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Climate Change and Economic Policy in Pakistan: A Roadmap for Sustainable Development

Rameez Haider
PhD Scholar, Department of Pakistan Studies, The Islamia University of Bahawalpur, Pakistan. princehaider011@gmail.com

Afaq Ahmad Chughtai
M.Phil Scholar, Economics Pakistan Institute of Development Economics Islamabad (PIDE), Visiting Lecturer, Department of Management Sciences, Riphah International University, Islamabad, Pakistan. afaqchughtai@gmail.com

Rabail Ali Kahan
M.Phil Scholar, Pakistan Study Pakistan Study Center University of Peshawar. rabailasif077@gmail.com

Abstract
Climate change poses a profound threat to Pakistan's economic stability, agricultural productivity, water resources, and public health. As one of the most climate-vulnerable countries in the world, Pakistan faces the dual challenge of mitigating environmental risks while pursuing economic growth. This paper explores the intricate relationship between climate change and economic policy in Pakistan, proposing a roadmap for sustainable development that aligns environmental resilience with economic planning. It examines existing policy frameworks, identifies key gaps in implementation, and analyzes the potential of green economy strategies, climate-smart agriculture, and renewable energy investments. Through policy integration and institutional reform, the paper argues that Pakistan can transition towards a low-carbon, climate-resilient economy. The study concludes with actionable recommendations aimed at fostering sustainable development, reducing vulnerability, and ensuring long-term economic and environmental security.

Keywords: Pakistan, Climate Change, Economic Policy, Sustainable Development

Introduction

Climate change has emerged as one of the most critical challenges confronting the modern world, threatening not only ecological systems but also socio-economic stability, health, and food security. For developing countries such as Pakistan, climate change is more than an environmental issue—it is a multifaceted crisis with deep implications for sustainable development, economic policy, and human security. Pakistan is ranked among the top ten countries most vulnerable to climate change, even though it contributes less than 1% to global greenhouse gas (GHG) emissions (Germanwatch, 2021). The country is highly susceptible to climate-related risks, including glacial melting in the north, frequent floods and droughts, erratic monsoons, and rising temperatures that endanger agriculture, energy production, public health, and overall economic performance.

Historically, Pakistan's economic policies have prioritized growth, infrastructure

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development, and poverty alleviation. However, these goals are increasingly at odds with the adverse impacts of climate change, which threaten to reverse decades of progress. The country's over-reliance on natural resources, coupled with a lack of climate-resilient infrastructure, poor governance, and inadequate planning, has made it vulnerable to both sudden-onset disasters and slow-onset climatic changes (Rasul, 2021). The integration of climate considerations into economic policymaking is no longer optional; it is essential for ensuring long-term sustainability.

The increasing frequency and intensity of climate-related events in Pakistan offer ample evidence of this urgent need. The devastating floods of 2010 and 2022, which submerged a third of the country, displaced millions, and caused economic losses exceeding billions of dollars, stand as grim reminders of climate vulnerability (World Bank, 2022). Similarly, prolonged droughts in Sindh and Baluchistan have severely affected food security and rural livelihoods. Rising temperatures in urban areas, such as Karachi and Lahore, have led to public health emergencies, while glacial retreat in the Himalayas threatens water security for the entire Indus Basin region. Moreover, Pakistan's economic structure is closely tied to climate-sensitive sectors. Agriculture, which employs about 38% of the labor force and contributes nearly 19% to GDP, is directly affected by changes in temperature, rainfall patterns, and water availability (Government of Pakistan, 2023). Hydropower, which constitutes a significant share of Pakistan's renewable energy mix, is similarly at risk due to glacier retreat and shifting precipitation regimes. Thus, the effects of climate change are not merely environmental they are economic, social, and political.

Despite the existence of several policy instruments, such as the National Climate Change Policy (2012) and the Alternative & Renewable Energy Policy (2019), Pakistan has struggled with implementation, coordination, and financing. A major gap exists in the integration of climate resilience into broader economic strategies. Policymaking in Pakistan often remains reactive, focused on short-term responses rather than proactive, long-term planning. Institutional fragmentation, weak enforcement mechanisms, and insufficient public awareness have further impeded the country's ability to address climate risks effectively (Ali, 2020).

