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## EVALUATING THE EFFECTIVENESS OF POLYCENTRIC CLIMATE GOVERNANCE IN PAKISTAN: A CASE STUDY OF GLOF II

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### INTRODUCTION

This study evaluates the effectiveness of the GLOF-II project in reducing glacial lake outburst flood (GLOF) risks and strengthening disaster preparedness in Gilgit Baltistan, with a focus on the role of polycentric governance in shaping project outcomes. The findings highlight various aspects of the project that need to be improved for better climate adaptation and governance. The project demonstrates strong alignment with national climate adaptation priorities and involves multiple stakeholders across institutional scales. However, its implementation reveals a structural contradiction. The presence of these institutions did not translate into flexible or context-responsive governance. Instead, a rigid, top-down model constrained its ability to adapt to the local needs and emerging challenges. Similarly, the findings highlight significant discrepancies between the intended outcomes and the lived experiences of the community, particularly regarding the effectiveness of early warning systems, livelihood interventions, and critical infrastructure implemented across project valleys. The findings suggest that polycentric arrangements are alone insufficient for adaptive governance. Effective climate adaptation requires not only multiple actors but also flexible decision-making, meaningful community engagement, and robust accountability mechanisms to ensure context-sensitive and sustainable outcomes.

### RESEARCH METHODOLOGY

The study adopts a multidisciplinary mixed-methods approach, integrating qualitative and quantitative data to evaluate project performance, including its relevance, effectiveness, efficiency, and sustainability of outcomes. Data sources include project documents, 45 key informant interviews (including MoCC, UNDP, PMD, PnD, EPAs, and other relevant line departments); three focus group discussions with 21 community members of 4 valleys, structured field observations, and satellite-based remote sensing analysis.



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## FINDINGS AND DISCUSSION

The GLOF-II project is presented as a significant institutional achievement, emphasizing that, despite multiple extensions, it has strengthened the capacity of key line departments, including those responsible for disaster management, forestry, irrigation, and environmental regulation. From this perspective, indeed the project has enhanced institutional experience in implementing a complex international climate adaptation initiative. While the findings support the project's alignment with national adaptation priorities, they also reveal a more complex reality at the local level. Community experiences frequently challenge the effectiveness and relevance of interventions. This divergence points to a disconnect between national-level planning and local-level realities, where standardized project designs failed to adequately respond to context-specific vulnerabilities.

***Project Relevance and Alignment with Local Needs:*** At the policy level, the project fits well within national climate adaptation strategies and disaster risk reduction priorities. However, its design reflects a largely standardized approach that did not fully account for the diverse socio-ecological conditions of high-altitude settlements. This indicates that local variations in risk are only partially reflected in project design and implementation.

***Project Outcomes and Effectiveness:*** The findings reveal a significant gap between intended results and actual implementation on the ground. While project documents report the establishment of early warning systems, safe havens, CBDRMCs, and livelihood interventions, field evidence indicates that many of these outputs were either partially implemented, of limited functionality, or not effectively utilized by communities. Early warning systems also showed limited effectiveness in practice. In addition, livelihood interventions reflected design-context mismatches, as livestock breeds and seeds distributed under the project were reported as unsuitable for high-altitude conditions, with seeds failing to germinate due to short growing seasons and poor soil conditions. These discrepancies between reported outputs and lived experiences underscore weaknesses in implementation quality, monitoring, and community integration, ultimately constraining the project's effectiveness in strengthening local resilience.

***Efficiency and Synergies:*** Findings from Key Informant Interviews (KIIs) with local government officials, project managers, and relevant stakeholders present a mixed picture of project efficiency and coordination. Institutional respondents describe project revisions including changes in targets, timelines, and financing as adaptive adjustments to improve implementation feasibility in response to changing conditions. However, they also consistently point to weak interdepartmental coordination during implementation. Despite multiple agencies being involved, roles and responsibilities were not clearly integrated, leading to fragmented execution across key activities such as plantation, irrigation support, and maintenance.

Community perspectives reinforced these findings, particularly regarding weak intersectoral coordination. Respondents similarly reported that plantation and adaptation activities were implemented without ensuring essential water availability, or taking terrain challenges in to account resulting in low survival and underperformance of interventions. These accounts confirm



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fragmented implementation and limited cross-sector synergy, which undermined overall project effectiveness.

***Sustainability of Outcomes:*** The findings indicate significant concerns regarding the sustainability of project outcomes. Several interventions lacked clear exit strategies, with no defined mechanisms for the long-term management of infrastructure such as CBDRMCs and EWSs. In particular, the absence of standard operating procedures for post-project operation and maintenance raises questions about institutional continuity and ownership. While the project contributed to increased awareness of climate risks and adaptation practices, this change cannot be solely attributed to the intervention, as it also reflects pre-existing local experiences of environmental change. Overall, the findings suggest that sustainability remains constrained by weak institutionalization, limited capacity transfer, and insufficient planning for post-project continuity.

