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# Climate Governance and Institutional Capacity: Lessons from Local Government Adaptation Strategies

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**ABSTRACT**

Climate adaptation has become a critical governance challenge for Indonesia, a highly vulnerable archipelagic country exposed to flooding, coastal inundation, drought, extreme rainfall, land subsidence, and other climate-related risks. While national policy frameworks increasingly recognize the importance of climate-resilient development, the effectiveness of adaptation dependecentralized the institutional capacity of local governments to translate policy commitments into sustained governance practices. This article examines climate governance and institutional capacity in Indonesian local government adaptation strategies. Using a qualitative policy analysis approach, the study analyzes policy documents, planning frameworks, and institutional arrangements related to local climate adaptation. The analysis is guided by five dimensions of institutional capacity: regulative, administrative, fiscal, coordinative, and participatory capacity. The findings show that climate adaptation has increasingly entered local development discourse, but its institutionalization remains uneven. Adaptation is often recognized in planning documents, yet implementation is constrained by fragmented bureaucratic mandates, limited fiscal resources, uneven technical capacity, weak integration of climate-risk data, and inconsistent community participation. The article argues that the main challenge of local adaptation in Indonesia is not merely the absence of climate policies, but the gap between policy recognition and institutional implementation. Strengthening local climate governance therefore requires moving beyond project-based adaptation toward adaptive institutional capacity embedded in planning, budgeting, coordination, and participatory governance systems. The article contributes to climate governance literature by offering an institutional capacity lens for understanding local adaptation in decentralized governance settings.



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## A. INTRODUCTION

The rapid advancement of digital technologies has fundamentally transformed the way governments deliver public services and interact with citizens. Across the globe, governments are increasingly adopting digital platforms, artificial intelligence, big data analytics, cloud computing, and integrated information systems to improve administrative efficiency, service accessibility, transparency, and accountability (Greenstein et al., 2013; Sneller et al., 2017). This transformation has strengthened the emergence of smart governance, a governance paradigm that emphasizes the strategic use of digital technologies to develop responsive, citizen-centered, data-driven, and collaborative public administration systems. Smart governance has become an essential component of digital government initiatives as public institutions seek to enhance service quality, improve decision-making processes, and create greater public value in an increasingly digital society (Greenstein et al., 2013; Meyerhoff Nielsen & Jordanoski, 2023).

In Indonesia, digital transformation has become a national strategic priority aimed at supporting bureaucratic reform and improving public service performance. Various government initiatives, including the Electronic-Based Government System (SPBE), digital identity programs, integrated public service applications, and smart city development projects, have been implemented to modernize public administration (Muslim et al., 2024). These initiatives are expected to streamline administrative procedures, reduce bureaucratic inefficiencies, increase service accessibility, and strengthen transparency and accountability within government institutions. As citizens increasingly expect faster, more reliable, and more accessible public services, digital transformation has become a critical instrument for enhancing government responsiveness and effectiveness in the digital era.

Despite substantial investments and policy commitments, the implementation of digital transformation in Indonesian public services continues to face considerable challenges. Many government agencies experience difficulties in integrating information systems, standardizing digital procedures, and ensuring effective coordination across institutions (Oktavianti et al., 2024; Silitonga, 2023). Consequently, digital transformation efforts often remain fragmented, resulting in duplicated systems, inconsistent service standards, and limited interoperability among government entities. Furthermore, disparities in digital infrastructure and technological readiness between regions contribute to unequal levels of service quality, particularly between urban and rural areas. These conditions suggest that technological adoption alone is insufficient to achieve successful digital transformation without adequate institutional support and organizational readiness.

Among the factors influencing digital transformation, institutional barriers represent one of the most critical challenges within the public sector. Institutional barriers refer to structural, organizational, regulatory, cultural, and administrative constraints that hinder the effective implementation of technological innovations. Previous studies indicate that rigid bureaucratic structures, resistance to organizational change, fragmented governance arrangements, insufficient leadership support, regulatory inconsistencies, and limited digital competencies among public officials frequently impede digital transformation initiatives (Agus Suharsono, 2023; Cooper & Robson, 2006). Such barriers weaken the ability of government institutions to leverage digital technologies effectively and limit the achievement of desired governance outcomes. Therefore, understanding the influence of institutional barriers has become increasingly important in the context of public sector modernization.

