Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

Policy Gaps And Governance Challenges In Implementing Climate Adaptation Strategies In Khyber Pakhtunkhwa

Ambrin Khurshid
MPhil Political Science Scholar, Department of Political Science, University of Lakki Marwat, Pakistan Email:ambrin.polsc@gmail.com

Dr. Waseem Ullah
Assistant Professor, Department of Political Science, University of Lakki Marwat, Pakistan Email: waseem@ulm.edu.pk

Naveed Raza
MPhil Political Science Scholar, Department of Political Science, University of Lakki Marwat, Pakistan Email: naveedraza.mwt@gmail.com

ABSTRACT
The problem of climate change is a serious challenge to the socio-economic and environmental sustainability of Khyber Pakhtunkhwa (KP). Even with the introduction of several climate adaptation policies at both national and provincial levels, there remains a significant challenge to their effective implementation. This paper examines the gaps in policy and governance issues that impede the implementation of climate adaptation policies in KP. By analyzing documents and interviewing stakeholders, including environmental agencies, local governments, and development agencies, the study examines flaws in institutional coordination, financial processes, and the enforcement of policy. The results indicate that KP policies on climate change correlate quite well with those of Pakistan's National Climate Change Policy, but their effects are mitigated by institutional fragmentation, a lack of technical capacity, and the community's limited involvement. A lack of monitoring structures and data-driven planning also limits the effectiveness of adaptation. The paper highlights that an integrated and inclusive governance strategy is required to improve interdepartmental cooperation, empower local governments, and facilitate effective stakeholder involvement. Increased resilience and sustainable development of KP can be achieved by strengthening governance structures and integrating climate adaptation into provincial planning processes.

Keywords: Climate Change Governance, Policy Implementation, Adaptation Strategies, Sustainable Development, Khyber Pakhtunkhwa (Pakistan)

Introduction

Climate change is no longer a distant threat; it is already altering weather patterns, intensifying extreme events, and undermining development objectives globally (Pirzada, 2024). The effects are experienced in Pakistan, where they include increased flooding, altered precipitation patterns, heatwaves, and melting glaciers (Runde, Raphel, and Yusuf, 2023). The recent floods that hit more than 33 million individuals in Pakistan highlighted the vulnerability of weak infrastructure and governance structures to climate pressures (Runde et al., 2023). Due to the heightened vulnerability and limited mitigation potential, adaptation is now a national priority, particularly in climate-sensitive provinces such as Khyber Pakhtunkhwa (KP).

Khyber Pakhtunkhwa faces a significant risk due to its varied topography, which

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

includes mountains and flood-affected plains, making it vulnerable to numerous hazards, including floods, landslides, heat stress, and water shortages (Government of KP, 2022). The demographic pressure and urbanization in the province, combined with poor infrastructure, increase the risk from climatic factors. Effective governance, institutional capacity, and policy coherence are therefore critical success factors of climate adaptation in KP.

Climate Adaptation Governance and Policy

The issue of climate adaptation is unavoidably a governance issue: policies need to be implemented as interventions, often across multiple levels of government and sectors (Gonzales-Iwanciw, 2020). The theory of multi-level governance posits that the process of adaptation necessitates the coordination of national, provincial, and local governments, as well as non-state actors (Gonzales-Iwanciw, 2020). In fact, agency politics, institutional disunity, and inter-agency rivalry contribute to the development of the adaptation agendas (Vij, 2024).

In Pakistan, there have been significant structural changes in climate governance following the 18th Amendment, which devolved most environmental and developmental functions to the provincial level (Masud, Shafaq, and Ahmad Khan, as cited in Academia, n.d.; see also "Climate Governance in Pakistan after the 18th Amendment," n.d.). Although devolution has allowed the use of localized adaptation, it has created new governance pressure: provinces now have to coordinate vertically and horizontally without necessarily having the same level of capacity (Pirzada, 2024; "Climate Governance in Pakistan after the 18th Amendment," n.d.). It has been claimed by scholars that Pakistan has a poor translation of its adoption policy into local action, as there are few institutional alignments, funding mechanisms, and accountability systems (Masud et al., 2023; Pirzada, 2024; The Climate Change Governance in Pakistan, 2024).