***Challenges and Lessons Learned:*** The findings highlight a combination of technical, institutional, and governance challenges that constrained the effectiveness of the GLOF-II project. Several interventions were not fully suited to local ecological conditions. Institutional coordination gaps across key departments further reduced implementation efficiency, while in some cases, interventions also generated unintended environmental impacts, as evidenced by regulatory action taken by the GB EPA at Kutwal Lake. At the governance level, a clear disconnect emerged between official success narratives and field-level realities, constraining transparency and weakening accountability mechanisms. These challenges indicate that project limitations were not isolated but systemic, highlighting the need for stronger contextual planning, improved inter-agency coordination, and more robust oversight in future climate adaptation initiatives.

***Adaptive Responses:*** Despite persistent implementation constraints, several adaptive responses emerged across community and institutional levels. Communities in high-risk valleys continued to rely on indigenous knowledge systems and informal warning networks to support timely evacuations when formal technological systems were inadequate. At the institutional level, regulatory interventions signaled growing environmental oversight, reinforcing the role of compliance mechanisms even within donor-funded projects. In parallel, increased public and media scrutiny has contributed to a more critical discourse on project performance, creating limited but important space for reflection and learning.

***Implications for Scaling and Replication:*** The GLOF-II experience indicates that scaling the current model without substantial redesign risks replicating existing weaknesses. Technical systems such as early warning infrastructure require stronger maintenance frameworks, deeper contextual alignment with fragile mountain ecosystems, and structured integration with local knowledge systems to ensure operational reliability.

From a governance perspective, scaling demands greater transparency, independent oversight, and stronger accountability mechanisms to ensure credible performance reporting. Institutionally, replication must move beyond fragmented implementation toward sustained interdepartmental coordination, with community participation embedded as an ongoing process rather than a procedural requirement.



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These findings suggest that effective scaling of climate adaptation interventions depends not on expanding existing models, but on reconfiguring them around technical resilience, institutional coherence, and accountable, community-centred governance.

## CONCLUSION

The GLOF-II project, while ambitious in scope and critical in intent, reveals a complex interplay of technical, institutional, and socio-political challenges that have limited its potential. Field evidence and stakeholder testimonies highlight a pattern of top-down implementation, fragmented coordination, and ecological misalignment. Despite the installation of early warning systems and livelihood interventions, the lack of sustained maintenance, community ownership, and adaptive planning has compromised the intended results. The findings indicate that the core challenge is not the absence of interventions, but the way they are governed and operationalized. Weak inter-agency coordination, inadequate data and monitoring systems, technically rigid designs, and largely symbolic community engagement collectively constrain performance and reduce overall impact.

As a result, resilience building remains narrowly infrastructure-driven, with limited attention to social protection, recovery systems, and long-term adaptive capacity. This structural imbalance continues to limit the project's transformative potential in high-risk environments.

## POLICY RECOMMENDATIONS

The findings highlight five key priorities for strengthening the effectiveness, accountability, and sustainability of climate adaptation interventions under polycentric governance.

**Strengthen Institutional Coordination and Polycentric Governance:** Clarify mandates across federal and provincial climate and disaster institutions to reduce overlap. Establish structured coordination mechanisms with clear roles, accountability frameworks, and joint planning systems.

**Institutionalize Transparency and MEAL Systems:** Develop robust MEAL systems with real-time, publicly accessible data. Introduce third-party verification and standardized dashboards to improve accountability and evidence-based decision-making.

**Improve Context-Sensitive Technical Design:** Base interventions on updated hazard data and site-specific assessments. Integrate local ecological knowledge and revise rigid design and cost frameworks for high-altitude environments.

**Embed Community-Centered Governance:** Institutionalize meaningful participation across all project stages through formal mechanisms. Strengthen feedback loops, communication, and shared monitoring systems to enhance ownership and sustainability.



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**Integrate Social Protection into Adaptation:** Expand adaptation planning beyond infrastructure to include relocation support, contingency planning, and adaptive social protection mechanisms for disaster-affected communities.

Overall, strengthening climate adaptation effectiveness requires moving from fragmented, infrastructure-led interventions toward a coordinated, transparent, and community-centred governance framework. Moreover, structural limitations in donor-funded technical interventions indicate that community-led adaptation can only be sustained through stronger and more functional local governance systems in Gilgit-Baltistan, a condition that remains both essential and uncertain within the region's broader political context.