Climate change and the barriers of LAPA implementation

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Abstract

Climate change poses significant challenges to local governance systems, particularly in developing countries where institutional, financial, and social capacities remain limited. Local Adaptation Plans of Action (LAPA) of Nepal represent a pioneering policy framework for integrating climate adaptation into local development planning. However, despite a decade of implementation, substantial gaps persist between policy design and on-ground execution. This study has examined the barriers affecting LAPA implementation in selected municipalities using a qualitative case study approach. Guided by a widely recognized diagnostic adaptation framework, the research draws on semi-structured interviews with municipal officials, local stakeholders, and development practitioners, complemented by document review and thematic analysis. The findings reveal six major categories of interlinked barriers: institutional fragmentation, financial ambiguity, regulatory and legal inconsistency, political interference, attitudinal resistance, and socio-cultural exclusion. These barriers manifest across all phases of the adaptation cycle, understanding, planning, and managing and tend to reinforce one another, creating systemic implementation bottlenecks. For instance, weak institutional coordination contributes to inefficient financial flows, while unclear mandates and elite capture compromise inclusive governance. The study highlights the need for targeted institutional reforms, enhanced budget-policy alignment, regulatory clarity at the subnational level, and stronger engagement with marginalized groups. By illuminating the dynamic interactions among barriers, the study contributes to the understanding of adaptation governance in decentralized contexts and offers policy-relevant insights for improving the effectiveness of local adaptation strategies in Nepal and similar settings.

Keywords: adaptation, barriers, climate change, community, implementation

Introduction

Climate change has emerged as one of the most pressing global challenges, with far-reaching implications for ecosystems, societies, and economies. It has been a critical global issue, evidenced by escalating temperatures and severe weather events like floods, landslides, and droughts (UNDP, 2015). Many climate change studies have shown Nepal as one of the least developed countries vulnerable to climate change, and it's experienced accelerated the glacial melting and heightened disaster risks (Jha & Shrestha, 2013; UNDP, 2015). This change in the environment has a substantial influence on the infrastructure, health, and agriculture sectors, leading to both seasonal and permanent migration across the nation. Nepal has implemented deliberate adaptation measures to reduce these effects and improve resilience as a result (NCCAF, 2012). Launched in 2010 with funding from the Least Developed

Countries Fund, the National Adaptation Plan of Action (NAPA) aims to incorporate climate change considerations into national development objectives (MSFP, 2015; NCCSP, 2012). In a same, decentralized governance and local involvement in adaptation activities are prioritized in the LAPA, which was started in 2011 and updated in 2019 (Maharjan, 2019; GoN, 2011; NCCSP, 2012).

However, the obstacles stand in the way of these adaptation strategies' successful execution in Nepal. The main obstacles are related to capability, planning, and governance (Maharjan, 2019; Regmi & Bhandari, 2013). Complicating matters are socio-cultural elements that impact local decision-making in addition to technical and budgetary limitations (Chanudhury et al., 2014).

This study aims to comprehensively analyze and examine these barriers, examining their characteristics, and assessing their impacts on the implementation of local climate change adaptation plans in Nepal. It specifically aims to respond to the following research question: What are the institutional, financial, legislative and regulatory, and social and cultural barriers encountered in the implementation of local climate change adaptation plans, and its impacts?

Hence, the study is focused to provide insights on the strategies for overcoming barriers and improving the effectiveness of climate adaptation planning in Nepal.

Adaptation barrier

Adaptation barriers are defined as factors that hinder the planning and implementation of adaptation actions or restrict available options (IPCC, 2014; National Research Council, 2010). These obstacles disrupt and slow down adaptation processes, reducing their effectiveness. Overcoming barriers requires coordinated efforts, efficient resource management, innovation, stakeholder engagement, consensus building, option prioritization, and adequate information (Eisenack, et al., 2014). While barriers and limits are sometimes conflated, limits refer to conditions that render adaptation ineffective due to insurmountable factors (Adger et al., 2007), whereas barriers are mutable impediments to adaptation.

Types of barriers

Barriers encompass socio-cultural, institutional, financial, attitudinal, and political dimensions, each presenting unique challenges to effective adaptation planning and implementation.

Cultural and behavioral barriers: These barriers stem from organizational norms, values, attitudes, and practices that influence how institutions perceive and respond to climate-related risks (Burch, 2010). They are particularly evident at the municipal level and shape the adaptation strategies adopted.

