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PROBLEMS IN USING THE TRANSBORDER RIVER

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Abstract
Transboundary rivers pose significant challenges in their utilization due to complex geopolitical, environmental, and socio-economic factors. This article examines the problems associated with harnessing these rivers for various purposes and discusses the implications of such challenges. Through an analysis of data on transboundary rivers, key issues such as water scarcity, conflicts over allocation, and environmental degradation are highlighted. Understanding these challenges is crucial for developing effective management strategies and fostering cooperation among riparian states. This article provides a comprehensive analysis of the challenges associated with the utilization of transboundary rivers, focusing particularly on Central Asia. It explores key issues such as water scarcity, geopolitical conflicts, environmental degradation, and the lack of cooperation among riparian states. Through a methodical approach that includes literature review, data analysis, and consideration of scientific research, the article examines the multifaceted nature of transboundary river management.

Keywords: Transboundary rivers, Water scarcity, Geopolitical conflicts, Environmental degradation, Riparian states, Cooperation.

Introduction

Transboundary rivers, flowing across political boundaries, often serve as vital sources of water for multiple countries. The utilization of these rivers for irrigation, hydropower generation, navigation, and domestic consumption is essential for the socio-economic development of riparian states [1-3]. However, the management and equitable distribution of water resources from transboundary rivers are fraught with challenges. This article aims to analyze the problems associated with utilizing transboundary rivers based on empirical data and research findings [4-6].

The transboundary environmental challenges faced by Central Asia underscore the interconnected nature of environmental degradation and resource exploitation. The transition from centralized governance to independent states has accentuated the need for coordinated environmental policies and cooperation among neighboring countries [7-9]. Addressing waste contamination from extractive industries, water scarcity, and energy resource management requires collaborative efforts, shared responsibility, and the establishment of effective regulatory frameworks. International organizations and multilateral agreements can play a crucial role in facilitating dialogue, promoting sustainable practices, and resolving conflicts related to transboundary environmental issues

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[10-14]. Moreover, fostering public awareness, stakeholder engagement, and community participation are essential for achieving long-term environmental sustainability in Central Asia. By acknowledging the interdependence of economic development, environmental conservation, and regional stability, Central Asian countries can work towards mitigating transboundary environmental hazards and fostering a resilient and sustainable future for generations to come [15-19].

Method:

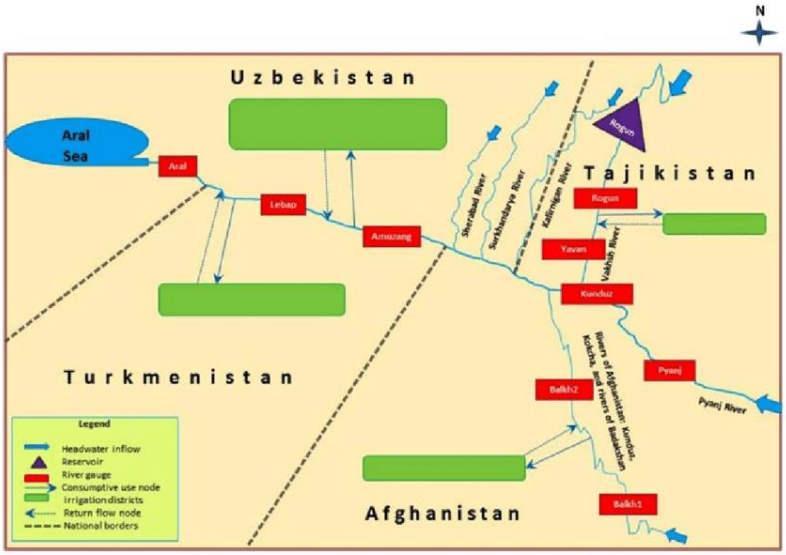
The analysis presented in this article is based on a review of existing literature, reports from international organizations, and empirical data on transboundary river basins. Data regarding water availability, usage patterns, conflicts over water resources, environmental impacts, and cooperation efforts among riparian states are examined to identify key challenges and trends.

Results:

We face several important problems in the use of transboundary rivers. The main parts of these problems were studied and their analysis was carried out. The researches of Uzbek and international scientists were studied and their approaches were considered.

Water Scarcity

Many transboundary river basins face water scarcity due to increasing demand from growing populations, unsustainable consumption patterns, and climate change-induced variability in precipitation patterns. Water scarcity in transboundary river basins poses complex challenges due to the shared nature of water resources between different countries or regions. Transboundary river basins often involve multiple stakeholders with different interests, further complicating water management and distribution. Many problems of water scarcity in transboundary river basins were analyzed and their main causes were studied.



Amu Darya river basin schematic: sources and uses of water.

In order to encourage neighboring countries in transboundary basins to cooperate in water

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development and distribution, analyzes describing water scarcity opportunities and politically constrained and economically optimized forms of water use in the basin were also explored [20].

