

ASSESSMENT OF ECONOMIC IMPACTS OF CLIMATE CHANGE IN UZBEKISTAN

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Abstract: Situated in the Central Asia, Uzbekistan is considered a vulnerable country to climate changes. As climate change is a global issue, the analysis of the climate-economic relation of Uzbekistan is estimated in comparison with other countries. This research paper overview the relationship between climate change and economy. The results indicate that despite delicate situation regarding climate change, Uzbekistan is progressing to improve readiness for further negative consequences of the phenomenon.

Keywords: Climate change, economic stability, agriculture, economic security, temperature levels.

INTRODUCTION

Negative changes in the environment can threaten humanity at various levels. It is known that global average temperature has risen and changing climate has caused many discussions. On a planetary scale, rising temperatures can be dangerous for its inhabitants, plants and animals. Wildfires caused by climate change can turn green forests into ash, reduce animal species, and cause people to evacuate their homes. Climate change affects all countries. Earth's temperature has been rising since the Industrial Revolution. Although natural variability plays a role, the preponderance of evidence shows that human activity, particularly the emission of heat-trapping greenhouse gases, is one of the main factors driving the warming of the planet.

Relative to other scientific metrics, Earth's temperature is remarkably intimately related to the world economy. A delicate situation is being played out as our planet warms, with certain industries perhaps benefiting and others facing major upheavals. In order to navigate a future shaped by climate change, it is imperative to comprehend this complex link.

Agriculture is one of the industries that is most directly impacted economically by temperature rise. Traditional growing seasons can be thrown off

by warmer temperatures, which can result in crop failures in certain areas and open up new growth prospects in others. This change could jeopardize food security and destabilize food prices, especially for vulnerable populations in emerging nations. Furthermore, severe weather conditions like droughts, which are made worse by climate change, can completely destroy agricultural output, affecting the world's food supply and leading to financial difficulties.

Today, other relatively debated issue that many countries including Uzbekistan has started facing is climate change. Modern monitoring data on the state of the climate system show that the number of days with high air temperature is increasing throughout Uzbekistan, in all seasons of the year. In this regard, the issue has been focused in recent years, action plan to transition to a "green" economy and ensure "green" growth in the Republic of Uzbekistan until 2030, approved by the decision of the President of the Republic of Uzbekistan No. PD-436 of December 2, 2022, in order to provide, as well as increase the effectiveness of measures to reduce the risk of natural disasters and increase resilience to climate change.

LITERATURE REVIEW

According to the analysis by scientists at NASA's Goddard Institute for Space Studies (GISS), the average global temperature on Earth has risen by at least 1.1°C since 1880. The main upward trend of the warming has occurred since then. The Global Temperature Anomaly of 2022 relative to 1951-1980, and the last 9 years were known to be the warmest years¹.

The impact of the climate shifts can be seen globally in different scenarios from long lasting draughts to extreme weather conditions such as floods. In 2013, the IPCC's report made an accent on the overall impact of climate change of economic development. Global greenhouse emission has been continuously rising and accounting for 49 mil. Tons in 2019². Climate change is predicted to have serious consequences on developing countries if measures are not taken to reach carbon neutrality.

Economic outcomes such as agricultural output, and important economic resources, such as water and human health are directly affected by climate factors. In addition, climate crisis indirectly affects huge variety of economic activities, such as energy production, manufacturing and other spheres (Arent et al., 2014).

¹ NASA. (n.d.). World of change: Global temperatures. NASA.
<https://earthobservatory.nasa.gov/world-of-change/global-temperatures>

² World Resources Institute. (n.d.). <https://doi.org/10.46830/wripub>

The impact of climate change on economies globally has already caused serious debates. Considering the complexity of assessing the relationship between climate shifts and economic stability and security the task may face difficulties even on fundamental level: the type of mechanisms through which economic stability is affected by climate shifts, identifying and investigating the scope of influence is significantly huge and complex. This is obvious in the following review of literature. Much research has been done on the relationship between the climate and agriculture (Deschenes and Greenstone 2007; Guiteras 2007). Most important but less discussed are classical ideas in economic growth which the relationship between development and temperature.

It is vital to consider the following primary directions of activity in order to guarantee the environmental safety of sustainable development under market relations conditions: a new level of environmental and nature utilization; an ecologically sound assessment of productive forces; the development of agriculture, industry, energy, transportation, and utilities; the sensible and all-encompassing use of natural resources; the neutralization of waste, disposal, and use of secondary resources (Abdulkosimov, 2019).