Social barriers: Jones (2010) describes social barriers as cognitive, normative, and institutional constraints that hinder the identification of optimal adaptation strategies. Generally, in Nepal, these barriers are intertwined with societal structures such as caste, class, ethnicity, and gender, impacting community resilience to climate impacts.

Structural and operational barriers: These barriers relate to organizational structures and procedures within institutions that influence long-term adaptation policies and practices (Burch, 2010). Issues such as weak governance, insufficient data availability, and fragmented decision-making processes hinder effective adaptation planning.

Regulatory and legislative barriers: This category includes policy tools and legislative frameworks that either facilitate or hinder adaptation planning efforts. Effective climate policies require robust institutional frameworks and clear legal mandates to integrate climate considerations into planning processes.

Contextual barriers: These barriers refer to environmental factors and community values that either support or hinder adaptation actions within local governance structures (Burch, 2010). Understanding these local contexts is crucial for aligning adaptation strategies with community priorities.

Institutional barriers: Eisenack et al. (2014) highlight institutional barriers arising from governance complexities, resource constraints, and inadequate technical capacities within institutions. Fragmented governance and unclear roles among stakeholder's complicate adaptation planning and decision-making processes (Productivity Commission, 2012).

Financial barriers: Financial constraints pose significant challenges to climate change adaptation, limiting resources for long-term planning and implementation (Eisenack, et al., 2014). Insufficient financial resources at the local level often hinder effective management of climate risks and proactive adaptation measures (Productivity Commission, 2012).

Attitudinal barriers: These barriers involve public attitudes, beliefs, and knowledge gaps about climate change, influencing community engagement in adaptation actions (National Research Council, 2010). Addressing attitudinal barriers requires efforts to enhance public awareness and change historical perceptions.

Political barriers: Political will and leadership are critical for advancing climate adaptation agendas, but political barriers such as conflicting interests, policy inertia, and budget constraints can delay effective adaptation planning (Ekstrom & Moser, 2014; Eisenack, et al., 2014). Political commitment is essential for mobilizing resources and creating supportive environments for local climate action.

Table 1

Phases and barriers in the stage of implementation of managing phase

Phases & process stage: planning	Barriers	Typologies
Implement Options	• Threshold of intent • Authorization • Sufficient resources (fiscal, technical, etc.) • Accountability • Clarity/specificity of option • Legality and procedural feasibility • Sufficient momentum to overcome institutional stickiness, path dependency and behavioral obstacles	• Financial • Institutional • Legislative and regulatory barriers

Source: Moser & Ekstrom, 2010.

Table 1 illustrates the phases and barriers during the implementation stage of the managing phase. In this phase, key barriers include financial constraints, institutional hurdles, and

legislative and regulatory complexities. These barriers pose challenges such as securing sufficient resources, navigating legal requirements, and overcoming institutional inertia and behavioral obstacles. The ability to implement adaptation options hinges on factors like clear intent, sufficient funding, and the emergence of new stakeholders actively involved in executing adaptation plans (Moser & Boykoff, 2013). For example, in Zimbabwe, farmers' reluctance to engage in adaptation actions due to lack of climate knowledge underscores the critical role of intent in implementation. Successful cases, like the Albay Province in the Philippines, highlight how overcoming these barriers requires a robust transition from planning to effective implementation of climate change action programs (Mimura, et al., 2014).

Review of literature

Climate change adaptation planning has received growing global attention as climate-induced risks intensify across socio-ecological systems. In developing countries like Nepal, institutional, financial, legislative, and socio-cultural challenges often hinder the implementation of adaptation policies at the local level. This section reviews existing literature relevant to the implementation of local climate change adaptation strategies, focusing particularly on the LAPA, and situates the present study within broader scholarly and policy debates.

Adaptation to climate change is broadly classified as anticipatory or reactive, and as autonomous or planned (Klein et al., 2007; Füssel, 2007). Autonomous adaptation often occurs at the level of individuals or households without formal policy guidance, whereas planned adaptation is typically initiated by governments or institutions in anticipation of projected climate impacts (Adger et al., 2007). Planned adaptation is more structured and linked to development planning processes, particularly in developing countries where vulnerabilities are higher and resources more constrained (Mimura et al., 2014).

