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Public Policy Analysis of Household Waste Management and Coastal Environmental Sustainability in Tallo District, Makassar, Indonesia

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Abstract

This study aims to analyze the implementation of household waste management policies and their implications for coastal environmental sustainability in Tallo District, Makassar City. The problem of domestic waste in urban coastal areas is becoming an increasingly complex environmental issue due to population growth, coastal urbanization, and limitations in environmental management systems. This study used a qualitative approach with a case study design to understand the dynamics of policy implementation, community participation, and coastal environmental conditions in depth. Data collection was conducted through in-depth interviews, field observations, and documentation. Research informants included government officials, environmental agencies, community leaders, environmental communities, fishermen, and coastal communities selected using purposive sampling techniques. Data analysis was conducted interactively using the Miles, Huberman, and Saldaña model through data condensation, data presentation, and conclusion drawing. The results indicate that the implementation of household waste management policies in Tallo District is still not optimal due to limited waste infrastructure, weak regulatory oversight, low institutional capacity, and minimal community participation. These conditions have led to increasing coastal environmental pollution, characterized by the accumulation of domestic waste in coastal areas, drainage channels, and river estuaries. This study also found that local community participation and waste bank programs positively contributed to increasing public environmental awareness. The study concluded that household waste management in urban coastal areas requires a collaborative, participatory, and socio-ecological sustainability-oriented environmental governance approach.

Introduction

The problem of household waste has become one of the most complex environmental challenges in urban areas worldwide, particularly in developing countries experiencing rapid population growth and urbanization. Increased domestic activities, consumer consumption, and changes in urban lifestyles have led to a continuous increase in waste volume each year. The United Nations Environment Programme (UNEP) confirms that domestic waste pollution, particularly plastic waste, has developed into a global environmental crisis that threatens the sustainability of terrestrial and coastal ecosystems (Islam et al., 2024). This situation not only impacts environmental quality but also has widespread social, economic, and public health consequences.

In many developing countries, waste management systems still face various limitations, ranging from low institutional capacity, a lack of waste infrastructure, weak regulatory oversight, and low public participation in environmental management (Herdianto, 2024).

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This situation is further complicated in urban coastal areas with high population densities and significant ecological pressures. Coastal areas are inherently vulnerable to environmental pollution due to the accumulation of domestic waste from urban activities and river flows (Akbar & Pratiwi, 2023). When waste management systems are ineffective, coastal areas become the final point of waste disposal, directly impacting marine ecosystems and coastal environmental sustainability.

The concept of coastal environmental sustainability is currently a strategic issue on the global development agenda, particularly following the ratification of the Sustainable Development Goals (SDGs), which place the protection of marine ecosystems and coastal areas as a crucial component of sustainable development (Nurhati & Murdiyarso, 2023). The SDG targets emphasize the importance of reducing marine pollution, improving waste management, and strengthening community-based environmental governance. In this context, household waste management is no longer seen as merely an urban sanitation issue, but rather as part of an environmental governance strategy to maintain the socio-ecological sustainability of coastal areas (Armi, 2026).

As an archipelagic nation, Indonesia faces significant challenges in waste management, particularly in urban coastal areas. Rapid urbanization has led to an increase in the volume of domestic waste that is disproportionate to environmental management capacity. Data from the Ministry of Environment and Forestry shows that the majority of urban waste in Indonesia is still dominated by household waste, with suboptimal management (Kurniawan & Fuaddah, 2024). Furthermore, Indonesia is also one of the world's largest contributors to marine plastic waste due to poor domestic waste management systems and low recycling rates (Faustine, 2022).

This situation is evident in various coastal cities in Indonesia, including Makassar, one of the largest urban growth centers in eastern Indonesia. Economic growth and residential expansion in Makassar have increased pressure on the coastal environment, particularly in Tallo District, known for its dense population and high domestic and coastal economic activity. This area faces serious problems related to household waste accumulation, drainage pollution, sedimentation, and coastal environmental degradation.

As an urban coastal area, Tallo District is characterized by high environmental vulnerability. Dense residential areas limited open space, and limited access to waste disposal facilities mean that some people still dispose of waste directly into rivers and coastal areas (Maysira et al., 2026). This situation exacerbates environmental pollution and increases the risk of flooding, public health problems, and damage to marine ecosystems (Nurholis & Mokodompit, 2024). These problems demonstrate that waste management in coastal areas is not solely related to individual behavior but also closely linked to the effectiveness of public policies and local environmental governance capacity.