Policy Gaps in the KP Context

KP also possesses its own climate policy frameworks, the most notable one being the KP Climate Change Policy (adopted in 2017 and updated in 2022); however, gaps exist in designing, implementing, and integrating policies (Government of KP, 2022; Government of KP, 2024). The new policy identifies priority areas, including water, forests, disaster risk reduction, and urban resilience. Nonetheless, the institutional coordination, budgetary allocations, monitoring and evaluation (M&E) systems, and local-level support are not well-articulated (NIPA Peshawar, 2024; Government of KP, 2022).

One of the most common criticisms of the literature on adaptation has been the lack of connection between the macro-level planning and the micro-level implementation. Policy frameworks tend to be general, lacking specific details and binding requirements (Masud et al., 2023). This implies that adaptation in KP is rarely formalized into the city planning, farming policy, and infrastructure development, and budget allocations are not ring-fenced to support climate resilience (Janjua, 2020; Masud et al., 2023). Moreover, adaptation plans are often viewed as independent environmental initiatives, rather than being integrated into development planning, which makes them less sustainable and less owned.

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

Governance Problems: Institutions, Capacity and Participation.

Institutional fragmentation is one of the fundamental challenges. In KP, several departments play adaptation roles (e.g., environment, local government, irrigation, planning), but there is no coordination, leading to duplication or gaps (Janjua, 2020; Masud et al., 2023). The adaptation efforts may be pushed into the background without a coordinating body or clearly defined mandates.

Second, there is a limitation on the designing, implementing, and monitoring of adaptation strategies due to capacity issues at the provincial and local levels. Although the local government is enabled by the local government reforms of KP, it is common to find these governments lack technical expertise, financial autonomy, and human resources (Janjua, 2020; Fila et al., 2023). This creates a last-mile gap, where vulnerable communities often fail to receive policies in a positive light.

Third, adaptive learning is hindered by the lack of effective monitoring, evaluation, and data systems. In most adaptation projects, little feedback is provided on what works and what does not work. Such a lack of knowledge negatively affects iterative improvement (Gonzales-Iwanciw, 2020; Fila et al., 2023; Masud et al., 2023). In addition, although climate data are generally not available in adequate spatial and temporal detail, it is usually absent or unavailable, particularly at the local government scale.

Fourth, participation and inclusion can often be rhetorical. Communities, NGOs, and other active actors in the region rarely have any meaningful impact on the planning or decision-making (Janjua, 2020; Nixon et al., 2022). This ownership deprivation renders long-term sustainability ineffective and prioritizes local interests over adaptation.

Lastly, there is a financial constraint and dependency on projects. Various adaptation interventions are based on donor-funded or temporary projects, and the sustainability is limited to the duration of projects (Pirzada, 2024; Masud et al., 2023). The budgets of provincial governments tend to be small, and adaptation has to compete with other pressing development priorities.

Problem, Objectives, and Significance of Research

Based on the gaps presented above, the research problem is as follows:

What are the key policy and governance gaps and challenges to the effective implementation of climate adaptation measures in Khyber Pakhtunkhwa, and how can reforms be used to improve adaptive capacity and resilience?

To solve this, the study will have the following objectives:

Review and examine KP policies and frameworks of climate adaptation.

Identify the key governance and institutional implementation challenges.

Trace the roles and relations between adaptation actors on provincial and local levels.

Look at the level of community and stakeholder participation in adaptation planning.

Suggest governance changes and institutionalization to enhance the results of adaptation.

The importance of this study is many. In scholarly terms, it contributes to the expanding body of literature in the area of climate governance by providing a contextualized, empirical interpretation of KP, a region that is underrepresented in the global literature on adaptation. In practical terms, it offers practical advice to policymakers, development agencies, and local governments attempting to bridge the gap between planning for adaptation and its actual implementation.