Another challenge is the inadequate mobilization of climate finance. According to UNDP (2021), Pakistan requires an estimated $40 billion by 2030 to adapt to climate change impacts. However, access to international climate funds remains limited, and domestic budget allocations for climate adaptation are often inconsistent or insufficient. The private sector has also been largely excluded from climate financing frameworks, despite its potential to contribute to green innovation and investment. At the same time, climate change presents an opportunity to transition towards a green economy that not only mitigates environmental risks but also fosters economic growth, job creation, and social equity. Sustainable development policies such as investments in renewable energy, climate-smart agriculture, urban resilience, and green infrastructure—can help Pakistan move toward a low-carbon and climate-resilient pathway. The Ten Billion Tree Tsunami project, although criticized for implementation flaws, reflects a growing political and public awareness of climate issues and the potential of nature-based solutions (Shah & Hussain, 2021).

Internationally, Pakistan has signaled its intent to pursue climate action through

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commitments under the *Paris Agreement* and the submission of updated *Nationally Determined Contributions (NDCs)*. The revised NDCs include a conditional target to reduce GHG emissions by 50% by 2030, subject to international financial support (Ministry of Climate Change, 2021). However, without aligning economic development strategies with these climate commitments, Pakistan risks falling short of its obligations and undermining national resilience. Therefore, seeks to explore the intersection between climate change and economic policy in Pakistan. It argues for a paradigm shift in which climate considerations are mainstreamed into national economic planning and development strategies. By critically analyzing current policy frameworks, assessing implementation challenges, and proposing actionable recommendations, this study aims to contribute to a roadmap for sustainable development that addresses both climate risks and economic imperatives.

The roadmap proposed in this study emphasizes the following pillars: (1) policy integration, where climate adaptation and mitigation become core components of economic planning; (2) renewable energy transition, to reduce dependence on fossil fuels and increase energy security; (3) climate-smart agriculture, to ensure food security and rural resilience; (4) green finance, to mobilize resources for sustainable infrastructure and innovation; and (5) institutional reform, to enhance coordination, accountability, and public participation. Furthermore, the study highlights the importance of regional cooperation, particularly in the context of South Asia, where transboundary environmental challenges such as water sharing, air pollution and disaster management require joint efforts. Pakistan's strategic location and shared river systems with India, Afghanistan, and China necessitate diplomatic and technical cooperation on climate resilience.

The climate change is not a distant or abstract threat for Pakistan—it is a lived reality. From submerged villages to scorched fields, the signs are unmistakable. Addressing this existential challenge requires more than isolated policy measures. It demands a holistic, integrated, and forward-looking economic strategy. This paper is an attempt to outline such a strategy, grounded in evidence, driven by innovation, and guided by the principles of equity and sustainability.

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DIALOGUE SOCIAL SCIENCE REVIEW