The Indonesian government has issued various regulations related to waste management and environmental protection, such as Law Number 18 of 2008 concerning Waste Management and various derivative policies regarding community-based waste reduction. These policies emphasize the importance of the principles of reduce, reuse, and recycle (3R), strengthening community participation, and developing sustainable waste management systems. However, in practice, policy implementation at the local level still faces various structural barriers such as budget constraints, lack of coordination

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between institutions, inadequate infrastructure, and weak environmental oversight (Samhaji & Anggara, 2025).

From a public policy perspective, the effectiveness of policy implementation is greatly influenced by institutional capacity, policy communication, resources, and the level of public compliance (Erinaldi et al., 2025). Good environmental policies will not be optimally implemented without the support of effective governance and strong social participation. Therefore, analyzing household waste management policies is necessary not only to identify the existence of formal regulations, but also to understand how these policies are implemented, accepted, and implemented by communities at the local level.

Beyond policy aspects, a collaborative governance approach is also crucial in coastal environmental management. Sustainable waste management requires collaboration between the government, the public, local communities, the informal sector, and environmental organizations (Anyanwu et al., 2025). Experiences from various cities show that successful waste reduction is significantly influenced by public involvement in community-based waste management practices such as waste banks, recycling activities, and environmental education (Fadilah et al., 2026). Thus, the sustainability of coastal environments depends not only on government policies but also on the ability to build collective public awareness of the importance of environmental protection.

Previous research on waste management in Indonesia has generally focused on technical aspects of waste management, community behavior, or environmental sanitation. Meanwhile, studies specifically integrating public policy analysis with coastal environmental sustainability are still relatively limited, particularly in the context of coastal urban areas in eastern Indonesia. Yet, coastal areas like Tallo District have distinct socio-ecological complexities compared to other urban areas due to the interaction between dense settlements, coastal economic activity, and marine environmental vulnerability.

Based on these conditions, this study is crucial for analyzing how the implementation of household waste management policies impacts the sustainability of the coastal environment in Tallo District, Makassar. This research not only evaluates the effectiveness of public policies but also examines the relationship between environmental governance, community participation, and the ecological conditions of coastal areas. Using a mixed-methods approach, this study is expected to provide a more comprehensive picture of the challenges of waste management in urban coastal areas and generate policy recommendations based on environmental sustainability and community-based environmental governance.

Academically, this research is expected to strengthen the development of public policy and environmental governance studies in the context of coastal waste management. Practically, the research results are expected to provide strategic input for local governments and stakeholders in formulating more effective, participatory, and sustainable waste management policies oriented towards coastal environmental sustainability in Makassar City.

Methods

Research Approach and Type

This research uses a qualitative approach with a case study. This qualitative approach was chosen because this study aims to understand in-depth the implementation of public

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policies related to household waste management and their impact on coastal environmental sustainability in Tallo District, Makassar City. This approach allows researchers to explore social phenomena, community behavior, environmental governance, and policy dynamics contextually based on the experiences and perspectives of informants.

This case study research method was used because Tallo District has complex social and ecological characteristics as an urban coastal area with high population density, a serious domestic waste problem, and significant coastal environmental vulnerability. Case study research allows researchers to conduct in-depth exploration of empirical conditions in the field, thus generating a comprehensive understanding of waste management policy implementation and coastal environmental sustainability.

Research Location

This research was conducted in Tallo District, Makassar City, South Sulawesi. The location was selected purposively, considering that Tallo District is an urban coastal area facing significant household waste management and coastal environmental pollution issues. This area also has a high residential density, intensive domestic activities, and drainage conditions and coastal areas that are vulnerable to waste accumulation.

Furthermore, Tallo District faces complex environmental issues related to coastal urbanization, limited waste management infrastructure, and the community's high dependence on coastal resources. These conditions make this area relevant for analyzing the implementation of waste management policies and sustainable environmental governance.

Research Informants

Informants in this study were selected using a purposive sampling technique based on their involvement, experience, and knowledge of household waste management and environmental policies in the study area. Informants included sub-district and village government officials, officials from the environmental agency, waste bank managers, community leaders, environmental communities, coastal fishermen, and households living in the coastal areas of Tallo District.

