

CLIMATE CHANGE ADVERSARIES AND GOVERNANCE: A CASE OF KHYBER PAKHTUNKHWA, PAKISTAN

Irfan Raja ¹, Dr. Muhammad Tariq²

¹Ph. D Scholar Department of Political Science Hazara University Mansehra

²Lecturer Department of Political Science Hazara University Mansehra

¹irfanraja.apex@gmail.com, ²muhammadtariq@hu.edu.pk

DOI: <https://doi.org/10.5281/zenodo.18604363>

Keywords

Climate, Change, Governance, Adversary, Impact, Policy

Article History

Received: 11 December 2025

Accepted: 26 January 2026

Published: 11 February 2026

Copyright @Author

Corresponding Author: *

Irfan Raja

Abstract

Khyber Pakhtunkhwa, one of the federating units of Pakistan and lying to the northwest of Pakistan, is very prone to the adverse effects of climate change. The adverse forms of climate change overpower the province in the shape of floods, cloudbursts, droughts, heat-waves, landslides, earthquakes and the pandemics. These natural calamities lead to loss of precious human lives, displacement of people, destruction of the infrastructure, irreparable loss to the standing crops, livestock, and destruction of buildings. Keeping in view the nature of these climate changes and gravity of situations, the government of Khyber Pakhtunkhwa had to establish 'Climate Change Department' for coping with such issues. The department devises institutional frameworks, policies, strategies and action plans to address the crises in the best possible way. This article analyzes the climate change adversaries and governance in Khyber Pakhtunkhwa. The study finds that climate change governance is not as effective as it should have been keeping in view the gravity of the situation. Climate change governance faces some key challenges that need to be addressed properly for an effective and target-oriented response to climate change in the province.

INTRODUCTION

Climate change is a pressing issue in today's world. It has negative implications all around the world. But the developing world, though having the least share of carbon emissions, faces high risks induced by climate change (Skeldon, 2025). Pakistan is also a developing country and faces the same vulnerability. The province of Khyber Pakhtunkhwa in Pakistan is exceptionally exposed to climate-related risks. Climate change's key consequences in the province include extreme temperatures, alterations in rainfall patterns, glacier melt, seasonal changes and water resource constraints (Bibi et al, 2025). All these consequences are leading to natural calamities with more intensity and frequency, including various types of floods, winds and dust storms, hailstorms, glacial lake outburst floods, cloudbursts. The common peoples of the

province are facing climate burden in the shape of deaths, injuries, destruction of occupations and property, diseases and displacements (KP Climate Change Policy, 2022).

The government of KP is cognizant of the severe repercussions of climate change within the province. To address this pressing issue and protect human security, the government has been actively initiating climate change governance system through, policy development, devising strategies for mitigation and adoption, and establishing institutions (Mumtaz, 2025). The environmental protection agency and climate change cell are the two main bodies that are working on climate change management. They are responsible for implementing climate change interventions along with other bodies (Khan et al., 2024). The provincial climate

change policy was developed in 2017 and recently updated in 2022. The policy is a major document that provides overall framework of climate change governance in the province. It provides key strategies and actions to be taken to address the vulnerabilities in various sectors of the provinces. In order to implement the measures proposed in this policy an action plan is also devise that provide all the core components to implement the policy on ground (Policy, 2022). Similarly climate change action board is also established. The board is responsible to look after and supervise all the activities that designed to address climate change concerns in the province (Ishfaq, 2025).

Despite the severity of this issue, it has received insufficient attention in academic research. The formulation and implementation of effective mitigation and adaptation strategies to cope with the climate change issue in the province will ameliorate the situation. Moreover, restructuring and enhancing the agricultural sector, improving the disaster management system, ensuring economic and political stability, advancing the health management system, and empowering the community to confront challenges can be instrumental in mitigating insecurities of peoples in the province. Consequently, the present paper aims to investigate climate change adversaries in Khyber Pakhtunkhwa along with the governance mechanism initiated by the government to tackle the issue.