The unrelenting irrigation of crops high in water content is the reason for the Aral Sea's progressive disappearance in Central Asia. The agriculture industry is facing a growing number of complex, multifaceted issues in recent years. Unpredictable and abrupt fluctuations in the climate have further confounded coping strategies associated to market output and risk (Bobojonov, 2014). Finding ways to control risk and use water more efficiently are crucial issues in the area as it relates to climate change.

Finding effective water-saving techniques is necessary to address the water shortage in dryland locations in particular considering the side effects of climate change. The impact of water uses and land management strategies on water productivity in Uzbekistan was examined by Uzbek and foreign scientists. One of the main problems with furrow irrigation's low water consumption efficiency rates is that it must be fixed for better water management. The research findings show that technology can help to reduce the significant difference between low and high-water productivity values as well as the role of legislative incentives if of huge importance (Mirshadiev, 2018).

There are two types of empirical study on the connection between financial stability and climate disasters. First, according to Noth and Schüwer (2017), financial risks will rise in response to climate disaster losses. They investigate how natural disasters linked to climate change affect bank risk and discover that in impacted locations, natural catastrophes greatly raise the operational risk faced by banks. Second, there is little evidence that damages from climatic disasters have a

detrimental effect on financial stability (Murshed et al., 2021; Cavallo et al., 2013). They contend that there is little correlation between natural disasters brought on by climate change and the financial stability and economic prosperity of wealthy nations.

In conclusion, there is a serious risk to economic security from climate change on all fronts. The study emphasizes how urgent it is to combine adaptation and mitigation actions. Through an awareness of the complex effects and the application of preemptive measures, decision-makers can strengthen economies and guarantee a more stable future for everybody.

METHODOLOGY

It should be noted that there is no single correct methodology, but rather an attempt was made to link the research question and chosen methods together. With the help of chosen method, deep understanding of the analysis of climate-economy relationship is made for future policy recommendation.

In the purpose of obtaining proper results for the research, the analysis of qualitative data collected using quantitative and non-quantitative methods. Statistical descriptive and inferential methods are used for achieving the objectives. Diagrams, data tables and visualization methods help to enrich the understanding ways of ensuring economic security in the face of climate change.

RESULTS

By 2050, Uzbekistan—currently the most populous nation in Central Asia—is predicted to have more than 50 million citizens. A reformative new development model is being pursued due to the combination of being highly dependent on diminishing natural resources and rapidly increasing population in need of employment and skills. Uzbekistan is currently undergoing extensive changes with the goal of making the nation an upper-middle-income nation with a contemporary economy driven by the private sector. After seven years, policy frameworks are getting better, but there is still more work to be done³.

On April 19, 2017, Uzbekistan submitted its Intended Nationally Determined Contribution to the UNFCCC Secretariat, so signing the Paris Agreement. On October 2, 2018 (Law of the Republic of Uzbekistan No. 491), the nation accepted the Paris Agreement, making the INDC the nation's first NDC⁴.

³The Country Climate and Development Report (CCDR)

⁴https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uzbekistan%20First/INDC%20Uzbekistan%2018-04-2017_Eng.pdf

According to the INDC, the Republic of Uzbekistan aims to increase its efforts to address climate change in the long run until 2030. This would enable it to cut particular greenhouse gas emissions per GDP unit by 10% from 2010 levels by that date.

Uzbekistan, a Central Asian nation nestled amidst towering mountain ranges and vast deserts, boasts a climate as diverse as its landscapes. Understanding average temperature and rainfall patterns across this region is crucial for appreciating its unique ecosystems and the challenges posed by a changing climate.

