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The Impact of Non-Evidence-Based Policy on Flood Management in Aceh Singkil Regency

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ABSTRACT

This study aims to investigate the impact of non-evidence-based policies on flood management in Aceh Singkil, where yearly flood had increased despite recommendations from the Ministry of Public Works and Public Housing. The main recommendation, building flood control embankments, was dropped by new local leaders, who instead chose river dredging despite its lack of scientific support. To achieve this objective, a qualitative case study method was used. Data were gathered through in-depth interviews with stakeholders, including government officials, experts, and affected residents, as well as through analysis of government reports and academic sources. The data were subsequently analyzed using triangulation methods to ensure validity and reliability. Furthermore, the political dynamics and impacts of these policy changes were explored, emphasizing how ignoring evidence-based solutions could lead to more severe floods and greater socioeconomic losses. The results showed that the river dredging policy in Aceh Singkil, shaped more by political interests than technical studies, proved ineffective in reducing flood. Instead, it offered only a temporary fix, increased socioeconomic losses, and disregarded the principles of evidence-based disaster mitigation and long-term sustainability.

Keywords: *Evidence-Based Policy; Flood Management; Disaster Mitigation*

INTRODUCTION

Evidence-based policy has become a key strategy in public decision-making across various countries (Davies & Nutley, 2000). By relying on empirical data and scientific studies, this type of policy offers more effective, efficient, and sustainable solutions (Sanderson, 2002). It also helps governments

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understand the causes of problems comprehensively and enables policy planning that addresses the actual needs of people (Spray et al., 2009). Globally, countries such as the United Kingdom and Australia have adopted evidence-based policies to address challenges including disaster management, climate change, and public health (Head, 2010). A notable example is flood mitigation program in the Netherlands, where evidence-based measures have successfully protected low-lying areas from flood by combining hydrological and geographic data with advanced technology (Sudmeier-Rieux et al., 2021).

Implementing evidence-based policies is often challenging, specifically in developing countries like Indonesia. The challenges include limited access to quality data, policymakers' restricted technical capacity, and political impact that frequently overrides scientific advice for short-term gains. In disaster management, ignoring scientific evidence can lead to ineffective policies, greater vulnerability to disasters, and higher socioeconomic losses (Jogia & Wedawatta, 2019). Therefore, integrating evidence-based strategies into decision-making is not only an urgent global need but also a crucial step in ensuring that public policies effectively address society's real challenges.

The annual flood that plagues Aceh Singkil Regency has become an increasingly pressing environmental issue for decades. The impacts not only disrupt daily life but also cause significant damage to infrastructure and agricultural productivity, the backbone of the local economy. Over the past two decades, Aceh Singkil has experienced repeated major floods. Data from Aceh Singkil Regional Disaster Management Agency (BDBP) confirmed that major floods had occurred a minimum of nine times since 2010, with the most severe incidents in 2014, 2017, and 2020. For example, in 2014, more than 3,500 people were affected by water levels reaching 1.5 meters. Meanwhile, in 2020, flood damaged 1,200 ha of agricultural land and inundated over 1,000 homes. In 2024, more than 2,299 people were impacted by flood, with water levels reaching 1.2 meters, inundating homes, public facilities such as schools and mosques, while also disrupting roads connecting villages. This incident was primarily triggered by persistently high rainfall, exacerbating the geographical conditions of Aceh Singkil, a low-lying area surrounded by large rivers (BPBA, 2023).

Based on 2023 data from the National Disaster Management Agency (BNPB) through the InaRisk platform, Aceh Singkil was at high risk of flood. More than 13,000 ha of land were potentially affected, and 38,000 people were at risk of seasonal and flash floods. These hydrometeorological risks demand sustainable, data-driven flood management to reduce recurring impacts and maintain economic and social stability in the area.[1]

A gap remains in understanding how local political dynamics influence the implementation of evidence-based policies in disaster management despite previous examinations of the effectiveness of technical strategies in flood mitigation. To address the gap, this current study analyzed how non-evidence-based political decisions

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exacerbated flood risk in Aceh Singkil and affected residents.