To obtain more in-depth information, this study also employed a snowball sampling technique. This technique involved requesting recommendations from key informants regarding other individuals deemed relevant to the research focus. This allowed the data collection process to evolve according to information needs in the field.

Data Collection Techniques

Data collection was conducted through in-depth interviews, field observations, and documentation. These three techniques were used to obtain comprehensive data on the implementation of household waste management policies and the sustainability of the coastal environment.

In-Depth Interviews

In-depth interviews were conducted semi-structured using interview guidelines developed based on the research focus. The interviews aimed to gather information on the implementation of waste management policies, the effectiveness of waste services,

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community participation, environmental governance barriers, and community perceptions of coastal environmental conditions.

A semi-structured approach was used to allow researchers flexibility in developing questions during the interview process. This method allowed informants to provide broader explanations based on their experiences and perspectives regarding environmental management in Tallo District.

Field Observations

Field observations were conducted directly in coastal residential areas, drainage channels, temporary waste disposal sites, and coastal areas experiencing domestic waste pollution. The observations aimed to understand the actual state of waste management, community behavior regarding waste disposal, and the environmental impacts on coastal areas.

During the observation process, researchers recorded various social and ecological phenomena related to environmental sustainability, including environmental cleanliness, waste collection systems, and community activities in coastal areas.

Documentation

Documentation was used as supporting data to strengthen the results of interviews and observations. The documents analyzed included waste management regulations, local government reports, waste data, environmental program documents, photographs of field conditions, and archives of environmental community activities in Tallo District.

Documentation analysis was conducted to understand government policies, waste management program implementation strategies, and forms of community involvement in supporting coastal environmental sustainability.

Data Validation Techniques

Data validity in this study was ensured through source triangulation and method triangulation techniques. Source triangulation was conducted by comparing information obtained from various informants, such as local government officials, community members, environmental communities, and coastal fishermen. Meanwhile, method triangulation was conducted by comparing the results of interviews, observations, and documentation to ensure data consistency.

In addition to triangulation, this study also utilized member checking techniques by reconfirming interview results and data interpretation with several key informants. This step was taken to ensure that the researcher's interpretations aligned with the experiences and perspectives of informants in the field.

Data Analysis Techniques

Data analysis was conducted interactively using the Miles, Huberman, and Saldaña model, which consists of data condensation, data presentation, and conclusion drawing. The analysis process was carried out continuously from data collection until the research was completed.

In the data condensation stage, the researcher selected, simplified, and categorized data based on research themes such as policy implementation, community participation,

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household waste management, and coastal environmental sustainability. The categorized data was then systematically organized to facilitate interpretation.

The data presentation stage was conducted in the form of descriptive narratives and thematic interpretations to illustrate the relationship between public policy, community behavior, and coastal environmental conditions. Furthermore, conclusions were drawn through in-depth interpretation of the social, institutional, and ecological patterns identified during the research.

This study also used a thematic analysis approach to identify key themes emerging from interviews and observations. These themes are then analyzed using the theoretical perspectives of public policy implementation, collaborative governance, and sustainable environmental governance to understand the dynamics of waste management and coastal environmental sustainability comprehensively.

Results

Implementation of Household Waste Management Policy

The results indicate that the implementation of household waste management policy in Tallo District, Makassar City, still faces various structural and social challenges that affect the effectiveness of coastal environmental management. Normatively, the local government has regulations and waste management programs that refer to the national policy on community-based waste reduction and management (Wirata & Sudiarawan, 2025). However, in practice, policy implementation at the local level has not been optimal due to limited infrastructure, weak oversight, and low community participation in domestic waste management.

Based on field observations, many households still dispose of waste directly into drainage channels, rivers, and coastal areas. This situation is particularly prevalent in densely populated residential areas with limited access to waste collection services. Researchers also found accumulations of waste in several coastal areas, indicating that the waste management system is unable to accommodate the increasing volume of domestic waste in coastal urban areas.

