Building Community Resilience through Adaptive Governance: An Institutional Approach in Gorontalo

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ABSTRACT

Purpose: This study aims to explore the role of adaptive governance in enhancing community resilience in Gorontalo, particularly focusing on the management of Lake Limboto. The research investigates how governance structures, community engagement, and institutional capacity contribute to building resilience against environmental and socio-economic challenges.

Subjects and Methods: The research employs a mixed-methods approach, combining qualitative interviews, surveys, and participatory observations. Key stakeholders, including local government officials, community leaders, and residents, were involved to assess the effectiveness of governance structures and community engagement in resilience-building efforts.

Results: Findings show that while adaptive governance has improved institutional capacity and social capital, significant challenges remain, including poor coordination among stakeholders, limited resources, and insufficient public participation. The community's awareness of flood risks was mixed, highlighting the need for targeted awareness campaigns. Institutional challenges, such as resource shortages and fragmented responses, hinder effective governance.

Conclusions: Strengthening collaboration among stakeholders, increasing resource mobilization, and enhancing public participation are critical for improving governance effectiveness. Additionally, ongoing efforts to bolster economic stability and environmental sustainability are essential for long-term community resilience and effective adaptation to future challenges.

INTRODUCTION

In recent years, communities around the world have faced numerous challenges, ranging from environmental disasters to social and economic crises. One of the most pressing issues in this regard is the ability of communities to adapt to these challenges and build resilience in the face of adversity. Resilience, in this context, refers to the capacity of a community to withstand, recover from, and ultimately thrive in the wake of disruptions. The ability to adapt and recover is influenced by a variety of factors, including the community's governance structures, the effectiveness of its institutions, and the strength of its social fabric (Carmen et al., 2022; Masud-All-Kamal & Monirul Hassan, 2018). In this regard, adaptive governance has emerged as a key approach for fostering resilience, particularly in areas vulnerable to climate change, natural disasters, and socio-economic shifts.

Adaptive governance, in essence, refers to a system of governance that is flexible, responsive, and capable of adjusting to changing conditions. According to Kaur et al. (2025), it emphasizes collaboration, learning, and the ability to adjust policies and strategies based on new information

or evolving circumstances. For communities to build resilience, adaptive governance needs to be embedded within local institutions, where decision-making processes are inclusive, transparent, and participatory. In this sense, institutions play a central role in enabling communities to cope with change and navigate uncertainties (Chauhan, 2024). The institutional approach, which focuses on the structures, rules, and practices that govern community interactions, is crucial for understanding how adaptive governance can be implemented effectively (DeCaro et al., 2017).

Gorontalo, a province located on the northern tip of Sulawesi Island in Indonesia, provides an interesting case study for examining the role of adaptive governance in community resilience. Fisher et al. (2017), this region is characterized by its unique geography, a mix of coastal and mountainous areas, and a population that relies heavily on agriculture and fisheries for their livelihoods. Gorontalo is particularly vulnerable to environmental risks such as floods, landslides, and climate-related events, which makes it an ideal setting for studying how communities adapt to and recover from such challenges. Yuan et al. (208) said that, the province has also been the site of significant social changes, with growing urbanization, demographic shifts, and increased demand for local resources putting pressure on traditional governance systems.

In response to these challenges, Gorontalo has been exploring ways to strengthen its governance framework, particularly through adaptive governance practices that emphasize community involvement, local knowledge, and flexible decision-making. This approach acknowledges that traditional, top-down models of governance may not be sufficient in the face of rapidly changing conditions. Instead, adaptive governance requires that communities themselves play a more active role in decision-making, recognizing their unique needs, priorities, and capacities (DeCaro et al., 2017; Dressel et al., 2020). By involving local actors, including community leaders, civil society organizations, and government agencies, adaptive governance can create a more inclusive and responsive governance system.

Building community resilience through adaptive governance involves fostering an environment where local institutions are able to respond to crises in a way that minimizes harm and facilitates recovery. This requires the development of strong institutional frameworks that can effectively coordinate responses to emergencies, while also promoting long-term sustainable development. Local governance systems must be able to integrate scientific knowledge with indigenous knowledge, balancing technical expertise with cultural and social norms. This fusion of knowledge is crucial for ensuring that governance strategies are relevant, effective, and acceptable to the local community.