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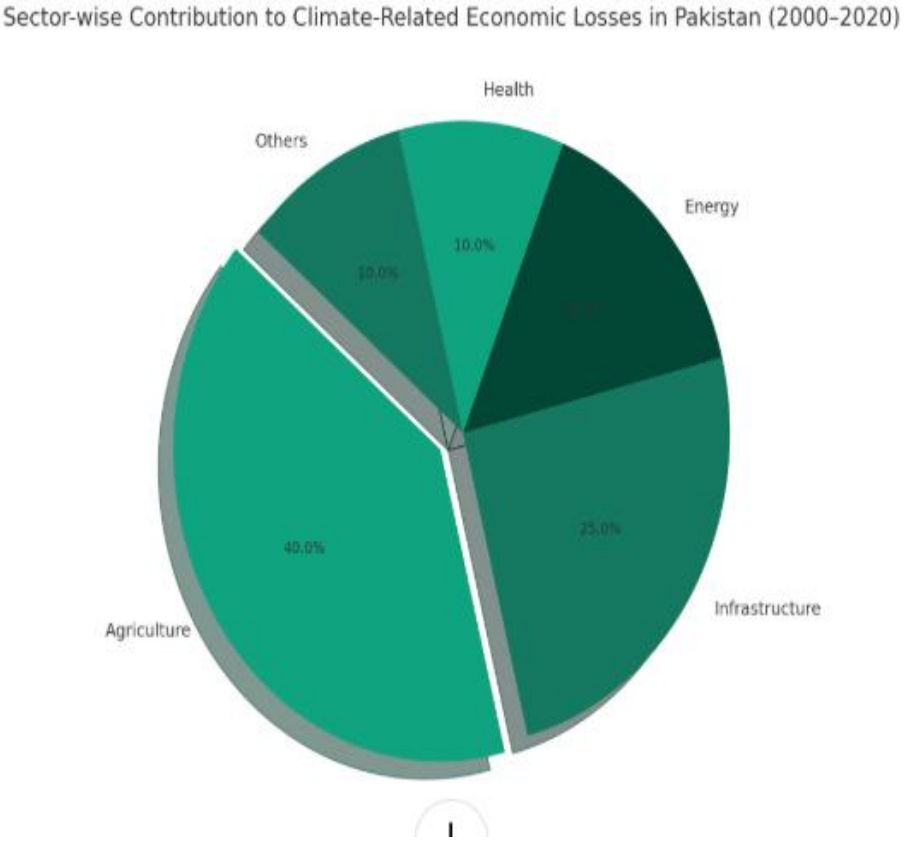
Sector-wise Contribution to Climate-Related Economic Losses in Pakistan (2000–2020)



Sources: Pakistan Climate Risk Country Profile – World Bank (2023)
Pie Chart Categories : (with estimated percentage of Total Climate Losses):

- Agriculture – 40%
- Infrastructure – 25%
- Health – 10%
- Energy – 15%
- Others (Water scarcity, Forestry, etc.) – 10%

Explanation (Pie Graph Section)

The pie chart presents the sector-wise breakdown of economic losses caused by climate change in Pakistan over the last two decades. The agriculture sector accounts for the largest share of climate-related economic losses (40%), reflecting the country's heavy reliance on climate-sensitive crops and the frequent occurrence of floods and droughts.

The Infrastructure damage (25%) includes destruction of roads, bridges, homes, and drainage systems due to extreme weather**.** Energy losses **(**15%) arise from disruptions in hydropower and rising energy demand during heatwaves. Health-related costs (10%) represent the economic burden of climate-induced diseases like malaria, dengue, and heatstroke. The remaining 10% covers losses in water resources, forestry, and biodiversity.

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www.thedssr.com

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 8 (August) (2025)

This graphical representation emphasizes the need for sector-specific climate resilience **strategies** within Pakistan's broader economic planning to achieve sustainable development.

Methodology

This qualitative study uses a descriptive and analytical approach. Secondary data is collected from government reports, academic journals, climate databases, and international agency publications. Policy analysis is conducted to evaluate the coherence and effectiveness of climate and economic strategies. The renewable energy and agriculture are used to illustrate practical interventions.

Impact of Climate Change on Pakistan's Economy

Agriculture

Agriculture accounts for over 19% of Pakistan’s GDP and employs around 38% of the labor force. Climate change has led to erratic rainfall, soil degradation, and pest outbreaks, reducing crop productivity and increasing food insecurity.

Water Resources

Pakistan’s water economy is highly dependent on glacier-fed rivers. Glacial retreat and changing monsoon patterns are threatening water availability, directly impacting agriculture, industry, and domestic use.

Energy Sector

Over-reliance on fossil fuels and outdated infrastructure limit Pakistan's ability to ensure energy security. Climate-induced disruptions in hydropower generation also contribute to energy shortfalls. The energy sector plays a pivotal role in driving economic growth, ensuring national security, and promoting sustainable development. As global demand for energy continues to rise, there is an increasing need to transition from fossil fuels to cleaner, renewable sources such as solar, wind, and hydropower. The sector faces critical challenges including resource depletion, climate change implications, infrastructure limitations, and policy inconsistencies. Innovations in energy efficiency, smart grids, and green technologies are reshaping the industry, while international cooperation and investment remain key to achieving a sustainable and secure energy future.

