

Sustainable Mangrove Management As An Effort to Achieve the Sustainable Development Goals in Donggala Regency

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Abstract: This study addresses ineffective implementation of sustainable mangrove management policies in Donggala Regency in relation to achieving the Sustainable Development Goals (SDGs). The study aims to analyze policy implementation and identify key factors influencing sustainable mangrove governance. A descriptive qualitative approach was employed, with data collected through in-depth interviews, observation, documentation, and literature review. Informants were purposively selected from local government institutions, coastal communities, and environmental organizations. Data analysis used Malcolm L. Goggin et al.'s (1990) policy implementation framework, focusing on policy content, communication structure, and the reputation of implementing actors. The findings indicate that while policy substance is relatively adequate, weaknesses in communication and limited government credibility impede effective implementation, resulting in a greater operational role for local communities and non-governmental organizations. The study concludes that strengthening multi-actor collaboration is crucial for improving sustainable mangrove management and supporting SDG achievement.

Keywords: Actor collaboration; Implementation; Mangrove; sustainable policy; SDGs.

Introduction

Mangroves play a vital role in maintaining the balance of coastal ecosystems. They have the ability to absorb more carbon dioxide (CO₂) compared to other types of vegetation, thus contributing significantly to global climate change mitigation (Mulia et al., 2018). In addition, mangroves function as natural filters that reduce marine pollution, regulate water salinity, and prevent excessive sedimentation (Wahyuni et al., 2021). Their presence also provides habitats for a wide range of fish, mollusks, and migratory birds, which are essential for biodiversity conservation.

However, mangrove ecosystems are currently facing very serious threats. Land conversion for agriculture, settlements, tourism, and infrastructure development are the main causes of mangrove loss. Moreover, water pollution, climate change leading to rising sea levels, and unsustainable fishing practices further exacerbate the condition of these ecosystems (Pramanik et al., 2021). Such pressures negatively affect

ecological balance and reduce the capacity of mangroves to deliver optimal ecosystem services.

Conservation and restoration of mangrove ecosystems have therefore become increasingly important issues. Many countries and international organizations have developed various programs to restore degraded mangrove ecosystems (Zain et al., 2014). One widely applied approach is mangrove reforestation combined with community-based management. Research also demonstrates that mangrove restoration can improve environmental quality, recover habitats for multiple species, and enhance the economic well-being of coastal communities who depend on the ecosystem (Roy, 2019).

Donggala Regency, located in Central Sulawesi Province, has an extensive coastal area that hosts an important mangrove ecosystem. Despite its vast potential, mangroves in Donggala face a range of challenges, including land conversion for settlements and agriculture, uncontrolled logging, and pollution from scattered waste within conservation areas. The degradation of mangroves in this region not only

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threatens the sustainability of the ecosystem but also poses serious risks to communities whose livelihoods depend on mangroves.

In line with global awareness of the importance of sustainable natural resource management, the Indonesian government, including Donggala Regency, has introduced several policies to address mangrove ecosystem degradation. One of these is Regional Regulation Number 02 of 2024 concerning the Facilitation of Sustainable Mangrove Management (PMB). This policy aims to ensure sustainable benefits from mangrove forests for public welfare through protection, utilization, education, research, and community empowerment. The implementation of sustainable mangrove management policies in Donggala Regency is therefore essential, given the potential and strategic role of this ecosystem.

With the increasing threats to mangroves, research on mangrove management and conservation has become highly necessary. This study is expected to make a significant contribution to mangrove preservation efforts, highlight the challenges encountered in policy implementation, and provide recommendations to improve the effectiveness of future mangrove management. Therefore, research on mangroves is not only important in the context of environmental conservation but also in achieving the Sustainable Development Goals (SDGs), particularly those related to ecosystem protection, climate change, and poverty alleviation.

