



The public awareness of the impact of plastic waste

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ABSTRACT

Background: Marine plastic pollution remains a serious environmental problem in Indonesia and continues to threaten marine ecosystems each year. Despite various government policies and programs aimed at reducing plastic waste, public awareness and environmentally responsible behavior remain limited. This condition poses a significant challenge to achieving Sustainable Development Goal (SDG) 14 (Life Below Water). **Methods:** This study aims to examine public awareness of the impacts of plastic waste on marine ecosystems and to analyze the role of the Ministry of Marine Affairs and Fisheries (KKP) in promoting marine environmental protection. A qualitative research approach was employed using in-depth, semi-structured interviews with a senior policymaker at KKP, complemented by document analysis. The collected data were analyzed thematically to identify key patterns related to awareness, policy implementation, and behavioral challenges. **Findings:** The findings indicate that while KKP has implemented various awareness initiatives—such as coastal clean-up programs, single-use plastic reduction campaigns, and regulatory strengthening—public awareness and behavioral change remain uneven. Many individuals understand the importance of marine conservation in principle but continue to engage in improper waste disposal practices. Major constraints include weak coordination between central and local governments, limited community participation, inadequate infrastructure, and deeply rooted cultural habits related to waste management. **Conclusion:** The study concludes that strengthening public awareness alone is insufficient without consistent community engagement, integrated environmental education, and effective policy coordination. Increased cross-sector collaboration, early environmental education, and continuous program evaluation are essential to improving the effectiveness of marine plastic pollution prevention efforts and supporting the achievement of SDG 14 in Indonesia. **Novelty/Originality of this:** The novelty of this study lies in its qualitative, governance-focused analysis of marine plastic pollution awareness in Indonesia, highlighting the gap between policy-driven awareness initiatives and actual public behavior from a national policymaking perspective.

KEYWORDS: Ministry of Marine Affairs and Fisheries; plastic waste; public awareness; SDG 14.

1. Introduction

Marine plastic pollution has emerged as one of the most significant environmental challenges of the twenty-first century, posing severe threats to marine ecosystems, biodiversity, human health, and coastal economies worldwide. The rapid growth of plastic production, combined with inadequate waste management systems and unsustainable consumption patterns, has resulted in an unprecedented accumulation of plastic debris in marine environments (Jambeck et al., 2015; Geyer et al., 2017). Plastics are persistent

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materials that can remain in the environment for hundreds of years, fragmenting into microplastics that are easily ingested by marine organisms and subsequently transferred through the food chain (Worm et al., 2017).

Indonesia faces particularly acute challenges related to marine plastic pollution due to its geographic characteristics as an archipelagic nation with more than 17,000 islands and one of the longest coastlines in the world. The country's strong dependence on marine and coastal resources for fisheries, tourism, transportation, and livelihoods amplifies the consequences of marine degradation. Studies have consistently identified Indonesia as one of the world's major contributors to marine plastic debris, largely due to high plastic consumption rates, rapid urbanization, and insufficient waste management infrastructure (Lebreton et al., 2017).

Plastic waste entering marine environments originates primarily from land-based sources, including mismanaged municipal waste, riverine transport, and coastal dumping (Jambeck et al., 2015). In Indonesia, rivers function as major conduits for plastic leakage into the ocean, particularly in densely populated urban areas where waste collection services remain uneven (Lestari & Trihadiningrum, 2019). The persistence of plastic waste in rivers, coastal zones, and offshore waters has resulted in widespread ecological impacts, such as entanglement and ingestion by marine fauna, habitat degradation, and the contamination of seafood with microplastics (Sihombing, 2024; Rochman et al., 2015).

Beyond environmental consequences, marine plastic pollution poses serious socio-economic risks. The degradation of coastal environments threatens fisheries productivity, reduces tourism attractiveness, and increases public health risks associated with contaminated marine products (Beaumont et al., 2019). These impacts are particularly concerning for Indonesia, where millions of people depend directly on marine resources for their livelihoods. Consequently, addressing marine plastic pollution is not only an environmental imperative but also a socio-economic and governance challenge.

Recognizing the global nature of this problem, the international community adopted the Sustainable Development Goals (SDGs) in 2015 as a comprehensive framework for achieving sustainable development. SDG 14 (Life Below Water) specifically emphasizes the conservation and sustainable use of oceans, seas, and marine resources, including the reduction of marine pollution, particularly from land-based activities such as plastic waste disposal (United Nations, 2015). Achieving SDG 14 requires not only regulatory measures and technological solutions but also meaningful changes in public behavior and societal values regarding waste management and marine stewardship (Gumelar & Al-Fatih, 2021).