The institutional approach to adaptive governance highlights the importance of the relationships between various actors within the governance system (Wang et al., 2018). In Gorontalo, the role of local institutions such as village councils, local government agencies, and traditional leaders has been pivotal in shaping the community's ability to respond to challenges. These institutions have the potential to build social capital by fostering trust, cooperation, and communication between different stakeholders. The involvement of local institutions in the decision-making process ensures that governance is grounded in the realities of the community, making it more likely that resilience-building efforts will be embraced and supported by the population.

At the heart of adaptive governance is the principle of learning. For communities to become more resilient, they must be able to learn from past experiences and incorporate those lessons into future actions. This continuous learning process is facilitated by institutions that encourage feedback, reflection, and the sharing of knowledge. In Gorontalo, mechanisms for monitoring and evaluating resilience-building initiatives have been established to track progress, identify gaps, and adjust strategies accordingly. This adaptive learning process not only improves the effectiveness of resilience-building efforts but also strengthens the governance system itself.

In the context of Gorontalo, community resilience is closely linked to the capacity of local institutions to manage natural resources sustainably. The province's economy is heavily dependent on agriculture, fisheries, and forestry, all of which are vulnerable to climate change. Adaptive governance in Gorontalo involves integrating climate change adaptation strategies into local development planning, while ensuring that the rights and needs of local communities are prioritized. The challenge lies in balancing environmental sustainability with the socio-economic

well-being of the population, ensuring that the benefits of development are equitably distributed (Hariram et al., 2023; Henderson & Loreau, 2023).

The role of government agencies in supporting adaptive governance is also crucial. In Gorontalo, local government institutions have made efforts to strengthen their capacity to manage disaster risks, promote sustainable development, and enhance community resilience. However, the success of these efforts depends on the active participation of community members and the alignment of local government policies with the needs of the people (Lee & Kim, 2018). It is essential for government institutions to work in partnership with local communities, recognizing that they possess valuable knowledge and insights into the challenges they face. This collaborative approach can lead to more effective governance, where policies are better suited to local realities and can be more easily implemented.

In addition to government and local institutions, civil society organizations (CSOs) also play a significant role in building community resilience. CSOs in Gorontalo have been involved in a range of initiatives aimed at strengthening adaptive governance, from community-based disaster risk management programs to environmental conservation efforts. These organizations often serve as bridges between the community and the government, facilitating communication, advocacy, and capacity-building. By empowering local communities to take an active role in governance, CSOs contribute to the development of a more resilient and adaptive society.

Moreover, the involvement of women and marginalized groups in governance processes is crucial for ensuring that resilience-building efforts are inclusive. In Gorontalo, women's participation in decision-making has been recognized as an essential component of adaptive governance. Women, who are often the primary caregivers and managers of household resources, have unique insights into the challenges faced by communities and are vital agents of change. According to Lwamba et al. (2022), Promoting gender equality in governance structures helps to ensure that the needs of all community members are addressed, fostering a more inclusive and sustainable approach to resilience building.

In conclusion, building community resilience through adaptive governance requires a multi-faceted approach that integrates local knowledge, inclusive decision-making, and effective institutional frameworks. In Gorontalo, the application of adaptive governance is an ongoing process, with local institutions and communities working together to address the challenges posed by environmental, social, and economic changes. By fostering an environment of collaboration, learning, and flexibility, Gorontalo can continue to build resilience, ensuring that its communities are better equipped to withstand future challenges. Through this institutional approach, the province can serve as a model for other regions facing similar challenges, demonstrating the power of adaptive governance in building sustainable and resilient communities.

METHODOLOGY

Research Method

The research above employs a mixed-methods approach, which combines both qualitative and quantitative research techniques. This method is appropriate for studying adaptive governance and community resilience, as it allows for a comprehensive understanding of both the subjective experiences and objective data associated with the research topic. The qualitative component of the study, consisting of interviews, participatory observations, and open-ended surveys, provides rich, in-depth insights into the perceptions of stakeholders and community members regarding governance practices. These qualitative methods are particularly useful in capturing the nuances of community engagement, perceptions of governance effectiveness, and the challenges faced by local institutions. The quantitative component, which involves structured surveys, allows for the collection of numerical data that can be analyzed to identify patterns and trends in public awareness, participation, and the impact of adaptive governance on various dimensions of community resilience.