Interviews with sub-district government officials revealed that one of the main obstacles to policy implementation is limited waste management facilities and infrastructure. An informant from the sub-district government explained:

> *"Actually, a waste management program already exists and outreach is often conducted, but our biggest obstacle is the limited number of waste collection vehicles. Many coastal areas are difficult to reach, so waste often piles up before being collected."*

In addition to limited infrastructure, the study also found that monitoring of community waste disposal behavior is relatively weak. Although regulations prohibiting littering exist, the implementation of sanctions in the field has not been consistent. As a result, some residents still consider dumping waste into rivers or the sea to be a common practice, especially in coastal residential areas that have long experienced limited waste collection services.

A coastal community leader revealed that the habit of dumping waste into the sea has been going on for quite some time and is difficult to change without adequate facilities. The informant stated:

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"People actually know that throwing waste into the sea is bad, but sometimes they have no choice because trash bins are far away and collection is irregular. In the end, many just dump it in canals or directly onto the beach."

This study also shows that the level of community participation in waste management programs remains low to moderate. Most households do not routinely sort their waste and are not active in recycling activities or waste banks. This low participation is influenced by a lack of environmental education, minimal program assistance, and a low collective awareness of the impact of waste pollution on the coastal environment.

However, in several areas, local community initiatives have been found to encourage community-based waste management practices through community service activities, environmental education, and the development of waste banks. The presence of these communities has had a positive impact on increasing public awareness of the importance of maintaining a clean coastal environment.

One waste bank manager explained:

"If the community is given ongoing support, they will actually participate in sorting their waste. In our area, housewives have started actively saving plastic waste because they see the economic benefits."

From an institutional perspective, the study found that inter-agency coordination in implementing waste management policies is still suboptimal. Environmental management programs often operate sectorally and are not fully integrated between sub-district and village governments and the environmental agency. Furthermore, limited regional budgets also impact the government's capacity to provide adequate waste management facilities for densely populated coastal areas.

Interviews with environmental agency officials revealed that the increasing volume of household waste in coastal areas poses a major challenge for city governments. The informant stated:

"Population growth in coastal areas is quite rapid, while waste management capacity has not developed significantly. This has led to many areas experiencing waste overload, especially in densely populated coastal areas like Tallo."

Overall, the research results indicate that the implementation of household waste management policies in Tallo District still faces various obstacles, both in terms of infrastructure, institutions, and community behavior. This situation indicates a gap between formal policies and implementation practices in the field. Therefore, strengthening institutional capacity, improving waste management services, environmental monitoring, and strengthening community participation are important factors in increasing the effectiveness of waste management policies and supporting coastal environmental sustainability.

Level of Community Participation

The research results indicate that the level of community participation in household waste management in Tallo District, Makassar City, remains in the low to moderate category. Community participation appears uneven across coastal areas, particularly in densely populated residential areas with limited access to waste management services and minimal environmental education. Most residents still view waste management as

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the primary responsibility of the government, resulting in less-than-optimal active involvement in maintaining environmental cleanliness (Fidia et al., 2026).

Based on field observations, researchers found that some households still do not routinely separate organic and inorganic waste. Household waste is generally dumped in one place without any sorting process, then dumped into temporary storage areas or even directly into drainage channels and coastal areas. This situation indicates that public awareness of the importance of sustainable waste management is still relatively limited.

Interviews with coastal communities indicate that low community participation is influenced by a lack of outreach and support for environmental programs from the government and relevant institutions. One resident stated:

> *"We rarely receive education on proper waste management. Sometimes there are outreach sessions, but they aren't regular, so people don't fully understand how to sort and manage household waste."*

In addition to education, the study also found that limited waste management facilities contribute to low community involvement in waste management. Several residents stated that the lack of trash bins and irregular collection schedules led people to choose to dispose of waste in more accessible locations, such as canals or coastal areas.

An informant from a coastal area explained:

> *"If the trash bins are full or the garbage trucks arrive late, many residents end up dumping their trash on the beach or in waterways because they have no other choice."*

However, this study also found that community participation is starting to develop through community-based activities. In some areas, communities collectively clean coastal areas and drainage channels to reduce waste accumulation. These activities are usually carried out through community-based work with village officials, youth groups, and local environmental communities.

A community leader explained:

> *"During the rainy season, we usually work together to clean the canals because if the trash piles up, it can cause flooding. So, people are starting to realize that environmental cleanliness also impacts their own lives."*

In addition to community-based work, the existence of waste banks has also begun to encourage increased community participation, particularly among housewives. The waste bank program provides economic incentives for people to separate plastic and recyclable waste, gradually building environmental awareness based on economic benefits.