Method

Research Design

This research employs a descriptive method with a qualitative approach. This approach was chosen because it provides an in-depth understanding of sustainable mangrove management policies in Donggala Regency, particularly in relation to the achievement of the Sustainable Development Goals (SDGs). Qualitative research is conducted in natural settings, with the researcher serving as the key instrument; data collection is carried out through triangulation; data analysis is inductive; and the research results emphasize meaning rather than generalization (Sugiyono, 2019). Emphasize that descriptive qualitative research produces data in the form of words or images, which are then described to make them easier to understand (Sugiyono, 2019). Thus, this study is intended to describe and interpret conditions related to sustainable mangrove management policies in Donggala Regency.

Time and Place of Research

The research location was selected in Donggala Regency, Central Sulawesi Province, considering that the mangrove ecosystem in this area is extensive and

plays an important role in climate change mitigation, coastal protection, and the livelihoods of coastal communities. This region is also highly relevant to the achievement of several SDGs, particularly SDG 13 on climate action, SDG 14 on life below water, and SDG 15 on life on land. The research focuses on Banawa and South Banawa Districts, which have distinctive mangrove ecosystem characteristics, are vulnerable to the impacts of climate change, and serve as centers of coastal community activities. In addition, Donggala Regency has significant experience in mangrove restoration efforts following the 2018 earthquake and tsunami, providing an important context for examining the effectiveness of implemented policies.

Data Collection

Data collection was carried out through several complementary techniques. First, in-depth interviews were conducted with various stakeholders, ranging from local government and technical agencies to coastal communities and environmental non-governmental organizations. Second, field observations were conducted to directly observe rehabilitation activities, conservation practices, and community interactions with mangroves. Third, documentation and literature studies were conducted by reviewing policy documents, previous research reports, and statistical data relevant to the mangrove condition in Donggala Regency. The combination of these methods enabled the research to obtain richer and more comprehensive data.

Research informants were selected purposively, based on specific considerations of their competence and involvement in mangrove management. They consisted of policy implementers, such as local government officials and relevant agencies, as well as coastal communities who are the direct beneficiaries of sustainable mangrove management policies. This selection strategy was expected to provide deeper insights into the dynamics of policy implementation in practice.

Data Analysis

To analyze sustainable mangrove management policies, this study applied the policy implementation theory developed by Goggin, Bowman, Lester, and O'Toole (Goggin et al., 1991). This theory emphasizes that the success of policy implementation is strongly influenced by the interaction between policymakers and implementers, which takes place within the framework of effective communication, clear policy content, and the credibility of implementing actors. In the context of this research, the analysis focused on three main indicators: policy content, communication structure, and the reputation of implementing actors. These indicators were used to assess the extent to which mangrove management policies in Donggala Regency support the

achievement of the SDGs, while also revealing existing challenges and opportunities in practice.

Result and Discussion

The Policy of Sustainable Mangrove Management Policy in Donggala Regency

To analyze the extent to which sustainable mangrove management policies in Donggala Regency have been effectively implemented, this study employs the policy implementation framework of Malcolm L. Goggin et al. (Goggin et al., 1991). This theory views implementation as a process shaped by the interaction between policymakers and field implementers, while also being influenced by structural and contextual factors. Three key indicators are used in this analysis: policy content, which assesses the relevance and adequacy of the policy substance; transmission structure, which examines the effectiveness of communication channels among actors; and the reputation of implementing actors, which evaluates the credibility and public trust toward policy implementers

The use of this framework is expected to provide a comprehensive understanding of the factors that support or hinder the implementation of mangrove management policies in Donggala. The findings will serve as the basis for formulating more adaptive, inclusive, and sustainable policy recommendations, strengthening synergies among government, communities, businesses, and non-governmental organizations. Thus, mangrove management in Donggala Regency is expected not only to serve as an instrument of environmental conservation but also as a driver of local economic development in line with the principles of the Sustainable Development Goals (SDGs).

Policy Content

Within the framework of Malcolm L. Goggin et al. (1990), policy content refers to the substantive quality of the implemented policy, including the clarity of its objectives, the suitability of strategies, the completeness of legal instruments, and its relevance to local conditions. This criterion assesses the extent to which a policy is designed to solve existing problems, provides clear operational guidelines, and integrates relevant actors into the implementation process. Comprehensive policy content should not only set targets but also detail mechanisms, roles, and coordination structures needed to achieve those goals.