Human Health and Migration

Extreme heat, vector-borne diseases, and air pollution are rising, straining the healthcare system and contributing to internal displacement due to environmental degradation. Migration is a defining feature of the 21st century, with millions of individuals crossing borders due to economic opportunities, conflicts, environmental change, and political instability. However, migration—both voluntary and forced—can significantly affect human health. Migrants often face limited access to healthcare, exposure to new diseases, psychological stress, and systemic discrimination. Understanding the intersection of human health and migration is vital for developing inclusive health systems, ensuring the well-being of migrants, and achieving global health equity.

- The line graph_showing the rising trend of climate change-related economic losses in Pakistan from 2000 to 2020.

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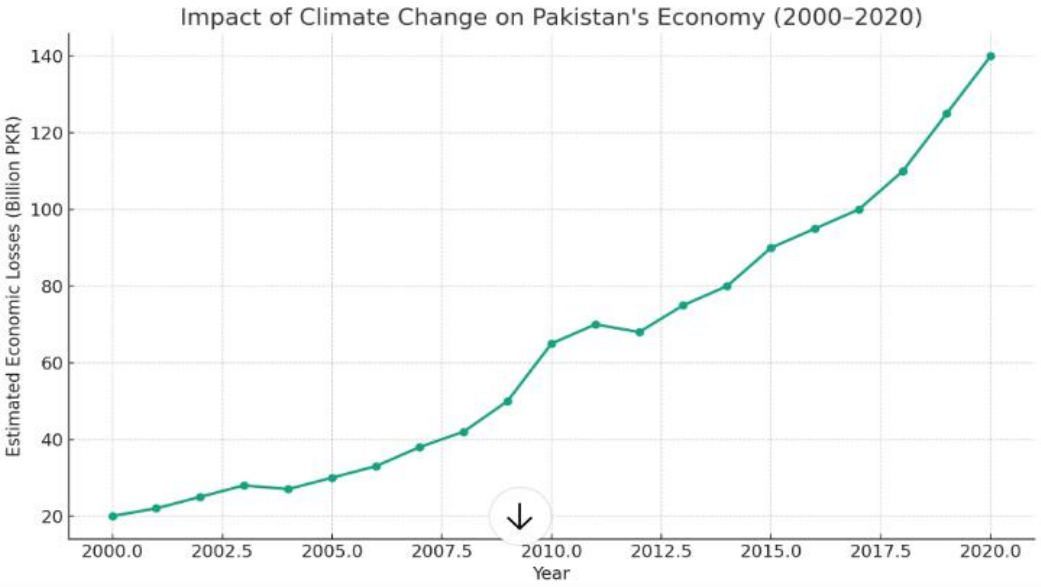
Vol. 3 No. 8 (August) (2025)



- World Bank. (2021).

Economic Policy Gaps and Challenges

- **Fragmented Policy Frameworks:** Climate and economic policies operate in silos.
- **Low Climate Financing:** Public and private climate investments are inadequate.
- **Weak Institutional Capacity:** Lack of technical expertise and poor governance hinder adaptation efforts.
- **Inefficient Resource Management:** Water, land, and energy are managed unsustainably.
- **Dependence on Carbon-intensive Industries:** Pakistan's economy heavily relies on sectors with high GHG emissions.

Proposed Roadmap for Sustainable Development

Policy Integration

Establish a unified policy platform that integrates climate action into national economic planning, such as incorporating climate resilience in Public Sector Development Programs (PSDPs).

Renewable Energy Transition

Scale up investment in solar, wind, and hydropower to reduce dependence on fossil fuels. The Alternative & Renewable Energy Policy 2019 can be strengthened with private sector incentives.

Climate-Smart Agriculture

Promote drought-resistant crops, efficient irrigation systems (like drip irrigation), and digital farming tools to increase productivity and reduce climate vulnerability.

