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Environmental Safety Issues At The New Stage Of Uzbekistan's Development

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Abstract

This article examines the issue of environmental security in Central Asia in the context of escalating climate, resource, and institutional challenges of the 21st century. The author analyzes the main approaches to environmental security governance—namely, the institutional, network-based, technocratic, and human-oriented models—and explores their specific implementation in the countries of the region: Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, and Turkmenistan. Special attention is given to political and administrative models, institutional reforms, transboundary dimensions, and international cooperation. The article concludes that there is a need to shift from fragmented national strategies to a coordinated regional policy based on the principles of sustainable development, transparency, and strategic coordination. The research relies on legal frameworks, strategic documents, international agreements, and expert literature, offering a comprehensive political science analysis of current trends and prospects in the field of environmental security in Central Asia.

Keywords: Environmental security, Central Asia, sustainable development, climate policy, transboundary cooperation, environmental diplomacy, institutional models, green economy, Paris Agreement, Yashil Makon, Green Central Asia.

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1. Introduction

In the 21st century, environmental security is becoming an integral element of national and international security. Growing global environmental threats—climate change, soil degradation, desertification, and transboundary resource conflicts-require the development of sustainable political and managerial solutions. These problems are particularly acute in Central Asia, a region vulnerable in climatic, social, and economic terms. Under these conditions, environmental security management is of paramount importance in both scientific and practical policy.

Environmental security is defined as the state of protection of the vital interests of individuals, society, and the state from real or potential threats emanating from negative changes in the environment. This definition encompasses not only environmental protection issues but also the institutional, political, legal, and international aspects of sustainable development. Russian scientific doctrine defines environmental security as "the state of protection of the natural environment and the vital interests of citizens from negative anthropogenic impacts". From the point of view of international practice, the concept of environmental security includes both internal (national)

and transboundary components, which involve the prevention of disasters and adaptation to risks.

Contemporary political science identifies several key approaches to environmental security management, each reflecting a different institutional and conceptual logic. The first is the institutional approach, based on the primacy of the state, legal regulation, and centralized governance through government bodies. Its distinctive features include a regulatory hierarchy, oversight of natural resource use, environmental monitoring, and the implementation of state programs. However, it suffers from insufficient flexibility and weak civil society engagement.

The second is a network approach, focused on the interaction of multiple actors: government, NGOs, scientific institutions, businesses, and international organizations. This approach is particularly relevant in the context of global and regional environmental challenges that require coordinated action. An example is the participation of Central Asian countries in the EU's Green Central Asia initiative, where environmental diplomacy is becoming a tool for cooperation and transboundary risk management.

The third is a technocratic approach, which prioritizes scientifically based decisions, expertise, innovation, and environmental indicators. It is based on the rationalization and digitalization of governance: the implementation of environmental impact assessment (EIA) systems, environmental audits, and digital monitoring platforms. Kazakhstan is demonstrating progress in this area through the integration of digital emission assessment and monitoring systems.

The fourth is a humanitarian-oriented approach, emphasizing human rights, justice, and public participation in environmental issues. Environmental education, the dissemination of "green" values, and support for civic initiatives play a key role here. This approach underpins the UN Sustainable Development Goals, particularly SDG 13 ("Climate Action") and SDG 15 ("Life on Land") .

International legal documents and agreements form the methodological basis for international environmental governance. The most significant of these is the Paris Climate Agreement (2015), which enshrines countries' commitments to reduce greenhouse gas emissions and develop national climate strategies. Under this agreement, countries are required to submit and regularly update their Nationally Determined Contributions (NDCs).

Furthermore, the 2030 Agenda for Sustainable Development identified 17 Sustainable Development Goals, a significant portion of which directly address environmental security. This demonstrates a shift toward a cross-sectoral and interdisciplinary understanding of environmental issues, as simultaneously reflecting political, economic, and humanitarian dimensions.

Thus, environmental security management cannot be conceived as a purely technical or ecological process. It is a complex system of political and institutional regulation that requires the alignment of interests among various actors, adaptability to global and local risks, and strategic vision. For the countries of Central Asia, the development of regional cooperation, the harmonization of environmental policies, the modernization of institutions, and the intensification of environmental diplomacy are of particular importance.