Based on the research findings, the sustainable mangrove management policy in Donggala Regency is aligned with the SDGs, particularly Goal 13 (Climate Action) and Goal 15 (Life on Land). The policy also emphasizes the importance of protecting, rehabilitating, and sustainably utilizing mangrove ecosystems. As

stipulated in Donggala Regency Regional Regulation (Perda) No. 2 of 2024 on Sustainable Mangrove Management, Chapter 2, Article 3, seven key mandates are outlined: (1) protecting and maintaining the existence and functions of mangroves; (2) restoring and rehabilitating damaged mangrove areas; (3) enhancing the economic benefits of mangroves to improve community welfare and support sustainable development; (4) increasing public knowledge and awareness of the functions and importance of mangroves; (5) strengthening stakeholder capacity in managing and utilizing mangroves in accordance with ecological carrying capacity and scientific data; (6) increasing community participation in mangrove management and utilization; and (7) establishing coastal and small island areas as centers for sustainable mangrove forest conservation.

Furthermore, Chapter 4, Articles 6 and 7 specify the scope of authority and responsibilities delegated to local governments, ranging from the regent to sub-district and village administrations, as explicitly stated in Perda No. 2 of 2024.

However, a fundamental weakness lies in the absence of explicit provisions to establish and strengthen a formal cross-sectoral collaboration forum. The researcher found that in Donggala, particularly in Banawa District and surrounding areas, interactions and coordination occurred only at the communicative level, not as structured collaboration integrated into a formal institutional framework.

The lack of such a collaboration forum has led to policy implementation being carried out sectorally. Local government, NGOs, community groups, universities, and private actors operate with their own agendas without a unified mechanism for goal alignment, role distribution, and joint evaluation. As confirmed by an interview with Mr. Erick, a staff member in the Environmental Office (DLH) of Donggala Regency, who works in the monitoring division, he explained:

"As far as I know, in Donggala there are many mangrove conservation communities, and in my capacity as a monitoring officer at the Environmental Office, I am often invited to attend their activities. From our side, the Environmental Office mainly acts as a supervisor and monitor. As for program implementation, to my knowledge, no regulation has yet been issued by our office. The existing regulations only concern law enforcement against perpetrators of mangrove destruction, such as illegal logging or land conversion into settlements."

Interviews with DLH officials confirmed that numerous community-based organizations are actively engaged in mangrove preservation activities such as planting, environmental campaigns, and ecosystem

advocacy. The DLH representative stated that while they often attend community-led events, the agency's role remains limited to supervision and monitoring rather than program execution. Interestingly, the informant acknowledged that, despite the enactment of Perda No. 2 of 2024 on Sustainable Mangrove Management at the regional level, DLH itself had not yet issued specific regulations or internalized program implementation measures. Instead, their regulatory focus has remained on enforcement actions against violations such as illegal cutting or land conversion. This condition raises a significant debate from the perspective of policy implementation theory. From a top-down approach, as articulated by Malcolm L. Goggin et al. (Lester et al., 1987), the success of policy implementation depends heavily on the clarity and completeness of communication from policymakers to implementers. The fact that DLH, as a key implementing actor, was unaware of Perda No. 2 of 2024 highlights a substantial transmission gap. Although the policy has been formally adopted, without comprehensive socialization, it fails to reach the implementing structure that should serve as the frontline of execution. This indicates that while the policy content exists, weaknesses in the transmission structure obstruct its realization on the ground.

Conversely, from a bottom-up perspective, as advanced by Michael Lipsky through the concept of street-level bureaucracy, this condition suggests that field initiatives are more strongly driven by non-governmental actors, particularly community-based mangrove groups. Even though DLH has yet to assume a role as a formal program implementer, these community initiatives function as the primary drivers of conservation efforts. However, without regulatory backing institutionalized within government agencies, these collaborations remain ad hoc interactions rather than structured partnerships within a strong institutional framework.

