INLAND WATERS OF NAVAI REGION AND THEIR NATURAL GEOGRAPHICAL SIGNIFICANCE

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Abstract: This article comprehensively covers the inland waters of Navoiy Province, landscape dynamics, soil regimes, vegetation cover, and the impact of anthropogenic changes based on scientific literature. The influence of the Zarafshon River, groundwater layers, desert areas, reservoirs, and irrigation systems on the region's ecological stability has been analyzed.

Keyword: inland waters, surface waters, rivers, reservoirs, lakes, artificial irrigation facilities, groundwater.

Аннотация: В данной статье на основе научной литературы широко освещены внутренние воды Навоийской области, динамика ландшафтов, почвенные режимы, растительный покров и влияние антропогенных изменений. Проанализировано воздействие реки Зеравшан, подземных водных горизонтов, пустынных территорий, водохранилищ и ирригационных систем на экологическую устойчивость региона.

Ключевые слова: внутренние воды, поверхностные воды, реки, водохранилища, озёра, искусственные ирригационные сооружения, подземные воды.

Inland waters include rivers, lakes, groundwater, glaciers, reservoirs, canals and ditches. Inland waters depend not only on the climatic characteristics of the country, but also on other elements of its nature, in particular, its relief. According to the definition of the expert geographer P. Baratov, “inland waters are a complex of all water bodies located on land and not directly included in the waters of the oceans and seas” - scientifically substantiated[1]. They are an important component of the geographical crust and play a significant role in the formation of natural landscapes and the socio-economic development of regions.

Inland waters are important in ensuring the stability of natural ecosystems. It is known that the territorial density of rivers and lakes, their water regime, primarily depends on the climatic conditions and relief of the area. The territory of Uzbekistan has its own hydrological characteristics, which differ in the

[1] P.Baratov O’zbekiston tabiiy geografiyasi . T-1996 O’qituvchi.

geographical location and natural conditions of the territory. Rivers and lakes are important centers of geomorphological features. At the same time, inland waters are widely used in the areas of drinking water supply, irrigation, industry, energy and transport.

Navoi region is located in the central part of Uzbekistan in the desert and semi-desert zone, and water resources are a decisive factor in the socio-economic development of this region. One of the most important aspects shaping the nature of the region is inland waters, which are the Zarafshan River, groundwater aquifers and artificial reservoirs. Inland waters play a key role in agriculture, industry, drinking water for the population, the formation of ecological systems and landscapes. The state of water resources is closely related to ecological stability, soil fertility, vegetation cover and landscape structure. When assessing the value of water resources in the region, their hydrological, ecological and economic functions play a special role.

It is advisable to divide the water resources of the region into two main systems: groundwater and surface water sources. The largest water source in the region is the Zarafshan River, which directly participates in several sectors of the region. The agrotechnical regime of using the river as an irrigation source has led to anthropogenic changes in landscapes.

The Zarafshan River has a total length of 870 km, an average gradient of 2.9%, and a current basin area of 40,600 km². Approximately 29% is in Tajikistan (11,700 km², 8.4% of Tajik territory), and 71% is in Uzbekistan (28,900 km², 6.5% of Uzbek territory). The river is fed mainly by glacial melt, so the maximum flow occurs in late spring and early summer, and the minimum flow occurs in winter. The average long-term flow on the Tajikistan-Uzbek border is 158 m³/s, and the annual flow is about 5 km³[2].

[2] Water quality, potential conflicts and solutions—an upstream– downstream analysis of the transnational Zarafshan River (Tajikistan, Uzbekistan) M. Groll • Chr. Opp • R. Kulmatov • M. Ikramova • I. Normatov Received: 24 June 2013 / Accepted: 28 November 2013 Springer-Verlag Berlin Heidelberg 2013

In Navoi, the groundwater level ranges from 2 to 20 meters, and salinity is high in a number of desert areas. The rise in the water level causes secondary salinization of the soil. In many districts of the region, drinking water is obtained from groundwater. Groundwater, as capillary moisture, is an additional source of moisture for vegetation in agricultural zones.

Reservoirs such as Tudakul, Shurkul, and Koratepa in Navoi region, in addition to their multifunctional importance, have a significant impact on the landscape of the region. Although this area is important for the diversity of water, flora, and fauna, it also increases water scarcity due to the high rate of evaporation. Since the region receives little precipitation, reservoirs alleviate seasonal water shortages. Fishery farms have formed around the reservoirs, and there are recreation areas for the population. Reservoirs contribute to the formation of coastal and meadow landscapes and the emergence of stopover zones for bird migration.