If we consider the analysis of these situations, they are competition for water resources, that is, several countries use the same water resources in transboundary river basins. With population growth and economic development, the demand for water increases, leading to competition among riparian states for access to and control over water resources. At the moment, unequal distribution is also having its effect. In transboundary river basins, water resources are often unevenly distributed among riparian states, leading to imbalances in water supply and use. Upstream countries may have more control over water flow, which may affect downstream areas and lead to conflicts over water sharing. Processes occurring due to climate change were also analyzed. Climate change will exacerbate water scarcity in many regions, including transboundary river basins. Changes in precipitation patterns, increased droughts, and rising temperatures will alter the availability and distribution of water resources, further straining water supply in these shared basins. Population growth and urbanization process Rapid population growth and urbanization increase the demand for water for domestic, industrial and agricultural needs. As urban centers expand and economies develop, pressure on water resources in transboundary river basins increases, leading to increased competition and potential conflicts over water allocation.

The water shortage in the transboundary river basin has a great impact on the deterioration of water quality, which is manifested in the deterioration of the environment. Human activities such as deforestation, pollution and unsustainable agricultural practices can degrade water quality and undermine the health of river ecosystems in transboundary basins. Environmental degradation exacerbates water scarcity and undermines the ability of coastal states to sustainably manage and use shared water resources.

Effective governance mechanisms and frameworks for cooperation are essential for water resource management in transboundary river basins. However, political tensions, historical disputes, and lack of institutional capacity can hinder cooperation among riparian states, making it difficult to address water scarcity and implement sustainable water management practices.

Addressing water scarcity in transboundary river basins requires coordinated efforts among riparian states supported by strong governance structures, transparent decision-making processes and dispute resolution mechanisms. International agreements, such as treaties and river basin commissions, help promote cooperation and enable equitable sharing of water resources among neighboring countries. In addition, investments in water infrastructure, technologies and conservation measures are essential to improve water security and sustainability in transboundary river basins.

Geopolitical Conflicts. Disputes over water allocation, infrastructure development, and control of river resources often lead to geopolitical tensions among riparian states. Competing national interests and historical grievances exacerbate these conflicts. Geopolitical conflicts involving transboundary river basins often arise from competition over water resources, historical disputes, and broader political tensions between riparian

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states. There are several factors that cause geopolitical conflicts in transboundary river basins, and we will look at these factors and analyze the causes.

Through hydropolitics and infrastructure development, the construction of dams, reservoirs and other water infrastructure projects in transboundary river basins can have important geopolitical implications. Upstream states may seek to establish control over water resources by building infrastructure that impacts downstream, potentially affecting water supplies, agricultural productivity, and the livelihoods of downstream riparian states. Disputes over hydropower development and infrastructure projects can lead to diplomatic tensions and conflicts between neighboring countries. In addition, historical and ethnic conflicts should be taken into account. Historical conflicts and ethnic divisions in transboundary river basins can exacerbate geopolitical conflicts over water resources. Long-standing disputes over territorial boundaries, resource ownership and historic water rights can reignite and intensify tensions between riparian states, leading to diplomatic standoffs and even armed conflict in extreme cases.

Political Instability and Governance Challenges - Political instability, weak governance structures, and limited institutional capacity can undermine cooperation and exacerbate geopolitical conflicts in transboundary river basins. In areas with political transitions, authoritarian regimes, or weak rule of law, disputes over water management and distribution may be exacerbated by the lack of effective mechanisms for dialogue, negotiation, and dispute resolution among riparian states. Analyzes of external influences and power dynamics show that geopolitical conflicts in transboundary river basins can be influenced by external actors, including neighboring countries, regional powers, and international organizations. External interventions, geopolitical rivalries, and power struggles can exacerbate existing tensions and complicate efforts to resolve disputes and promote cooperation among riparian states. Solving geopolitical conflicts in transboundary river basins requires a comprehensive approach that resolves the main factors of tension, promotes dialogue and cooperation between riparian states, and promotes fair and sustainable management of common water resources. International mediation, confidence-building measures and multilateral cooperation frameworks can play a crucial role in easing geopolitical tensions and ensuring peace and stability in regions affected by transboundary water disputes.

Environmental Degradation - The construction of dams, diversion of water for irrigation, and pollution from industrial and agricultural activities contribute to environmental degradation in transboundary river basins. Loss of biodiversity, habitat destruction, and water pollution are among the adverse impacts. Absolutely, the construction of dams, diversion of water for irrigation, and pollution from industrial and agricultural activities are significant contributors to environmental degradation in transboundary river basins. While dams serve various purposes such as hydroelectric power generation, flood control, and water storage, they can also have adverse environmental effects. The construction of dams can alter the natural flow of rivers, disrupt aquatic ecosystems, and fragment habitats for fish and other wildlife. Dams can also impede the migration of fish species, degrade water quality, and lead to the loss of biodiversity in affected river basins.