The waste bank manager explained:

> *"Initially, people weren't interested in sorting their waste, but after they learned that plastic waste could be saved and generated income, community participation began to increase, especially among housewives."*

However, the level of community participation still faces various social and cultural obstacles. Some communities still have long-standing habits of littering that are difficult to change quickly. Low collective awareness and weak social control contribute to the

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persistence of environmentally unfriendly waste disposal practices in several coastal areas.

This study also shows that community participation tends to be higher in areas with active community environmental support and local government support. Areas that regularly receive environmental education and empowerment programs exhibit relatively better cleanliness than areas with minimal social intervention.

Coastal Environmental Sustainability

Research results indicate that the sustainability of the coastal environment in Tallo District, Makassar City, is facing significant ecological pressure due to increasing household waste pollution and weak environmental management. Coastal areas, which should serve a vital ecological function as a buffer for marine ecosystems, fisheries catchment areas, and social spaces for coastal communities, are experiencing a decline in environmental quality, characterized by the accumulation of domestic waste, waterway pollution, and coastal area degradation (Subur et al., 2025).

Based on field observations, researchers found accumulations of plastic waste, organic waste, and mixed domestic waste along the coastline, river estuaries, and drainage channels that empty into the sea. This waste not only disrupts the aesthetics of the coastal environment but also causes blockages in water flow, increasing the risk of flooding in densely populated residential areas. The polluted environmental conditions indicate that the sustainability of the coastal area in Tallo District is under significant pressure due to domestic activities and limited waste management systems.

A coastal community member explained the environmental conditions they experience daily:

> *"When the tide is high or during the rainy season, trash from canals and homes is usually washed ashore. Sometimes the beaches are full of plastic and household waste, making the environment look very dirty."*

In addition to visual pollution, research has also found ecological impacts on coastal water quality. The increasing accumulation of domestic waste has caused the water in several coastal areas to appear murky and polluted. Household waste entering the sea has the potential to disrupt the balance of coastal ecosystems, including the habitats of fish and other marine life.

A local fisherman explained that coastal pollution is starting to affect the community's fishing activities:

> *"Nowadays, fish catches have decreased compared to before. Sometimes our nets catch more plastic waste than fish, especially around estuaries."*

This research also shows that coastal environmental sustainability is not only related to ecological conditions but also has a direct impact on social and public health aspects. Polluted coastal environments increase the risk of environmental-related diseases such as respiratory disorders, skin diseases, and poor sanitation due to poor environmental quality. Furthermore, the accumulation of waste in drainage channels and coastal areas increases the potential for waterlogging and flooding during heavy rainfall.

One resident said:

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"If the drainage channels are clogged with trash, water quickly overflows into people's homes. The smell of trash is also very disturbing, especially in hot weather."

Although coastal environments face significant pressure, the research found that local communities are making efforts to maintain environmental sustainability through community-based activities like cleaning beaches and waterways. Some environmental communities have begun actively educating people about the dangers of plastic waste to marine ecosystems and the importance of maintaining coastal cleanliness.

A member of the environmental community explained:

"We often conduct beach cleanups with local residents and youth. The goal is to raise public awareness that waste thrown into the ocean ultimately impacts their own lives."

However, these efforts still face limitations due to the high volume of household waste and low awareness among some residents about the importance of coastal environmental sustainability. This research shows that environmental issues in Tallo District are multidimensional, related not only to individual behavior but also to environmental governance, waste infrastructure, coastal urbanization, and the institutional capacity of local governments.

From a sustainability perspective, the condition of the coastal environment in Tallo District demonstrates an imbalance between urban development activities and the environment's capacity to accommodate domestic waste. The growth of coastal settlements, unaccompanied by a strengthened environmental management system, has led to increased pressure on coastal ecosystems and a decline in the quality of the community's living environment.