Data Collection Techniques

Data for the research is collected through interviews, surveys, and participatory observations. Interviews are conducted with key stakeholders, such as local government officials, community leaders, civil society organizations, and residents, to understand their roles in governance and their perceptions of the effectiveness of adaptive strategies. Surveys are distributed to a larger population to quantify aspects such as community awareness of flood risks, satisfaction with governance practices, and perceptions of resilience. Participatory observations provide additional context, as the researcher observes interactions and behaviors within the community during resilience-building activities, such as disaster preparedness exercises or community meetings.

Data Analysis Technique

For the quantitative data analysis, the research uses descriptive statistics to summarize and interpret the data collected from the surveys. This method allows for the presentation of findings in a clear and structured format, such as frequency distributions, percentages, and mean scores. Descriptive statistics are used to identify trends, such as the level of awareness about flood risks or the perceived effectiveness of governance practices. The data is analyzed using software such as SPSS or Excel to ensure accuracy and consistency in the results. For the qualitative data analysis, the study employs thematic analysis, which involves coding and categorizing interview responses and observational notes into themes or patterns. This technique helps to identify recurring issues, perceptions, and challenges related to adaptive governance and community resilience. Thematic analysis allows the researcher to extract meaning from the narrative data, offering insights into how governance practices are experienced on the ground, and how they contribute to building resilience within the community. The data analysis process for qualitative research typically involves transcribing interviews, reading through the transcripts, identifying key themes, and organizing the data accordingly.

Integration of Findings

The mixed-methods approach allows for the integration of both qualitative and quantitative findings to provide a more holistic view of the effectiveness of adaptive governance. The qualitative data complements the quantitative results by providing context and deeper understanding of the statistical trends. For instance, while the surveys may indicate that a large percentage of the community is aware of flood risks, the interviews and observations may reveal gaps in preparedness or areas where awareness has not translated into action. By combining both types of data, the research can offer more comprehensive conclusions and recommendations for improving governance practices and enhancing community resilience.

RESULTS AND DISCUSSION

This study investigates the role of adaptive governance in enhancing community resilience in Gorontalo, Indonesia, focusing on the management of Lake Limboto. The findings are presented through six key tables that illustrate various aspects of adaptive governance and its impact on community resilience.
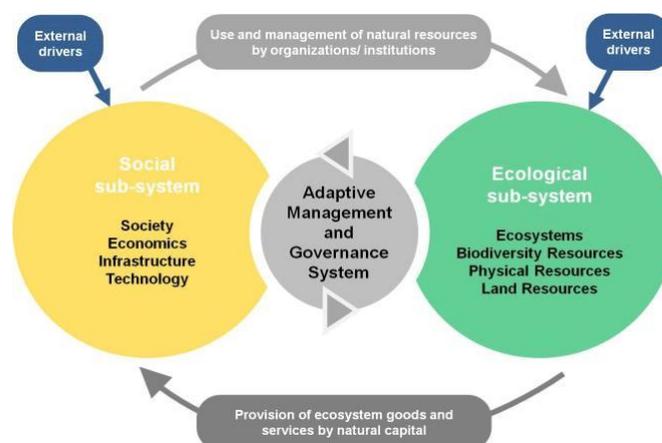

Figure 1. The Interrelationship Between Social and Ecological Sub-Systems in Adaptive Management and Governance Systems

This study investigates the role of adaptive governance in enhancing community resilience in Gorontalo, Indonesia, with a particular focus on the management of Lake Limboto. As one of the critical environmental assets in the region, Lake Limboto faces various challenges, including pollution, sedimentation, and the impact of climate change. The ability of the local community to adapt and respond to these challenges is deeply tied to the effectiveness of governance structures and the degree of community involvement in the decision-making process. To explore this, the study adopts a mixed-methods approach that combines qualitative interviews, surveys, and participatory observations. These methods provide a comprehensive understanding of the governance processes in place, the roles played by different stakeholders, and the community's perceptions of these governance mechanisms. By incorporating both qualitative and quantitative data, the research aims to assess the strengths and weaknesses of current governance systems and their ability to foster resilience within the community.