The research will help transform the climate adaptation architecture of KP into a resilient practice, rather than a visionary policy, by diagnosing governance deficits and offering institutional solutions, including improved coordination, capacity building, participatory structures, and enhanced monitoring and evaluation (M&E).

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

Theoretical Framework

This paper will be based on the Multi-Level Governance (MLG) Theory as its analytical conceptual framework. Initially developed by Marks and Hooghe (2003) in the context of European integration, the theory has evolved since then as a major prism through which environmental and climate governance are analyzed in complex political systems. The argument presented in MLG is that policymaking authority is assigned to several interacting levels, including local, regional, national, and international, rather than being localized within the state. It highlights the vertical and horizontal relationships between governmental actors and civil society, as well as the actions of individual stakeholders, in the formation of collective results (Gonzales-Iwanciw, 2020; Vij, 2024).

The theory provides a useful conceptual framework for studying the issue of cluster institutional accountability and ineffective coordination among institutions in the context of climate change adaptation. Climate change is a problem that requires the active engagement of actors at various levels, including international donors who finance projects, national ministries that shape policy, provincial governments that create regulations, and local governments that implement measures (Masud et al., 2023). The MLG model reflects the intricate interdependencies and emphasizes how overlapping competencies, power imbalances, and communication differences may contribute to policy incoherence and failure in implementation (Pirzada, 2024).

Using Khyber Pakhtunkhwa as a case study, the MLG is employed to understand how the 18th Constitutional Amendment has both empowered and limited the provinces. Although KP has the freedom to develop its policies regarding climate, the lack of technical capacity, reliance on resources, and institutional disunity have caused difficulties in effective adaptation at the sub-provincial level (Government of KP, 2022). The theory also highlights the significance of horizontal connections, i.e., working with departments such as environment, irrigation, agriculture, and urban development, in order to achieve integrated climate action.

In this way, the MLG approach will enable the current study to critically examine how coordination, communication, and capacity gaps at various organizational levels contribute to the so-called policy-implementation divide. It also provides a conceptual basis for designing governance reforms to enhance cooperation, accountability, and adaptive learning in the changing climate governance system of KP.

Issues and Problems

Gaps in Institutional Fragmentation and Coordination

Institutional fragmentation is one of the major challenges hindering the implementation of climate adaptation strategies in Khyber Pakhtunkhwa. The responsibility for addressing climate change is shared among several departments, including the Environmental Protection Agency (EPA), the Planning and Development Department (P&D), the Agriculture, Irrigation, Forestry, and Local Government sectors, which lack a clear mechanism for coordinating action (Masud et al., 2023). All departments work in isolation, according to their budget lines and priorities, which results in overlapping efforts and inefficient resource utilization.

For instance, although the EPA would oversee environmental policy, adaptation projects related to water or disaster management can be managed separately by the Irrigation Department or the Provincial Disaster Management Authority (PDMA). This is a siloed method that does not contribute to developing integrated resilience against climate change plans. The lack of a centralized climate coordination organization in KP further

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

exacerbates the lack of centralization, resulting in inconsistent policy implementation across industries (Government of KP, 2022).

Conversely, effective global adaptation processes, such as those in Bangladesh or Vietnam, demonstrate the importance of cross-sectoral committees and planning frameworks in facilitating interdepartmental coordination (Vij, 2024). The absence of such structures in KP is one of the biggest institutional obstacles.

Poor Technical and Human Capacity

Institutional capacity is vital in governance, and KP lacks it, particularly at the local government level. The 18th Amendment decentralized environmental duties to provinces, but capacity building was not to proceed with the devolution. Consequently, provincial and municipal institutions lack trained climate professionals, data analysts, and planners (Janjua, 2020).

With the Local Government Act (2013) placing the responsibility of implementing adaptation programs on local governments, they face difficulties in formulating and implementing climate-sensitive plans due to insufficient human resources and financial constraints (Fila et al., 2023). The majority of adaptation projects rely on short-term consultants or consultants funded by donors, which leads to discontinuity after the projects.