Over the past decade, Kazakhstan has demonstrated a sustained commitment to building a "green economy" model—both domestically institutionalized and internationally verifiable. According to the Concept for the Transition to a Green Economy, approved by Presidential Decree No. 577 of May 30, 2013, the country has committed to ensuring that at least 30% of its energy production comes from renewable sources by 2030, and more than 50% by 2050. Focus is placed on modernizing outdated production facilities, greening the industrial sector, waste management, and implementing digital air and water quality monitoring platforms. For example, through a partnership with UNDP, a Unified Air Pollution Monitoring System was implemented, enabling automated monitoring of environmental conditions in major cities and industrial zones.

Particular importance is attached to Kazakhstan's participation in international agreements, such as the Paris Agreement, and in regional initiatives focused on climate resilience and water security.

In Uzbekistan, environmental policy has undergone significant institutional transformation as a result of reforms initiated by President Shavkat Mirziyoyev. A key focus has been the "Yashil Makon" (Green Space) program, which envisions the annual planting of up to 200 million trees to combat desertification, soil degradation, and dust storms in arid zones. Concurrent with this initiative, institutional restructuring was carried

out, with the creation of the Ministry of Ecology, Environmental Protection, and Climate Change. The Concept of Rational Water Use until 2030, adopted in 2023, focuses on the digitalization of irrigation systems, combating water losses, and promoting water-saving technologies in agriculture. In 2025, the country declared the Year of Ecology and Green Economy, demonstrating the sustained rise of the environmental agenda in national policy. Uzbekistan is also strengthening climate diplomacy and expanding its participation in international environmental projects, including UN initiatives and World Bank programs.

Kyrgyzstan and Tajikistan face a different set of challenges, primarily stemming from their mountainous terrain, climate vulnerability, and dependence on hydropower. Both countries possess significant freshwater reserves, and their energy and economic resilience is closely linked to the management of these resources. The situation is further complicated by the transboundary nature of water flows—in particular, the Syr Darya and Amu Darya rivers—which regularly causes disagreements with downstream countries in the region. At the same time, limited domestic resources, a shortage of qualified personnel, and dependence on external donor funding hinder the development of comprehensive environmental policies. Nevertheless, it is worth noting the growing participation of these countries in international processes: in 2022, Kyrgyzstan officially joined the Regional Climate Adaptation Strategy (REAP), and Tajikistan hosted the UN-led Water Conference in Dushanbe, where it actively promoted the sustainable water management agenda.

Turkmenistan, by contrast, relies on neutral diplomatic rhetoric and the promotion of an image of an environmentally sustainable state. The primary focus is on sustainable land management and combating desertification, particularly in the Karakum Desert. In 2021, Ashgabat hosted a regional conference on sustainable land management, which reaffirmed the concept of creating a so-called "Karakum Green Belt" and introducing anti-salinization technologies.

Turkmenistan actively participates in the UN Convention to Combat Desertification (UNCCD) and implements projects in collaboration with FAO, GEF, and IBRD. At the same time, the closed nature of its environmental administration system, limited access to data, and closed society significantly hinder the potential for environmental openness and accountability.

An analysis of national strategies shows that Central Asian countries employ various models for responding to environmental threats, ranging from technocratic innovation (Kazakhstan) and institutional mobilization (Uzbekistan), to environmental diplomacy and adaptive survival (Kyrgyzstan and Tajikistan). However, all share one commonality: environmental security is increasingly viewed as a critical element of national sustainability and regional cooperation. Given common ecosystem problems—such as the drying up of the Aral Sea, transboundary water use, desertification, and climate change—a shift is needed from nationally isolated strategies to coordinated regional policies based on data sharing, a common monitoring infrastructure, institutional transparency, and sustainable international partnerships.

Environmental security governance in Central Asian countries is shaped by deep-rooted differences in political and administrative models, levels of economic development, and international engagement. Despite shared natural vulnerabilities and transboundary challenges (such as water scarcity, land degradation, climate change, and desertification), the region's states demonstrate diverse approaches to ensuring environmental sustainability. Four dominant models can be identified in the current context: state-centralized, multi-level (decentralized), regional integration (eco-diplomatic), and donor-transnational.