Climate Change Adversaries in Khyber Pakhtunkhwa

Khyber Pakhtunkhwa is extremely exposed to climatic adversaries. Climate change exerts direct and adverse effects on the lives of individuals in the province. It poses a menace to the fundamental aspects of individuals' lives and provincial socio-economic fabric through climatic events such as overflows, droughts, elevated heats, glacial melt, water scarcity, and excessive precipitation. Over the past few decades, there has been loss of life, impairment to crops and dwellings, depletion of water sources, disruption of food systems, displacement, and increased frequency of health emergencies (KP Climate Change Policy, 2022). Human Rights Watch (2023), in a report,

observed that Khyber Pakhtunkhwa (KP) is extremely exposed to climate change effects. Extreme harmful climatic events like floods are regularly occurring. The recent 2022 flood, caused by heavy rain and glacier melting, has cost the lives of one thousand people, with homes and crops destroyed. Similarly, other climatic events are also severely affecting the lives of people in the province regularly. In KP, the climatic variations are increasing the frequency of natural disasters, including floods, storms, and heavy rainfall. These events have compelled the inhabitants of affected areas to migrate to other locations in search of safe living conditions and secure occupational resources. This scenario has the potential to lead to interprovincial conflicts over scarce natural resources (Saad et al., 2024).

Similarly, the northern region of Khyber Pakhtunkhwa contains more than 3000 glaciers. Elevated temperatures contributed to glacial melt and retreat. This accelerated glacial melting leads to water scarcity because these glaciers serve as the primary water source for rivers and streams in the region. Consequently, water availability for agriculture and human activities is diminishing. This phenomenon has the potential to affect two critical aspects of human lives in the province: food and economic wellbeing (Afghan, 2024). Agriculture is one of the main sources of livelihood in the province. But it is a highly unprotected sector to the harmful influences of climate change in Khyber Pakhtunkhwa. Agriculture plays an important role in the lives of people and the economy in two respects. Firstly, it fulfills the food needs of people in the province. Secondly, it is the prime income-generating sector for the people of the province. However, climate change is currently disrupting agricultural activities, making it unprofitable occupation (Rizwan et al., 2024).

Climate Change Governance in Khyber Pakhtunkhwa

Climate change is a global issue that endangers life on earth. It requires efforts from all sections of society and governments to address the issue. The adversaries brought by climate change give rise to climate change governance as a special area of a larger state governance framework. Climate change governance refers to

institutional frameworks, legal instruments and interventions designed to manage the crisis through mitigation and adaptation strategies. It also involves public and relevant stakeholders' participation for effective management of climatic implications (Heinen et al., 2022). The implications of climate change are not confined to a specific area or country. Instead, it has worldwide implications. That's why every country has its own climate change governance system.

The 18 Amendment to the constitution of Pakistan has devolved the subject of the environment to the provinces. Consequently, the management of climate change issue is now the authority and responsibility of provinces. Khyber Pakhtunkhwa (KP) is one of the most vulnerable provinces to climate change. The government of KP recognized the gravity of climate change and has established a climate change governance mechanism in the province. This mechanism includes institutions and bodies on climate change, laws and acts, policies, action plans and strategies and specific projects on sectorial mitigation and adaption of climate change.

Institutions & Bodies on Climate Change

In Khyber Pakhtunkhwa (KP), several institutions and departments are involved in the management of the climate change crisis. The environmental protection agency is the oldest body that deals with climate change. It was reestablished under the KP Environmental Protection Act of 2014. The agency provides valuable services in managing interventions on climate change through establishing coordination among stakeholders and departments, revising and integrating policies and supervising departmental activities (Khan et al., 2024). Another main body for climate in the province is climate change cell. It is established in the planning and development department. The cell serves as a central entity in the assessment, reporting and implementation of climate change-related activities in the province. It also contributes to policy revisions and updating (Government of KP, 2025). The environment and wildlife department plays an imperative role in the climate change governance of the province. KP provincial

climate change policy is formulated on the initiative of the department. It also serves as leading body on provincial climate change action plan formulation that is designed for the implementation of activities on climate change. Similarly, it also leads to deforestation projects like a billion trees. It also prepares and implements activities on climate change adaptation targeting wildlife and forest conservation (Khattak et al., 2021). Another body with the name of environmental protection council was also established in 2014. This council is a highly empowered body under the management of the chief minister of the province. It also has top civil servants, like chief secretary and secretaries of various departments, as its members. It supervises the implementation of climate-related laws in the province.