At the same time, smart governance has attracted growing attention in public administration literature as governments seek to maximize the benefits of digital transformation. Smart governance extends beyond the digitization of public services by emphasizing technology-enabled decision-making, transparency, citizen participation, inter-organizational collaboration, and public value creation. However, although prior studies have examined digital government, e-government adoption, smart city development, and public sector innovation, several research gaps remain. First, many studies focus predominantly on

technological determinants while paying limited attention to institutional barriers. Second, digital transformation and smart governance are often investigated as separate constructs rather than as interconnected processes. Third, empirical evidence from developing countries, particularly Indonesia, remains limited despite the distinctive institutional challenges faced by emerging economies. Furthermore, studies incorporating citizens' perceptions as an evaluative perspective remain insufficient, even though public trust and acceptance are essential indicators of successful governance transformation.

To address these gaps, this study investigates the influence of institutional barriers on digital transformation and examines the implications of digital transformation for smart governance in Indonesia. Unlike previous studies that primarily emphasize technological readiness or organizational innovation, this research highlights the institutional dimension of digital transformation and explores how institutional constraints shape governance outcomes through the transformation process. The novelty of this study lies in the integration of institutional barriers, digital transformation, and smart governance within a single analytical framework in the context of Indonesian public services. Moreover, by incorporating citizens' perceptions as the basis of analysis, this study offers a citizen-centered perspective on the effectiveness of digital government initiatives. Accordingly, this study aims to analyze the effect of institutional barriers on digital transformation, examine the impact of digital transformation on smart governance, and investigate the mediating role of digital transformation in the relationship between institutional barriers and smart governance. The findings are expected to contribute to the advancement of digital governance and public administration literature while providing practical recommendations for strengthening institutional capacity and accelerating digital transformation initiatives in Indonesia.

## B. LITERATURE REVIEW

### Climate Governance and Local Adaptation

Climate governance refers to the institutional arrangements, policy processes, and actor networks through which societies respond to the causes and consequences of climate change (O'Riordan & Jordan, 2019). It is not limited to formal government regulation, but also involves coordination among state institutions, local governments, communities, private actors, civil society organizations, knowledge institutions, and international development partners (Brinkerhoff, 1999; Waddell & Brown, 1997). In the context of adaptation, climate governance becomes particularly complex because climate risks are uncertain, unevenly distributed, and deeply embedded in existing development problems such as poverty, spatial inequality, infrastructure deficits, and environmental degradation.

Adaptation differs from mitigation in its territorial and institutional character. While mitigation is often measured through emission reduction targets, adaptation is more context-specific and depends on the ability of institutions to reduce vulnerability in particular places. Local adaptation may include flood control, coastal protection, water management, climate-resilient agriculture, public health preparedness, disaster risk reduction, and social protection for vulnerable groups. These interventions require not only technical solutions but also institutional coordination, financing, local knowledge, public participation, and long-term planning.

In Indonesia, climate adaptation is strongly connected to local governance because climate impacts are experienced directly in cities, districts, villages, coastal areas, agricultural zones, and disaster-prone settlements. Local governments are responsible for many policy sectors that are central to adaptation, including spatial planning, drainage infrastructure, waste management, water supply, local roads, health services, disaster management, agriculture, fisheries, and social assistance. Therefore, the capacity of local governments to integrate climate risks into development planning becomes a decisive factor in determining the effectiveness of adaptation strategies.

However, local adaptation is rarely implemented within a single policy domain. Flood management, for example, may involve public works agencies, disaster management offices, environmental agencies, spatial planning authorities, housing agencies, and community organizations. Coastal adaptation may involve marine affairs institutions, public works agencies, local planning boards, environmental offices, and affected communities. Agricultural adaptation requires coordination among agricultural extension services, water management agencies, farmers' groups, and local development planners. This cross-sectoral nature makes climate adaptation a governance challenge rather than merely a technical intervention.