However, the effectiveness of planned adaptation is highly contingent on institutional frameworks, governance structures, and local capacity. The Intergovernmental Panel on Climate Change (IPCC, 2014) emphasizes that adaptation responses are shaped by governance systems that influence the enabling or constraining environment for implementation. This aligns with the diagnostic framework proposed by Moser and Ekstrom (2010), which identifies barriers in three sequential phases—understanding, planning, and managing—each containing institutional, informational, financial, cultural, and political dimensions. Their framework has been influential in shifting attention from technical limitations to the broader social and institutional landscape that shapes adaptation outcomes.

In the context of Nepal, adaptation planning has evolved through several key national initiatives, including the National Adaptation Programme of Action (NAPA), the Climate Change Policy (2019), and subsequently, the LAPA framework (GoN, 2019). LAPA, in particular, emphasizes decentralized and community-driven planning approaches, aiming to embed climate resilience in local development processes (Maharjan, 2019). While the LAPA framework represents a shift from top-down to bottom-up adaptation governance, multiple studies have revealed implementation bottlenecks.

Dhungana et al. (2017) assessed the initial phase of LAPA implementation and found significant gaps in institutional coordination and local consultation. They argued that insufficient integration of local knowledge, lack of clarity in roles among stakeholders, and

poor accountability mechanisms weakened the framework's effectiveness. These findings resonate with Moser and Ekstrom's (2010) "managing phase" barriers, particularly around institutional inertia and leadership deficits.

Maharjan (2019) further highlights how political interests often override climate objectives in local planning processes. For example, development projects such as road construction receive higher prioritization than long-term climate adaptation measures. This reflects the kind of political and attitudinal barriers emphasized by Eisenack et al. (2014), where misaligned incentives and short-term political gains can distort adaptation priorities.

Similarly, Regmi and Bhandari (2013) explored institutional capacity challenges in Nepal's adaptation landscape, underscoring the disconnect between national adaptation frameworks and local governance readiness. They argued that despite the proliferation of policies, effective adaptation requires functional local institutions, trained personnel, and delineated mandates, a theme echoed by Smith et al. (2009) in their broader assessment of adaptation governance.

Internationally, the literature reflects similar patterns. Biesbroek et al. (2013) argue that adaptation is often constrained not by lack of knowledge or technology, but by institutional fragmentation, unclear responsibilities, and lack of coordination across governance levels. This is also evident in Australian and European contexts, where local governments struggle to reconcile sectoral mandates and limited funding with climate responsibilities (Bauer et al., 2012; Baker et al., 2012).

The lack of adaptive capacity at the local level is a recurring theme. For example, studies by Carmin et al. (2012) and Gero et al. (2012) show that although local governments are central to climate resilience, they often face funding limitations, technical gaps, and overlapping mandates. These issues are mirrored in Nepal's experience with the LAPA, particularly in remote districts where institutional presence is weak and financial flows are inconsistent.

The literature also points to the underutilization of indigenous knowledge and social capital in adaptation planning. In Nepal, the marginalization of traditional practices, such as indigenous seed varieties and community-based farming systems, has been identified as a significant social and cultural barrier (Chaudhury et al., 2014; Jones, 2010). Despite policy mandates on gender and inclusion, practical implementation often overlooks the decision-making roles of women and disadvantaged groups.

While the existing literature identifies various typologies of barriers, ranging from institutional and financial to socio-cultural and political, few studies provide a structured analysis of how these barriers interact across different phases of adaptation planning. The present study addresses this gap by using the Moser and Ekstrom (2010) framework to examine the LAPA implementation challenges through an integrated lens. This approach enables a deeper understanding of not only the types of barriers but also their relationships and cumulative impacts on the ground.

In sum, while substantial literature has examined the constraints to adaptation, there remains a need for grounded, empirically informed studies that integrate theory with practice. This research contributes to addressing this need by providing an evidence-based assessment of the barriers to the LAPA implementation in Nepal, highlighting the interdependence of institutional, financial, legislative, social, political, and attitudinal factors.

Global perspectives on climate change adaptation

Globally, climate change adaptation has emerged as a policy and research priority due to the escalating intensity and frequency of climate-related hazards. International frameworks such as the United Nations Framework Convention on Climate Change (UNFCCC) and its offshoots, including the NAPAs, have been instrumental in guiding adaptation priorities in developing countries (UNFCCC, 2021). The Paris Agreement further reinforced the commitment to adaptation by placing it on equal footing with mitigation, emphasizing the role of countries in planning and implementing context-specific adaptation strategies (Magnan & Ribera, 2016).

