



The Economic Implications of Climate Change and Sustainable Practices

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Abstract

Climate change has emerged as one of the most pressing global challenges of the 21st century, with profound economic implications for nations, businesses, and communities. Rising temperatures, unpredictable weather patterns, and natural disasters disrupt agricultural output, industrial production, infrastructure, and human livelihoods. On the other hand, adopting sustainable practices offers opportunities for economic growth, innovation, and long-term resilience. This paper explores the dual dimensions of economic risks posed by climate change and the potential benefits of sustainable practices as a response. There is no doubt that climate change is already widespread happening, and its severe threats to human welfare, development, and the environment, are known as the most significant future challenge of the century 21. Greenhouse gases emitted into the atmosphere through human activities are a primary driver of global warming and are responsible for causing climatic change. Increasing emissions of carbon dioxide is a definite danger to the fate of the earth, which results in putting environmental sustainability and long-term human survival at risk (Khan et al., 2021a; Skytt et al., 2020). In order to curb these adverse effects of climate change, it is necessary for all countries to take a decisive response to reducing greenhouse gas emissions with a comprehensive and multi-dimensional approach.

Keywords

Climate Change, Sustainable Development, Green Economy, Economic Growth, Renewable Energy & Environmental Policy.

Introduction

The global economy is increasingly vulnerable to the effects of climate change. Floods, droughts, cyclones, and rising sea levels inflict massive economic costs on agriculture, health, infrastructure, and trade. The World Bank estimates that climate change could push over 100 million people into poverty by 2030. However, sustainable practices such as renewable energy adoption, resource efficient technologies, and circular economic models provide pathways for reducing risks while fostering innovation and green jobs. Understanding the balance between economic costs and benefits is crucial for policymakers, businesses, and society at large. There is a new wave of political and scientific interest in understanding the effects of climate change on economies and issues related to sustainable development, which provides an opportunity to shift toward a sustainable economic system and the development of sustainable technologies (Khan et al., 2019). The government needs to improve its social-economic and environmental policy in a way to restrict carbon emissions and adopts sustainable practices in economic operations, such as a green supply chain, and green technologies, which will ultimately provide healthy economic growth (Khan et al., 2021c). Now, a controversial question among economists is whether economic growth and development are affected by climate change and weather variation (Li et al., 2020). Also, many big economic questions in the coming decades will be related to the climate-economy relationships. Although climate change is a global phenomenon with consensus about its occurrence, its extent and extreme in some regions of the world, such as Asia as a vulnerable region is greater, which in turn makes its economic effects controversial as well. Thus, it is necessary to focus on regions such as Asia. We also pursue assessing the economic impacts of climate change on Asian countries.

Methodology:

The analysis is based on secondary data sources such as, Scholarly articles, books, and journals on and governance, Reports from, World Bank, and UNDP, Government documents and policy papers. The study uses an analytical approach to examine the causes, forms, and impacts of The Economic Implications of Climate Change and Sustainable Practices.

Objectives of the Study:

1. To analysis the climate change on economies and issues related to sustainable development of the Assam.
2. To examine how climate change is a global phenomenon with consensus about its occurrence, its extent and extreme in some regions of the world.

Discussion: Economic Implications of Climate Change:**1. Agriculture and Food Security :**

Climate change can affect crops, livestock, soil and water resources, rural communities, and agricultural workers. The agriculture sector also emits greenhouse gases into the atmosphere that contribute to climate change.

Agriculture contributes approximately 10 percent of total U.S. greenhouse gas emissions (not including emissions from onsite fossil energy use). Agricultural emissions of greenhouse gases include carbon dioxide, nitrous oxide, and methane. To evaluate the total impacts, emissions of the latter two gases can be converted to "carbon dioxide equivalent" (CO₂e) based on their relative impacts on climate change.

Agricultural emissions of greenhouse gases result from complex natural processes that are difficult to measure – in contrast with emissions from burning fossil fuels.

Methane comes primarily from livestock digestion (known as enteric fermentation) and the way livestock manure is managed. It contributes the most to agricultural emissions of greenhouse gases.

The second largest contributor is nitrous oxide, which results mostly from agricultural fertilizer application to soils and from manure management.

Carbon dioxide emissions come from increased decomposition of plant matter in soils and from converting lands to agricultural uses.

2. Infrastructure and Urban Systems:

For more than half a century, climate change impact and vulnerability assessments have tended to focus on issues for natural (and human-managed natural) environments, where changes in climate parameters have direct effects on such systems as ecology and hydrology. Because human-built systems are so often designed in part to buffer human well-being from natural-environmental constraints, it was implicitly assumed that implications of climate change for human infrastructures could be treated as a lesser concern. What we know now, however, is that human-built infrastructures are of particular interest to the US population and to decision-makers who respond to their needs and demands. Climate and weather events can directly affect services that most people care about, such as comfort, convenience, mobility, labor productivity, and security. In many cases, the greatest concerns are with population and service concentrations in urban areas, especially those located in vulnerable areas, which are often threatened by storms, floods, wildfires, droughts, heat waves, and other weather phenomena linked to longer-term climatic processes. As a new topic for national climate change assessments in the U.S., any effort to de

Anyone who considers infrastructures and infrastructure services under conditions of threats and stresses understands that any particular infrastructure is linked with other kinds of infrastructures as well; but capacities for modeling and analyzing such linkages have developed only recently in response to concerns about national security, and in many cases published research on the linkages has been scarce and spotty.