**Institutional Capacity in Climate Adaptation**

Institutional capacity can be understood as the ability of public institutions to formulate, coordinate, finance, implement, monitor, and sustain policy interventions (Milio, 2007). In the field of climate adaptation, institutional capacity is not limited to administrative competence; it also includes political leadership, regulatory authority, fiscal resources, technical knowledge, coordination mechanisms, and participatory processes (Eakin et al., 2011). Adaptation requires institutions that can manage uncertainty, learn from changing risk conditions, and coordinate across fragmented policy sectors.

For local governments, institutional capacity is central because adaptation involves long-term risk reduction rather than short-term response alone. A local government may have climate-related programs, but these programs will not necessarily lead to effective adaptation if they are not supported by adequate institutional arrangements. For example, flood control infrastructure may reduce risk temporarily, but without spatial planning enforcement, maintenance budgets, watershed management, and community engagement, flood vulnerability may persist. Similarly, climate-resilient agriculture programs may fail if they are not connected to water governance, agricultural extension, local financing, and market access.

Regulative capacity refers to the ability of local governments to translate climate adaptation priorities into local regulations, development plans, spatial plans, and operational policies (Keskitalo et al., 2016). Administrative capacity refers to the presence of competent personnel, organizational procedures, technical units, and implementation mechanisms (Addison, 2009). Fiscal capacity concerns the ability to allocate budgets, access external funding, and sustain adaptation programs beyond short-term projects. Coordinative capacity refers to the ability to align multiple agencies, policy sectors, and levels of government. Participatory capacity refers to the ability to involve communities, vulnerable groups, civil society, academia, and private actors in adaptation decision-making.

These dimensions are analytically useful because they help explain why some local governments are better able to implement adaptation strategies than others. A local government may have strong regulative capacity but weak fiscal capacity, resulting in ambitious plans that cannot be implemented. Another local government may have access to funding but weak coordinative capacity, resulting in fragmented projects that do not produce systemic resilience. Similarly, a government may have technical programs but limited participatory capacity, leading to interventions that fail to address the real needs of vulnerable communities. Therefore, institutional capacity should be analyzed as a multidimensional condition rather than as a single administrative variable.

**Multi-Level Governance and Local Government Capacity**

Climate adaptation operates within a multi-level governance system involving national, provincial, district, municipal, and village-level institutions (Muhammad et al., 2025). Multi-level governance is important because climate risks cross administrative boundaries (Gupta, 2007). Flooding may be linked to upstream land-use change, urban drainage, river management, and coastal dynamics (Cea & Costabile, 2022). Drought may involve watershed governance, agricultural policy, irrigation systems, and water allocation. Coastal vulnerability may involve local settlement patterns, national infrastructure policy, marine ecosystems, and community livelihoods. Therefore, local governments cannot manage climate risks independently from broader governance structures.

Multi-level governance is especially relevant because authority over climate-related sectors is distributed across different levels of government. National government plays a major role in setting policy direction, climate commitments, sectoral regulations, and funding mechanisms. Provincial governments coordinate regional planning and cross-district issues. District and municipal governments implement many adaptation-related programs directly. Village governments and community institutions also play important roles in local risk management and community resilience. The effectiveness of adaptation therefore depends on how these levels interact.

They are expected to act as frontline implementers of adaptation, but they may not control all the resources, regulations, or infrastructure systems needed to address climate risks. For example, a city government may need to manage urban flooding, but flood risk may be influenced by regional watershed conditions outside its administrative boundary. A coastal district may need to protect vulnerable communities, but coastal infrastructure, marine zoning, or land-use authority may involve provincial or national institutions. These conditions show that adaptation requires vertical coordination as much as local initiative.

Adaptation strategies may be weakened when national, provincial, and local plans are not aligned. If climate priorities are not reflected in local medium-term development plans, spatial plans, and annual budgets, adaptation may remain peripheral. Conversely, when national climate policy is translated into local planning instruments, adaptation becomes more likely to influence development decisions. Policy coherence is therefore a key condition for effective climate governance. In addition to vertical coordination, horizontal coordination among local agencies is equally important. Climate adaptation cannot be assigned to environmental offices alone. It requires the involvement of development planning boards, disaster management agencies, public works offices, health offices, agricultural agencies, social affairs offices, and spatial planning institutions. Without horizontal coordination, adaptation risks becoming fragmented into isolated sectoral programs. Strong coordinative capacity enables local governments to align policy objectives, share data, avoid duplication, and develop integrated adaptation strategies.