However, literature indicates that while global policy frameworks provide high-level direction, their translation into national and sub-national planning often faces significant contextual challenges (Biesbroek et al., 2013). These include resource constraints, institutional misalignments, and varying degrees of governance capacity. The current study echoes these issues, particularly in the Nepali context, where adaptation plans like LAPA have struggled to align global priorities with local realities due to governance and resource barriers.

Understanding adaptation to climate change

Adaptation refers to the process of adjustment in human or natural systems in response to actual or expected climate stimuli or their effects (IPCC, 2014). It can be anticipatory or reactive, autonomous or planned. Planned adaptation, which is policy-driven and structured within formal institutions, is often necessary in contexts with high vulnerability and limited adaptive capacity, such as Nepal (Adger et al., 2007; Klein et al., 2007).

Planned adaptation is particularly relevant for the implementation of LAPA, which represents a strategic intervention to incorporate climate risks into local development planning. However, as identified in Moser and Ekstrom's (2010) diagnostic framework, barriers at each stage of the adaptation cycle, which are understanding, planning, and managing, can inhibit effective implementation. This study applies that framework to examine how different types of barriers manifest within the LAPA context and influence adaptation outcomes.

National initiatives in Nepal

Nepal has taken several steps to institutionalize climate adaptation planning, beginning with the NAPA in 2010, followed by the Climate Change Policy (2019), and later, the LAPA introduced in 2011 and revised in 2019 (Government of Nepal, 2011). These initiatives aim to mainstream climate considerations into local governance and development processes.

Despite these efforts, adaptation planning in Nepal remains challenged by fragmented institutional roles, insufficient local capacity, and inadequate funding (Regmi & Bhandari, 2013; Maharjan, 2019). Moreover, adaptation is often deprioritized in favor of conventional development projects, reflecting political barriers that undermine strategic climate action (Dhungana et al., 2017). The present study provides empirical validation of these observations by documenting field-level implementation challenges faced by the LAPA actors.

Local government roles in adaptation

Local governments are the key actors in the adaptation landscape, especially in decentralized systems like Nepal. They are tasked with translating national policies into tangible local

actions that reflect community needs and vulnerabilities (Hamin & Gurran, 2009). The LAPA was designed with this principle in mind, promoting community-led adaptation planning and local decision-making. However, as Gero et al. (2012) and Carmin et al. (2012) highlight, local authorities often face institutional constraints, lack technical knowledge, and have minimal financial autonomy, which are observed cases in Nepal.

Challenges to climate adaptation governance

Effective adaptation governance involves the coordination of multiple actors across levels of government, sectors, and communities. Key challenges include policy fragmentation, unclear mandates, weak institutional capacities, and the lack of sustained political will (Eisenack et al., 2014; Biesbroek et al., 2013). These challenges are not just structural but are also embedded in cultural, behavioral, and attitudinal dimensions that influence how climate risks are perceived and prioritized (Moser & Boykoff, 2013). In Nepal, these governance challenges are particularly acute in remote and rural municipalities where adaptation is often externally funded and not embedded into the regular planning framework (Regmi et al., 2016).

Conceptual framework

This study employs a diagnostic approach to investigate the barriers that hinder the implementation of the LAPA in Nepal. The conceptual framework is primarily informed by Moser and Ekstrom's (2010) analytical model, which is designed to identify, categorize, and interpret the various types of barriers that hinder climate change adaptation efforts. Their framework is particularly suitable for this study as it not only categorizes barriers by type, such as institutional, informational, financial, social, and political, but also locates them within different phases of the adaptation process: understanding, planning, and managing.

