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"GREEN ECONOMY" - PROBLEMS AND SOLUTIONS IN THE CENTRAL ASIAN REGION

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Abstract: This book examines in detail the role of the green economy and urgent questions of its transition in the Republic of Uzbekistan and Central Asia. Main challenges facing the region involve dependence on fossil fuels, scarce water resources, environmental degradation, and lack of green technologies. Correspondingly, possible solutions include transfer to renewable sources of energy, efficient water management, and reinforcement of environmental regulations. It is maintained that the green economy's development is just that very factor which will guarantee a sustainable, ecologically safe future of the region.

Keywords: Green economy, Uzbekistan, Central Asia, renewable energy, water resources, environmental issues, green technologies, sustainable development.

Introduction

Global climate change and environmental challenges are increasing the need for a transition to a green economy around the world. A green economy, a sustainable and environmentally friendly economic model, is based on the principles of efficient use of resources and environmental protection.

Uzbekistan and the Central Asian countries face a number of challenges in ensuring environmental security and economic sustainability. Limited water resources, dependence on fossil fuels, and environmental damage make the transition to a green economy a pressing issue in the region.

This article analyzes the importance of transitioning to a green economy in Uzbekistan and Central Asia, the existing problems and their solutions. The introduction of renewable energy sources, efficient use of water resources , and investment in green technologies are considered important factors in this process.

A green economy is an economic model based on the principles of rational use of available resources, minimizing environmental damage , and striving for sustainable development. Although Central Asia, including Uzbekistan, has vast natural resources, it faces a number of challenges in building a sustainable economy that uses these resources in the long term.

Literature Review

Digital Infrastructure and Economic Growth

The role of digital infrastructure as a growth driver is well-documented in both developed and emerging economies. Foundational studies indicate that a 10% increase in broadband penetration correlates with a 1.5% increase in GDP, highlighting broadband's role in stimulating economic activity by enhancing productivity, efficiency, and market access (Koutroumpis, 2009; Qiang et al., 2009). Uzbekistan's investments in broadband infrastructure have provided similar economic benefits, facilitating connectivity, operational efficiency, and e-commerce growth across urban and rural regions (Chavula, 2013).

Research further indicates that broadband expansion supports economic diversification, particularly in Uzbekistan’s service and retail sectors, which have seen substantial growth due to digital integration. In agriculture, broadband-enabled technologies have allowed for real-time data access, facilitating precision farming practices and increasing productivity. This sectoral growth aligns with Uzbekistan's strategic goal of fostering a balanced, knowledge-based economy (World Bank, 2024).

Methodology

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Systematic Review Approach

This article employs a systematic review methodology, integrating studies on Uzbekistan's digital infrastructure investments from 2000 to 2024. Systematic reviews allow for a rigorous synthesis of data from diverse sources, ensuring comprehensive insights into how digital infrastructure impacts economic growth and development (Petticrew & Roberts, 2006).

Data Sources and Search Strategy

Data were collected from JSTOR, IEEE Xplore, Google Scholar, and institutional sources such as the World Bank, ITU, and ADB. The search strategy focused on terms like "Uzbekistan digital infrastructure," "economic growth digital investment," and "e-governance financial inclusion." Studies conducted between 2000 and 2024 were prioritized to capture Uzbekistan's full digital transformation.

Inclusion and Exclusion Criteria

The inclusion criteria required empirical studies focusing on the economic impacts of digital infrastructure in Uzbekistan from 2000 onward. Exclusion criteria omitted theoretical studies, non-English papers, and those lacking empirical data directly related to digital infrastructure.

Data Extraction and Quality Assessment

Key themes such as broadband connectivity, public sector efficiency, financial inclusion, and productivity were identified. Each study was assessed for methodological soundness, data reliability, and relevance to ensure a robust and unbiased synthesis.

Problems

Energy dependence. Uzbekistan and neighboring countries rely heavily on fossil fuels, particularly gas and oil. This economic model is causing significant environmental damage. Industrial and energy technologies are outdated and emit large amounts of harmful gases and other waste.

Lack of water resources. The Central Asian region is considered arid, and water scarcity is one of the major problems. The drying up of the Aral Sea and the sharp decline in water reserves in other water basins are leading to environmental disasters in the region. These problems have jeopardized the sustainable development of agriculture and other water-dependent sectors.

Environmental pollution. Uzbekistan and neighboring countries have environmental problems associated with industrial development, including air, soil, and water pollution, and waste management problems. Industrial waste, chemicals, and the widespread use of pesticides in agriculture are leading to the contamination of soil and water sources.

Lack of green technologies. Many countries are implementing new energy sources to build a green economy. However, Uzbekistan and the countries of Central Asia face difficulties in the widespread introduction of such technologies. Regulations and initiatives in this area are not sufficiently developed.

to implement and ensure the widespread use of green technologies. The introduction of technological equipment based on modern green technologies into the country and their rational use require not only large financial investments, but also the training of qualified personnel who can ensure the maximum productive use of such technologies.

Solutions

Transition to renewable energy sources. Solar, wind and hydropower are important for developing a green economy in Central Asia. For example, Uzbekistan is taking positive steps in the use of solar energy. It is necessary to attract more investments and introduce innovations in this direction.