Factors Inhibiting Policy Implementation

Table 1. Supporting and Inhibiting Factors in Household Waste Management Policy Implementation

Factor	Role in Policy Implementation	Evidence from the Study	Effect on Coastal Sustainability
Waste management infrastructure	Major supporting requirement, but currently inadequate	Limited waste collection vehicles, disposal facilities, and access to collection services	Increases waste accumulation in coastal areas, drainage channels, and waterways
Government budget capacity	Determines the government's ability to provide facilities and programs	Limited funding restricts infrastructure development and environmental education	Reduces the coverage and continuity of waste management programs
Regulatory supervision and enforcement	Ensures community compliance with waste regulations	Regulations exist, but monitoring and sanctions are inconsistent	Allows littering and illegal disposal to continue
Institutional capacity	Supports effective implementation and service delivery	Local institutional capacity has not developed in line with	Creates an implementation gap

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		increasing waste volumes	between policy and field conditions
Community participation	Important supporting factor for sustainable waste management	Participation remains low to moderate, but improves through community activities and waste banks	Higher participation contributes to better environmental awareness and cleanliness
Environmental education and outreach	Builds knowledge and sustainable waste-disposal behavior	Education programs are irregular and unevenly distributed	Limited education contributes to low awareness and poor waste-sorting practices
Waste bank programs	Positive community-based supporting factor	Waste banks encourage households, particularly housewives, to sort recyclable waste through economic incentives	Strengthens participation, waste sorting, and environmental awareness
Inter-agency coordination	Supports integrated policy implementation	Coordination between sub-district, village governments, and environmental agencies remains suboptimal	Sectoral programs reduce implementation effectiveness
Coastal urbanization and population growth	External pressure on the waste management system	Increasing population and dense settlements increase household waste volumes	Intensifies pressure on coastal ecosystems and waste services

Table 1. indicates that the implementation of household waste management policy in Tallo District is influenced by a combination of supporting and inhibiting factors. Community participation and waste bank programs emerge as important supporting factors because they encourage waste sorting, increase environmental awareness, and strengthen community involvement in waste management. However, these positive initiatives remain constrained by inadequate waste management infrastructure, limited budget capacity, weak regulatory supervision and enforcement, insufficient institutional capacity, irregular environmental education, and suboptimal inter-agency coordination. In addition, coastal urbanization and population growth increase the volume of waste and intensify pressure on coastal environmental conditions. Overall, the findings suggest that effective waste management policy implementation requires not only stronger government capacity and infrastructure, but also continuous community empowerment, environmental education, regulatory enforcement, and collaboration among relevant stakeholders.

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The figure shows that limited waste management infrastructure and low community participation are the most prominent factors affecting policy implementation in Tallo District. Inadequate collection facilities, weak regulatory supervision, limited institutional capacity, and insufficient environmental education further constrain effective waste management. Meanwhile, community-based initiatives and waste bank programs provide important support by increasing environmental awareness and encouraging waste sorting. Overall, the findings reveal an implementation gap between formal policy and practice, indicating the need for improved infrastructure, stronger institutional capacity, consistent enforcement, continuous environmental education, and greater community participation.

Research results indicate that the implementation of household waste management policies in Tallo District, Makassar City, still faces various inhibiting factors, including structural, institutional, social, and environmental factors. These obstacles prevent the waste management policy from optimally supporting coastal environmental sustainability (Amali et al., 2025). Although the local government has waste management regulations and programs, implementation at the community level still faces various limitations that impact the effectiveness of policy implementation.

One of the main factors identified in this study is limited waste infrastructure. Based on observations, waste management facilities in coastal areas remain inadequate, particularly regarding the number of temporary disposal sites, waste collection vehicles, and access to waste collection services in densely populated areas. Some coastal areas are even difficult for waste collection vehicles to reach due to narrow roads and dense population density.

A sub-district government official explained:

> *"Our biggest obstacle is the very limited waste collection facilities. The available vehicles are not commensurate with the volume of household waste that continues to increase daily."*

In addition to limited facilities, the study also found that low-budget capacity is a significant obstacle to environmental policy implementation. Local governments face limited funding for waste management facilities, landfill management, and public

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education programs. As a result, various waste management programs often operate on a limited basis and fail to reach all coastal areas in Tallo District.

An environmental agency official stated:

> *"The environmental management budget is actually still very limited compared to the needs on the ground. Meanwhile, the volume of waste continues to increase due to population growth and the activities of coastal communities."*

Another inhibiting factor is weak supervision and enforcement of regulations related to waste disposal. Research shows that although there are regulations prohibiting littering, the implementation of sanctions for violations is still inconsistent. This situation causes some people to continue dumping waste into rivers, canals, and coastal areas without any deterrent effect.