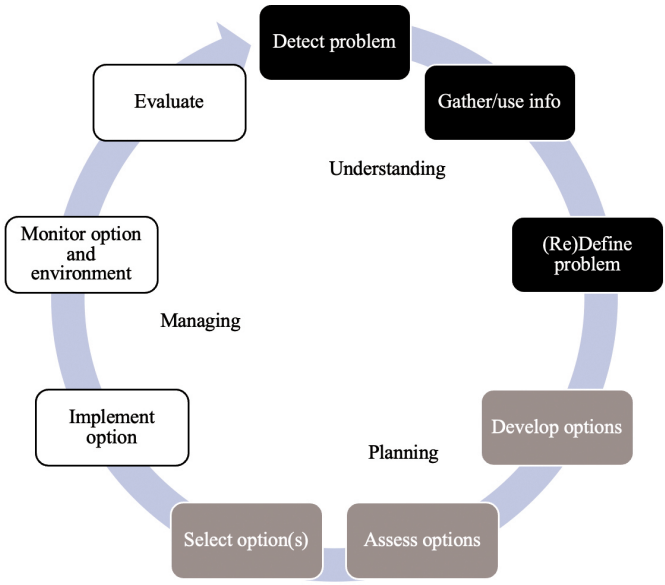
In this framework, barriers are defined as conditions or factors that impede the initiation, design, or execution of adaptation strategies, thereby constraining decision-making or implementation (Moser & Ekstrom, 2010). Importantly, barriers are not conceptualized as insurmountable "limits," but rather as challenges that can be addressed or overcome through appropriate intervention, coordination, or reform (Adger et al., 2007).

Moser and Ekstrom (2010) framework is applied to analyze qualitative data collected from stakeholders involved in the LAPA implementation in Nepal. Each identified barrier type whether institutional, financial, legislative, socio-cultural, political, or attitudinal is examined in terms of its location in the adaptation cycle and its functional interaction with other barriers. For example, weak institutional capacity is understood not merely as a discrete issue but as a constraint that cascades into ineffective financial planning and limited regulatory enforcement. Similarly, attitudinal and political barriers are considered to influence both the threshold of intent and stakeholder commitment, which are pivotal for practical implementation in the managing phase of adaptation.

Figure 1 below conceptualizes how these barriers interact in the adaptation planning process, as adapted from Moser and Ekstrom (2010). The outer structure represents the three sequential phases of adaptation: understanding the problem, planning responses, and managing implementation. Within each phase, specific categories of barriers are nested. For instance, informational and cognitive limitations are more likely to arise during the understanding phase, while financial and regulatory constraints dominate the planning and managing stages.

Figure 1

Different phases and process of adaptation



Source: Moser & Ekstrom, 2010

The framework also accommodates cross-cutting and interacting barriers. For instance, institutional inertia defined by staff turnover, weak leadership, and fragmented mandates not only impedes planning but also undermines the sustainability of implementation. Similarly, financial ambiguity often reflects deeper regulatory and institutional gaps. By structuring the analysis through this diagnostic lens, the study not only identifies the most prominent barriers but also reveals their interconnectedness and cumulative effects.

Methods and materials

This study employed an exploratory qualitative design to investigate the barriers encountered during the implementation of the LAPA in Nepal. An exploratory approach was appropriate, given the limited prior research on how diverse barriers interact at the local level, which allowed for an in-depth understanding of stakeholder perspectives and contextual dynamics (Moser & Ekstrom, 2010). The research design facilitated a comprehensive examination of institutional, financial, legislative, regulatory, socio-cultural, political, and attitudinal factors influencing the LAPA implementation.

Participants were recruited through a combination of convenience and snowball sampling. Initially, convenience sampling identified the LAPA practitioners and local government officials who were readily accessible and met predefined inclusion criteria, such as having direct involvement in the planning or execution of the LAPA activities. Following these initial interviews, snowball sampling was employed to identify additional stakeholders with relevant experience or insights; early interviewees provided referrals to other key informants (Noy, 2008). This two-pronged strategy was essential given the decentralized and context-

specific nature of the LAPA implementation, where individuals with pertinent knowledge are not uniformly distributed across districts. Although this sampling approach limits statistical generalizability, it enabled the purposeful identification of those most knowledgeable about implementation challenges. To mitigate potential sampling bias, interviews were conducted across four distinct districts, Humla, Jumla, Rukum, and Kathmandu, ensuring a range of geographic, institutional, and socio-cultural contexts were represented.

Primary data were collected between February and April 2024 via semi-structured interviews. A total of forty stakeholders participated, including the LAPA officials, representatives from local government offices, committee members, and climate adaptation experts. Each interview lasted between 45 and 60 minutes and followed a predeveloped interview protocol designed to probe perceptions of various barriers (institutional, financial, legislative/regulatory, socio-cultural, political, and attitudinal). Field notes were taken during face-to-face interviews, and all sessions were audio-recorded with participant consent. Secondary data comprised official the LAPA guideline documents, policy reports, and progress reviews obtained from the Ministry of Forests and Environment (MoFE) and the Nepal Climate Change Support Programme (NCCSP). These documents were reviewed to triangulate stakeholder accounts and enhance the robustness of barrier identification.