**Community Participation and Local Knowledge**

Communities play a central role because they experience climate risks directly and possess local knowledge about environmental change, livelihood vulnerability, and coping strategies (Dolan & Walker, 2006). In Indonesia, many communities have long adapted to floods, droughts, tidal inundation, landslides, and seasonal uncertainty through local practices, social networks, and informal institutions. However, these forms of knowledge are often not fully integrated into formal planning processes.

Local governments need mechanisms to involve affected communities in risk identification, program design, implementation, and evaluation (Serrao-Neumann et al., 2015). Participation is particularly important for vulnerable groups, including low-income households, informal settlement residents, small-scale farmers, fishers, women, elderly people, people with disabilities, and communities living in high-risk areas (Kamara et al., 2026). Without meaningful participation, adaptation policies may fail to address differentiated vulnerabilities and may even reproduce existing inequalities (Mikulewicz, 2018; Parsons et al., 2025). Climate adaptation often involves difficult policy choices, such as relocation, land-use restrictions, infrastructure prioritization, water allocation, or changes in livelihood practices (Froese & Schilling, 2019). These decisions require public trust and social acceptance. When communities are excluded, adaptation measures may face resistance or fail to reflect local needs. When communities are included, adaptation is more likely to be socially grounded and institutionally sustainable.

However, participation should not be understood merely as consultation. Many local policy processes include formal public meetings, but these do not always influence decision-making. Meaningful participation requires access to information, recognition of local knowledge, representation of vulnerable groups, and feedback mechanisms that connect community input to policy decisions. In this sense,

participatory capacity is not simply about inviting citizens to meetings, but about creating institutional channels through which communities can shape adaptation priorities.

### Conceptual Framework

Based on the literature above, this article develops a conceptual framework that links climate governance, institutional capacity, and local adaptation effectiveness. The framework begins from the assumption that climate risks create pressure on local governments to formulate adaptation strategies. However, the effectiveness of these strategies depends on institutional capacity. Local governments with stronger institutional capacity are more likely to integrate adaptation into development planning, coordinate across sectors, allocate resources, engage communities, and sustain policy learning.

The framework identifies five dimensions of institutional capacity: regulative, administrative, fiscal, coordinative, and participatory capacity. These dimensions mediate the relationship between climate risks and adaptation outcomes. Regulative capacity determines whether climate adaptation is formally embedded in local policies and planning instruments. Administrative capacity determines whether local bureaucracies can implement adaptation programs effectively. Fiscal capacity determines whether adaptation can be financed sustainably. Coordinative capacity determines whether agencies and governance levels can work together. Participatory capacity determines whether adaptation reflects community needs and local knowledge.

The central proposition of this article is that local adaptation effectiveness is not determined merely by the presence of climate policies, but by the institutional capacity to translate those policies into sustained governance practice. In Indonesia, where climate risks are diverse and local government capacity is uneven, this proposition is particularly important. The article therefore uses institutional capacity as an analytical lens to examine how local governments formulate and implement climate adaptation strategies, and what lessons can be drawn for strengthening climate governance in decentralized settings.

## C. RESEARCH METHOD

### Research Design

This study adopts a qualitative policy analysis approach to examine how institutional capacity shapes local government adaptation strategies in Indonesia. A qualitative design is appropriate because the study seeks to understand governance processes, institutional arrangements, coordination mechanisms, and implementation challenges rather than measuring adaptation outcomes statistically. The analysis focuses on how local governments translate climate adaptation priorities into policy instruments, planning processes, and practical interventions. The study is designed as a document-based policy analysis supported by selected local government cases. This approach enables the article to assess the relationship between climate governance and institutional capacity by examining policy documents, planning frameworks, regulatory instruments, and institutional practices related to climate adaptation at the local level.

### Case Selection

Indonesia is selected as the country context because it combines high climate vulnerability, decentralized governance, and significant variation in local government capacity. Under decentralization, district and municipal governments play an important role in development planning, infrastructure provision, disaster risk reduction, environmental management, and public service delivery. These functions make local governments central actors in climate adaptation.