This theoretical tension highlights the sharp contrast between the normative existence of policy and its practical effectiveness in implementation. The top-down perspective emphasizes the need for stronger communication and coordination so that enacted policies are known, understood, and executed by all relevant actors. Meanwhile, the bottom-up approach underscores the importance of recognizing and integrating community initiatives into formal policy frameworks. In the case of Donggala Regency, the information gap experienced by DLH reflects the failure to harmonize these two approaches, resulting in policies that, while formally established, are not yet functioning optimally in directing sustainable mangrove management.

Transmission Structure

In the policy implementation theory of Malcolm L. Goggin et al. (Goggin et al., 1991), transmission structure refers to the systems and mechanisms through which policy information is conveyed from policymakers to implementers, as well as among the implementers themselves. Effective communication must be clear, structured, consistent, and accessible to all relevant stakeholders. Ideally, information regarding policy substance should not only be delivered during the initial stage of socialization but also followed by continuous communication mechanisms and feedback channels that allow for clarification, coordination, and synchronization of policy implementation in the field.

Based on the findings, a fundamental weakness was identified in the communication structure of implementing Regional Regulation (Perda) No. 2 of 2024 on Sustainable Mangrove Management (PMB) in Donggala Regency. One indicator of weak communication is the fact that several related offices and technical agencies were unaware of the regulation's existence. A communication gap was also found between the regency and village levels. Many village officials, coastal community groups, and technical implementers (such as the Environmental Office and the Marine and Fisheries Office of Donggala Regency) were not fully informed about the content and policy direction of the regulation.

This situation creates confusion regarding authority, priorities, and implementation procedures. As revealed by the Head of the Environmental Office of Donggala Regency, Mrs. Dra. Aritatriana, M.Si., during an interview conducted at the DLH office:

"We are also confused about whether mangrove management or conservation falls under the responsibility of which local government agency. At DLH, our role has mostly been limited to providing environmental education to the public in general. As for specific mangrove management, we are still uncertain about this responsibility. In fact, we believe that mangrove management has been more of a responsibility of non-governmental mangrove advocacy communities."

She further added:

"To our knowledge, no official regulation has been issued by the local government specifically regarding mangrove management. So far, the only activities have been programs related to commemorations of national days, such as during the National Police Day, where we were invited to participate in mangrove planting in several coastal areas. Last year, there was also a program from the central government that provided funding for mangrove management, but we passed it on to community groups or organizations working in

environmental advocacy, including mangrove-related initiatives."

The researcher also confirmed this with the Marine and Fisheries Office of Donggala Regency, where a similar response was obtained. According to Mrs. Nirmala, S.Pi.:

"For mangrove conservation matters, we leave it to the mangrove advocacy communities, since Donggala has many of them. Our office mainly carries out public awareness campaigns on the benefits of mangrove conservation and the risks of disasters such as abrasion if the ecosystem is damaged."

This view was consistent with that of Mr. Samarta, S.Hut., from the Forestry Office (Forest Protection and Nature Conservation Division), who stated:

"Regarding mangrove ecosystem conservation, our role is mostly in providing seedlings, while the management is usually carried out by local communities organized in environmental advocacy groups, particularly mangrove-focused ones. As for specific regulations on mangrove management, I am not aware of any—it seems none exist yet."

These accounts indicate that despite the relatively clear technical guidelines outlined in Perda No. 2 of 2024, related agencies such as the Environmental Office of Donggala, the Marine and Fisheries Office of Donggala, and the Forestry Office of Central Sulawesi Province were not specifically aware of the regulation. They were only aware of general advisories from the central government regarding mangrove conservation, such as planting and rehabilitation, but not of the regulation itself—an issue confirmed by both the Head of DLH and the Marine and Fisheries Office.