The findings from this research are organized into several key areas, including stakeholder involvement, community perceptions, and the effectiveness of governance mechanisms. Table 1 provides a detailed overview of the key stakeholders involved in the management of Lake Limboto and their respective levels of involvement in governance processes. This table serves as a foundation for understanding the different roles played by local government, community leaders, civil society organizations, the private sector, and academia in the governance of the lake and the broader community resilience efforts. In the following table, we present the involvement of various stakeholders in the management of Lake Limboto, highlighting their specific activities and the impact of their participation on adaptive governance efforts. This table offers insights into how collaboration among these groups contributes to resilience-building and adaptive management in the region.

Table 1. Stakeholder Involvement in Lake Limboto Management

Stakeholder Group	Level of Involvement	Key Activities
Local Government	High	Policy formulation, resource allocation
Community Leaders	Moderate	Mobilizing local support, community education
Civil Society Organizations	High	Advocacy, environmental monitoring
Private Sector	Low	Limited investment in sustainable practices
Academia	Moderate	Research, capacity building

The table above categorizes the involvement of various stakeholders in the management of Lake Limboto, providing an insightful breakdown of the roles and contributions of each group. It highlights the differing levels of engagement, reflecting the complexity and diversity of governance in the region. The local government, with its high level of involvement, plays a central role in policy formulation and resource allocation, shaping the overall direction of adaptive governance efforts. Their authority and access to resources make them a key player in the development of long-term strategies for managing environmental and social challenges in the area. Civil society organizations (CSOs), also with a high level of involvement, play a crucial role in advocacy and environmental monitoring. They act as bridges between the community and formal governance structures, raising awareness, promoting environmental protection, and advocating for policies that align with local needs. Their involvement ensures that community voices are heard in decision-making processes, fostering greater transparency and accountability in governance. Additionally, CSOs contribute significantly to building community resilience by mobilizing local populations and empowering them to participate actively in governance activities.

Community leaders, who have a moderate level of involvement, act as the link between the local government, CSOs, and the community. They are instrumental in mobilizing local support for governance initiatives and are often the first point of contact for community members seeking information or assistance. Their role in community education is pivotal in fostering a sense of ownership and responsibility among local residents. However, the extent of their influence is often dependent on their relationship with other stakeholders and the resources available to

them. The private sector's involvement, which is currently low, presents a significant opportunity for future development. While businesses and industries may have some interest in sustainable practices, their direct participation in governance remains limited. This indicates a potential area for strengthening partnerships with local governments and CSOs to promote more sustainable and profitable investments. Engaging the private sector could unlock additional resources, innovation, and technical expertise that would enhance adaptive governance efforts and contribute to the sustainable management of Lake Limboto.

Academia, with a moderate level of involvement, contributes through research and capacity building. Universities and research institutions are essential in providing evidence-based solutions and strategies for adaptive governance. They play a critical role in monitoring the health of the lake, analyzing environmental data, and proposing scientifically sound approaches for resource management. By building the capacity of local stakeholders through education and training, academia helps ensure that the community and governance structures are equipped with the knowledge and skills needed to adapt to changing conditions. This table, therefore, not only serves as a snapshot of the current governance structure in Gorontalo but also points to areas where further collaboration and investment could lead to more effective adaptive governance. Strengthening the involvement of the private sector, enhancing the role of community leaders, and fostering deeper collaboration between academic institutions and local governments could significantly improve the management of Lake Limboto and increase the community's resilience to environmental challenges.

Table 2. Community Perceptions of Adaptive Governance

Perception Category	Percentage (%)
Awareness of adaptive governance	65
Trust in local institutions	70
Satisfaction with current governance	60
Perceived effectiveness of governance	55

The table above presents the community's perceptions of adaptive governance in Gorontalo, offering valuable insights into how local residents view the effectiveness and responsiveness of governance structures. It serves as an important tool for understanding the public's confidence in the systems designed to manage environmental and social challenges in the region. The relatively high levels of awareness (65%) and trust (70%) in local institutions indicate a general recognition of the importance of adaptive governance and an acknowledgment of the roles played by government and other key stakeholders. This suggests that the foundational principles of adaptive governance such as inclusivity, responsiveness, and flexibility are well-understood by the community. However, despite high levels of awareness and trust, satisfaction with the current governance system is lower (60%), and the perceived effectiveness of governance ranks even lower at 55%. These figures point to a significant gap between community expectations and the actual performance of governance structures. This disparity suggests that while the community acknowledges the efforts of local institutions, they may feel that these efforts are not translating into tangible, positive outcomes.