Data analysis adopted a thematic analysis framework, drawing on the principles outlined by Braun and Clarke (2006) and the diagnostic framework of Moser and Ekstrom (2010). Analysis proceeded through six iterative phases: (1) familiarization with raw data by repeatedly reading transcripts and field notes; (2) generation of initial codes by highlighting meaningful data segments related to barrier types; (3) identification of candidate themes by clustering codes according to Moser and Ekstrom's typologies (e.g., institutional, financial, legislative/regulatory, socio-cultural, political, attitudinal); (4) review and refinement of themes to ensure coherence and representativeness; (5) definition and naming of finalized themes with clear operational definitions; and (6) production of a comprehensive thematic narrative linking barrier characteristics to implementation outcomes (Braun & Clarke, 2006; Moser & Ekstrom, 2010). Coding was performed manually, with cross-checking by two researchers to enhance reliability. Discrepancies in code application were resolved through discussion until complete consensus was reached.

To minimize researcher bias, several measures of trustworthiness were employed. First, methodological triangulation compared interview findings with documentary evidence (e.g., LAPA guidelines, NCCSP reports) to validate and contextualize stakeholder assertions. Second, reflexive journaling was maintained throughout data collection and analysis to record researcher insights, assumptions, and potential influences on interpretation. Third, member checking was conducted by sharing preliminary thematic summaries with five purposively selected participants to confirm the accuracy of representation and interpretation. Finally, an audit trail documented all steps from data collection through final analysis, ensuring transparency and replicability (Miller & Brewer, 2003; Maxwell, 2012).

Ethical considerations were carefully observed. Informed consent was obtained from all participants before conducting interviews. Participants were assured of anonymity and confidentiality, and data were securely stored to maintain privacy and data integrity.

General information of respondents

Out of the total 40 respondents, the majority interviewed were from the LAPA including

experts, coordinators, executive members were altogether 25, whereas local government officials and administrative assistants were 12 and 3 respectively. The information from respondents was also verified by experts, including the NCCSP employees and Ministry of Forest and Environment (MoFE) representatives.

Similarly, the working experiences of the respondents were varied working in the climate change adaptation projects. Out of the 40 respondents, the dominated group has 4-6 years of 13 respondents, followed by 10 respondents with over 6 years, 8 with 2-4 years, and 9 with less than one year of experience.

Findings

This section presents the findings of the study, focusing on the barriers encountered during the implementation of the Local Adaptation Plans of Action (LAPA) in selected districts of Nepal. The discussion is structured around key themes such as institutional, financial, legislative and regulatory, socio-cultural, attitudinal, and political barriers and is interpreted using Moser and Ekstrom's (2010) diagnostic framework.

Implementation modality of the LAPA

Implementation of the LAPA activities focus on thematic areas such as natural resource management, climate-friendly infrastructure, and watershed management. The LAPA framework emphasizes three guiding principles: enhancing climate resilience, making infrastructure resilient, and promoting adaptation and disaster risk reduction practices through community participation.

Barriers encountered in the LAPA implementation

Barriers encountered during the LAPA implementation were categorized into institutional, financial, legislative, regulatory, and socio-cultural barriers. Institutional barriers included lack of capacity among executive committee members, absence of specialized focal persons, high staff turnover, and delays due to seasonal and logistical challenges. Coordination issues between stakeholders, gender and social inclusion gaps, and bureaucratic delays further hindered effective implementation.

Institutional barriers

Institutional barriers emerged as the most frequently reported and structurally pervasive challenge across all study sites. These included a lack of dedicated climate adaptation focal persons, frequent staff turnover, poor documentation and knowledge transfer, and limited technical capacity at the municipal level. According to Moser and Ekstrom (2010), such constraints are characteristic of the "managing" phase of the adaptation process, where institutional inertia and weak leadership hinder transition from planning to implementation.

The research found that the LAPA executive committees often lacked technical expertise and continuity. The absence of institutional memory due to rapid staff changes meant that adaptation plans were inconsistently implemented or delayed. These findings align with Dhungana et al. (2017), who noted similar institutional discontinuities in local adaptation processes in Nepal. Additionally, coordination gaps between national and local authorities led to inconsistent support, duplications in planning efforts, and unclear lines of accountability, a phenomena also described in the context of other developing countries (Eisenack et al., 2014).