A similar observation was shared by Mr. Hendra, Head of the Sahabat Mangrove Tanjung Batu community group, who said:

"I have heard about the sustainable mangrove management facilitation policy, I believe since 2024. However, we are still not certain about its instructions. Our group has been implementing programs based on our own initiative. As for training, we were once invited to an event organized by mangrove advocacy volunteers from Australia, held in Bali, where we also promoted our MSME products such as coffee, cakes, and powder made from mangroves."

The interview with the Sahabat Mangrove Tanjung Batu community revealed that while they had heard of the policy since 2024, their knowledge remained general, with no detailed understanding of its contents or directives. Nevertheless, they continued implementing conservation programs based on group initiative, independent of government directives. They were also actively engaged in external capacity-building activities, such as training by Australian mangrove volunteers,

while promoting mangrove-based local products, demonstrating sustainable coastal resource utilization.

From the perspective of Malcolm L. Goggin et al.'s policy implementation theory, this reflects a clear transmission gap in the communication structure. Although the policy was formally enacted through Perda No. 2 of 2024, information about its content and implementation mechanisms has not been fully conveyed to key actors, particularly community-based mangrove groups. From a top-down perspective, this gap represents a fundamental weakness in policy communication, since all stakeholders should ideally have comprehensive information to align their activities with policy objectives. Without detailed understanding, communities will act based on their own initiatives, potentially misaligned with the official policy direction. On the other hand, from a bottom-up perspective, as described by Michael Lipsky's concept of street-level bureaucracy, this situation demonstrates how community and grassroots initiatives can continue despite incomplete policy dissemination. The independent programs and MSME product development by local communities show their capacity for sustainable resource management. However, without well-distributed policy support, collaboration between communities and government actors remains informal and lacks institutional grounding.

This theoretical debate underscores the contrast between the top-down model, which prioritizes formal instructions, clear regulations, and planned coordination, and the bottom-up model, which emphasizes community initiative and flexibility. In the case of Donggala, the fact that community groups have only general knowledge of the mangrove policy highlights the lack of integration between the two approaches. To maximize policy effectiveness, more open, structured, and participatory communication is required so that community initiatives can be directed and strengthened within the framework of the official regulation.

At the village government level, the researcher also interviewed Mr. Rusdin, a village official in South Banawa, who stated:

"As far as we know, there has been no official government policy on mangrove management. The programs that exist usually come from community groups, who often receive direct grant funding from the central government for mangrove conservation initiatives."

This highlights the ambiguity and diffusion of responsibility regarding the sustainable mangrove management policy, as relevant agencies deflect responsibility, leaving local communities to assume the key implementation role. Yet, the policy's substance clearly specifies the institutions that should be involved.

This situation shows that policy information dissemination has not reached all implementers and stakeholders. The lack of formal socialization, the absence of systematic policy document distribution, and the failure to establish regular cross-sector coordination mechanisms are the primary causes of this information gap.

The consequences of weak information distribution are significant. Agencies unaware of the regulation struggle to integrate it into their programs and budget planning, resulting in uneven implementation and potential policy overlaps. In mangrove management, which requires cross-sector synergy, the unawareness of some implementing actors undermines coordination and overall effectiveness.

From Goggin's theoretical lens, this indicates a transmission gap not only as a technical issue but also as an institutional one, exposing the lack of formal procedures to ensure consistent, timely information for all stakeholders. Policy communication should ideally be conducted through formal, documented channels such as circular letters, inter-agency coordination meetings, official government publications, and the use of information technology to disseminate policy documents.

By strengthening the transmission structure, the implementation of Perda No. 2 of 2024 in Donggala Regency could become more consistent, coordinated, and inclusive. This step would also ensure that all stakeholders share a common understanding, enabling them to contribute optimally to sustainable mangrove management and the achievement of the SDGs.

Reputation of Implementing Actors

In the perspective of policy implementation theory developed by Malcolm L. Goggin et al. (1990), the indicator of Reputation of Implementing Actors refers to the level of trust and credibility that policy implementers hold in the eyes of the community and other stakeholders. This reputation greatly influences the extent to which a policy can be accepted, supported, and effectively carried out in practice.