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www.thedssr.com

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 8 (August) (2025)

Green Finance and Carbon Markets
Develop national frameworks for green bonds, carbon pricing, and climate risk insurance. Public-private partnerships should be leveraged for funding climate-resilient infrastructure.

Institutional and Governance Reforms
Strengthen institutions such as the Ministry of Climate Change and provincial departments. Ensure better coordination, transparency, and community participation in decision-making.

Capacity Building and Awareness
Invest in education, training, and media campaigns to raise awareness and build a skilled green workforce.

Recommendations
Mainstream Climate Adaptation into Economic Planning
Integrate climate resilience measures into national and provincial development plans, budgets, and infrastructure projects to minimize vulnerability to climate-related shocks.

Promote Renewable Energy and Green Technology
Encourage investment in solar, wind, and hydro energy through subsidies, public-private partnerships, and supportive policies to reduce dependence on fossil fuels and improve energy security.

Enhance Climate-Smart Agriculture
Implement water-efficient irrigation techniques, drought-resistant crop varieties, and early warning systems to improve agricultural productivity and food security amid changing climate patterns.

Strengthen Institutional and Legal Frameworks
Establish an independent climate authority or strengthen the Ministry of Climate Change to monitor, evaluate, and enforce climate-related policies, and ensure coordination among federal and provincial bodies.

Increase Climate Finance Mobilization
Leverage international climate funds (e.g., Green Climate Fund, Adaptation Fund) and develop domestic green financing instruments to support climate adaptation and mitigation initiatives across sectors.

Conclusion
Pakistan stands at a critical crossroads where climate change is no longer a distant threat but a present and intensifying crisis with deep economic implications. The country's vulnerability to climate-related disasters such as floods, droughts, and extreme heat events has already resulted in significant human suffering and economic losses. Yet, despite the scale of the challenge, Pakistan's economic policies remain largely disconnected from climate imperatives. the urgent need to integrate climate resilience into Pakistan's economic policy framework. The current institutional and policy landscape

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www.thedssr.com

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 8 (August) (2025)

reveals gaps in implementation, funding, and coordination. However, these challenges also present an opportunity to reimagine economic growth through a climate-smart lens. By adopting green fiscal reforms, promoting renewable energy, encouraging sustainable agriculture, and enhancing urban resilience, Pakistan can lay the foundation for a more inclusive, secure, and sustainable future.

Sustainable development in Pakistan is only possible through bold, coordinated action that aligns economic priorities with environmental stewardship. It requires not only national commitment but also international collaboration and local participation. The recommendations outlined—such as establishing a Climate-Economic Council, mainstreaming climate budgeting, expanding renewable energy, and effectively utilizing climate finance—offer a practical roadmap for achieving this transformation. In sum, climate change is not just an environmental issue; it is a defining economic challenge. Pakistan's ability to address this crisis proactively will determine the well-being of its people, the stability of its economy, and the sustainability of its development path in the decades to come.

Climate change is increasingly defining the contours of economic development, social stability, and national security in the 21st century. For Pakistan, the stakes are exceptionally high. As one of the most climate-vulnerable countries globally, Pakistan finds itself facing a complex set of interlinked challenges ranging from food insecurity and water scarcity to energy shortfalls and health crises all exacerbated by changing climate patterns. The climate change is intricately linked to Pakistan's economic development and how existing policy frameworks have often failed to adequately integrate climate resilience into the core of economic planning. While several national policies, such as the National Climate Change Policy and Vision 2025, acknowledge environmental concerns, their implementation remains fragmented, underfunded, and disconnected from broader economic objectives. The economic cost of inaction is rising. Climate-induced disasters have already cost Pakistan billions in damages, disrupted livelihoods, and pushed millions into poverty. If current trends continue, climate change could severely compromise Pakistan's ability to meet its development goals, placing additional stress on already strained fiscal and social systems. However, this crisis also presents a unique opportunity.