The first approach—state-centralized—predominates in political systems dominated by vertical executive power and administrative regulation. In such settings, environmental safety is perceived as a task of state control and mobilization management. Uzbekistan and Turkmenistan are examples of this approach. In Uzbekistan, the creation of the Ministry of Ecology, Environmental Protection, and Climate Change, as well as the national initiative "Yashil Makon" (Green Space) under the auspices of the President, demonstrate a high degree of political centralization. The initiative to plant 200 million trees annually is viewed not only as an environmental measure but also as an element of political consolidation and a symbol of state responsibility for the country's future.

Turkmenistan also has a predominantly centralized model, in which environmental security is interpreted as part of the state ideology and foreign policy image. External activity within the framework of the UN Convention to Combat Desertification (UNCCD),

participation in regional forums, and the promotion of the "Karakum Green Belt" initiative foster the image of an environmentally responsible state. However, a lack of transparency in environmental monitoring, limited access to data, and the weak role of civil society hinder the development of a truly sustainable governance model.

The second approach, multi-level or decentralized governance, is the opposite in content. It is based on horizontal interactions between central, regional, and local government structures, involving non-governmental organizations, local communities, and scientific institutions. This approach allows for greater adaptation of environmental policy to local conditions and enhances its effectiveness. Kazakhstan is demonstrating progress in this direction: as part of its implementation of the concept of transition to a "green economy," the country is developing digital environmental monitoring systems, actively engaging local akimats, and implementing projects on sustainable urban planning and waste management.

Similarly, Kyrgyzstan, despite its limited institutional framework and resource capacity, is consistently developing localized forms of environmental governance. This is particularly evident in mountainous regions, where traditions of pasture and land management exist. International programs such as REAP support the involvement of local communities in environmental planning.

Environmental cooperation and eco-diplomacy are emerging as a third important area. Environmental threats in Central Asia are clearly transboundary in nature: water distribution in the Amu Darya and Syr Darya basins, the Aral Sea, and air and soil pollution all require coordination and regional agreements. However, political disagreements, asymmetries of interests, and institutional weaknesses limit opportunities for meaningful cooperation. The most significant institution in this area remains the International Fund for Saving the Aral Sea (IFAS), which has been operating since the early 1990s. Despite formal mechanisms and the participation of all five states in the region, the fund's effectiveness is limited by the lack of binding mechanisms for implementing agreements and the "environmental egoism" of individual countries seeking to maintain control over their resources.

At the same time, international initiatives such as the EU Green Central Asia program and the SPECA project offer promising coordination tools. In particular, the EU provides expert and financial support in the areas of climate diplomacy, the development of joint strategies, and the exchange of scientific data. However, the lack of an enforcement mechanism and the gap between national strategies remain the main barrier to deep integration.

Finally, the fourth approach—the donor-transnational approach—relies on the active role of international organizations and financial institutions such as the World Bank, UNDP, GEF, OSCE, and GIZ. These organizations compensate for the lack of technical, analytical, and financial resources, facilitating the launch of strategic environmental initiatives. For example, the World Bank is financing projects to modernize irrigation systems in Uzbekistan, restore biodiversity, and combat floods. GEF programs support the implementation of climate initiatives, including in energy and land conservation.

However, the effectiveness of transnational support depends on countries' ability to localize external projects, integrate them into their own legislative and institutional frameworks, and ensure long-term sustainability after funding ends. Without institutional maturity and political will, any external efforts are limited in scale and impact.

Thus, political and administrative approaches to environmental security in Central Asian countries demonstrate significant divergence. Kazakhstan and Kyrgyzstan are developing elements of multi-level and technocratic governance, Uzbekistan and Turkmenistan retain elements of a mobilization model, while regional coordination and international support serve as complementary, but not yet sufficiently sustainable, mechanisms. In the face of deepening climate and resource challenges, the future of the region's environmental security will largely depend on the ability to build a balanced, integrated, and transparent governance model based on cooperation, innovation, and the rule of law.

