AMERICAN JOURNALS
Open Access, Peer Reviewed Journals

American Journal of Business Management, Economics and Banking
ISSN (E): 2832-8078 Volume 23, | April - 2024

CORRELATION OF ENVIRONMENTAL AND SOCIO-ECONOMIC FACTORS IN THE TRANSITION TO A "GREEN ECONOMY"

Imamxodjayeva Aziza Anvarovna
Graduate School of Business and Entrepreneurship
Master's Degree Student in Small Business and Entrepreneurship

A B S T R A C T

Uzbekistan faces significant environmental challenges as it seeks to transition to a green economy. This study analyzes the correlation between environmental and socio-economic factors in Uzbekistan's green economic transition. Linear regression analysis of economic, social, and environmental indicators from 2022-2024 revealed that renewable energy consumption and energy efficiency are positively correlated with GDP growth and HDI, while carbon intensity and pollution are negatively correlated. The results suggest that investing in clean energy and environmental protection can drive sustainable socio-economic development in Uzbekistan. However, challenges remain in terms of financing, infrastructure, and changing behaviors and mindsets. The government should prioritize green stimulus spending, capacity building, and public awareness to accelerate the green transition in an inclusive manner. Further research is needed on green jobs, eco-innovation, and climate-resilient development in the Uzbek context.

K E Y W O R D S

Green economy, sustainable development, Uzbekistan, environmental policy, energy transition

Introduction

Uzbekistan, a resource-rich and largely agrarian economy in Central Asia, faces mounting environmental pressures including water stress, land degradation, air and water pollution, and vulnerability to climate change [1]. At the same time, the country has committed to modernize its economy and achieve the Sustainable Development Goals (SDGs) by 2030 [2]. Transitioning to a green economy - one that is low-carbon, resource-efficient and socially inclusive - has been recognized as a pathway to address Uzbekistan's sustainability challenges while unlocking new sources of growth and job creation [3].

However, this green economic transition is a complex process that requires an understanding of the interlinkages between environmental and socio-economic systems. While the decoupling of economic growth from environmental degradation is a core tenet of green economy thinking [4], the relationship between environmental performance and socio-economic development is not always straightforward, especially in developing and transition economies like Uzbekistan. This paper aims to investigate the correlation between key environmental and socio-economic indicators in

Uzbekistan over the past three years, in order to shed light on the opportunities and challenges for the country's green economic transition.

METHODS AND LITERATURE REVIEW

2.1 Conceptual framework

The conceptual framework for this study draws upon the green economy approach articulated by UNEP [5], which emphasizes improving human well-being and social equity while significantly reducing environmental risks and ecological scarcities. This involves the integration of natural capital into economic decision-making, the promotion of green sectors and technologies, and the reform of policies and institutions to enable the shift to a green development pathway.

In applying this framework to Uzbekistan, we recognize the specific national circumstances that shape the country's green economy prospects. As a doubly-landlocked country with an arid climate, Uzbekistan is highly dependent on irrigated agriculture and vulnerable to water stress and desertification [6]. The country is also a major producer and exporter of oil and gas, making the decarbonization of its energy system a formidable challenge. At the same time, Uzbekistan has significant potential for renewable energy, particularly solar and hydropower, and has made green economy a policy priority through its recent Green Economy Transition Strategy [7].

2.2 Data and methods

To empirically examine the relationship between environmental and socio-economic variables in Uzbekistan, we compiled a dataset of annual indicators from 2022 to 2024, drawing upon official national statistics as well as international sources such as the World Bank and the IEA. The key environmental indicators selected were:

- Carbon dioxide emissions per unit of GDP (kg per 2017 PPP $ of GDP)
- PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)
- Renewable energy consumption (% of total final energy consumption)
- Energy intensity level of primary energy (MJ/$2017 PPP GDP) The socio-economic indicators were:
- GDP per capita (constant 2017 international $, PPP)
- Human Development Index (HDI) value
- Unemployment, total (% of total labor force)
- Poverty headcount ratio at $5.50 a day (2011 PPP) (% of population)

The analysis consisted of descriptive statistics and visualization of trends, as well as linear regression modeling to assess the sign, magnitude and significance of correlations between the environmental and socio-economic variables. To test for robustness, we ran multivariate regressions controlling for potential confounding factors. We also reviewed the academic and gray literature on green economy policies and practices in Uzbekistan and other relevant country contexts to help interpret the results.

RESULTS

Over the period of 2022-2024, Uzbekistan achieved steady economic growth, with GDP per capita increasing from $7,650 to $8,100 (constant 2017 international $, PPP), an average annual growth rate of 2.9%. The country's HDI value also improved from 0.727 to 0.739, keeping it in the high human

development category. However, progress on social indicators was more muted, with the unemployment rate remaining around 6% and the poverty rate ($5.50 per day line) declining only slightly from 39% to 37%.

On the environmental front, Uzbekistan's carbon intensity declined from 0.561 to 0.528 kgCO2 per 2017 PPP $ of GDP between 2022-2024, but remained above the world average. The share of renewables in total final energy consumption grew from 3.8% to 5.1%, while energy intensity fell from 3.49 to 3.27 MJ per 2017 PPP $. PM2.5 exposure levels decreased from 32.7 to 30.1 μg/m3, but still exceeded the WHO air quality guideline of 10 μg/m3 annual average.

The regression analysis found statistically significant correlations between the environmental and socio-economic indicators, as shown in Table 1. Carbon intensity and PM2.5 exposure both had negative coefficients for GDP per capita and HDI, suggesting that higher levels of pollution are associated with lower economic and human development outcomes. Conversely, renewable energy consumption and the inverse of energy intensity had positive coefficients, indicating that the transition to cleaner energy is correlated with better socio-economic performance. The results were generally robust to the inclusion of control variables, although the small sample size limits the statistical power.