It offers a moment for transformative change—an invitation to shift from reactive, short-term strategies to proactive, long-term planning that harmonizes economic development with environmental sustainability. A climate-resilient economic policy should not be seen as a burden but as an investment in future stability, prosperity, and equity. The recommendations outlined in this paper provide a strategic roadmap for such a transformation. Establishing a centralized Climate-Economic Coordination Council can ensure coherent policy-making, while climate budgeting and environmental taxation can help reorient fiscal priorities. Expanding renewable energy infrastructure and creating green jobs can boost economic growth while reducing emissions. Supporting climate-resilient agriculture and improving water governance can protect livelihoods; ensure food, and water security. Finally, tapping into international climate finance can bridge funding gaps and strengthen institutional capacity.

The path to sustainable development in Pakistan must be rooted in an integrated

approach where climate action is not an afterthought but a guiding principle of economic policy. Policymakers must recognize that climate adaptation and mitigation are not separate from development—they are essential to it. Without urgent, inclusive, and sustained efforts to address climate change through economic reform, Pakistan risks deepening its vulnerabilities and missing the opportunity to build a resilient and thriving future for all its citizens.

Pakistan's vulnerability to climate change is not just an environmental issue—it is an economic crisis in the making. The country's future economic security and social stability depend on how effectively it integrates climate considerations into its economic policymaking. A coherent, inclusive, and forward-looking roadmap is urgently required—one that prioritizes renewable energy, green jobs, sustainable agriculture, and institutional reform. Climate change must no longer be seen as an externality but as a central driver of economic policy and planning. Only then can Pakistan ensure sustainable development for its current and future generations.

References

- Ahmed, S., Khan, M. A., & Qureshi, S. (2019). *Green Economy and Sustainable Development in Pakistan: Challenges and Opportunities*. Sustainable Development Journal, 27(3), 150–167.
- Ahmed, W., Tan, Q., Shaikh, G. M., Waqas, H., Kanasro, N. A., Ali, S., & Solangi, Y. A. (2020). Assessing and prioritizing the climate change policy objectives for sustainable development in Pakistan. *Symmetry*, *12*(8), 1203.
- Ali, N., Butzbach, O. K., Katohar, H. A., & Afridi, H. I. (2024). Structural and External Barriers to Pakistan's Economic Growth: Pathways to Sustainable Development. *World*, *5*(4), 1120-1129.
- Asian Development Bank. (2021). *Climate Change Profile of Pakistan*. https://www.adb.org
- Aslam, H., Nazir, A., & Zia, U. (2022). *Pakistan's Way Forward Towards a Green Economy: Perspectives for a Clean Energy Transition*. Sustainable Development Policy Institute.
- Chaudhry, Q. Z. (2017). *Climate change profile of Pakistan*. Asian Development Bank. https://www.adb.org/sites/default/files/publication/357876/climate-change-profile-pakistan.pdf
- Cho, J., Isgut, A. E., & Tateno, Y. (2016). Pathways for adapting the Sustainable Development Goals to the national context: the case of Pakistan.
- Eckstein, D., Künzel, V., & Schäfer, L. (2021). *Global Climate Risk Index 2021*. Germanwatch.
- Germanwatch. (2021). *Global Climate Risk Index 2021*. Retrieved from https://germanwatch.org.
- Government of Pakistan. (2012). *National Climate Change Policy*.
- Government of Pakistan. (2012). *National Climate Change Policy*. Ministry of Climate Change, Islamabad.
- Government of Pakistan. (2019). *Alternative & Renewable Energy Policy*. Ministry of Energy (Power Division), Islamabad.
- Government of Pakistan. (2021). *Pakistan's Updated Nationally Determined Contributions (NDCs)*. Ministry of Climate Change.