A community leader explained:

> *"The regulations are actually in place, but there's a lack of oversight. So people feel that littering isn't a big problem because there are rarely any firm actions."*

In addition to institutional aspects, the research also found that low public awareness is a significant social barrier. Some people still have long-standing habits of littering. This lack of understanding of the impacts of environmental pollution means that waste management has not been a priority in the daily lives of coastal communities.

One resident stated:

> *"Some people still think that waste thrown into the sea will be carried away by the current. So, awareness of environmental protection is still lacking."*

The lack of education and outreach for environmental programs also contributes to low community participation. Research shows that outreach regarding waste sorting, recycling, and sustainable environmental management has not been conducted routinely and evenly. As a result, the public does not yet fully understand the importance of sustainable waste management.

A waste bank manager explained:

> *"If the community continues to receive education and support, they can actually change. But the problem is that outreach activities are often not sustainable."*

This study also found obstacles to inter-agency coordination in the implementation of waste management policies. Environmental management programs still tend to be sectoral, resulting in sub-optimal coordination between sub-district and village governments and related agencies. This condition often results in overlapping or incomplete program implementation.

Furthermore, coastal urbanization and the growth of informal settlements contribute to increasing pressure on the environmental management system. Population growth in coastal areas has significantly increased the volume of household waste, while waste management capacity has not developed commensurately. As a result, waste overload has occurred in several coastal areas, worsening environmental conditions.

A coastal fisherman explained:

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"The population is now increasing, and houses are becoming more crowded. Waste is increasing, but management remains the same as before, making the coastal environment increasingly dirty."

The research results indicate that the obstacles to implementing waste management policies in Tallo District are multidimensional and interconnected, involving factors such as infrastructure, institutions, budgets, community behavior, and the pressures of coastal urbanization. This situation suggests that the success of waste management policies depends not only on the existence of formal regulations but also requires the support of strong institutional capacity, effective oversight, community participation, and the strengthening of sustainable environmental governance.

Household Waste Management Policy Implementation and Coastal Environmental Sustainability

This study aims to analyze the implementation of household waste management policies and their implications for coastal environmental sustainability in Tallo District, Makassar City. Based on the results, it was found that the implementation of waste management policies in urban coastal areas still faces various structural, institutional, and social challenges, which prevent the policy's effectiveness from addressing the complexity of coastal environmental issues in a sustainable manner. These findings indicate that the problem of household waste in coastal areas is not simply a technical issue of domestic waste transportation, but rather a multidimensional issue closely related to governance capacity, urban development inequality, and the socio-ecological dynamics of coastal communities (Jelibseda & Umar, 2025).

One of the main findings of this study is the implementation gap between formal regulations and implementation practices at the local level. Normatively, the government has various sustainability-based waste management policies through the reduce, reuse, recycle (3R) and community-based waste management approaches (Kholid & Ikhwani, 2026). However, in practice, this policy has not been fully implemented effectively due to limited waste infrastructure, weak inter-agency coordination, and inadequate environmental oversight. These findings reinforce the perspective of Mazmanian and Sabatier, who assert that successful policy implementation is heavily influenced by institutional capacity, resource availability, policy communication, and the level of compliance of target groups (Misliani, 2025).

In the context of Tallo District, the implementation of waste management policies still tends to be administrative in nature and has not been fully integrated with a participatory environmental governance approach. The local government focuses more on the operational aspects of waste collection than on developing an environmental governance system capable of sustainably changing community behavior. As a result, waste management is more reactive to waste accumulation than preventive in reducing domestic waste production at the household level (Hasanah et al., 2025).

Research findings also indicate that low waste infrastructure capacity is a significant factor contributing to weak policy implementation. The disparity between the increasing volume of household waste and the capacity of waste services demonstrates an ecological governance deficit in the management of urban coastal areas (Hossain et al., 2025). This situation demonstrates that coastal urbanization in Makassar City is progressing faster than the capacity of local institutions to provide adequate environmental services.

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Therefore, the problem of waste in coastal areas cannot be separated from the issue of unequal urban development and the unequal distribution of public services (Judijanto et al., 2026).