The recommendations provided by the Ministry of Public Works and Public Housing represent the initial concrete steps toward a long-term solution to flood issue. Based on a comprehensive study conducted by the Ministry and an interview with the former Head of Aceh Singkil Public Works Office on September 10, 2023, constructing embankments is considered the most effective strategy. Embankments are designed to manage river flow, prevent overflow into residential areas, and reduce the erosion that often worsens flood. This solution is both preventative and proactive, offering sustainable protection against flood.

The policy direction has shifted significantly due to a change in leadership at the local government level. The newly elected regional head halted the proposed embankment construction project and instead adopted a river dredging policy. Although this measure appeared to provide an immediate solution, the policy lacked solid scientific support. With dredging temporarily increasing water flow capacity, its effectiveness is very limited and does not address the underlying causes of flood in the region.[2]

This current study aims to deepen the understanding of how non-evidence-based political decisions affected public policy and disaster management. Therefore, it not only contributes to academic knowledge but also provides policymakers with practical guidance for developing more effective, evidence-based disaster mitigation strategies. This decision has become a major focus in public policy analysis in Aceh Singkil. In the context of disaster risk management, evidence-based policy is crucial for creating effective and sustainable solutions (Alexander, 2021; Fears et al., 2021). In this context, the decision was not based on scientific evidence but on political preferences. Ignoring technical recommendations from the Ministry of Public Works and Public Housing stalled a project that could have permanently addressed flood issue, replacing it with an ineffective short-term solution.

Technically, river dredging projects have significant weaknesses. Dredged rivers will continue to experience sedimentation, the deposition of material carried by water flow (Saad & Habib, 2021). Materials, such as sand and silt, naturally accumulate on the riverbed, reducing its flow capacity and necessitating ongoing dredging (Obialor et al., 2019). This confirms that dredging cannot serve as a sustainable long-term solution, as it provides only temporary effects. Therefore, the strategy is more reactive than preventive and drains the budget without delivering adequate long-term results.

In natural disaster management, one of the key principles is sustainable mitigation. This involves efforts to reduce the risk and impact of natural disasters before the occurrence (Carabine, 2015), emphasizing the importance of evidence-based policies in guiding informed decision-making. However, in the case of Aceh Singkil, the river dredging policy disregarded the principle of long-term mitigation, focusing on measures that offered only temporary relief.

Political factors significantly influenced decision-making in Aceh Singkil. Leadership changes led to shifts in policy that do not often relate with previous results or expert recommendations. In this case, the

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new Regent appears to prioritize actions that produce quick results for the public, without considering long-term effectiveness. River dredging, with its immediate visible outcomes, may be perceived as a "faster" solution by the public, even though its benefits are only temporary.[3]

The decision to abandon the embankment project shows an imbalance in the public decision-making process. Policies that lack thorough studies often overlook the complexity of the issue and focus solely on immediate outcomes rather than long-term implications. This contradicts a scientific strategy, where all decisions should be grounded in solid data, analysis, and empirical evidence. In the case of Aceh Singkil, this non-evidence-based policy actually worsened flood challenge.

Flood challenge in Aceh Singkil is not merely an environmental issue but also affects the social and economic well-being of residents. When flood occurs, the impacts are widespread, ranging from damage to homes and public infrastructure to the destruction of farmers' and fishermen's livelihood. A 2023 report from Aceh Singkil Regional Disaster Management Agency noted that more than 2,299 people were affected by flood, with thousands of hectares of farmland damaged. Furthermore, this disaster has caused economic losses of up to IDR 28 billion over the past 5 years (Aceh Singkil's Social Office, 2023).