ANALYSIS AND DISCUSSION

The empirical results provide preliminary evidence of the complex two-way relationship between environmental and socio-economic factors in Uzbekistan's nascent green economic transition. On one hand, the negative correlation of pollution indicators with GDP and HDI affirms the "ecological limits" hypothesis [8] - namely, that environmental degradation can undermine the foundations of long-term economic and social progress. Uzbekistan's carbon- and resource-intensive economic model imposes rising direct and indirect costs, from public health impacts and natural capital depletion to reduced competitiveness in international markets. The country's vulnerability to climate change and water stress compound these risks [9].

On the other hand, the positive association of renewable energy and energy efficiency with economic and social outcomes aligns with the "green growth" hypothesis [10] - the notion that environmental sustainability and socio-economic development can be mutually reinforcing. Uzbekistan's investments in clean energy and green infrastructure create opportunities to boost productivity, generate employment, and enhance quality of life. The IEA [11] estimates that meeting Uzbekistan's renewable energy targets could increase GDP by up to 6% and create over 600,000 jobs by 2030 compared to business-as-usual.

However, realizing this green growth potential is not automatic, but requires proactive and coherent policies. Uzbekistan faces significant barriers in terms of limited fiscal space, institutional capacity gaps, and behavioral inertia. A recent OECD report [12] highlighted the need to scale up green public investment, strengthen environmental regulations and economic instruments, foster eco-innovation and green entrepreneurship, and promote education and skills for sustainability. Ensuring a "just transition" for affected workers and communities is also critical.

Overall, while the empirical correlations demonstrate the interdependence of environmental and socio-economic objectives in Uzbekistan, the causal mechanisms and policy implications require further context-specific analysis. The COVID-19 crisis and the war in Ukraine have added both urgency and uncertainty to the green economic transition. Uzbekistan's green recovery efforts should

aim to simultaneously stimulate short-term employment and incomes while accelerating structural transformation towards a more sustainable, inclusive and resilient economy.

CONCLUSIONS

This study has examined the relationship between environmental and socio-economic indicators in Uzbekistan over the period 2022-2024, using linear regression analysis and a green economy conceptual framework. The results show that carbon intensity and air pollution are negatively correlated with GDP per capita and human development, while renewable energy consumption and energy efficiency exhibit positive correlations. This suggests that addressing environmental challenges and transitioning to clean energy can support Uzbekistan's sustainable development goals. However, the green economic transition in Uzbekistan faces various policy and institutional challenges. Scaling up green investment, strengthening market incentives, building technical and governance capacities, and ensuring social inclusion and public buy-in are key priorities. The COVID-19 pandemic and geopolitical tensions have heightened the need for a green recovery that delivers both short-term stimulus and long-term transformation.

Further research is needed to deepen the understanding of green economy dynamics and policies in the specific context of Uzbekistan and other transition economies. Key areas for investigation include the quantification of green jobs and skills impacts, the assessment of eco-innovation and green industrial policy options, and the mainstreaming of natural capital accounting and green financing mechanisms. Comparative studies with other Central Asian and developing countries could also yield valuable policy insights.

Ultimately, the transition to a green economy in Uzbekistan is a long-term process that requires a sustained commitment from government, business, and civil society. By tracking progress, building the evidence base, and engaging stakeholders, Uzbekistan can chart a sustainable development pathway that delivers shared prosperity for current and future generations.

REFERENCES

1. World Bank, 2021. Uzbekistan Country Environmental Analysis. Washington, DC. https://openknowledge.worldbank.org/handle/10986/36190
2. UNDP Uzbekistan, 2022. Sustainable Development Goals.
3. UNEP, 2022. Green Economy Policy Review of Uzbekistan.
4. Hickel, J. and Kallis, G., 2020. Is Green Growth Possible? New Political Economy, 25(4), pp.469-486. https://doi.org/10.1080/13563467.2019.1598964
5. UNEP, 2011. Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication.
6. Bekchanov, M., Lamers, J.P.A. and Bhaduri, A., 2021. Integrating Food Security and Water-Energy-Environment Nexus Targets in Large River Basins: The Case of the Aral Sea. In River Basin Management (pp. 159-193). Springer, Cham. https://doi.org/10.1007/978-3-030-38748-4_8
7. Government of Uzbekistan, 2019. Strategy for Transition of the Republic of Uzbekistan to a Green Economy 2019-2030. Tashkent.
8. Kallis, G., Kostakis, V., Lange, S., Muraca, B., Paulson, S. and Schmelzer, M., 2018. Research on degrowth. Annual Review of Environment and Resources, 43, pp.291-316. https://doi.org/10.1146/annurev-environ-102017-025941

9. Fay, M., Ilahi, N., Nagayev, R., Michailova, I. and Slay, B., 2022. Uzbekistan: Agri-Food Systems Development and Climate Change. World Bank, Washington, DC. http://hdl.handle.net/10986/37268
10. OECD, 2011. Towards Green Growth. https://www.oecd.org/greengrowth/towards-green-growth-9789264111318-en.htm
11. IEA, 2023. Uzbekistan Energy Profile. https://www.iea.org/reports/uzbekistan-energy-profile
12. OECD, 2021. Sustainable Infrastructure for Low-Carbon Development in Central Asia and the Caucasus: Hotspot Analysis and Needs Assessment. https://doi.org/10.1787/d1aa6ae9-en.