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The diversion of water from transboundary river basins for agricultural irrigation can lead to significant environmental consequences. Excessive water abstraction can reduce river flows, deplete groundwater resources, and disrupt the natural hydrological balance of river ecosystems. Reduced water flows can also exacerbate habitat degradation, increase salinity levels in soils, and contribute to the degradation of wetlands and riparian habitats. Industrial and agricultural activities along transboundary river basins can result in the release of pollutants such as heavy metals, pesticides, fertilizers, and untreated wastewater into water bodies. Pollution from industrial discharges and agricultural runoff can contaminate water supplies, degrade water quality, and impair the health of aquatic ecosystems. Increased pollution levels can also pose risks to human health, wildlife, and ecosystems dependent on transboundary river systems.

Actual volumes of discharges. Table 1

Actual volumes of discharges		2017	2018
Industrial discharges	Water disposal volume, thousand m^3	343.698	592.013
	Volume of pollutants, thousand tons	0.02	0.03
Domestic waste water	Water disposal volume, thousand m^3	13257.6	13824.252
	Volume of pollutants, thousand tons	12.09	12.241
Emergency and unauthorized discharges	Water disposal volume, thousand m^3	0.0	0,0
	Volume of pollutants, thousand tons	0.0	0,0
Discharges to surface water	Water disposal volume, thousand m^3	13601.3	13642,013
	Volume of pollutants, thousand tons	13.01	0,03
Total (all of the above discharges)	Water disposal volume, thousand m^3	27202.55	28058.278
	Volume of pollutants, thousand tons	25.121	0.06

Ecological problems are described in a broad sense in the example of Kizilorda. Based on the information provided:

1. The total volume of domestic wastewater discharges in comparison with 2017 increased by 556.7 thousand m3. This increase is attributed to both the increased discharges by oil-producing enterprises and the growth in the population of Kyzylorda.
2. In the Kyzylorda region, industrial discharge (conditionally clean) into the Syrdarya river is conducted by the State Unitary Enterprise PEO "Baikonurenergo" (Baikonur).
3. In 2018, the volume of industrial discharge compared to 2017 increased by 248.3 thousand m3. This increase is primarily due to the heightened utilization of water for boilers and heating systems during the heated period of the year.

These data indicate a significant rise in both domestic and industrial wastewater discharges in the Kyzylorda region, with specific factors contributing to the increase in each category [15,17].

From the provided information: The average interstate allocation of water to Uzbekistan from the river is 33.9 km^3. In 2000, 2.39 million hectares were irrigated in the Uzbek portion of the Amudarya basin, requiring 35.3 km^3 of water. The main sources of pollution in the transboundary rivers of the Aral Sea basin are return waters from the agricultural sector,

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municipal, and industrial waste waters. Return waters, consisting of drainage and wastewater from irrigation, industry, and municipal users, constitute a significant proportion of water resources in the basin. Annual mean values of return flows have varied between 28.0 km³ and 33.5 km³. About 95% of the return waters are agricultural drainage water, while about five percent are untreated domestic and industrial wastewater. These points illustrate the significant water demands and pollution challenges facing Uzbekistan and its neighbors in the Amudarya basin. The reliance on irrigation for agriculture puts pressure on water resources, while the return flows contribute to pollution in the basin, particularly affecting the Aral Sea. Managing water use and addressing pollution are critical for sustainable development and environmental health in the region [22].

Lack of cooperation - Limited cooperation and trust among riparian states hinders effective management of transboundary rivers. Bilateral and multilateral agreements are often inadequately implemented or poorly implemented, leading to a lack of consensus on water allocation and management strategies. Political tensions and historical disputes between riparian states can undermine trust and cooperation in managing transboundary rivers. Historical grievances, territorial disputes, and conflicting national interests may hinder efforts to negotiate and implement cooperative water management agreements. Power imbalances among riparian states can complicate efforts to achieve equitable and inclusive water management arrangements. Dominance by upstream states in terms of water resources or geopolitical influence may marginalize downstream states and impede their ability to participate effectively in decision-making processes related to transboundary river management. Trust-building measures are essential for fostering cooperation and resolving conflicts among riparian states. However, a lack of trust, transparency, and confidence-building measures can hinder progress toward collaborative water management initiatives. Mutual suspicion, perceptions of unfairness, and concerns about water security may perpetuate a cycle of distrust and impede efforts to reach consensus on shared water resources.

Conclusion:

The utilization of transboundary rivers presents complex challenges that require coordinated efforts among riparian states, international organizations, and other stakeholders. Addressing water scarcity, resolving geopolitical conflicts, mitigating environmental degradation, and promoting cooperation are essential for sustainable management of transboundary river basins. Increased transparency, dialogue, and adherence to principles of equity and fairness can facilitate the development of mutually beneficial solutions. By acknowledging the interconnectedness of water resources and fostering cooperation, riparian states can harness the potential of transboundary rivers while minimizing conflicts and environmental impacts. Ultimately, effective management of transboundary rivers is vital for promoting regional stability, economic development, and environmental sustainability.

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