The study focuses on selected local governments that represent different forms of climate risk, particularly urban flooding, coastal vulnerability, land subsidence, extreme rainfall, and water-related hazards. The cases are selected purposively based on three criteria: first, exposure to significant climate-related risks; second, the existence of local policy or planning instruments relevant to adaptation; and third,

the availability of official documents and institutional information. This purposive strategy allows the study to compare institutional responses across local contexts without claiming statistical representativeness.

**Data Sources**

The study relies primarily on secondary data and official policy documents. The main sources include national climate policy documents, local development planning documents, spatial planning documents, disaster risk reduction documents, local government reports, and institutional publications from relevant agencies. Documents from ministries, local development planning agencies, environmental offices, disaster management agencies, and international development organizations are also used where relevant. The use of policy documents is appropriate because climate adaptation is formally embedded in planning, budgeting, regulation, and inter-agency coordination. By examining these documents, the study identifies how adaptation is framed, prioritized, institutionalized, and implemented within local governance systems.

**Analytical Framework**

The analysis is guided by an institutional capacity framework consisting of five dimensions: regulative capacity, administrative capacity, fiscal capacity, coordinative capacity, and participatory capacity. Regulative capacity refers to the ability of local governments to translate climate adaptation into local regulations, planning documents, and policy instruments. Administrative capacity refers to bureaucratic competence, organizational arrangements, and technical implementation mechanisms. Fiscal capacity concerns the availability and sustainability of financial resources for adaptation. Coordinative capacity refers to the ability to align agencies, sectors, and levels of government. Participatory capacity concerns the involvement of communities, civil society, academia, and other local actors in adaptation processes. These five dimensions are used as analytical categories to examine how local governments formulate and implement adaptation strategies. The framework helps identify whether adaptation is merely acknowledged in policy documents or has been institutionalized into governance practices.

**Data Analysis**

Data are analyzed through qualitative content analysis. The analysis involves three stages. First, relevant documents are reviewed to identify climate-related risks, adaptation priorities, and institutional arrangements. Second, the documents are coded according to the five dimensions of institutional capacity. Third, patterns are compared across selected local cases to identify common challenges, institutional strengths, and policy lessons. The analysis does not aim to rank local governments, but to explain how institutional conditions enable or constrain adaptation strategies. Particular attention is given to the gap between policy planning and implementation, especially in relation to coordination, financing, technical capacity, and community participation.

**Validity and Limitations**

To strengthen validity, the study uses triangulation across different types of documents, including national policies, local planning documents, sectoral reports, and institutional publications. This allows the analysis to compare formal policy commitments with implementation-oriented information. The study has several limitations. First, because it relies primarily on secondary data and official documents, it may not capture all informal political dynamics and everyday bureaucratic practices. Second, the selected cases are not intended to represent all local governments in Indonesia. Third, the analysis focuses on institutional capacity rather than direct measurement of adaptation outcomes. Nevertheless, the approach provides a useful basis for understanding how local governance structures shape the effectiveness of climate adaptation strategies in a decentralized country.

## D. RESULTS AND DISCUSSION

## Overview of Local Climate Adaptation Governance in Indonesia

The document analysis indicates that climate adaptation in Indonesia has increasingly been recognized as part of national and local development governance. National policy frameworks emphasize the importance of climate-resilient development, particularly in sectors such as water, agriculture, coastal and marine areas, health, and disaster risk reduction. This national policy direction provides an important foundation for local governments to integrate climate risks into development planning.

However, the findings suggest that the institutionalization of climate adaptation at the local level remains uneven. Local governments generally recognize climate-related risks, especially when those risks are closely associated with recurring disasters such as floods, tidal inundation, drought, landslides, and extreme rainfall. Yet the extent to which these risks are translated into systematic planning, budgeting, coordination, and community-based implementation varies across local contexts.