The gap between trust and satisfaction, for instance, suggests that while people have confidence in the local institutions, they may not feel that their needs are being fully addressed or that the governance processes are achieving the desired results. The relatively low perceived effectiveness (55%) highlights a critical area for improvement. It indicates that adaptive governance, despite its promise of flexibility and resilience, may not be fully delivering on its potential. Factors such as delays in decision-making, inadequate resource allocation, or insufficient collaboration between stakeholders could be contributing to this perception. Addressing these issues is essential to closing the gap between community trust and the actual effectiveness of governance practices. For example, ensuring that governance decisions lead to visible improvements in areas such as disaster preparedness, environmental sustainability, and economic resilience could significantly increase the community's satisfaction and belief in the system's efficacy.

These findings offer key insights into areas that require targeted interventions. To improve satisfaction and effectiveness, there may be a need for enhanced communication between local

institutions and the community to ensure transparency, and to provide feedback mechanisms that allow for greater community participation in decision-making processes. Additionally, strengthening accountability and ensuring that governance processes are directly linked to the community's needs and priorities will be essential. By addressing these areas, Gorontalo's adaptive governance framework can be better aligned with the aspirations and expectations of its residents, ultimately fostering greater resilience within the community.

Table 3. Adaptive Capacity Indicators

Indicator	Score (1-5)
Institutional flexibility	3
Resource mobilization	4
Knowledge sharing	3
Community participation	4
Policy responsiveness	2

The adaptive capacity indicators in Table 3 provide a comprehensive evaluation of the key factors that contribute to the effectiveness of adaptive governance in Gorontalo. These indicators focus on the ability of local institutions to respond to changing conditions, mobilize resources, share knowledge, and engage the community in decision-making processes. Each of these elements plays a crucial role in ensuring that the governance system remains flexible and capable of addressing both short-term challenges and long-term development goals. The score for institutional flexibility (3) indicates a moderate ability of local governance structures to adapt to changing circumstances. This suggests that while there is some level of responsiveness to emerging issues, there may be room for improvement in how quickly and effectively institutions can modify their strategies or policies in response to new challenges. Strengthening the adaptability of institutions could involve streamlining decision-making processes and enhancing their capacity to integrate new information, which would help improve overall governance flexibility. Resource mobilization scored relatively high (4), demonstrating that Gorontalo's governance system is generally effective in mobilizing the necessary resources to address local challenges.

This includes financial resources, human capital, and technical expertise. High resource mobilization is a strength, as it suggests that there is sufficient capacity to tackle environmental and social issues through the allocation of resources. However, the challenge remains in ensuring that these resources are optimally distributed to areas where they are most needed and are utilized in a way that maximizes their impact on community resilience. The score for knowledge sharing (3) indicates that while there is some exchange of information and expertise between stakeholders, there may be barriers to fully realizing the potential of this practice. Effective knowledge sharing is crucial in adaptive governance as it helps ensure that all relevant parties government agencies, civil society, community leaders, and academics are informed and can contribute to decision-making. Improving knowledge sharing could involve creating platforms for better communication, establishing regular forums for cross-sectoral dialogue, and fostering greater collaboration between local stakeholders. Community participation scored high (4), reflecting the strong engagement of local communities in governance processes.

This indicates that community members are actively involved in decision-making, with their input being valued and incorporated into policies and actions. This level of participation is critical for adaptive governance, as it ensures that local knowledge and needs are considered in the development of strategies. Enhancing this participation further can ensure that the community remains a central player in governance, leading to more relevant and widely supported outcomes. The score for policy responsiveness (2), however, reveals a significant area for improvement. This low score indicates that there are challenges in the governance system's ability to quickly and effectively implement policies in response to changing needs or emerging crises. Inadequate policy responsiveness can undermine the effectiveness of adaptive governance, especially in times of urgent environmental or socio-economic changes. To improve policy responsiveness, the governance system may need to implement mechanisms for faster decision-making, increase the capacity of institutions to act swiftly, and improve coordination between different stakeholders to ensure that policies are not only well-designed but also quickly executed. Overall, the data from

these indicators suggest that while there are some strengths in resource mobilization, community participation, and institutional flexibility, there are clear areas especially policy responsiveness and knowledge sharing that need attention to strengthen the adaptive governance framework in Gorontalo. Enhancing these aspects will contribute to a more resilient and responsive governance system that can better meet the challenges of the future.