The findings show that the implementation of Donggala Regency Regional Regulation No. 2 of 2024 on the Facilitation of Sustainable Mangrove Management faces significant obstacles with regard to the reputation of implementing actors. Coastal communities place greater trust in local organizations such as WALHI Central Sulawesi and mangrove advocacy groups like Sahabat Mangrove Tanjung Batu Community, Bonebulu Foundation, Mangrove Farmers Group, and KEHATI Foundation, compared to local government institutions, which are perceived as less active and less responsive in supporting the regulation's implementation.

Interviews with several community figures indicate that local organizations such as WALHI, Sahabat Mangrove, KEHATI Foundation, Bonebulu Foundation,

and the Mangrove Farmers Group have consistently been present within communities through activities such as education, mangrove rehabilitation training, and advocacy against environmental destruction. Their reputation has been built through a long track record of directly engaging with communities, understanding local contexts, and applying participatory approaches. This has created strong social legitimacy and positioned them as trusted actors in coastal environmental conservation.

In contrast, local government—particularly technical agencies—are often perceived as unresponsive, appearing only sporadically in formal forums. Limited field monitoring, delays in responding to reports of mangrove destruction, and weak involvement in rehabilitation activities have further undermined the government's image. Several informants even noted that the government's presence was more visible during ceremonial events than in situations requiring conflict resolution or technical assistance. As stated by Mr. Jamal, a resident of Donggala Regency:

"We see that those who really care about the condition of mangrove forests and the surrounding environment, especially in coastal areas, are only the advocacy groups formed from the initiatives of local communities. As for the local government, it seems they are more focused on large-scale policies or political interests."

The interview findings highlight a higher level of trust among coastal communities toward grassroots environmental groups, especially those established through community initiatives. According to respondents, genuine concern for mangrove forests and the coastal environment is more evident in the direct actions of these groups than in local government initiatives. In their view, the government tends to concentrate on drafting large-scale policies or engaging in political agendas, while direct involvement in conservation practices on the ground is rarely felt by local communities. This indicates a perception gap and social distance between government actors as policymakers and communities as beneficiaries and guardians of the ecosystem.

From the perspective of Malcolm L. Goggin et al.'s policy implementation theory (1990), this phenomenon is closely tied to the indicator of reputation of implementing actors. Reputation in this context is not determined solely by formal authority but also by the level of public trust in the commitment and performance of implementers in the field. Greater trust in advocacy groups compared to local government suggests that the government has yet to build a positive image through concrete actions directly felt by coastal communities. From a top-down perspective, this represents a serious obstacle, as low public trust undermines the legitimacy

of government institutions in coordinating policy implementation, including sustainable mangrove management.

On the other hand, from a bottom-up perspective, which emphasizes the role of local actors and grassroots initiatives, high levels of trust in advocacy groups represent an important form of social capital. These groups have been able to fill the gaps left by government inaction, carrying out real actions such as mangrove planting, monitoring destructive activities, and conducting public education. However, without structured integration between local government and community groups, conservation efforts risk becoming fragmented, with overlapping or unsustainable programs.

Conclusion

Based on the findings, the implementation of sustainable mangrove management policies in Donggala Regency is influenced not only by policy content, communication structure, and the reputation of implementing actors, as proposed by Goggin et al. (1990), but also by the level of actor collaboration. This study achieves its objective by demonstrating that effective policy implementation requires active and structured collaboration among multiple stakeholders, including government institutions, communities, NGOs, universities, and the private sector. The absence of institutionalized collaboration has limited policy effectiveness, despite relatively clear policy substance and credible actors. Therefore, this study introduces actor collaboration as an additional indicator that complements Goggin's policy implementation framework. Strengthening collaborative mechanisms, such as a sustainable mangrove management forum, is essential to enhance policy implementation and support the achievement of the Sustainable Development Goals (SDGs).

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Author Contributions

The author was solely responsible for the conceptualization of the study, research design, data collection, data analysis, interpretation of results, and manuscript preparation

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Conflicts of Interest

The author declares no conflict of interest related to the conduct and publication of this research.

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