Table 1. Summary of Institutional Capacity Findings in Local Climate Adaptation Governance

| Institutional Capacity Dimension | Main Finding | Governance Implication |
|---|---|---|
| Regulative capacity | Adaptation is increasingly recognized in national and local policy documents, but integration across planning instruments remains uneven. | Local adaptation must be mainstreamed into RPJMD, RKPD, RTRW, KLHS, and sectoral plans. |
| Administrative capacity | Technical and bureaucratic capacity varies across local governments. | Local governments need stronger climate-risk data systems, technical staff, and monitoring mechanisms. |
| Fiscal capacity | Financing remains a major constraint, especially for long-term and preventive adaptation. | Adaptation should be embedded in regular local budgeting rather than dependent on short-term projects. |
| Coordinative capacity | Adaptation is fragmented across agencies and levels of government. | Stronger horizontal and vertical coordination mechanisms are needed. |
| Participatory capacity | Community participation exists but is often uneven and consultative. | Vulnerable communities need to be involved in risk assessment, planning, and evaluation. |

In many cases, adaptation is still positioned between environmental management and disaster risk reduction. This creates an institutional ambiguity in which climate adaptation is formally acknowledged but not always treated as a core development agenda. As a result, adaptation policies often appear in planning documents, but their implementation depends heavily on local leadership, fiscal capacity, technical expertise, inter-agency coordination, and the availability of climate-risk data.

## Regulative Capacity: Adaptation Recognition in Local Planning

The first finding concerns regulative capacity. The analysis shows that Indonesia has developed a relatively clear national policy direction for climate adaptation. Climate resilience has been incorporated into national development planning, and local governments are encouraged to align their development priorities with climate-risk reduction. This indicates that the regulatory and policy environment for adaptation has become stronger over time.

At the local level, several governments have begun to incorporate climate-related concerns into development planning, spatial planning, resilience strategies, and disaster risk reduction documents. Cities exposed to flooding, coastal risks, and land subsidence tend to show stronger recognition of climate adaptation because the impacts are visible and politically urgent. In such cases, climate risks are often framed

through urban flooding, tidal inundation, drainage management, coastal protection, and disaster preparedness.

Nevertheless, the findings also show that regulative capacity does not automatically produce effective implementation. The existence of planning documents does not necessarily mean that adaptation has been fully mainstreamed into local governance. In some cases, adaptation remains embedded in sectoral documents rather than integrated across planning, budgeting, spatial management, and public service delivery. This suggests that local governments may have formal policy recognition but still lack the institutional mechanisms needed to translate adaptation into sustained governance practice.

**Administrative Capacity: From Planning Documents to Implementation Mechanisms**

The second finding relates to administrative capacity. Local adaptation requires competent bureaucratic institutions, technical staff, risk assessment tools, implementation procedures, and monitoring systems. The analysis indicates that administrative capacity varies significantly across local governments. Larger urban governments or cities with prior involvement in resilience networks tend to have more developed planning instruments and stronger exposure to technical assistance. In contrast, smaller or fiscally constrained local governments may have limited technical capacity to interpret climate data, conduct vulnerability assessments, and design adaptation programs.

Administrative capacity is particularly important because climate adaptation requires more than routine program implementation. Local governments must identify climate risks, prioritize vulnerable areas, coordinate technical agencies, design infrastructure and non-infrastructure interventions, and monitor long-term outcomes. These tasks require specialized knowledge that may not be evenly available across local bureaucracies.

The findings suggest that one of the main administrative challenges is the limited integration between climate data and local planning practice. Climate-risk information may exist at the national or sectoral level, but local governments often face difficulties translating such information into operational decisions. This weakens the ability of local institutions to move from general climate awareness to risk-informed development planning.

**Fiscal Capacity: Financing as a Constraint on Adaptation**

The third finding concerns fiscal capacity. Climate adaptation often requires substantial and sustained financing, especially for flood control, drainage improvement, coastal protection, water management, resilient infrastructure, public health preparedness, and community-based adaptation. The findings indicate that financing remains one of the most significant constraints for local adaptation in Indonesia.

Although climate resilience has been recognized in national development policy, local governments often face competing budget priorities. Adaptation programs must compete with infrastructure development, poverty reduction, education, health, administrative spending, and other politically visible programs. Because the benefits of adaptation are often preventive and long-term, they may receive lower priority in annual budgeting compared to short-term development projects.

The analysis also suggests that local governments with stronger fiscal capacity or access to external support are better positioned to implement adaptation measures. External support may come from national government programs, donor-funded initiatives, development partners, private-sector cooperation, or city networks. However, reliance on project-based or external financing may create sustainability problems if adaptation is not embedded in regular local budgeting systems.