Flood can diminish quality of life, disrupt access to education and healthcare, and worsen poverty in a region. According to data from the Ministry of Health, waterborne diseases such as diarrhea and skin infections increased by up to 35% in flood-affected areas, emphasizing the urgency of evidence-based management (Ministry of Health, 2023). These impacts confirm the critical need for sustainable, evidence-based solutions to address flood challenges.

The embankment construction project recommended by the Ministry of Public Works and Public Housing is designed to address all flood challenges. By controlling water flow and preventing river overflows, embankments can protect residential and agricultural land from damage, and also reduce soil erosion, which often worsens the impact of flood. Compared to river dredging, which is only effective in the short term, this solution offers comprehensive and sustainable protection.

Efforts to combat flood in Aceh Singkil will continue to face major obstacles without strong political backing. The failure to adopt evidence-based policies has already had a significant impact on residents. Each year, flood worsens, damaging infrastructure and reducing agricultural productivity. Without a comprehensive, long-term plan, flood will remain a persistent threat to the lives of Aceh Singkil residents.

In the context of public policy, it is crucial to understand that decisions made without careful scientific considerations tend to fail in the long run (Demir, 2023). Non-evidence-based policies not only harm the environment but also create worsening social and economic problems (Edler et al., 2022). Therefore, local governments should reconsider expert-recommended solutions and adopt evidence-based measures to ensure sustainable flood mitigation.

This current study made a unique contribution by critically analyzing flood

[3] Interview with an economic and political observer from Aceh Singkil, conducted on August 20, 2024

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management policies in Aceh Singkil, which often neglected evidence-based recommendations. Unlike previous investigations that mainly focused on the technical aspects of flood mitigation or only evaluated policy effectiveness, it specifically explored local political dynamics and the impact on the adoption of evidence-based policies. Therefore, this study not only considers the technical effects of policies ignoring evidence but also emphasized how political factors could hinder the implementation of long-term solutions recommender by experts.

This current study introduced a new perspective to disaster management investigations by emphasizing the disconnect between technical recommendations and political decisions at the local level. This perspective strengthens the understanding of the importance of relating evidence-based recommendations with policy decisions, particularly in disaster-prone areas such as Aceh Singkil. Using a qualitative case analysis, this study provided detailed empirical insights, making its results valuable not only for academic literature but also for the development of more effective public policies.

METHOD

This study used a qualitative case analysis method to examine the impact of non-evidence-based policies on flood management in Aceh Singkil. The method was selected because it enabled an in-depth exploration of the perspectives of various stakeholders, including local governments, affected residents, and disaster management experts. The objective was to understand how policy dynamics, particularly policy changes implemented by Regent Dulmusrid during the 2017-2022 period, contributed to worsening flood conditions in the region. This study focused not only on the technical aspects of the policies but also on how political, social, and economic factors influenced decision-making.

Primary data collection involved in-depth interviews with local government officials, including those from offices responsible for flood management and infrastructure, as well as disaster management experts from the Ministry of Public Works and Public Housing. The interviews aimed to gather perspectives on the reasons for shifting policy from embankment construction to river dredging, along with views on the impacts of this change. Furthermore, interviews with flood-impacted residents were conducted to capture experiences and assess how this policy shift impacted daily lives economically, socially, and in terms of security.

Secondary data were obtained from official government documents, specifically reports from the Ministry of Public Works and Public Housing, local policy documents, and flood data from Aceh Singkil Regional Disaster Management Agency, to complement the primary data. The data provided additional context regarding flood patterns in Aceh Singkil, technical analysis related to embankment construction, and previous studies on the effectiveness of river dredging as a short-term solution. A review of academic literature related to disaster management and public policy was also conducted to establish the theoretical framework underlying evidence-based policymaking.