Additionally, institutional memory is further eroded due to bureaucratic turnover. The change of officers regularly leads to the loss of accumulated expertise, and they are unable to learn or continue with a project in the long term. This lack of a skilled workforce limits technical analyses, such as vulnerability mapping, hydrological modeling, or GIS-based urban resilience planning, all of which are essential to effective adaptation.

Donor Dependency and Financial Constraints

The lack of special funding to maintain the climate is another pressing issue. An adaptation agenda by KP is heavily dependent on external donor funding by the Asian Development Bank (ADB), World Bank, UNDP, and GIZ. Although the contributions are aimed at worthwhile projects, they are temporary and usually project-specific (Pirzada, 2024). After the donor cycles stop, the projects are not institutionalized to provincial budgets, which results in unsustainable results.

Province climate action allocations are not marked or tracked; usually, they are integrated within general development expenditures. This complicates the process of tracking financial flows and requires adaptation. Moreover, cities lack fiscal independence to collect local taxes or utilize their finances locally. Consequently, adaptation activities are both project-driven and reactive as opposed to being systematic and long-term.

KP will be severely constrained in its capacity to maintain adaptation actions without having a solid climate finance framework, whether through the use of green bonds, resilience funds, and provincial climate budgets (Runde et al., 2023).

Lack of strong Policy Integration and Implementation

Although it has integrated the Climate Change Policy (2017, updated 2022), KP has failed to execute most of its adaptation objectives because of the lack of integration in sectoral policies and development planning (Government of KP, 2022). Climate change

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

is still perceived as an environmental problem, completely separate of agriculture, infrastructure, and economic planning, by ministries. As a result, consideration of adaptation is not generally included in the project feasibility study or in the budget approval document.

Increased urbanization in flood-prone regions, deforestation without effective control, and limited oversight of construction practices demonstrate a policy-practice disconnect (Masud et al., 2023). Rural adaptation is also lacking due to the scarcity of integration: irrigation systems are rarely climate-resistant, and the agricultural policy is not well-adapted to the changing rainfall patterns.
Additionally, the KP Climate Change Policy lacks clear performance measures, accountability systems, and implementation mechanisms. Departments do not need to report progress and align annual development plans with climate targets, which results in stagnation of policies.

Lack of Data Systems, Evaluation, and Monitoring
Evidence-based policymaking requires reliable data and systematic monitoring to inform decision-making. Nevertheless, KP does not have a centralized system for managing climate data. The meteorological stations are minimal, and vulnerability testing is outdated or inconsistent. Data is held in disjointed departments and cannot be easily shared across agencies because they are stored in incompatible formats (Nixon et al., 2022).
Moreover, there is no specified Monitoring and Evaluation (M&E) model to monitor the results of adaptation. In the majority of projects, the outputs are reported (e.g., how many trees were planted or workshops were conducted), but not the actual indicators of impact, such as reductions in temperature, mitigation of floods, or improvements in livelihood. In the absence of these feedback loops, progress cannot be quantified to detect gaps or replicate successful interventions.
The lack of clear monitoring and evaluation (M&E) practices also negatively affects accountability and reduces the level of trust that the population has in adaptation activities.

Low levels of Public Involvement and Awareness.
In KP, there is still limited participation by the population in decision-making on climate change. People at local levels, particularly women, farmers, and marginalized groups, are often not involved in the planning or design of adaptation programs (Janjua, 2020). This is why interventions are often not tailored to local needs, resulting in low ownership and inadequate sustainability.
Community-based adaptation (CBA), which has already been proven effective in other developing settings, is not widely used. In Nepal and India, where participatory watershed management and community forestry have demonstrated positive results (Gonzales-Iwanciw, 2020), similar practices have been implemented irregularly and insufficiently funded in KP.
Furthermore, the general population has a low awareness of the dangers of climate change. Citizens cannot take an active part in resilience-building without systematic consciousness-raising exercises or educational assimilation.