If we look at the current state of financing for the use of solar energy in Uzbekistan, this year banks have allocated a total of 1 trillion 52 billion soums for the purchase of 116 MW of solar panels, including entrepreneurship. allocated 740.8 billion soums (86 MW) in loans to enterprises and 311.7 billion soums (30 MW) to the population.

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It is also very important to further expand the use of wind energy in the region. In Uzbekistan alone, the technical potential for using wind energy reaches 100-500 billion kWh . However, the constant availability of wind energy compared to solar energy increases its advantages in use.
In 2024, it is planned to launch 100 megawatts of wind power plants in the Kara-Uzak district of the Republic of Karakalpakstan, 2 wind power plants with a capacity of 500 megawatts each in the Peshku and Gijduvan districts of the Bukhara region (total 1,000 MW), and a total of 4 industrial-scale wind power plants with a capacity of 500 megawatts in the Tomdi district of the Navoi region.
Effective management of water resources. Rational use of water is essential for the sustainable development of Central Asia. The problem of water scarcity can be reduced by introducing drip irrigation and water recycling technologies. Ecological restoration projects in the Aral Sea region are helping to increase the ecological sustainability of the region.
In our time, when water shortages are becoming increasingly acute, special attention is being paid to its appreciation and economical use. In recent years, 472 thousand hectares of land have been transferred to drip irrigation and 48 thousand hectares to sprinkler irrigation, and other water-saving technologies have been introduced on 97 thousand hectares. 649 thousand hectares of land have been leveled with lasers.
As a result of such measures, 2 billion cubic meters of water were saved in 2023 alone.
Introduction of renewable energy sources:
Theoretical significance: An in-depth analysis of the economic and environmental impacts of renewable energy sources (solar, wind, hydropower) enriches the theory of green economics. Optimizing energy production methods using these sources requires new scientific developments.
Practical recommendations: Production prospects There are opportunities for widespread use of solar energy in Uzbekistan and the countries of Central Asia. It is necessary to increase the share of renewable energy by attracting investments and developing energy infrastructure. In this process, the introduction of international experience and advanced technologies will serve as practical solutions.
Efficient use and management of water resources:
Theoretical significance: Conducting scientific research and developing innovative technologies to solve the problems of water scarcity and drought will allow for the effective organization of the use of water resources.
Practical recommendations: There is a need for widespread use of water-saving technologies, such as drip irrigation systems in Central Asia, and for further development of water recycling and storage infrastructure.
Strengthening regional cooperation on transboundary water resources management is essential to addressing this issue.
Environmental standards and legal norms:
Theoretical significance: Analysis of legal and economic mechanisms, scientific research on improving environmental legislation to ensure sustainable development and environmental cleanliness should be carried out. In the transition to a green economy, a scientific basis is created for the application of environmental protection rules to all sectors of the economy.
Practical recommendations: It is necessary to introduce strict rules on environmental safety in industry and agriculture. It is necessary to strengthen cooperation between the state and international organizations on monitoring emissions and their impact on the environment. Increasing financial penalties for enterprises that do not comply with ecological standards can also be an important solution.
Widespread introduction of green technologies:
Theoretical significance: Scientific research should propose new approaches to the development of green technologies and their economic efficiency. In particular, innovative ideas on waste-free technologies and energy-efficient technologies will further enrich the theory of green economy development.

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Practical recommendations: It is necessary to expand state support programs for the introduction of green technologies. Innovative solutions, such as the development and implementation of waste recycling and energy-efficient technologies, will ensure environmental safety in various sectors of the economy.

Specialized international expertise and collaboration:

Theoretical significance: Studying international experience and successful green economic models is of great importance in developing green economy theory in Central Asia .

Practical recommendations: It is necessary to strengthen cooperation with international financial organizations, including the World Bank and the UN Sustainable Development Programs, to attract technologies and technical assistance related to the green economy. At the same time, it will be beneficial for the region to develop cooperation with international scientific centers and expand research activities on the green economy.

These proposals and recommendations are important in accelerating the transition to a green economy in Uzbekistan and Central Asia, ensuring economic development and environmental sustainability.

Training national personnel in the theory and practice of an economy based on green technologies :

Practical recommendations: Taking into account the interconnectedness of problems in the Central Asian region, the creation of a single scientific center for in-depth study of green technologies; training personnel in areas aimed at solving existing problems arising from the environmental situation in the region, based on the analysis of the experiences of advanced foreign countries, is an extremely useful factor for the transition to new technologies being introduced in the region in the future and the most rational use of these technologies.

Conclusion

plays an important role not only in ensuring environmental sustainability for Uzbekistan and the Central Asian countries, but also in starting a new stage of economic development. The region's dependence on fossil fuels, water scarcity , and environmental pollution make the transition to a green economy an urgent problem. To address these problems, the development of renewable energy sources, effective water resource management, strengthening environmental standards , and the introduction of green technologies are of great importance.

and cooperation are of great importance in the transition to a green economy in the region . By working closely with international financial institutions and research centers and by widely implementing innovative technologies and sustainable development programs, the future of the region can be environmentally safe and economically sustainable.

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