Financial barriers

Financial constraints were widely acknowledged by stakeholders, not only in terms of funding volume but also in terms of procedural clarity and sequencing. Respondents reported that the LAPA budgets were allocated without comprehensive planning, resulting in mismatches between financial flows and implementation priorities. As Moser and Ekstrom (2010) suggest, adaptation efforts often fail when there is a threshold of intent but insufficient resources to operationalize planned interventions.

Budget allocation mechanisms remained unclear, especially regarding what constituted management versus programmatic expenses. Several interviewees noted that budget ceilings were often rigid and failed to accommodate local infrastructure needs, echoing Regmi and Bhandari's (2013) observation that national budgeting processes do not sufficiently reflect bottom-up planning. Furthermore, delays in disbursement of funds affected project sequencing, reducing both efficiency and stakeholder confidence in adaptation planning.

Legislative and regulatory barriers

The absence of localized climate adaptation legislation or operational guidelines tailored for the LAPA was a significant constraint. While the Climate Change Policy (2019) offers strategic direction, respondents noted the lack of district-level by-laws or implementation directives. This regulatory vacuum hampered the institutionalization of the LAPA within municipal planning frameworks.

This finding reflects the "authorization" and "legal feasibility" bottlenecks identified by Moser and Ekstrom (2010) during the planning and managing phases. The gap between national frameworks and local legal instruments is not unique to Nepal; similar difficulties have been reported in decentralized adaptation settings in sub-Saharan Africa (Antwi-Agyei et al., 2015). In addition, traditional and indigenous practices were rarely integrated into planning regulations, despite their potential relevance for locally appropriate adaptation.

Socio-cultural barriers

Social norms, gender roles, and caste hierarchies were frequently mentioned as underlying factors that constrained inclusive adaptation planning. Despite the mandatory provision for 33% female representation in executive committees, many respondents indicated that women and marginalized groups remained largely symbolic participants in decision-making. This dynamic reflects both normative and behavioral barriers, which are deeply rooted in Nepal's socio-political structure.

Jones and Boyd (2011) argue that such social barriers, manifesting as limited participation, reduced voice, and institutional exclusion, can critically undermine the legitimacy of adaptation and its outcomes. The current findings reinforce that view, particularly in remote districts where literacy gaps and traditional power structures further impede inclusive engagement. Notably, reluctance to adopt indigenous crops or water practices was also linked to socio-cultural preferences shaped by modernization narratives promoted through donor-led interventions.

Attitudinal and political barriers

Attitudinal barriers were particularly evident in the form of apathy among local bureaucrats

and elected officials, some of whom viewed climate adaptation as a peripheral rather than core development agenda. This perception influenced resource allocation decisions and undermined political ownership of adaptation interventions. The absence of dedicated climate adaptation departments at the municipal level further diluted administrative responsibility and interest.

Political barriers were also present in the form of elite capture, wherein politically connected individuals influenced adaptation funds and project decisions. As observed by Maharjan (2019), adaptation priorities often lost ground to more visible infrastructure projects, especially in pre-election contexts. These observations align with the "threshold of intent" and "stakeholder commitment" barriers in Moser and Ekstrom's (2010) framework, where weak political will impedes adaptive transitions.

Synthesis and interactions between barriers

Notably, the study revealed that these barriers do not operate in isolation. Rather, they are interrelated and mutually reinforcing. For instance, weak institutional capacity often leads to inefficient financial management, while regulatory ambiguity amplifies attitudinal apathy by making accountability less clear and diffuse. Political interference further exacerbates institutional and financial barriers by distorting priorities.

Such interactions support Eisenack et al.'s (2014) argument that adaptation barriers should be understood as "systemic" rather than discrete. The present study contributes to this line of thinking by demonstrating how institutional fragmentation, fiscal ambiguity, and social exclusion collectively produce an environment in which adaptation plans like the LAPA are neither wholly owned nor sustainably implemented.

These findings suggest that the LAPA framework provides a structured entry point for community-level adaptation, its implementation is undermined by a combination of systemic and localized barriers. Addressing these challenges requires an integrated approach that goes beyond technical interventions to include institutional reform, political engagement, and regulatory innovation.

