservoir.

Source: https://mapcarta.com/34882204 and https://www.mindat.org/feature-11268263.html

Climate: The climate of the area where the reservoir is located is characterized by rapid changes, i.e. dry, hot summer, and cold winter. The maximum air temperature in summer reaches +40 °C, and the minimum air temperature in winter reaches -26 °C. The average annual air temperature is +11.9 °C. Annual rainfall is 300-330 mm (around the Varzik reservoir). The period of the most precipitation is in October-March, which is 75% of the annual precipitation. In the north-northeast region, the wind in the north direction is characterized by a lot of blowing, the average speed is 3.57 m/s. In other directions, the wind speed is not high. During the operation of the reservoir, freezing of the surface of the reservoir was observed in 2008, when the winter months were cold. Then the thickness of the ice was up to 10-15 cm. The period of melting of the reservoir ice corresponds to late February and the first ten days of March. After that, the water temperature starts to rise. In the spring months, the water temperature varies from +4 °C to +10 °C. The period of maximum increase in water temperature corresponds to July, and the average is +27.3 °C.

Suv omborini to‘ldirish manbaining gidrologik tavsifi: G‘ovasoy daryosi Varzik qishlog‘ida joylashgan Varzik suv omborining to‘ldirish manbai. Daryoda suv oqimi may-iyun oylarida ko‘payadi (o‘rtacha 18-22 kub/s), yanvar-fevralda esa pasayadi (o‘rtacha 1,2 kub/s). Govasoy daryosining o‘rtacha yillik suv oqimi sekundiga 5,92 kub metrni tashkil qiladi. Daryoning umumiy uzunligi 96 km, suv havzasi 724 kv.km. Daryoning oqimi yuqori hududlarni sug'orish va suv omborini to'ldirish uchun ishlatiladi. Suv omborini to'ldirish asosan may-iyun oylarida suv toshqini tufayli amalga oshiriladi [2].

Table 1. Parametric data of Varzik reservoir

The reservoir basin has the following morphometric elements (according to the project) at the standard water level (SWL) mark:	
the full volume of the reservoir	16,55 mln.m^3
the length of the basin	1,8 km
maximum width	650 m
maximum depth	38 m
The area of the reservoir	1,17 km^2
Area up to 2 meters deep	0,21 km^2
The total length of the shoreline of the reservoir	7,2 km
Size	0,01 mln.m^3

Source: Karimova. N. Diploma project "Reconstruction of Varzik Reservoir". Tashkent Institute of Architecture and Construction. Tashkent-2015. P.21.

Any dam accumulates some level of sediment in turbid waters downstream. Species of flora and fauna are in direct contact with sediments. Increased sediment concentration often produces turbid waters with a smaller euphotic zone [13] (the layer closer to the surface that receives enough light for photosynthesis to occur). In the Varzik reservoir, this layer also reduces the productivity of plants and negatively affects the livelihood of fish and bird species distributed in the area. Causes disease in fish, thereby increasing the likelihood of illness or death. Turbidity can also cause visual impairment in fish, which affects their feeding (Figure 2):

On May 6, 1993, Uzbekistan adopted the Law "On Water and Water Use" [3]. Protection from contamination, pollution, and depletion, prevention and elimination of the harmful effects of water, improving the condition of water bodies, as well as protecting the rights and legal interests of enterprises, institutions, organizations, farmers, peasant farms, and citizens in the field of water relations consists of.

In particular, serious concerns about the increasing level of pollution from the disposal of agricultural chemicals, and the further pollution of water resources as a result of waste from the mining industry and settlements are increasing day by day. Improper use of water and its low efficiency hinder the development of irrigated agriculture.

Figure-2. Dewatered parts of the Varzik reservoir.
(Photographed by the authors)

Conclusion/Recommendations.

As a result of the observations, it became known that the impact of water resources on the environment as a result of the activities of the population in the agricultural sector can be shown in the following examples:

- agricultural techniques - these techniques pollute the surface and underground waters around the reservoir, even in small quantities, with fuel and oil materials and their waste;
- land reclamation - shallowing of the water reservoir, decrease in rainfall, reduction of some species of plants and animals, and reduction of fish stocks;
- chemical fertilization - as a result of the washing of fields, mineral fertilizers enter water bodies, which leads to the rapid growth of blue-green algae, which die and form a thick layer of sediment on the bottom of water bodies. Their decomposition consumes almost all the oxygen in the water;
- pesticide use - pesticides flow into water bodies and accumulate there. In the human body, it often causes allergic diseases, and in animals and plants, it can penetrate into all tissue systems and cause negative complications;
- impact on the population - erosion, destruction, silting, swamping, salinization, and other negative phenomena of individual natural and economic objects around water bodies may be observed.

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