This finding highlights the difference between project-based adaptation and institutionalized adaptation. Project-based adaptation may produce visible outputs, but institutionalized adaptation requires

regular budget allocation, long-term maintenance, and integration into local planning cycles. Without fiscal institutionalization, adaptation programs may remain fragmented and temporary.

**Coordinative Capacity: Fragmentation Across Agencies and Levels of Government**

The fourth finding relates to coordinative capacity. Climate adaptation is inherently cross-sectoral, yet local bureaucracies are often organized around sectoral mandates. The analysis shows that adaptation involves multiple agencies, including local development planning boards, environmental offices, disaster management agencies, public works offices, health offices, agricultural agencies, spatial planning institutions, and social affairs offices.

The findings indicate that coordination remains a recurring challenge. Flood adaptation, for example, cannot be managed only by a disaster management agency or public works office. It requires coordination with spatial planning, settlement management, watershed governance, waste management, drainage systems, and community participation. Similarly, coastal adaptation involves environmental management, marine and fisheries policy, infrastructure planning, settlement regulation, and livelihood protection.

In Indonesia's decentralized system, coordination challenges are not only horizontal but also vertical. Local governments are expected to implement adaptation strategies, but some climate-related risks require coordination with provincial and national authorities. River basin management, coastal protection, major infrastructure, spatial planning, and climate financing often exceed the authority of a single municipality or district. This creates a governance problem in which local governments carry significant adaptation responsibilities but do not always control all necessary resources and policy instruments. The findings suggest that stronger coordinative capacity is associated with clearer institutional roles, regular inter-agency forums, shared data systems, and stronger alignment between local development plans and national climate-resilience priorities. Without these mechanisms, adaptation risks becoming fragmented across programs and agencies.

**Participatory Capacity: Community Involvement and Local Knowledge**

The fifth finding concerns participatory capacity. Climate risks are experienced differently by communities depending on location, income, occupation, gender, age, disability, and access to public services. Therefore, community participation is essential for identifying vulnerability and designing locally relevant adaptation strategies.

The analysis indicates that participatory approaches are increasingly recognized in local resilience and adaptation discourse. Some local adaptation initiatives involve communities, universities, civil society organizations, private actors, and development partners. This is particularly visible in cities that have participated in urban resilience or climate adaptation networks. In these cases, participation helps broaden the understanding of climate risks beyond technical infrastructure solutions.

However, participation is not always meaningful or sustained. In some cases, community involvement remains consultative rather than decision-making oriented. Local communities may be invited to planning forums, but their knowledge and priorities are not always reflected in budget allocation or program design. This creates a risk that adaptation policies become technocratic and insufficiently responsive to the lived experiences of vulnerable groups.

The findings suggest that participatory capacity is strongest when local governments create institutional channels that connect community knowledge with planning and implementation. This includes vulnerability mapping, community-based disaster risk reduction, participatory planning forums, local monitoring, and collaboration with universities and civil society organizations. Participation becomes especially important in high-risk areas such as coastal settlements, flood-prone neighborhoods, agricultural communities, and informal urban settlements.

## Discussion

The findings show that the central problem of local climate adaptation in Indonesia is no longer the absence of climate policy recognition. Climate risks have increasingly entered national and local policy discourse through development planning, disaster risk reduction, environmental management, and resilience-oriented programs (Choudhury & Haque, 2024). However, policy recognition does not automatically produce institutionalized adaptation. The more critical issue is whether climate adaptation is embedded in the routine functions of local government, including planning, budgeting, coordination, implementation, monitoring, and public accountability (Mees & Driessen, 2019).

Recognition refers to the formal acknowledgment of climate risks in policy documents, strategic plans, and government narratives. Institutionalization, by contrast, refers to the extent to which adaptation becomes part of the everyday operating system of local governance. A local government may recognize flood risk, coastal vulnerability, drought, or extreme rainfall, but adaptation remains weak if such recognition is not translated into budget priorities, spatial regulation, infrastructure standards, cross-agency coordination, and community-based risk reduction (Birkmann et al., 2014).

In this sense, the findings challenge a document-centered understanding of climate governance. The presence of adaptation language in planning documents should not be interpreted as evidence of effective governance. Policy documents are important, but they often represent formal commitment rather than institutional capability. The real test of local climate governance lies in the ability of local institutions to convert policy commitments into durable administrative routines and collective action.