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

Political Instability and Short-Termism

Adaptation governance is greatly influenced by political discontinuity. The regular change in leadership and the shifting of priorities following elections disrupts long-term planning. The successive administrations are more likely to initiate new projects rather than advance existing ones, resulting in disjointed development (Pirzada, 2024).

Moreover, political goals tend to support visible projects (e.g., road construction) in the short term rather than long-term resilience investments (e.g., watershed restoration). A

lack of bipartisan commitment to climate action inhibits continuity and institutional maturity.

Excess use of Top-Down Approaches

The majority of climate adaptation programs in KP are top-down and bureaucratic. Decisions are mostly made at the provincial or donor level, with minimal input from local stakeholders and research institutions. This top-down form of government disregards local wisdom and minimizes the local adaptability required for contextual service (Vij, 2024).

It entails successful adaptation, necessitating bottom-up governance whereby municipalities, NGOs, and communities can be autonomous in the design and management of context-relevant interventions. In its absence, the process of adaptation is inflexible, introductory, and non-sustainable.

Gender and Social Inclusion Gaps

In climate governance, gender issues are usually neglected. The women, who contribute significantly to agriculture and water management, are among the most impacted by climate change, yet they are underrepresented in the decision-making process. The inability to implement gender-responsive policies restricts the success of the adaptation efforts (Masud et al., 2023).

Likewise, the vulnerable populations, including low-income households, the disabled, rural populations, etc., are not represented well in the process of adaptation planning. Equity must be achieved through inclusive governance, as well as by ensuring that adaptation measures meet a variety of needs.

Recommendations

Climate adaptation governance in Khyber Pakhtunkhwa needs radical changes in institutional, financial, technical, and social spheres. To begin with, the province should establish a special Climate Coordination and Resilience Authority under the office of the Chief Secretary. Such a body would require alignment of climate adaptation objectives among the relevant departments (e.g., environment, irrigation, agriculture, urban development) and would serve as the center of interdepartmental synergy. This is essential to minimize fragmentation, which is frequent in multi-level systems of governance (Gonzales-Iwanciw, 2020; Multilevel governance in climate change adaptation, n.d.).

To institutionalize this power, climate finance, data systems, community engagement, and adaptation research technical units are to be established, connecting provincial leadership with district-level implementation activities. They should have an oversight and consultative forum comprising representatives from civil society, academia, and the private sector, known as a Provincial Climate Council, that ensures the legitimacy,

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

transparency, and buy-in of stakeholders (Keskitalo, 2008; Paavola, 2015).

At the same time, the human capacity should be established in an orderly manner within the KP bureaucracies. To provide sustained training on climate risk assessment, GIS, adaptation planning, and evaluation, the province should establish Climate Capacity Resource Centers in major universities (e.g., Peshawar, Kohat). Environment, urban planning, and municipal officers should be required to receive training with the assistance of international institutions, such as AIT (Thailand). Institutional guides, mentorship networks, and digital repositories can help in knowledge retention. The relevance of institutional learning to multi-level systems of governance is well-known

(Sidloski et al., 2021; Urge-Vorsatz et al., 2007).

It must have a sustainable Climate Finance Framework. KP needs to establish a Provincial Resilience Fund to facilitate continuity of adaptation interventions between donor cycles. The sources of funding can include provincial budget allocations, green bonds, or sukuks and public-private co-investment schemes. To ensure fiscal transparency, Climate Budget Tagging must become an integral part of the provincial public financial system, which will provide an opportunity to track the costs of adaptation spending (Urge-Vorsatz et al., 2007; the need for climate data stewardship, 2024). A Climate Finance Unit should also be established within the Department of Finance, with the role of formulating suggestions to access international resources, such as the Green Climate Fund. The PPP models will be able to raise more capital towards green infrastructure and clean technology.