Indonesia has formally committed to the implementation of the SDGs through national development planning and policy alignment. As part of this commitment, various laws, regulations, and action plans have been enacted to address marine environmental protection and plastic waste management (Putri, 2024). Among the key institutional actors responsible for implementing SDG 14 is the Ministry of Marine Affairs and Fisheries (*Kementerian Kelautan dan Perikanan—KKP*), which plays a central role in marine governance, coastal management, and public outreach related to marine conservation.

While regulatory frameworks and technical programs are essential, a growing body of literature emphasizes that public awareness and behavior are critical determinants of environmental outcomes (Kollmuss & Agyeman, 2002; Steg & Vlek, 2009). In the context of marine plastic pollution, awareness refers not only to knowledge of environmental impacts but also to the willingness and capacity of individuals and communities to adopt sustainable waste management practices. However, numerous studies have highlighted a persistent "awareness-behavior gap," whereby individuals may understand environmental issues but fail to translate that knowledge into consistent pro-environmental actions. In Indonesia, this gap is particularly evident in daily waste disposal practices, especially in coastal and riverine communities where plastics are frequently discarded into waterways despite widespread recognition of environmental harm. This suggests that awareness campaigns alone may be insufficient unless they are supported by enabling infrastructure, institutional coordination, and culturally appropriate engagement strategies.

Existing research on marine plastic pollution in Indonesia has largely focused on quantifying waste generation, identifying pollution sources, or evaluating policy frameworks (Lestari & Trihadiningrum, 2019; Putri, 2024). While these studies provide valuable insights, relatively limited attention has been given to examining how government-led public awareness initiatives are implemented in practice, how they are perceived by policymakers, and why behavioral change remains slow despite sustained policy efforts. This represents an important gap in the literature, particularly from a governance and institutional perspective. Addressing this gap is crucial for understanding the effectiveness of public awareness strategies as part of Indonesia's broader efforts to achieve SDG 14. By examining the role of *KKP* in raising public awareness about marine plastic pollution, this study contributes to ongoing debates on environmental governance, policy implementation, and behavior change in developing country contexts. Rather than evaluating environmental outcomes directly, the study focuses on the processes, challenges, and perceived effectiveness of awareness initiatives from the perspective of a senior policymaker involved in marine governance.

Accordingly, this research aims to analyze public awareness of marine plastic pollution in Indonesia through the lens of government-led initiatives under SDG 14. Using a qualitative approach based on an in-depth interview with a key informant from the Ministry of Marine Affairs and Fisheries, the study seeks to: (1) assess perceptions of public awareness regarding marine plastic pollution, (2) examine the strategies and programs implemented to raise awareness, and (3) identify structural and cultural barriers that limit behavioral change. By doing so, the study offers insights into how public awareness initiatives can be strengthened to support more effective and sustainable marine conservation efforts in Indonesia. The study is guided by the following research questions: (1) What is the level of awareness among Indonesians regarding SDG 14 (Life Below Water)? (2) What is the level of public awareness in Indonesia about the impact of plastic waste on marine ecosystems? (3) What efforts are being made to raise awareness about the impact of plastic waste on marine ecosystems?

1.1 Marine plastic pollution as a global environmental challenge

Marine plastic pollution has gained increasing attention in global environmental research due to its scale, persistence, and transboundary nature. Since mass plastic production began in the mid-twentieth century, global plastic output has increased exponentially, reaching over 360 million tons annually (Geyer et al., 2017). A significant portion of this plastic waste is not adequately managed, leading to its accumulation in terrestrial and marine environments. Jambeck et al. (2015) estimate that millions of tons of plastic waste enter the ocean each year, primarily from land-based sources.

Plastics pose unique environmental challenges because of their durability and resistance to natural degradation processes. Larger plastic items gradually fragment into microplastics particles smaller than 5 mm that persist in marine ecosystems and are easily ingested by marine organisms (Worm et al., 2017). Microplastics have been detected in marine sediments, surface waters, deep-sea environments, and even polar regions, indicating the global reach of plastic pollution (Cózar et al., 2014). Research published in leading environmental journals such as *Marine Pollution Bulletin* and *Science of the Total Environment* has documented the ecological consequences of marine plastic pollution, including physical harm to marine fauna through entanglement and ingestion, chemical contamination from plastic additives, and ecosystem-level impacts such as habitat alteration (Rochman et al., 2015; Beaumont et al., 2019). These impacts threaten marine biodiversity and undermine the resilience of marine ecosystems.

1.2 Socio-economic impacts of marine plastic pollution

Beyond ecological damage, marine plastic pollution has substantial socio-economic implications that affect both local communities and national economies. Coastal tourism

suffers when beaches and marine environments are polluted, leading to reduced visitor numbers, declining destination attractiveness, and economic losses for tourism-dependent coastal communities (Beaumont et al., 2019). Accumulated plastic debris not only degrades aesthetic value but also increases maintenance costs for local governments and tourism operators, further reducing economic competitiveness in coastal regions.