Data analysis was carried out using triangulation techniques, where data obtained from various sources were cross-verified to ensure the validity and reliability of the results. This triangulation was crucial

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because it provided a more comprehensive picture and helped avoid bias in data interpretation. For example, results from interviews with government officials were compared with technical reports from the Ministry of Public Works and Public Housing to assess alignment between political narratives and scientific recommendations. Furthermore, data from affected residents were compared with flood statistics from Aceh Singkil Regional Disaster Management Agency to ensure that experiences corresponded with available empirical data.

A key aspect of the methodology was a comparative analysis between the solutions recommended by the Ministry of Public Works and Public Housing and the river dredging policy implemented by the new Regent. This study compared the effectiveness of both solutions using historical flood data in Aceh Singkil. For example, it assessed differences in flood frequency and intensity, infrastructure damage, and socioeconomic impacts on residents before and after the implementation of the dredging policy. This analysis helped determine whether the policies provided genuine solutions or further exacerbated flood problem.

This study used a contextual analysis method, considering the political and social factors influencing decision-making. This was essential because flood management policies were shaped not only by technical considerations but also by local political dynamics, particularly with the change in leadership. This study examined how political considerations drove decisions made by the new Regent and how these conflicted with existing scientific recommendations. Therefore, the effectiveness of the policy from both a technical standpoint and a broader public policy perspective was evaluated.

RESULT AND DISCUSSION

1. The Impact of River Dredging Policy on Flood Severity

Based on the results of a qualitative study conducted through in-depth interviews with various stakeholders, the river dredging policy implemented after the change in local leadership in Aceh Singkil did not have significant positive impacts on flood mitigation. Interviews with local government officials, experts from the Ministry of Public Works and Public Housing, and impacted residents confirmed that dredging provided only a temporary solution, failing to address the deeper root causes of the problem. This occurred because the new local leadership lacked a structured and sustainable flood mitigation program. Decisions prioritized short-term, visible solutions without considering long-term effectiveness. In addition, weak coordination with technical stakeholders and inadequate data-driven planning further contributed to the policy's ineffectiveness.

The river dredging policy implemented after the change in regional leadership in Aceh Singkil did not have significant positive impacts on flood. Officials from Aceh Singkil Regional Disaster Management Agency explained that dredging only temporarily increased water flow but did not address the root cause of flood. Rapid sedimentation resumed, leading to a decline in the river's flow capacity in a few months of dredging. Therefore, flood continued with a similar intensity to previous years

Interviews with several residents showed differing opinions on the effectiveness of river dredging. Some residents felt that dredging had a temporary

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effect that was still better than doing nothing, even though annual flood persisted. Therefore, public perceptions did not often correspond to the findings of expert technical studies, emphasizing the need for more effective communication strategies to build a shared understanding of flood mitigation efforts.

To clarify the impact of river dredging policies on the frequency and extent of flood, the following quantitative data are presented in the form of a table:

YEAR	FLOOD FREQUENCY (TIMES/YEAR)	IMPACTED AREA (HA)
2018	2	500
2019	3	650
2020	3	750
2021	4	950
2022	5	1.100
2023	5	1.200

The preceding data showed that after the implementation of the river dredging policy, the frequency of flood and the extent of the impacted area actually increased annually. This confirmed dredging did not provide effective long-term mitigation.

The data further showed that river dredging was only a temporary solution and not permanent. From a disaster risk reduction (DRR) perspective, the dredging policy in Aceh Singkil did not adhere to the principles of sustainable disaster risk reduction. DRR emphasized the importance of long-term preventive measures, such as infrastructure development that could mitigate the lasting impacts of disasters, like flood control embankments (Twigg, 2015).

Based on analysis, river dredging was only a temporary fix that did not address the root issue, sustainable management of river flow and sedimentation. DRR also emphasized that effective disaster risk mitigation required thorough planning and an evidence-based strategy that considered long-term impacts on residents and infrastructure (Naheed, 2021).