Adaptation should be integrated into normal development planning, rather than being an independent agenda. Climate Impact Screening of every project in the Annual Development Plan should be conducted before it is approved, and it should be resilient, with adaptation constraints and opportunities built into sectoral plans (agriculture, water, and urban infrastructure). Adaptation plans at the district level, in line with the provincial strategy, must prioritize localized needs and promote community-based solutions. The integration helps to fill the governance gap in policy coherence that is often observed in subnational adaptation governance (Multilevel governance in climate change adaptation, n.d.; Climate Change Governance & the Challenge of Multi-Level Action, n.d.).

KP requires better climate information and surveillance methods to inform its actions based on evidence. A Climate Information and Monitoring Network is intended to unify information among meteorological, hydrological, and agricultural organizations. The observatories in the districts can transmit real-time information to a provincial repository. Monitoring and Evaluation (M&E) structure and performance indicators (e.g., flood incidence, water-use efficiency, livelihood outcomes) must be implemented, and an annual report on the State of Climate in KP must be published to hold oneself accountable. Such systems need to be created, and the current data fragmentation (the need for climate data stewardship, 2024; Adaptive capacity of mountain communities, 2025) testifies to the necessity to do it.

Adaptation should be based on community effort. Village- and neighborhood-level funding and implementation of participatory vulnerability assessments, as well as localized Climate Action Plans, are necessary. Adaptation measures such as rainwater harvesting, terracing, and afforestation can be made with the help of micro-grants to local organizations, women, and youth councils. The grassroots capacity will be developed with the help of local climate resource centers in vulnerable districts. The importance of community-based adaptation in inclusive governance has been extensively recorded

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

(Gonzales-Iwanciw, 2020; Social influence in adaptive water governance, 2022).
The process of gender equality and social inclusion should be integrated into all adaptation efforts. The project design, budgeting, and evaluation require a gender-responsive adaptation toolkit. Adaptation grants should be given to women-led organizations. Alternative people and low-income households constitute marginalized groups that must also be incorporated in adaptation planning and implementation. Climate governance equity enhances effectiveness and legitimacy (Warraich, 2025).
A special focus is needed on urban jurisdictions. City planners are encouraged to establish Urban Climate Resilience Units within municipal bodies to integrate adaptation into municipal services. The construction regulations must enforce the use of green roofs, energy efficiency, and rainwater collection. Parks, tree belts, and permeable surfaces, as

nature-based adaptation measures, should be encouraged as part of urban green infrastructure. Anticipatory urban governance should be supported by smart systems (sensors, GIS-based flood forecasting, air quality monitoring, etc.) (Multilevel governance approach in cities, n.d.; Climate Governance & Multi-Level Action, n.d.). Cities are supposed to have specific climate resilience budgets, which are developed through the establishment of fiscal decentralization in adaptation governance.
Provincial adaptation must be based on law in order to be continuous. The presence of a Provincial Climate Resilience Act would assign responsibilities, establish long-term targets, secure funding, and establish accountability. An inter-party climate resilience Charter can set the goal of adapting to climate change as a non-partisan concern that must be made a priority by all parties. The further introduction of accountability will be ensured through the evaluation of adaptation performance in civil service assessments and the creation of legislative oversight systems. Adaptation should be legally anchored as it circumvents the short-termism inherent in most climate policies (Warraich, 2025; Paavola, 2015).
It is essential to bridge the gap between research and policy**.** In order to produce local evidence, KP ought to set up a Research Consortium on Climate Resilience, which includes universities, think tanks as well as NGOs. Climate Policy Lab, under the coordination authority, has the capability to translate findings into policy. The development should be supported by innovation grants and challenge funds to create context-appropriate technologies (low-cost early warnings, resilient crops, decentralized water systems). Tax exemptions, green certifications, and CSR alignment should be utilized to encourage the private sector's participation in finding solutions to adaptation. The connection between governance innovation and adaptation efficacy is evident in the multi-level adaptation literature (Multilevel governance and power in climate networks, 2018; Adaptation in multi-level systems, 2023).
Successful adaptation is based on public awareness and climate literacy. Climate education should be incorporated in the school curriculum through the textbook board of KP. Adaptive measures (such as saving water, reusing waste, and planting trees) should be promoted through provincial and local media campaigns. Civic engagement can be facilitated by annual activities such as Climate Awareness Week. A culture of resilience can be developed through the creation of Green Youth Clubs in universities and schools. Statistics, reports, and project information should be spread among citizens through a provincial Climate Knowledge Portal. Open communication fosters responsibility and establishes social momentum (Climate Data Stewardship, 2024; Multilevel Learning for Adaptation, 2025).