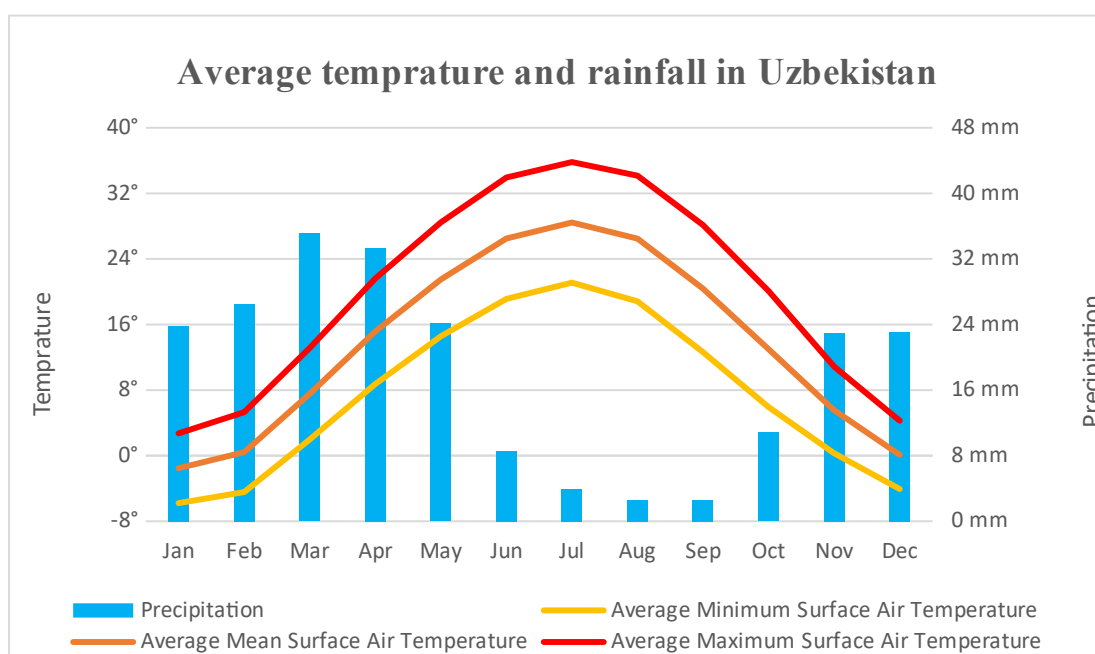


Figure 1. Average monthly temperature and rainfall in Uzbekistan, 1991–2022⁵

Dominated by a continental climate, Uzbekistan experiences significant seasonal variations. Summers are long, hot, and dry. Average temperatures soar to a scorching 27.2°C (81°F) in July, with highs exceeding 35°C (95°F) in major cities like Tashkent. This period sees minimal rainfall, often less than 25 mm (1 inch) per month, creating arid conditions. Conversely, winters are cold, particularly in the north, where temperatures can plummet to -8°C (18°F) on average. Precipitation levels rise slightly during this season, with March being the wettest month, receiving around 66 mm (2.6 inches) on average.

Climate change poses a monumental challenge for nations around the globe. Its impact isn't uniform, with some countries more vulnerable than others. The Notre Dame Global Adaptation Index (ND-GAIN)⁶ emerges as a crucial tool in

⁵ WBG Climate Change Knowledge Portal (CCKP, 2022). Climate Data: Historical. Available at: <https://climateknowledgeportal.worldbank.org/country/uzbekistan>

⁶ University of Notre Dame (2021). Notre Dame Global Adaptation Initiative.

navigating this complex landscape. Analysis of the ND-GAIN ranking system, its significance, and its limitations in understanding a nation's preparedness for a changing climate is important.

The ND-GAIN index ranks countries based on two key dimensions: vulnerability and readiness. Vulnerability assesses a country's exposure, sensitivity, and capacity to adapt to the negative effects of climate change across six life-supporting sectors: food, water, health, ecosystems, human habitat, and infrastructure. Readiness, on the other hand, evaluates a nation's ability to leverage investments and translate them into concrete adaptation actions. These are further broken down into economic, governance, and social readiness sub-components.

ND-GAIN Ranking													
Year	96	97	98	99	00	01	02	03	04	05	06	07	08
Ranking	87	86	88	88	88	88	88	89	90	10	11	11	10
Year	09	10	11	12	13	14	15	16	17	18	19	20	21
Ranking	107	113	116	114	110	109	108	109	108	80	76	76	72

Table 1. The ND-GAIN Ranking of Uzbekistan, 1996-2021⁷

The analysis of the climate profile of Uzbekistan has been made and it analyzes country's position according to ND-GAIN Index. According to ND-GAIN Index, Uzbekistan ranked at 83 in 2020. The ND-GAIN Index shows Uzbekistan's vulnerability to climate shifts and global issues in combination with its preparation to progress resilience. The aim of the index is ND-GAIN ranking is to support public and private sector better implement investments in reply to sudden global issues ahead. As of today, Uzbekistan improved its position ranking at 72.