Policies that focused solely on reactive actions, such as river dredging, without considering more sustainable flood control solutions, often failed to build the resilience needed to withstand future flood (Makajić-Nikolić, 2020). Analyzing these data, government policies emphasizing quick results often ignored the importance of sustainability. Reactive measures, such as river dredging, did not ensure long-term safety, as sedimentation continued to occur and increased future flood risks. A long-term, science-based strategy, as promoted by DRR, should be prioritized in decision-making for more effective disaster management.

Interpreting the data, it became clear that government policies focused on quick results and often neglected sustainability. This occurred due to several key factors. First, political pressure and the need to demonstrate quick results to the public frequently led local leaders to choose solutions with immediate visible impacts, even when lacking long-term effectiveness. Second, budget constraints and uncertainty in the allocation of funds for long-term infrastructure development meant that preventative policies, such as embankment construction, were less prioritized than cheaper short-term river dredging. Third, the lack of coordination between central and regional governments in implementing evidence-based policies led to technical recommendations from the Ministry of Public

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Works and Public Housing not being fully adopted by local stakeholders.

Merely reactive solutions, such as river dredging, did not guarantee long-term protection, as sedimentation continued to recur and exacerbate future flood risks. Furthermore, the absence of a mechanism for continuous policy evaluation contributed to the repetition of these ineffective measures. This confirmed a long-term strategy based on scientific evidence, as advocated by DRR, should have been prioritized in decision-making for more effective disaster management. Residents directly impacted by flood also voiced concerns, with a local farmer expressing,

"Every time the river is dredged, we hope it will prevent flood again, but year after year, flood continues to destroy our fields."

The testimony reinforced empirical data showing that since the river dredging policy was implemented, flood had continued to occur frequently, and the impacts had even worsened. It also corresponded to the path dependence theory in public policy, where decisions not based on scientific evidence often exacerbated problems and pushed the system down a policy path that was difficult to change.

Data from Aceh Singkil Regional Disaster Management Agency reported an increase in flood frequency over the past 5 years, with major floods occurring annually. For example, before the river dredging policy was implemented, Aceh Singkil experienced major floods twice in 5 years. However, after the policy was adopted, major floods continued to occur on an annual basis. Furthermore, flood intensity had risen, with the impacted area expanding from 500 ha to over 1,200 ha of agricultural land. The data confirmed that river dredging did not significantly reduce flood risk, in line with resilience theory, emphasizing the importance of building environmental capacity to sustainably cope with natural stresses.

2. Analysis of Political Decisions in Policy Change

The policy change from embankment construction to river dredging was largely impacted by local political dynamics. Several officials stated the new regional head prioritized policies that appeared to deliver quick results, such as dredging. This was seen as a populist move to improve the government's image, even though its effectiveness had not been scientifically proven. This reflected the impact of populist politics in decision-making, often ignoring in-depth technical analysis.

The political economy of disaster theory was applied to understand the preceding context. This theory explains how disasters are often exploited by political actors to achieve specific objectives, specifically in situations where quick and visible decisions are more politically advantageous (Cohen & Werker, 2008).

Case studies from other parts of Indonesia and around the world offered useful comparisons for a broader perspective. For example, in Jakarta, evidence-based river normalization policies had proven more effective in controlling flood than partial, politically motivated naturalization policies. Globally, studies in the United States showed that cities like New Orleans successfully reduced flood risk through a combination of evidence-based strategies, including constructing embankments, improving drainage systems, and implementing integrated water catchment strategies.

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In the case of Aceh Singkil, the river dredging policy was selected because it appeared to represent quick government action, even though technically, the solution did not address the core problem. Over time, policies driven by political motives like this could increase residents' vulnerability to disasters as infrastructure or systems failed to handle future disaster risks.

A report from the Ministry of Public Works and Public Housing further reported that the previously recommended embankment project had strong scientific justification. The project was based on hydrological and geomorphological surveys that showed the potential of embankments to permanently control river flow and reduce flood risk by up to 70% (Rahman et al., 2024). Meanwhile, river dredging only offered temporary effects and entailed high operational costs for annual maintenance. From an evidence-based policy perspective, political decisions that disregard empirical evidence clearly harmed the public and ignored expert recommendations grounded in thorough technical analysis (Oliver et al., 2014).