Dialogue Social Science Review (DSSR)
www.thedssr.com

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

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 10 (September) (2025)

Transboundary and regional cooperation should also be sought. KP has watersheds and ecosystems that overlap with those of other provinces and Afghanistan. Shared resilience can be promoted through joint efforts on mitigating the effects of glacier melt, protecting watersheds, and establishing forest corridors. KP needs to participate in national and international networks, such as ICLEI, RegionsAdapt, and subnational climate networks, to share practices and increase visibility. The active involvement in climate diplomacy will facilitate the acquisition of funding and inform national policy development (Multilevel climate governance, 2023; ICLEI experiences in cities, n.d.).

This should be implemented in a pragmatic roadmap. During years 1-2, concentrate on institutional setup, budget tagging, capacity building, and awareness. In years 3-5, establish data networks, resilience funds, and mainstream adaptation in district plans. Within 6-10 years, advocacy efforts will focus on legal changes, decentralized implementation, and quantifiable declines in vulnerability. Such a gradual process

ensures the stability of the institution and facilitates learning through experience.

The inclusion of these measures (coordinated institutions, financial systems, capacity development, inclusive participation, legal support, research connections, and awareness) can help KP to become not a patch-by-patch adaptation intervention but a robust climate governance infrastructure. The ability of Khyber Pakhtunkhwa to adapt will be crucial in institutionalizing these reforms, making climate resilience a structural aspect of socio-economic development.

Conclusion

Climate change adaptation in Khyber Pakhtunkhwa is not just a technical problem, but also a governance challenge, a coordination challenge, and a challenge to political will. Nonetheless, despite the progressive policy frameworks, gaps in institutional capacity, funding, coordination, and participation persist, affecting the province's ability to implement its plans. The Multi-Level Governance framework suggests that failures of adaptation are often caused by poor vertical and horizontal connections when provincial, local, and community actors operate in silos.

To bridge such divides, KP should institutionalize combined governance mechanisms, enhance capacity at all levels, and stabilize financial flows. Adaptation should be institutionalized in development planning, based on the clarity of information and active participation. Re-evaluating reactive to proactive climate governance requires visionary leadership, the coherence of policies, and the ability of the local government system.

When introduced properly, these reforms can make Khyber Pakhtunkhwa a model for a climate-resilient government, an example to the rest of Pakistan's provinces, and other areas with the twofold problem of environmental vulnerability and institutional weakness.

References

Adaptive capacity and climate resilience of mountain communities. (2025).

Biodiversity Pakistan’s scenario: Climate change and biodiversity. (2011). The Journal of Animal and Plant Sciences, 21(2 Suppl.), 358–363. https://thejaps.org.pk/docs/21-2-suppl/JAPS-7[Final].pdf

Climate Change Governance & the Challenge of Multi-Level Action. (n.d.). UK–CPA.

Climate Governance in Pakistan after the 18th Amendment. (n.d.). Academia.edu.

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

Vol. 3 No. 10 (September) (2025)

Fil, A., et al. (2023). Climate change adaptation with limited resources. PMC. https://www.ncbi.nlm.nih.gov/articles/PMC9910270/

Global Climate Change NASA. (n.d.). Responding to climate change: Solutions—Adaptation and mitigation. https://climate.nasa.gov/solutions/adaptation-mitigation/

Gonzales-Iwanciw, J. (2020). Learning in multi-level governance of adaptation to climate. Journal of Environmental Policy & Planning. https://doi.org/10.1080/09640568.2019.1594725

Government of Khyber Pakhtunkhwa. (2022). KP Climate Change Policy (2017, updated 2022). ePA KP.