This argument is particularly relevant in Indonesia's decentralized system. Local governments are expected to respond to climate risks that are highly specific to their territories, yet they operate under uneven fiscal, technical, and bureaucratic conditions. Decentralization creates opportunities for locally relevant adaptation, but it also exposes the unevenness of institutional capacity across regions. Therefore, the success of adaptation depends not only on the existence of national policy frameworks, but also on the capacity of local institutions to internalize climate risk into the logic of local development.

### Institutional Fragmentation as a Core Governance Barrier

The findings indicate that institutional fragmentation remains one of the most significant barriers to local climate adaptation. Climate adaptation is inherently cross-sectoral, but local government institutions are commonly organized through sectoral mandates. Environmental offices, disaster management agencies, public works departments, planning agencies, health offices, agricultural agencies, social affairs offices, and spatial planning authorities often operate with different priorities, budgets, data systems, and performance indicators. This creates a structural mismatch between the nature of climate risk and the organization of local bureaucracy.

Climate risks do not follow administrative boundaries or sectoral divisions. Flooding may involve upstream land-use change, urban drainage, waste management, river governance, housing policy, and community behavior. Coastal vulnerability may involve land subsidence, settlement patterns, infrastructure, livelihood insecurity, ecosystem degradation, and spatial planning. Drought may involve agriculture, water governance, irrigation, food security, and social protection. Yet policy responses are frequently divided among agencies that do not always share data, budgets, or implementation targets.

This fragmentation weakens adaptation in at least three ways. First, it creates duplication, where different agencies implement overlapping programs without a shared strategic framework. Second, it creates policy gaps, where certain risks fall between institutional mandates and are therefore not addressed systematically. Third, it reduces accountability because no single institution is fully responsible for ensuring that adaptation outcomes are achieved. As a result, adaptation becomes dispersed across programs rather than coordinated as a coherent governance agenda.

The findings suggest that climate adaptation requires institutional orchestration rather than isolated sectoral intervention. Local development planning agencies can play a strategic role in this regard because they are positioned to align sectoral priorities, integrate climate risks into planning cycles, and connect adaptation with budget allocation. However, this coordinating role is often constrained when climate adaptation is still perceived as the responsibility of environmental or disaster management agencies alone. Such a narrow framing limits the transformative potential of adaptation.

A more effective model of local climate governance requires shifting from sectoral ownership to collective institutional responsibility. Adaptation should not be treated as the agenda of one office, but as a cross-cutting governance function that influences infrastructure, spatial planning, public health, livelihoods, social protection, and local economic development. Without this shift, adaptation will remain vulnerable to bureaucratic fragmentation and policy discontinuity.

## E. CONCLUSION

This article has examined climate governance and institutional capacity in the context of local government adaptation strategies in Indonesia. It argues that the effectiveness of climate adaptation at the local level cannot be understood merely from the existence of climate-related policies, planning documents, or adaptation programs. The more decisive issue is whether local governments have the institutional capacity to translate climate commitments into sustained governance practices. The findings show that climate adaptation has increasingly been recognized within Indonesia's national and local policy landscape. Climate risks such as flooding, coastal vulnerability, drought, extreme rainfall, land subsidence, and disaster-related disruption have entered public policy discourse and development planning. However, recognition alone is insufficient. The institutionalization of adaptation remains uneven because local governments vary in regulative, administrative, fiscal, coordinative, and participatory capacity.

The article demonstrates that the central challenge of local climate adaptation in Indonesia lies in the gap between policy recognition and institutional implementation. Adaptation is often acknowledged in planning documents, but it is not always fully embedded in budgeting systems, spatial planning, cross-sectoral coordination, monitoring mechanisms, and community-based governance. This gap reflects broader institutional constraints, including fragmented bureaucratic mandates, uneven technical capacity, limited fiscal space, weak climate-risk data utilization, and inconsistent participation of vulnerable communities. The discussion also shows that adaptation should not be treated as a sectoral environmental program or as a temporary project-based intervention. Climate adaptation is a cross-cutting governance agenda that must be integrated into the core functions of local government. Effective adaptation requires institutional arrangements that can connect development planning, disaster risk reduction, infrastructure provision, environmental management, public health, social protection, and community resilience.

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