Discussion

The study aimed to investigate the barriers that hinder the effective implementation of the LAPA in Nepal, drawing on stakeholder perspectives and structured through the diagnostic framework of Moser and Ekstrom (2010). The findings reveal that these barriers are not isolated phenomena but interrelated, dynamic, and embedded within institutional, regulatory, socio-cultural, political, and behavioral systems. This section discusses how the empirical insights extend existing literature, confirm prior observations, and generate new understanding of climate adaptation governance in developing country contexts.

Consistent with earlier studies (Regmi & Bhandari, 2013; Dhungana et al., 2017), this research confirms that institutional barriers such as staff turnover, lack of climate focal units, and fragmented mandates that remain central challenges to adaptation implementation in Nepal. However, by applying Moser and Ekstrom's (2010) framework, this study further demonstrates that these institutional gaps are not merely operational issues but represent deeper deficiencies in adaptive capacity and system-level governance. Specifically, institutional inertia within the "managing" phase of the adaptation cycle obstructs the translation of plans into practical on-the-ground actions.

Similarly, financial constraints are well-documented in climate adaptation literature (Biesbroek et al., 2013; Antwi-Agyei et al., 2015). This study contributes a more precise explanation of how fiscal ambiguity, particularly the lack of alignment between budget cycles and project readiness, undermines the execution of local adaptation priorities. This echoes Moser and Ekstrom's (2010) notion of the "threshold of intent," whereby adaptation is deprioritized when administrative and financial systems are misaligned.

A more nuanced contribution of this study lies in its exploration of socio-cultural and attitudinal barriers. As noted by Jones and Boyd (2011), structural social exclusion based on gender, caste, and ethnicity can significantly distort adaptation outcomes. In the context of Nepal, this research found that while formal provisions for inclusion exist, informal power dynamics often limit meaningful participation of marginalized groups in the LAPA planning and execution. Moreover, the study identifies a perception gap: local officials often perceive adaptation as an external, donor-driven agenda, which reduces internal motivation and accountability.

Political barriers particularly elite capture and project politicization—also surfaced as key obstacles. These findings reinforce Maharjan's (2019) observations that visible infrastructure projects are often prioritized over less tangible adaptation measures, especially during pre-election periods. Political disinterest, when coupled with regulatory ambiguity, weakens the implementation environment and erodes local ownership. These patterns affirm the systemic nature of adaptation barriers described by Eisenack et al. (2014), in which structural, cognitive, and procedural challenges interact across governance levels.

The study finds that these barriers are not discrete but mutually reinforcing. Institutional weakness undermines financial accountability; weak regulatory frameworks permit political interference; socio-cultural exclusion erodes the legitimacy of participatory processes. Such interlinkages demonstrate that adaptation planning cannot succeed without addressing the whole ecosystem of implementation constraints.

Conclusion

This study examined the barriers that constrain the implementation of the LAPA in Nepal, drawing on stakeholder perspectives and interpreting findings through Moser and Ekstrom's (2010) diagnostic framework. The research highlights that institutional fragmentation, financial ambiguity, weak regulatory mandates, socio-cultural exclusion, attitudinal indifference, and political interference collectively undermine the goals of decentralized climate adaptation.

The study contributes to the literature by illustrating how these barriers not only exist independently but also interact systemically across the adaptation process. For instance, weak institutional capacity exacerbates financial inefficiencies, while regulatory uncertainty facilitates elite capture and political misdirection. These insights emphasize that adaptation planning cannot be treated as a technical task alone but must be situated within a broader governance and social context.

From a policy perspective, several recommendations emerge. First, institutional reforms are needed to establish dedicated climate focal points at the municipal level with stable staffing and technical training. Second, budgeting procedures should be aligned with bottom-up planning to ensure flexible, timely, and accountable financial flows. Third, legal instruments

at the subnational level must be clarified to enable the LAPA institutionalization within municipal governance systems. Fourth, efforts to improve inclusivity should extend beyond quotas and focus on capacity-building and leadership development among marginalized groups.

Lastly, fostering political commitment through sustained advocacy and embedding climate adaptation within national development planning processes can help overcome attitudinal and political barriers. Strengthening vertical coordination between federal, provincial, and local governments is also essential to ensuring that adaptation planning is both participatory and effective.

While the study was limited by geographic scope and the availability of respondents during the COVID-19 pandemic, the findings offer valuable insights for other least developed and climate-vulnerable countries facing similar governance and implementation challenges. Future research may expand on this work by applying mixed-methods approaches across diverse ecological and administrative regions in Nepal, or by conducting longitudinal assessments of the post-LAPA revisions.

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