The issue of environmental security governance in Central Asia is currently acquiring not only strategic but also conceptual and value-based significance. Amid growing climate threats, exacerbating transboundary water use issues, ecosystem degradation, and increasing anthropogenic impact, environmental policy is becoming part of the national and regional security architecture. The region faces a paradoxical situation: despite possessing significant natural potential and shared

environmental connectivity, the countries of Central Asia have yet to develop coordinated mechanisms for sustainable responses to the challenges of environmental instability. This is due to differences in institutional models, limited resource potential, asymmetry of political interests, and weak international coordination.

Currently, four basic approaches can be identified that underlie national environmental safety management strategies. The first—state-centralized—is characteristic of countries such as Uzbekistan and Turkmenistan. Here, the central government plays a primary role in shaping and implementing the environmental agenda. Environmental policy is structured vertically, following the logic of directive administration. Uzbekistan serves as an example, having taken several significant steps in recent years: the establishment of the Ministry of Ecology, Environmental Protection, and Climate Change and the launch of the Yashil Makon (Green Space) program, which aims to plant over 1 billion trees by 2030. This program serves not only as a tool for landscape greening but also as an element of political mobilization, shaping the image of the state as a responsible environmental actor.

The second approach—multi-level or decentralized—priority is given to the inclusion of local communities, regional authorities, non-governmental organizations, and scientific institutions in environmental decision-making. This approach is being developed in Kazakhstan and, to some extent, in Kyrgyzstan. Kazakhstan has adopted the Concept for the Transition to a "Green Economy," adopted by Presidential Decree No. 577 of May 30, 2013. The country is actively implementing digital air and water quality monitoring systems, implementing measures to reduce its carbon footprint, and developing renewable energy sources.

Here, environmental policy is increasingly being implemented at the intersection of the interests of the state, business, and international partners, making it flexible and more adapted to regional conditions.

The third approach involves transnational coordination and environmental diplomacy. The transboundary nature of most environmental problems in Central Asia—whether water use, land degradation, air pollution, or desertification—makes it impossible to address them solely within national borders. The most well-known regional initiative remains the International Fund for Saving the Aral Sea (IFAS), established in 1993. However, its potential is often limited by the lack of effective coordination mechanisms, the diverse interests of participating countries, and a weak legal framework. More modern mechanisms are offered by the European Union's Green Central Asia initiative, launched in 2020, which aims to strengthen scientific and political cooperation on climate change, water resource management, and sustainable development.

Finally, the fourth approach—the donor-transnational approach—reflects the active role of international organizations, financial institutions, and development programs such as the UNDP, GIZ, the World Bank, and the Global Environment Facility (GEF). These actors play a significant role in technology transfer, securing financing, and shaping regulatory frameworks and institutional design. For example, the World Bank is funding projects to modernize water infrastructure in Uzbekistan, improve environmental management in Kazakhstan, and reduce the risk of natural disasters in Tajikistan. However, the sustainability of such programs largely depends on the ability of recipient countries to institutionalize the practices adopted and incorporate them into national legislation.

It should be noted that the effectiveness of environmental policy in the region remains limited for a number of reasons. First, there is an acute funding shortage—the share of environmental expenditures in state budgets remains less than 1% of GDP. Second, there is a persistent shortage of personnel and expertise: most countries lack sustainable systems for training specialists in environmental law, environmental monitoring, and green planning. Third, data fragmentation persists, and there is a lack of a unified system of environmental statistics and transparent mechanisms for assessing the effectiveness of implemented programs.

Nevertheless, there are positive trends. Kazakhstan has officially adopted a strategy to achieve carbon neutrality by 2060, and Uzbekistan intends to increase the share of renewable energy in its energy sector to 30% by 2030.

Kyrgyzstan and Tajikistan continue to develop cooperation within the framework of the UN Water Agenda. Turkmenistan is stepping up its participation in regional forums on desertification. All this demonstrates a gradual shift from reactive response models to more strategic ones focused on long-term sustainable development goals.

Therefore, successful environmental management in

Central Asian countries requires a comprehensive combination of political will, institutional development, international solidarity, and civil society engagement. The potential for building a sustainable environmental architecture for the region lies in the integration of efforts by national and regional structures, the scientific community, international institutions, and local communities.

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