From a political ecology perspective, this situation demonstrates that coastal environmental vulnerability is fundamentally created through urban development processes that fail to fully consider the ecological carrying capacity of coastal areas (Syam, 2025). Areas such as Tallo District tend to be marginal urban spaces that experience greater ecological burdens due to high residential density, limited basic infrastructure, and weak environmental controls. Therefore, coastal pollution from domestic waste is not only a consequence of individual behavior but also a reflection of unequal urban development governance. (Arafah et al., 2025)

This study also found that community participation plays a central role in determining the effectiveness of waste management policy implementation. Areas with active environmental communities and waste bank programs exhibit relatively better environmental conditions than areas without such social organization. These findings reinforce the theory of collaborative governance, which emphasizes that resolving environmental issues requires collaboration between the government, the public, local communities, and the informal sector (Maani & Nurdin, 2025).

However, the research findings show that community participation in Tallo District remains partial and has not yet developed into collective ecological awareness. Most residents still view waste management as a government responsibility, while social involvement in maintaining environmental sustainability is limited to community service activities or incidental programs. This situation suggests that the transformation towards sustainable environmental behavior requires a longer social process through environmental education, strengthening social capital, and empowering local communities on an ongoing basis (Widanami et al., 2026).

An important implication of these findings is that household waste management policies can no longer be formulated solely through a technocratic and administrative approach. Coastal environmental management requires a socio-ecological governance approach that simultaneously integrates social, cultural, institutional, and ecological dimensions (Rahayu & Hidayah, 2023). In other words, the effectiveness of policies is not only determined by the existence of formal regulations, but also by the government's ability to build collaborative relationships with coastal communities as the main actors in the environmental management system.

Furthermore, this study shows that household waste pollution has a direct impact on the sustainability of coastal environments. The accumulation of plastic waste and domestic waste in coastal areas and river estuaries has led to a decline in marine ecosystem quality, disruption of community fishing activities, increased flood risk, and deteriorating environmental health (Sundoko et al., 2026). These findings confirm that the domestic waste problem has long-term ecological implications for the resilience of urban coastal areas (Rokilah et al., 2025).

From a sustainability science perspective, this situation demonstrates an imbalance between community socio-economic activities and the environment's capacity to absorb domestic waste. When environmental management systems are unable to control ecological pressures caused by urbanization and household consumption, coastal areas

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will experience ecological degradation, threatening the social and economic sustainability of local communities (Ario et al., 2025). Therefore, this study strengthens the argument that coastal environmental sustainability must be viewed as an integral part of sustainable urban governance (Ariaoktafiani, 2024).

The policy implications of this research are crucial for the development of environmental governance in Indonesia's coastal areas. First, local governments need to strengthen institutional capacity and waste management infrastructure, especially in densely populated coastal areas with high environmental vulnerability. This capacity building includes increasing waste collection fleets, providing community-based waste management facilities, and strengthening environmental monitoring and oversight systems.

Second, this study demonstrates the importance of developing community-based waste management as a primary strategy for sustainable waste management. Waste bank programs, environmental education, and local community empowerment need to be systematically expanded to build public ecological awareness. A participatory approach is crucial because the domestic waste problem cannot be resolved solely through government intervention without changing community social behavior.

Third, this study has theoretical implications for the development of public policy and environmental governance studies in urban coastal areas. The research findings demonstrate that the effectiveness of environmental policy implementation is significantly influenced by the interaction between institutional capacity, community participation, and the dynamics of coastal urbanization. Thus, this study broadens the understanding that household waste management must be understood within a socio-ecological system framework involving complex relationships between people, policies, and the environment.

Conclusion

This study shows that the implementation of household waste management policies in Tallo District, Makassar City, is still not optimal in supporting coastal environmental sustainability due to various structural, institutional, and social barriers. Limited waste infrastructure, weak regulatory oversight, low institutional capacity, and minimal community participation mean that domestic waste management is unable to effectively control coastal environmental pollution. This situation has resulted in increased waste accumulation in coastal areas, decreased coastal environmental quality, disruption to marine ecosystems, and increased health and flood risks in coastal residential areas. Nevertheless, the study also found that the existence of local communities, mutual assistance activities, and waste bank programs have positively contributed to raising public awareness of the importance of sustainable environmental management. Therefore, this study confirms that household waste management in urban coastal areas cannot be addressed solely through administrative approaches but requires collaborative, participatory environmental governance that is oriented toward socio-ecological sustainability through strengthening government capacity, improving waste infrastructure, and empowering communities based on community-based environmental governance.

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