Recently, due to growing concerns related to climate change-induced disasters in the province, the government has decided to streamline climate response in the province. In response to this, a new climate action board was established under the supervision of an additional chief secretary. Now this board serves as the highest body in all the matters related to climate change governance. It has the responsibility to supervise the formulation, revision and implementation of climate change policies and strategies. In the context of climate change mitigation, the board will maintain emissions inventories and advise on a gradual decrease in greenhouse releases. It will also have the responsibility to promote effective research on various areas of climate change by collaborating with national and international research institutions (Ashfaq, 2025).

Legal Coverage on Climate Change

In Khyber Pakhtunkhwa (KP) a few legal instruments exist on climate change, including acts and policies. After the devolution of climate change subject to provinces, the first legal instrument that was introduced was the environmental protection act of 2014. The act was aimed at the promotion and conservation of a clean and safe environment conducive for long-term development. Under this act, several actions and activities were declared unlawful and punishable by crimes, including the production, distribution, purchase and use of plastic bags,

discharge and emission of pollutants into the air, import of dangerous materials and deforestation. It also established various bodies for implementation of this act and the promotion of safe environmental activities. These bodies include the environmental protection council, environmental protection agency, the environmental fund and tribunal to adjudicate the cases under this act (Environmental Protection Act KP, 2014).

The climate change policy of Khyber Pakhtunkhwa is the main legal instrument for all strategic measures on climate change in the province. The policy was formulated in 2017 and revised in 2022 to adjust to new targets. The policy provides a comprehensive strategic framework for climate change mitigation and adaptation in the provinces. It also indicates measures to lessen the effects of climate-induced disasters to protect the lives of people from socio-economic insecurities. It also aimed at the strengthening of provincial infrastructure through adaption activities against climatic variations. It proposed detailed activities address climate change implications in the most vulnerable sectors, such as biodiversity, agriculture and livestock, forest, water and food, health, land use, urbanization etc. It has also set mitigation targets to reduce carbon emissions (Climate Change Policy KP, 2022).

For the smooth implementation of the policy and other measures on climate change, an action plan is also devised and approved by the cabinet of KP. This plan offers a mechanism for effective execution of measures and actions proposed in climate change policy. It grouped the actions on climate change in accordance with climate change policy into 4 types that are priority, short term, medium and long term. The actions are designed with a full implementation framework that includes a description of specific actions in a specific sector, time for completion, and the department or organization responsible for implementation. The plan is instrumental in promoting the government's efforts on climate change management. It clearly indicates measures on climate change mitigation and adaptation in key prone sectors such as farming and livestock, water management, forest, health, transportation and energy areas (Climate Change Action Plan KP, 2022).

Program & Projects on Climate Change

In KP, several projects are also being implemented on climate change management. Among these projects, the Billion Tree Tsunami project is a prominent one. This project is a key contribution to both climate change mitigation and adaptation. In this project, three plantation drives were carried out in different areas of the province. In this drive, a huge number of trees and plants were planted on barren lands, road sides, forest sides and other available land areas (Aleem et al., 2024). Another project with the title climate change resilience through horticulture is also being carried out. In this project, orchards are being established in selected locations of the province. In this orchard establishment, the communities also need contributions and take care of the orchards. This project includes various sub-activities such as support for the irrigation system, solar system provisions and capacity building of staff and community members (National Disaster & Risk Management Fund, 2024).