Table 4. Flood Risk Awareness and Preparedness

Awareness Level	Percentage (%)
High	50
Moderate	30
Low	20

Table 4 provides valuable insights into the community's awareness levels and preparedness regarding flood risks in Gorontalo. The data shows that while 50% of the population has a high awareness of flood risks, 30% have a moderate level of awareness, and 20% possess low awareness. This distribution indicates that while a majority of the community recognizes the threat posed by floods, there is still a significant portion of the population that lacks sufficient knowledge or preparedness. The 50% of individuals with high awareness represent those who are likely familiar with the potential risks, preventive measures, and the importance of preparedness strategies. These individuals are more likely to engage in activities such as creating emergency plans, participating in local awareness programs, and sharing knowledge with others. However, the remaining 50% of the population, split between those with moderate and low awareness, highlights a critical gap in flood risk communication and preparedness. It is essential to recognize that the level of awareness directly influences how effectively a community can respond to floods, including how well they understand early warning systems and evacuations procedures.

The presence of 20% of the population with low awareness is particularly concerning, as this group may be the least prepared and most vulnerable in the event of a flood. This group may not have access to accurate information, or they may not have participated in educational programs on flood risks. In addition to education campaigns, efforts need to be made to ensure that this population is reached through community outreach, leveraging local leaders, and using various communication channels to disseminate information. Ultimately, the table emphasizes the need for targeted educational initiatives aimed at increasing awareness across all segments of the population. For the community to be adequately prepared, it is crucial to ensure that everyone, regardless of their current awareness level, understands the risks and is equipped with the necessary tools to respond effectively. By addressing the gaps identified in this table, Gorontalo can enhance its overall flood preparedness, improve community resilience, and reduce the risks associated with flooding.

Table 5. Institutional Challenges in Adaptive Governance

Challenge	Frequency (%)
Lack of Coordination	45
Insufficient Resources	40
Limited Public Participation	35
Inadequate Policy Frameworks	30

Table 5 highlights several institutional challenges that hinder the effectiveness of adaptive governance in Gorontalo, providing a clear overview of the primary obstacles local governance faces in its efforts to build community resilience. The data reveals that lack of coordination (45%) is the most significant challenge, pointing to the difficulty in aligning efforts across various government agencies, civil society organizations, and other stakeholders. This lack of coordination can lead to fragmented responses, inefficient use of resources, and missed opportunities for synergistic collaboration. Effective governance requires a high degree of cooperation between different entities, and this challenge suggests that more structured communication channels, joint planning, and clearer roles and responsibilities are necessary. The second most significant challenge, insufficient resources (40%), underscores the limitations that

local institutions face in executing their adaptive governance strategies. This could refer to a lack of financial resources, human capital, or technical expertise. When resources are scarce, it becomes difficult to implement comprehensive disaster preparedness plans, develop necessary infrastructure, or invest in capacity-building initiatives.

This challenge emphasizes the need for better resource mobilization and allocation, as well as the importance of seeking external funding or partnerships to supplement local capacities. It also highlights that enhancing the resource base is crucial for achieving the long-term goals of resilience and sustainable development. Limited public participation (35%) is another key challenge identified in the table, pointing to the need for greater community engagement in governance processes. When public participation is restricted, governance decisions may not reflect the true needs or priorities of the community, and local residents may lack a sense of ownership over resilience-building efforts. Public participation is a cornerstone of adaptive governance, and fostering greater involvement from all sectors of the community can ensure that governance strategies are both relevant and widely supported. Engaging the public through workshops, forums, and collaborative decision-making processes can help address this gap and create a more inclusive governance system. Finally, inadequate policy frameworks (30%) represent a critical institutional challenge that limits the effectiveness of governance efforts. In this case, local institutions may lack clear, comprehensive policies that address long-term resilience, climate adaptation, or disaster risk management.