A nation's score decreases with increasing vulnerability and increases with readiness to strengthen its resilience. Norway is ranked first and gets the highest score.

The ND-GAIN ranking serves several significant purposes. Firstly, it provides a valuable comparative framework for policymakers. By pinpointing a country's strengths and weaknesses in both vulnerability and readiness, the index helps prioritize areas for improvement.

⁷ University of Notre Dame (2021). *Notre Dame Global Adaptation Initiative*. Available: <https://gain.nd.edu/our-work/country-index/>

Ensuring food security for any country in the face of climate change is one of the most serious issues today. The frequency and severity of droughts can destabilize agricultural production and undermine food security. The frequency and severity of droughts can destabilize agricultural production and undermine food security.

The main tasks of the agrarian policy of the Republic of Uzbekistan	
ensuring the country's food security, providing the population and industry with agricultural products	implementation of structural changes in agriculture as well as increase productivity in agriculture and maintain economic efficiency of the network
increase the standard of living of the rural population	implementation of structural changes in agriculture
increase in foreign exchange earnings due to increase in export of agricultural products	strengthening the competitive environment in agriculture
to moderate the distribution of incomes coming to the agricultural economy among other sectors	improvement of rural infrastructure and market relations in agriculture;

Table 2. The main tasks of the agrarian policy of the Republic of Uzbekistan

In the Republic of Uzbekistan, agricultural reform is being implemented in very difficult conditions. These conditions may include:

- obsolescence of technical base of agriculture;
- the fact that the price parity for agricultural and industrial products has not developed in a favorable condition for the agricultural economy;
- insufficiently developed market infrastructure in agriculture;
- relatively low purchasing power of the rural population;
- limited opportunities to bring cheap and high-quality machinery and equipment for agriculture;
- decrease in supply (production of some) of agricultural chemicals, mineral fertilizers:
 - relatively high rate of inflation in the first years of independence;
 - decrease in the quality of land and water resources.

CHAPTER V. CONCLUSION

In the face of escalating climate change, ensuring economic security has become an imperative for governments, businesses, and individuals worldwide. Climate change poses multifaceted challenges to economic stability, ranging from disruptions in food and water systems to increased healthcare costs and the displacement of populations. This article explores the various dimensions of economic security in the context of climate change and outlines strategies for mitigating risks and building resilience.

Impacts of Climate Change on Economic Security:

- **Disruption of Food and Water Systems:** Climate change can lead to shifts in precipitation patterns, extreme weather events, and the degradation of land and water resources, affecting agricultural productivity and food availability. This disruption can contribute to food insecurity, malnutrition, and increased vulnerability to poverty.

- **Impact on Insurance and Financial Markets:** Climate-related risks pose challenges for insurance markets by increasing premiums and reducing coverage options, while also affecting financial markets through asset devaluation and investment uncertainty.

- **Displacement and Migration:** Climate-induced environmental changes, including droughts, and desertification, can force populations to migrate in search of safer and more sustainable living conditions, leading to social, economic, and political challenges for both origin and destination areas.

Uzbekistan agrees with the international community that every attempt should be made to stop climate change. Uzbekistan has updated and strengthened its commitments (NDC) under the Paris Agreement for the period until 2030 based on the ability and responsibility and taking into account the nation's transition to a resource-efficient "green" development model, which is based on the decarbonization of the economy and the ongoing socio-economic reforms in the country. Through the creation of a roadmap for 2030, the nation is putting into practice a national strategy for the transition to a green economy, with the following goals in mind:

- double the GDP's carbon intensity and energy efficiency indicator;
- further develop renewable energy sources to increase their share to 25% of total power generation;
- guarantee that up to 100% of the population and economic sectors have access to modern, affordable, and reliable energy supply;

- upgrade the infrastructure of industrial enterprises to ensure their sustainability by increasing energy efficiency by at least 20% and by expanding the use of clean and environmentally friendly technologies and industrial processes;
- achieve land degradation neutrality;
- greatly increase the water use efficiency in all economic sectors;
- expand the production and use of motor fuels and vehicles with improved energy-efficiency and environmental performance, as well as develop electric transport;

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