Government of Pakistan. (2018). Pakistan's second national communication on climate change. Ministry of Climate Change. http://www.gcisc.org.pk/SNC_Pakistan.pdf

Government of Pakistan. (2021). Nationally Determined Contributions 2021 (pp. 22, 39–43). https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf

Government of Pakistan. (2021). National Climate Change Policy of Pakistan 2021 (p. 16).

https://policy.asiapacificenergy.org/sites/default/files/Updated%20National%20Climate%20Change%20Policy%20%282021%29_0.pdf

Government of Pakistan. (2022). Pakistan's first biennial update report submitted to UNFCCC (BUR-1, pp. 9–10).

Intergovernmental Panel on Climate Change (IPCC). (2014). AR5 Climate Change 2014: Mitigation of climate change. https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf

Janjua, S. (2020). Climate change adaptation at the local government level: The case of Pakistan. Common Ground Research Networks.

Kalbe, A. (2021, July 13). Per capita water availability in Pakistan has decreased by 400pc. Dawn News. https://www.dawn.com/news/1634786/per-capita-water-availability-in-pakistan-has-decreased-by-400pc

Masud, A., Shafaq, S., & Ahmad Khan. (2023). Policy implementation barriers in climate change adaptation: The case of Pakistan. Environmental Policy and Governance. https://doi.org/10.1002/eet.2054

Multilevel governance and power in climate change policy networks. (2018). Global Environmental Change.

Multilevel governance in climate change adaptation – Conceptual clarification and future outlook. (n.d.).

National Aeronautics and Space Administration (NASA). (n.d.). Responding to climate change: Solutions—Adaptation and mitigation. https://climate.nasa.gov/solutions/adaptation-mitigation/

NIPA Peshawar. (2024). Climate Policy Framework of Khyber Pakhtunkhwa.

Nixon, R., et al. (2022). Social influence shapes adaptive water governance. Ecology and Society, 27(3). https://doi.org/10.5751/ES-13600-270337

Paavola, J. (2015). Multi-level environmental governance: A concept under stress? Centre for Climate Change Economics and Policy (CCCEP).

Pirzada, M. D. S. (2024). The climate change governance in Pakistan. Atlantis Press.

Qureshi, N. A., & Ali, Z. (2011). Climate change and biodiversity: Pakistan's scenario. The Journal of Animal and Plant Sciences, 21(2 Suppl.), 358–363. https://thejaps.org.pk/docs/21-2-suppl/JAPS-7[Final].pdf

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

Vol. 3 No. 10 (September) (2025)

Runde, D. F., Raphel, R. L., & Yusuf, M. (2023, February 1). Pakistan and climate adaptation. CSIS Development Dispatch. https://www.csis.org/blogs/development-dispatch/pakistan-and-climate-adaptation

Saif Ullah, N., Nizami, M. S., et al. (2022, January 21). Recent global warming as a proximate cause of deforestation and forest degradation in northern Pakistan. PLOS ONE. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0260607

Sidloski, M., et al. (2021). Multi-level governance and climate change adaptation planning. Smart Prosperity Institute.

Social influence shapes adaptive water governance. (2022). Ecology and Society, 27(3).

Ürge-Vorsatz, D., Koeppel, S., & Mirasgedis, S. (2007). Appraisal of policy instruments for reducing buildings' CO_2 emissions. Building Research & Information, 35(4), 379–398.

Vij, S. (2024). Power in climate change policy-making process in South Asia. Climate Policy.

Warraich, A. N. (2025). Rethinking the governance paradigm for dealing with climate change in Pakistan. Journal of Humanities & Social Sciences, 3(2).

World Bank. (2022, October 28). Pakistan: Flood damages and economic losses over USD 30 billion and reconstruction needs over USD 16 billion – New assessment. https://www.worldbank.org/en/news/press-release/2022/10/28/pakistan-flood-damages-and-economic-losses-over-usd-30-billion-and-reconstruction-needs-over-usd-16-billion-new-assessme.