The absence of robust policy frameworks can result in a reactive rather than proactive approach to governance, where institutions are not adequately prepared for emerging challenges. Strengthening policy frameworks and ensuring that they are flexible enough to adapt to changing circumstances would greatly improve the capacity of local institutions to address complex challenges and build community resilience. In summary, the table provides a detailed look into the institutional barriers that limit the effectiveness of adaptive governance in Gorontalo. The challenges identified, such as coordination issues, insufficient resources, limited public participation, and inadequate policy frameworks, highlight areas for urgent improvement. Addressing these obstacles through enhanced coordination, increased resource allocation, better public engagement, and stronger policy development will be critical in fostering a more resilient and adaptive governance system.

Table 6. Impact of Adaptive Governance on Community Resilience

Resilience Dimension	Improvement (%)
Social Capital	60
Economic Stability	50
Environmental Sustainability	55
Institutional Capacity	65

Table 6 presents the impact of adaptive governance on various dimensions of community resilience, reflecting how governance strategies influence the overall well-being and sustainability of communities in Gorontalo. The data shows that adaptive governance has a notable positive effect on key resilience dimensions, with institutional capacity (65%) and social capital (60%) demonstrating the most significant improvements. This indicates that the adaptive governance framework has been highly effective in strengthening local institutions and fostering community connections, both of which are critical for the long-term resilience of the area. Strong institutions are better equipped to manage crises, implement sustainable policies, and support local development, while social capital enhances the community's ability to collaborate, share resources, and support one another during times of need. The improvement in economic stability (50%) suggests that adaptive governance also plays a vital role in stabilizing the local economy, though there is still room for further progress. Economic stability is crucial for ensuring that communities can recover from disruptions, whether they are environmental, social, or economic in nature. While the governance framework has made positive strides in this area, the moderate improvement indicates that more targeted efforts, such as diversifying income sources or improving access to markets, may be needed to further strengthen the economic resilience of the community.

Environmental sustainability (55%) also shows moderate improvement, reflecting the growing awareness and action taken to manage the region's natural resources more sustainably. However, given the ongoing environmental challenges in Gorontalo, including pollution, deforestation, and climate change, there is still a need for more aggressive and coordinated efforts to enhance environmental governance. These results suggest that adaptive governance has laid the groundwork for more sustainable environmental practices, but further investments in environmental policies and local capacity building are needed to achieve more significant long-term outcomes. In summary, the findings from Table 6 highlight the positive impact of adaptive governance in enhancing community resilience across multiple dimensions. While there have been substantial improvements in institutional capacity and social capital, economic stability and environmental sustainability still present areas for growth. The results suggest that while adaptive governance has made a positive difference, continued efforts to enhance economic opportunities and environmental management will be essential to fully capitalize on the benefits of adaptive governance and ensure a more resilient future for Gorontalo's communities.

Discussion

Stakeholder Involvement in Lake Limboto Management

The findings from Table 1 indicate that the involvement of different stakeholders in Lake Limboto's management is central to the success of adaptive governance in Gorontalo. Local government agencies, which play a high role in policy formulation and resource allocation, are pivotal in setting the direction of governance efforts. However, the challenges of coordination and the absence of streamlined communication channels between stakeholders can create inefficiencies. Civil society organizations (CSOs) and community leaders have demonstrated a high level of involvement, advocating for environmental monitoring and local engagement (Ibones et al., 2024; Pasamonte, 2024). However, the limited participation of the private sector suggests that opportunities for investment in sustainable practices remain underexplored. For adaptive governance to reach its full potential, engaging the private sector more fully could help secure additional resources and innovative solutions, bridging gaps in the governance system.

Community Perceptions of Adaptive Governance

While there is a strong sense of trust in local institutions and a high level of awareness about governance mechanisms, satisfaction with the performance of these institutions falls short (Beeri et al., 2019). This discrepancy indicates that while communities recognize the importance of governance structures, they may not always see tangible results or feel that their needs are being effectively addressed. This gap could be due to factors such as slow decision-making processes, lack of visible outcomes from policies, or the delayed impact of governance interventions. Therefore, efforts to increase satisfaction should focus on enhancing the responsiveness of governance systems and ensuring that outcomes align more closely with community expectations. This could be achieved by improving transparency in decision-making and more actively involving communities in the implementation of policies.