Due to the extreme vulnerability of KP to climate-induced flash and riverine floods, a project on flood resilience is being implemented with the financial support of the Green Climate Fund. The project name is Integrated climate risk management for strengthened resilience to climate change. This project is based in Buner and Shangla districts. It started in September 2024 and will continue till September 2028. In this project, early warning system activities are operationalized. These activities include installation of weather station observatories, programmed river gauges and a water level observation system (Green Climate Fund, 2024). Similarly, the province is also prone to glacial lake outbursts and floods as it hosts hundreds of glaciers. In order to protect the lives and livelihoods of the people from this disaster, a project on risk reduction is being carried out in Chitral district. The project aimed at community capacity building and promoting active response to disaster by constructing flood-resistant walls, safe pathways and an early warning system (Ministry of Climate Change, 2024).

Challenges to Climate Change Governance

Though a climate change governance mechanism is established in KP, the real problem lies with its effectiveness. The institutions are available but non-responsive to emerging needs of climate change management. They also face issues like lack of financial resources, lack of technical capacities, shortage of human resources and, most importantly, lack of sincerity to cause. Policy on climate change is available but away from effective on-ground implementation (Mumtaz, 2025). The mitigation and adaptation targets that are set are unrealistic and efforts to achieve these targets are not common. Similarly, a lack of political commitment is also a challenge to effective climate change governance in the province. The government is engaged in other political issues and ignores this matter of high significance. There is also no accountability system through which departments and staff are held responsible for activities on climate change. Similarly, lack of coordination within departments and stakeholders is another cause of weak climate change response (Roman, 2024).

Conclusion

Climate change is a serious issue for Khyber Pakhtunkhwa. Climate change brings about adverse effects on the lives of people and the entire infrastructure. The government of Khyber Pakhtunkhwa in cognizance of the gravity of the situation and the imminent catastrophic impact on the lives of the people, livestock, standing crops, displacement of the people and the destruction of buildings, roads and houses has established a well-defined 'Climate Change Department' for dealing with all such issues on emergency basis. The role of the provincial disaster management cell in collaboration with the national disaster management have been doing a lot in taking preventive measures and taking all possible efforts for overcoming the natural disasters emanating from the climate change. Previously, climate change did not have that much severity and catastrophic effects as in today's world due to changing dynamics of climate, global warming, deforestation, installation of solar panels and the use of petro-chemical substances and gasoline in almost all areas and walks of life.

Though the government of Pakistan has been doing a lot in improving upon the Climate Change Department by keeping it as a separate ministry yet the measures normally taken during the natural disasters are not in harmony with the needs and requirements of the people. Usually, lack of timely facilities, lack of expertise, lack of professional soundness, and alternate arrangements do not meet the needs of the affected people. The government of Khyber Pakhtunkhwa needs to focus more on the areas that are more vulnerable to the climate change and take stringent actions for make improvement upon all the available resources so to avoid the possibility of impending dangers during natural calamities. Strong governance system coupled with the proper policy making for the worst forms of climate change should better be made by utilizing all the possible remedies. There is a greater need to allocate more and more funds for the affected areas and also the areas with more likely chances of calamities. Deployment of more skilled staff, well-equipped personnel, strengthening of the disaster management system and well organized institutions would help in reducing the issues of climate change to a greater extent.

REFERENCES

Skeldon, R. (2025). Migration, climate change and the futures of global population redistribution. *New Zealand economic papers*, 59(1), 41-45.

Bibi, L., Khan, M., & Bibi, D. (2025). Climate Change in Khyber Pakhtunkhwa. *ASSAJ*, 3(02), 2020-2028.

Ministry of Climate Change. (2024). Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction Retrieved from: mocc.gov.pk/Detail/ZmI3OWZlMzYtMTdkYy00ZGU5LTgyZjAtMzIxODdkMTBmMTEy

KP Climate Change Action Plan, 2022). Climate Change Action Plan Document. <https://epakp.gov.pk/wp-content/uploads/2022/09/Khyber-Pakhtunkhwa-Climate-Change-Action-Plan-August-2022-English.pdf>

Aleem, M., Khan, S. N., Akbar, M. U., Arshad, A., Alsubhi, Y., Pandey, M., ... & Nasir, A. (2024). Ten Billion Tree Tsunami Project Reveals Climate Change Mitigation and Precipitation Increase in Khyber Pakhtunkhwa Province, Pakistan. *Earth Systems and Environment*, 1-18.