The Kuyimozar reservoir is built on the eponymous depression and receives water from Zarafshan and the Amu Darya via the Amu-Bukhara Canal. Its area is 6 km2, the deepest point is 22.8 m, the average depth is 16.8 m, and the water capacity is 350 million m3[3].

Tudakol reservoir: Located in the Kyzyltepa district of Navoi region. It was formed naturally as a result of the Zarafshan flood waters flowing into the Tudakol lowland in 1965-1977. It is located in a natural valley 26 km east of Bukhara, in the eastern part of the Kuyimozar reservoir. The reservoir has a standard water level of 223.50 meters, a full volume of 1200 million m3, a water surface area of 213.19 km2, a length of 15 km, a width of 14 km, and a depth of 9.8 m[8]. This reservoir collects excess water from the Zarafshan River through the Urtachol Canal, and is filled with water from the Amudarya through the Amu-Bukhara Machine Canal. In 1960, the Tudakol Reserve with an area of 30 thousand hectares was established on the basis of the reservoir.

Shurkul Reservoir is a reservoir in Bukhara region. It is filled in the autumn-winter season through a specially dug channel from the Zarafshan River. Built in

1977–80. Total volume 170 million m³, surface area 30.5 km², length 5.5 km, width 3.5 km, depth 30 m, average depth 5.7 m, dam length 560 m, dam height 14.5 m, maximum water transfer capacity 35 m³/s. It supplies water to 35 thousand hectares of farmland in G'ijduvan in Bukhara region, Konimekh in Navoi region and other districts.

Due to the natural geographical conditions of the region, agricultural products: grain, cotton, vegetables, viticulture, horticulture, etc. are cultivated at the expense of inland waters. The efficiency of irrigation systems is considered a key factor in productivity. It also serves to stabilize the landscape system.

The importance of water for industry is high, which justifies the fact that the region is one of the major industrialized centers. The processes of metallurgy, chemistry, and construction materials production in the region are related to water and are organized according to the theory of complexity.

Groundwater is intended for technical purposes and is regulated by state and industry standards, technical conditions or the requirements of specific water-consuming organizations. Groundwater accumulates and moves in the pores, cracks, karst and other cavities of rocks, forming various deposits or separate areas of groundwater accumulation.[3]

As a result of climate change, improper use of inland waters is accelerating salinization processes and leading to soil degradation. Insufficient collector-drainage systems in irrigation areas are causing groundwater levels to rise and salts to migrate to the soil surface.

Dust and salt aerosols rising from dry saline areas reduce air quality. This process is especially intensified in years of low water. The formation of purposefully created artificial groundwater resources (artificial replenishment of their reserves) is carried out in cases where natural-anthropogenic resources or dynamic reserves are not saturated with water intake at the required level or are of

[3] Tog‘-kon sanoati va geologiya vazirligining 2025-yil “9” apreldagi 8-sonli Yer osti suvlarining ekspluatatsiya zaxiralari va prognoz resurslari tasnifi"ni ichimlik va texnik suvlar konlariga qo‘llash bo‘yicha qarori 15-ilovasi

very small volume, which does not provide a limited decrease in the groundwater level for a limited period.

Alluvial processes of the Zarafshan River ensure the relief shape of the valley, the formation of fertile soils and agro-landscapes. Water scarcity increases wind erosion, sand migration and degradation processes. One of the main factors of desertification in Navoi region is the depletion of water resources.

Irrigation systems, collector networks, and reservoirs have artificially changed the landscape of the region. Cultural agro-landscapes have emerged in areas that were previously deserts. It is no secret that the irrational use of water resources in the region leads to increased environmental risks. To prevent such negative situations, it is important to conduct scientific assessment, constant monitoring, and analysis of groundwater. These observations, along with GIS, hydrogeological maps, statistical data, are the main scientific tools for monitoring the state of aquifers in desert areas.

In general, the inland water resources of Navoi region are of strategic importance for economic, environmental and social spheres. The Zarafshan River, groundwater aquifers and artificial reservoirs play a key role in agriculture, industry, drinking water supply, ecological balance and landscape formation. Rational management of water resources ensures the sustainable development of the region. At the same time, the fight against desertification and systematic water use practices serve to increase the ecological stability of the region. The impact of inland waters of Navoi region on ecological and landscape systems is a complex and multifactorial process. The depletion of water resources leads to environmental consequences such as soil salinization, desertification, degradation of vegetation cover, deterioration of air quality. Therefore, water management, monitoring and ecological restoration measures are necessary in the region.

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