3. Socioeconomic Impacts of Non-Evidence-Based Policies

The impacts of non-evidence-based policies could be observed from a socioeconomic perspective. The socioeconomic effects of recurring flood further worsened residents' conditions. Data collected from interviews with residents confirmed that 65% of farmers in affected areas experienced a 50% decrease in production over the past 5 years. A farmer mentioned the inability to harvest once a year due to repeated flood damage to agricultural land.

Flood management policies in the Netherlands achieved significant results in protecting residents from severe socioeconomic impacts. Using an evidence-based strategy that combined embankment infrastructure and smart drainage systems, economic losses from flood in the country was kept below 1% of national GDP. With an adoption of a similar strategy in Aceh Singkil, potential annual flood-related losses could be significantly reduced (Chan et al., 2022).

From an economic perspective, frequent flood significantly reduced agricultural productivity, decreased household incomes, and increased residents' economic vulnerability. This corresponded to the vulnerability theory, describing how residents' vulnerability grows as a result of repeat exposure to disasters without effective intervention (Kohn, 2014).

The social impacts of flood were evident in the form of internal migration. Several families were forced to leave villages each time major floods occurred, disrupting access to education and healthcare. A report from Aceh Singkil Social Services Department stated that economic losses due to flood rose sharply, from IDR 12 billion in 2019 to IDR 28 billion in 2023. These losses included not only physical damage to infrastructure and homes but also the loss of livelihoods for thousands of families. The situation was worsened by limited access to education and healthcare during flood, resulting in a 10% increase in school dropout rates in some affected villages. The theory of social disruption in the context of disasters emphasizes that disasters not only cause physical damage but also impact social structures, disrupt residents' routines, and exacerbate social injustice (England & Albrecht, 1984).

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4. Comparing the Effectiveness of Embankment and River Dredging Policies

This study compared the effectiveness of the solution recommended by the Ministry of Public Works and Public Housing with the river dredging policy implemented by the local government. The planned embankment could reduce flood-impacted area by up to 1,000 ha in the first 5 years of implementation. In addition, the estimated cost of constructing the embankment was more efficient than dredging, requiring ongoing maintenance. For comparison, the annual cost of dredging was IDR 15 billion, while the embankment construction was estimated to cost IDR 50 billion per project, with benefits lasting up to 20 years.

The strategy corresponded to sustainable flood management theory, which emphasizes the importance of infrastructure-based solutions in reducing long-term flood risks. In contrast, river dredging only temporarily improved water flow without addressing core issues related to water movement and sediment buildup. Empirical evidence showed that sediment in Aceh Singkil River quickly refilled the dredged riverbed, reducing the effectiveness of dredging shortly after. Therefore, dredging policies did not correspond to the principles of adaptive flood management, emphasizing the need for policies that adjust to changing natural conditions (Bouwer et al., 2007).

5. Evaluation Based on a Resilience Building Perspective

From a resilience theory perspective, the policies implemented in Aceh Singkil did not appear to improve residents' resilience to flood. Embankment construction is a solution that can gradually strengthen regional resilience by controlling flood and offering more permanent protection. The success of embankments was also supported by the experience of several regions that adopted similar policies. For instance, in Hulu Sungai Tengah Regency, embankment construction effectively reduced flood frequency by up to 80% in 5 years, confirming the suitability of this solution for implementation in Aceh Singkil.

River dredging policies, on the other hand, did not guarantee that flood would not recur in the near future. Therefore, dredging was only a temporary fix and did not provide sufficient time for residents to recover from the socioeconomic impacts. The notion corresponded to criticisms of short-term policies, which failed to help residents build the capacity of adapting to growing environmental risks (Hakstege, 2013).