National Disaster & Risk Management Fund. (2024, March 13). Climate Resilience through Horticultural Interventions in Khyber Pakhtunkhwa. <https://ndrmf.pk/projects/climate-resilience-through-horticultural-interventions-in-khyber-pakhtunkhwa>.

Climate Change Policy Khyber Pakhtunkhwa. (2022). Policy document. Retrieved from <https://epakp.gov.pk/wp-content/uploads/2022/09/>.

Environmental Protection Act KP. (2014). Khyber Pakhtunkhwa Environmental Protection Act 2014. <https://kpcode.kp.gov.pk/uploads/>.

Ashfaq, M. (2025, September 3). KP Assembly passes bill to establish climate action board. Dawn. <https://www.dawn.com/news/1939219/kp-assembly-passes-bill-to-establish-climate-action-board>

Heinen, D., Arlati, A., & Knieling, J. (2022). Five dimensions of climate governance: a framework for empirical research based on polycentric and multi-level governance perspectives. *Environmental policy and governance*, 32(1), 56-68.

Naz, S., Iqbal, Z., & Begum, S. (2024). Climate Change's Impact on Food Security in Pakistan: Challenges and Mitigation Strategies. *Pakistan Social Sciences Review*, 8(2), 426-438.

Nafees, M. (2022). An assessment of the impact of climate change on water bodies of Pakistan and Khyber Pakhtunkhwa. In Conference on Climate Change impacts on water resources of Khyber Pakhtunkhwa: Opportunities and Challenges. University of Peshawar, Pakistan. Bacha, MS.

Ahmad, S., Israr, M., Yaseen, A., & Ahmad, N. (2017). Climate change trend analysis on selected food crops at central Khyber Pakhtunkhwa of Pakistan. *Int. J. Dev. Sustain*, 6, 2082-2093.

Pawlak, K., & Kołodziejczak, M. (2020). The role of agriculture in ensuring food security in developing countries: Considerations in the context of the problem of sustainable food production. *Sustainability*, 12(13), 5488.

Aldis, W. (2008). Health security as a public health concept: a critical analysis. *Health Policy and Planning*, 23(6), 369-375.

Pakistan Today. (2022, September 10). KP healthcare system suffers Rs2b losses due to floods.. <https://www.pakistantoday.com.pk/2022/09/10/kp-healthcare-system-suffers-rs2b-losses-due-to-floods/>

Ullah, S., Ali, H., Aziz, I., Ali, H., & Ahmad, A. (2025). Exploring the Relationship Between Climate Change and Human Health in KPK: A Cross-Sectional Perspective. *Journal of Pharma and Biomedics*, 3(1), 31-35.

Pakistan Observer. (2022, September 20). Closure of industrial units in KP leaves thousands jobless - Pakistan Observer. <https://pakobserver.net/closure-of-industrial-units-in-kp-leaves-thousands-jobless/>

Irshad, J. (2025, July 3). Climate Crisis Threatens Pakistan's Tourism Future And National Wellbeing. The Friday Times. <https://www.thefridaytimes.com/03-Jul-2025/climate-crisis-threatens-pakistan-s-tourism-future-and-national-wellbeing>

Ullah, L., Bangash, A. K., Khan, M., & Khan, Y. (2023). Challenges and Potential Opportunities of Tourism in Kumrat Valley, Khyber Pakhtunkhwa. *Qlantic Journal of Social Sciences*, 4(4), 108-120.

Shah, A. A., Gong, Z., Khan, N. A., Khan, I., Ali, M., & Naqvi, S. A. A. (2021). Livelihood diversification in managing catastrophic risks: evidence from flood-disaster regions of Khyber Pakhtunkhwa Province of Pakistan. *Environmental science and pollution research*, 28(30), 40844-40857.