3. Health and Labor Productivity:

Health is an essential element that enables people to spend their life with great potential. A healthy life helps to live with confidence and self-esteem. At the macro level, the key foundation of economic development is health. On the micro-level, health can efficiently ensure people's productive and gratifying life. Health affects economic growth in any ways i.e.

workers' poor health causes a reduction in productivity, on the other hand, due to healthy nutrition productivity rises. The core objective of conducting this study is to investigate the impact of human health on worker productivity. The health proxies that are used in this study is life expectancy. The indicator of education is the school enrollment at the secondary level; labor force and gross capital formation are also used as independent variables. Heat-related illnesses and vector-borne diseases increase healthcare expenses. Rising temperatures reduce outdoor labor efficiency, especially in tropical regions.

Trade and Global Supply Chains:

In the context of globalization, cross-border transactions are growing. They not only change product flows but may also disrupt some chains. To reveal how trade policies, including tariffs, quotas, and subsidies, affect the global supply chain equilibrium, this study first decomposes the supply chain network into several product-market chains (PM chains) according to the product flows and the directed market. Second, to characterize the inter-chain competition under the Cournot-Nash competition, we establish an optimization model for each PM Chain and by using variation inequality theory. Third, we propose the qualitative properties of the equilibrium and solve the model using the Euler algorithm. Finally, to analyze the influence of different trade policies imposed at different stages, we conduct several numerical examples based on a network that is close to reality. We figure out the threshold when one chain is disrupted by the trade policy. PM Chain disruption reconstructs the network and generates a new equilibrium. It explains the appearance of when analyzing the policies' effects. Here we summarize the major impacts of trade policies before network reconstruction. All three trade policies imposed on the supply side increase the competitive advantage of domestic raw material suppliers, but they hurt domestic final product producers in the studied network. On the other hand, these trade policies imposed on the demand side benefit the domestic final product producer while hurting the foreign final product producer. The effects of tariff/quota and subsidy imposed on the demand side have the opposite effects on raw material suppliers: the tariff/quota decreases while the subsidy increases the output of the raw material suppliers. We consider three extensions with the adjusted network structures and partially substitutable products to demonstrate the wide applicability of the proposed approach.

While the economic costs of climate change are undeniable, the transition to sustainable practices presents a viable solution. However, challenges remain in terms of financing, policy enforcement, and international cooperation. Developing nations face the dilemma of balancing growth with sustainability, requiring support through climate finance and technology transfer.

Conclusion

The economic implications of climate change are severe, but they also provide an opportunity to reshape global economies toward sustainability. By integrating green practices, governments and businesses can mitigate losses, promote innovation, and ensure inclusive growth. Climate change should thus not only be seen as a crisis but also as a catalyst for building a resilient and sustainable global.

Reference:

1. Katyal, A. K. (2009). Climate change: social, economic, and environmental sustainability. *Environmental Forensics*, 10(3), 177-182.
2. Beg, N., Morlot, J. C., Davidson, O., Afrane-Okesse, Y., Tyani, L., Denton, F., ... & Rahman, A. A. (2002). Linkages between climate change and sustainable development. *Climate policy*, 2(2-3), 129-144.
3. Swart, R., Robinson, J., & Cohen, S. (2003). Climate change and sustainable development: expanding the options. *Climate policy*, 3(sup1), S19-S40.
4. Shove, E., & Spurling, N. (2013). Sustainable practices: Social theory and climate change. In *Sustainable practices* (pp. 1-13). Routledge.
5. Banuri, T., & Opschoor, H. (2007). Climate change and sustainable development.
6. Bawayelaazaa Nyuor, A., Donkor, E., Aidoo, R., Saaka Buah, S., Naab, J. B., Nutsugah, S. K., ... & Zougmore, R. (2016). Economic impacts of climate change on cereal production: implications for sustainable agriculture in Northern Ghana. *Sustainability*, 8(8), 724.
7. Abbass, K., Qasim, M. Z., Song, H., Murshed, M., Mahmood, H., & Younis, I. (2022). A review of the global climate change impacts, adaptation, and sustainable mitigation measures. *Environmental science and pollution research*, 29(28), 42539-42559.
8. Okon, E. M., Falana, B. M., Solaja, S. O., Yakubu, S. O., Alabi, O. O., Okikiola, B. T., ... & Edeme, A. B. (2021). Systematic review of climate change impact research in Nigeria: implication for sustainable development. *Heliyon*, 7(9).