ISSN Online: 3007-3154
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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 8 (August) (2025)

https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Pakistan%20First/Pakistan%20Updated%20NDC%202021.pdf

- Government of Pakistan. (2021). *Updated National Climate Change Policy*.
- hamid, m., khan, d., & zeeshan, i. (2025). strategic roadmap for pakistan (2018–2025): political stability, governance, economic resilience, and social equity. *international journal of social sciences bulletin*, *3*(1), 461-473.
- Hasan, M. A., Abubakar, I. R., Rahman, S. M., Aina, Y. A., Chowdhury, M. M. I., & Khondaker, A. N. (2020). The synergy between climate change policies and national development goals: Implications for sustainability. *Journal of Cleaner Production*, *249*, 119369.
- International Monetary Fund. (2022). *Pakistan: Climate Change Policy Assessment*. IMF Country Report No. 22/288. https://www.imf.org/en/Publications/CR/Issues/2022/10/05/Pakistan-Climate-Change-Policy-Assessment-524320
- Khan, M. A., & Salman, M. (2020). Climate change and economic growth in Pakistan: An empirical analysis. *Environmental Science and Pollution Research*, 27(20), 25384–25397. https://doi.org/10.1007/s11356-020-08941-4
- Khan, R. U. A., Idrees, R. Q., & Shahid, A. (2024). Pakistan's Climate Change Act: Evaluating Impacts, Efficacy, and Prospects for Future Progress. *International Research Journal of Social Sciences and Humanities*, *3*(1), 332-348.
- Khan, S. A. R., Godil, D. I., Quddoos, M. U., Yu, Z., Akhtar, M. H., & Liang, Z. (2021). Investigating the nexus between energy, economic growth, and environmental quality: A road map for the sustainable development. *Sustainable Development*, *29*(5), 835-846.
- Khan, S. A. R., Yu, Z., & Umar, M. (2022). A road map for environmental sustainability and green economic development: an empirical study. *Environmental Science and Pollution Research*, *29*(11), 16082-16090.
- Malik, A., & Qasim, M. (2020). Climate change adaptation and economic development in Pakistan: Challenges and opportunities. *Pakistan Development Review*, 59(2), 123–140.
- Ministry of Climate Change. (2012). *National Climate Change Policy*. Government of Pakistan. http://www.mocc.gov.pk/
- Ministry of Planning, Development and Reform. (2014). *Pakistan Vision 2025*.
- Naseer, M., & Ullah, S. (2023). Impact of climate change on agricultural productivity in Pakistan: Evidence from panel data. *Climate Risk Management*, 40, 100510. https://doi.org/10.1016/j.crm.2023.100510
- Nasir, M., & Rehman, F. (2020). *The Economic Consequences of Climate Change in Pakistan*. Environmental Economics and Policy Studies, 22(4), 551–572.
- Raza, M. A., Aman, M. M., Rajpar, A. H., Bashir, M. B. A., & Jumani, T. A. (2022). Towards achieving 100% renewable energy supply for sustainable climate change in Pakistan. *Sustainability*, *14*(24), 16547.
- Rehman, A., Ma, H., Ozturk, I., Murshed, M., & Dagar, V. (2021). The dynamic impacts of CO2 emissions from different sources on Pakistan's

ISSN Online: 3007-3154
ISSN Print: 3007-3146

economic progress: a roadmap to sustainable development. *Environment, Development and Sustainability*, *23*(12), 17857-17880.

- Sadiq, M., & Muhammad, A. (2022). *Institutional Frameworks for Climate Resilience in South Asia*. Journal of Climate Policy and Development, 18(1), 45–60.
- Ullah, W., Bashir, H., Marwat, I. U. K., Umar, M., & Khan, S. R. (2024). Economic Implications of Climate Change in Pakistan: A Comprehensive Analysis. *Insights of Pakistan, Iran and the Caucasus Studies*, *3*(4), 25-37.
- United Nations Development Programme. (2022). *Climate Promise: Pakistan*. UNDP. https://climatepromise.undp.org/what-we-do/where-we-work/pakistan
- World Bank. (2021). *Climate Risk Country Profile: Pakistan*. Washington, DC: World Bank Group. https://openknowledge.worldbank.org/handle/10986/36245
- World Bank. (2022). *Country Climate and Development Report: Pakistan*.
- World Bank. (2023). *Pakistan Floods 2022: Post-Disaster Needs Assessment*. https://www.worldban
- Ahmed, V., & Asghar, Z. (2016). *Pakistan's climate change policy: An assessment*. Sustainable Development Policy Institute. https://sdpi.org