Khan, A. N. (2013). Analysis of 2010-flood causes, nature and magnitude in the Khyber Pakhtunkhwa, Pakistan. *Natural hazards*, 66(2), 887-904.

Hayat Zada, I., Zamin, M., Ahmad, S., Kashif, M., Habib, M., Naheed, H., & Aslam, A. Climate change impacts on the agriculture sector of Khyber Pakhtunkhwa: a comprehensive review with comparative regional analysis. *Journal of Agriculture Sustainability and Environment ISSN*, 2997, 271X.

Ullah, W., Nihei, T., Nafees, M., Zaman, R., & Ali, M. (2018). Understanding climate change vulnerability, adaptation and risk perceptions at household level in Khyber Pakhtunkhwa, Pakistan. *International Journal of Climate Change Strategies and Management*, 10(3), 359-378.

Nafees, M. (2022). An assessment of the impact of climate change on water bodies of Pakistan and Khyber Pakhtunkhwa. In Conference on Climate Change impacts on water resources of Khyber Pakhtunkhwa: Opportunities and Challenges. University of Peshawar, Pakistan. Bacha, MS.

Jabeen, A., Ansari, J. A., Ikram, A., Khan, M. A., & Safdar, M. (2022). Impact of climate change on the epidemiology of vector-borne diseases in Pakistan. *Global Biosecurity*, 4.

Gierszewski, J. (2017). Personal security within the human security paradigm. *Security Dimensions. International and National Studies*, (23), 51-66.

Fukuda-Parr, S., & Messineo, C. (2012). Human Security: A critical review of the literature. Centre for Research on Peace and Development (CRPD) Working Paper, 11, 1-19.

Petzold, J., & Scheffran, J. (2024). Climate change and human security in coastal regions. *Cambridge Prisms: Coastal Futures*, 2, e5.

Rana, I. A., Khan, M. M., Lodhi, R. H., Altaf, S., Nawaz, A., & Najam, F. A. (2023). Multidimensional poverty vis-à-vis climate change vulnerability: Empirical evidence from flood-prone rural communities of Charsadda and Nowshera districts in Pakistan. *World Development Sustainability*, 2, 100064.

Idrees, M., Shahzad, N., & Afzal, F. (2022). Growing climate change impacts on hydrological drought and food security in district Peshawar, Pakistan. In *Handbook of Climate Change Across the Food Supply Chain* (pp. 467-483). Cham: Springer International Publishing.

Ullah, S., Ali, H., Aziz, I., Ali, H., & Ahmad, A. (2025). Exploring the Relationship Between Climate Change and Human Health in KPK: A Cross-Sectional Perspective. *Journal of Pharma and Biomedics*, 3(1), 31-35.

Mahmood, S., Abbas, F., & Hussain, S. (2024). Cause and Damages Assessment of 2022-Flood in Khyber Pakhtunkhwa, Pakistan. *Int. J. Innov. Sci. Technol*, 6, 637-651.

Mumtaz, M. (2025). Climate Change and Adaptive Governance in the Khyber Pakhtunkhwa Province of Pakistan. *Transactions of the American Philosophical Society*, 114(1), 119-130.

Khan, A., Rao, B. S., Rehman, F., Azrar, S., & Islam, M. (2024). Chief Minister's task force on climate policy framework of Khyber Pakhtunkhwa and international obligations.

Ashfaq, M. (2025, September 3). KP Assembly passes bill to establish climate action board. *Dawn*. <https://www.dawn.com/news/1939219/kp-assembly-passes-bill-to-establish-climate-action-board>

Asif, M, & Arif, A. (2025). How Misreporting Cloudbursts Masks, The Real Climate Crisis In Khyber Pakhtunkhwa. <https://www.thefridaytimes.com/20-Aug-2025/how-misreporting-cloudbursts-masks-the-real-climate-crisis-in-khyber-pakhtunkhwa>