CONCLUSION

In conclusion, this study showed flood management policies in Aceh Singkil faced significant challenges due to a lack of adherence to evidence-based recommendations. Although long-term solutions, such as the construction of flood control embankments proposed by the Ministry of Public Works and Public Housing, had been scientifically proven to be more effective, local governments had opted for river dredging, which offered quick results but lacked a sustainable impact. This reflected local decision-making often driven by political considerations rather than comprehensive technical evaluation.

From an evidence-based policy perspective, the policies showed the local government's failure to prioritize long-term residents' interests over short-term results. Policies implemented without sufficient empirical data support would only worsen the impact of disasters, resulting in greater economic and social losses for residents.

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Therefore, a stronger commitment to applying scientifically validated technical recommendations for flood management in this region was essential.

This study further emphasized the importance of more intensive involvement of experts and other stakeholders in disaster policy decision-making. The involvement should be accompanied by efforts to minimize political impact, which often dominated and distracted from evidence-based solutions. Leadership changes in Aceh Singkil had also contributed to a lack of continuity in policy implementation, frequently stalling the adoption of long-term solutions.

The real impact of neglecting evidence-based policies in Aceh Singkil was an increased risk of increasingly severe annual flood. Impacted residents not only have to endure infrastructure damage and loss of livelihoods, but also face uncertainty about future disaster management. This further emphasized the importance of collaboration among local governments, experts, and residents in creating more responsive policies grounded in technical studies.

An analysis of Aceh Singkil's regional budget allocation over the past 3 years (2022–2024) showed significant fluctuations in funding for flood management. In 2022, the IDR 35 billion allocated was directed toward constructing small embankments at various vulnerable points. However, in 2023, the budget decreased to IDR 28 billion, with the majority allocated to river dredging. In 2024, the allocation increased to IDR 40 billion but remained predominantly focused on dredging rather than embankment construction or integrated drainage systems.

The preceding data confirmed an imbalance in budget allocation, favoring short-term policies over evidence-based solutions with more sustainable impacts. Allocating funds that were not oriented toward permanent solutions risked wasting resources without providing optimal protection for residents. Therefore, reforms in budget planning were needed to balance investments between river dredging, embankment construction, and more effective drainage infrastructure over the long term.

The policy implications of this study showed local governments needed to adopt more data-driven decision-making mechanisms and incorporate technical recommendations into disaster mitigation strategies. One of the crucial steps was to establish an independent team comprising academics, disaster practitioners, and representatives from civil society to evaluate flood management policies before implementation. Furthermore, transparency in policy development should be improved to avoid reactive and short-term decisions.

Suggestions for further studies included the adoption of quantitative methods, such as spatial analysis and hydrological modeling, to more objectively assess the impact of flood mitigation policies. Furthermore, policy experimentation, such as piloting natural drainage systems or combining river dredging with embankment construction, could help evaluate the effectiveness of different flood management strategies. Comparative studies with other regions that had successfully applied evidence-based mitigation could also improve understanding of best practices in disaster risk management.

Local governments were further recommended to adopt more data-driven decision-making and technical strategies for disaster mitigation. One of the effective steps

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could be establishing an independent team composed of academics, disaster practitioners, and civil society members to review flood management policies before implementation. Furthermore, improving transparency in policy development was essential to avoid reactive, short-term decisions.

Future analyses were expected to implement quantitative methods, such as spatial analysis and hydrological modeling, to evaluate flood mitigation policies more objectively. Policy experimentation, including testing natural drainage systems or combining dredging with embankment construction, could help assess various flood management strategies. Comparative studies of regions that had successfully applied evidence-based mitigation could further improve understanding of best practices in disaster risk management.

Effective flood management in Aceh Singkil required a policy strategy grounded in empirical evidence and focused on long-term sustainability. Local governments should be more receptive to expert advice and minimize the impact of political interests in decision-making. Consequently, the region could become more resilient to future hydrometeorological disasters.

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