Adaptive Capacity Indicators

The adaptive capacity indicators presented in Table 3 highlight several strengths and weaknesses in the governance system. The moderate score for institutional flexibility suggests that local institutions can adapt, but they may require additional support in terms of training, decision-making processes, and institutional reform. Increasing institutional flexibility is key for ensuring that governance structures can respond effectively to new challenges, especially in the face of environmental changes or economic disruptions. The high score for resource mobilization demonstrates the ability to gather necessary resources for governance efforts, but greater efficiency in resource allocation and addressing areas with limited access could further enhance governance outcomes. The moderate performance in knowledge sharing and policy responsiveness signals that although there are existing mechanisms for learning and information exchange, there are barriers to fully realizing the benefits of these practices (Shadmanfar & Makvandi, 2024). Improving these aspects will help ensure that governance is proactive, rather than reactive, and that strategies evolve based on the lessons learned from past experiences.

Public Awareness and Preparedness for Flood Risks

The community's awareness of flood risks is examined, revealing a mixed understanding of the threats they face. While half of the population demonstrates high awareness, there remains a significant proportion of individuals with moderate to low levels of understanding regarding flood risks and preparedness. This indicates that while there has been some success in educating the public, there is still a critical need for more widespread and targeted awareness campaigns, particularly aimed at reaching those with lower awareness levels. Given the vulnerability of Gorontalo to flood-related disasters, improving public preparedness is essential for reducing the impact of future events (Aprianti et al., 2025). The use of diverse communication channels, such as local radio, community meetings, and digital platforms, could help enhance outreach and ensure that flood risk education is accessible to all segments of the population.

Institutional Challenges in Adaptive Governance

Several institutional challenges hinder the effectiveness of adaptive governance in Gorontalo. The most significant challenge identified is the lack of coordination among stakeholders, which leads to fragmented responses and inefficiencies in governance processes. Effective governance relies heavily on collaboration and clear communication between different actors, and the absence of these elements creates barriers to achieving collective goals. According to Simpson et al. (2019), the challenge of insufficient resources further exacerbates these difficulties, as local institutions struggle to allocate sufficient funds, expertise, and infrastructure to resilience-building initiatives. The lack of resources limits the scope and impact of governance strategies, underscoring the need for more robust resource mobilization and external partnerships. Additionally, the limited public participation in governance processes signals that-citizens may feel disconnected from decision-making processes. Enhancing citizen engagement, through participatory governance models and feedback mechanisms, could improve accountability and ensure that policies are better aligned with community needs (Waddington et al., 2019).

Impact of Adaptive Governance on Community Resilience

The positive impact that adaptive governance has had on various dimensions of community resilience, with significant improvements in institutional capacity and social capital. Strengthening institutional capacity is essential for ensuring that local governments and agencies can respond effectively to future challenges, such as environmental disasters or economic shocks. Similarly, the increase in social capital reflected in stronger community ties and cooperation demonstrates the potential of adaptive governance to foster a more cohesive society that can work together to overcome difficulties (Guardaro et al., 2022). While the improvements in economic stability and environmental sustainability are promising, they remain areas that require continued focus. Economic stability is vital for ensuring long-term resilience, as it provides the foundation for communities to withstand external shocks. Similarly, ongoing efforts to enhance environmental sustainability will be crucial to reducing vulnerability to climate change and ensuring the long-term viability of local resources.

CONCLUSION

In conclusion, the research highlights the importance of adaptive governance in enhancing community resilience in Gorontalo, particularly in managing Lake Limboto and addressing environmental and socio-economic challenges. While there have been significant improvements in institutional capacity and social capital, challenges such as insufficient coordination, limited resources, and gaps in public participation still hinder the full effectiveness of governance. The findings suggest that strengthening stakeholder collaboration, increasing resource mobilization, and improving public engagement are critical to building a more resilient community. Additionally, continued efforts to enhance economic stability and environmental sustainability are essential for ensuring long-term resilience and adapting to future challenges.

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