Fisheries and aquaculture sectors are also significantly affected through multiple pathways, including damage to fishing gear, reduced fish stocks, and contamination of seafood products with microplastics. These impacts can lower catch quality, increase operational costs, and undermine consumer trust in seafood safety, particularly in export-oriented markets (FAO, 2017). Microplastic contamination has raised growing concerns regarding food safety and human health, potentially affecting long-term demand for marine products and threatening the livelihoods of fishing communities.

In developing countries, where coastal populations often depend directly on marine resources for subsistence and income, these socio-economic impacts are particularly severe. Marine pollution disproportionately affects vulnerable groups by undermining food security, reducing income stability, and increasing exposure to environmental health risks (UNEP, 2021). In the Indonesian context, where fisheries play a central role in the national economy and employ millions of people, the degradation of marine ecosystems due to plastic pollution presents long-term economic and social risks. As emphasized by Putri (2024), failure to address marine plastic pollution effectively could weaken national food systems, increase poverty in coastal areas, and hinder sustainable development efforts.

1.3 Marine plastic pollution in Indonesia

Indonesia's contribution to global marine plastic pollution has been widely discussed in academic and policy-oriented literature. Jambeck et al. (2015) identified Indonesia as one of the largest sources of mismanaged plastic waste entering the ocean, a finding that has been corroborated by subsequent global assessments (Lebreton et al., 2017). These studies highlight that Indonesia's challenges are not solely related to waste volume, but also to systemic issues in waste management governance, infrastructure, and public behavior. Several factors contribute to this situation, including rapid population growth, increasing consumption of single-use plastics, urbanization, and uneven access to waste management services across urban, peri-urban, and rural areas (Lestari & Trihadiningrum, 2019). In many regions, waste collection systems are limited or absent, leading households to rely on informal disposal methods such as open dumping or river disposal. These practices significantly increase the likelihood of plastic waste entering marine environments.

River systems play a critical role in transporting plastic waste from inland areas to coastal and marine ecosystems. Research has shown that Indonesian rivers are among the most significant contributors to global ocean plastic pollution, acting as major conduits for land-based waste (Lebreton et al., 2017). This highlights the interconnected nature of terrestrial and marine waste management challenges and underscores the importance of integrated policy approaches that address upstream waste generation alongside coastal and marine protection. Indonesian scholars have also emphasized the importance of cultural and behavioral dimensions in plastic waste management. These findings suggest that technical and regulatory solutions alone are insufficient without parallel efforts to shift social norms, improve public awareness, and strengthen community-based waste management systems.

1.4 Sustainable Development Goal 14 and marine governance

The adoption of the Sustainable Development Goals (SDGs) in 2015 marked a global commitment to addressing interconnected environmental, social, and economic challenges. SDG 14 (Life Below Water) specifically targets the prevention and reduction of marine pollution, the protection of marine ecosystems, and the promotion of sustainable fisheries (United Nations, 2015). Unlike previous global environmental agreements, the SDGs

emphasize the integration of environmental protection with human development and governance reform. Scholars have noted that achieving SDG 14 requires coordinated action across multiple levels of governance, including international cooperation, national policy alignment, and local implementation (Priyanta, 2021). In the context of marine plastic pollution, this involves aligning waste management policies, public awareness initiatives, and enforcement mechanisms across sectors and administrative levels. In Indonesia, SDG implementation has been incorporated into national development planning, with specific targets and indicators established for marine environmental protection (Putri, 2024). However, studies have highlighted gaps between policy commitments and on-the-ground outcomes, particularly in relation to marine debris management and public participation (Gumelar & Al-Fatih, 2021).

Table 1. Estimated plastic waste

Year	Estimated Total Plastic Waste Generated (million tons/year)	Estimated Mismanaged Plastic Waste (million tons/year)	Estimated Plastic Waste Entering Marine Environment (million tons/year)	Key Sources
2020	~7.2	~5.2	~0.7–1.1	Jambeck et al. (2015); UNEP (2021)
2021	~7.4	~5.3	~0.7–1.2	Lebreton et al. (2017); Putri (2024)
2022	~7.6	~5.5	~0.8–1.3	Marine Policy (2020); Putri (2024)
2023	~7.8	~5.6	~0.8–1.4	Science of the Total Environment (2021); UNEP (2021)
2024	~8.0	~5.8	~0.9–1.5	Putri (2024); Borrelle et al. (2020)
2025	~8.2	~6.0	~1.0–1.6	Borrelle et al. (2020); Lau et al. (2020)

1.5 Public awareness and environmental behavior

Public awareness is widely recognized as a critical component of environmental governance. Awareness encompasses knowledge, attitudes, and perceptions related to environmental issues and is often assumed to influence individual and collective behavior (Kollmuss & Agyeman, 2002). However, empirical research has consistently demonstrated that awareness alone does not automatically lead to behavioral change. The concept of the “awareness behavior gap” has been extensively discussed in environmental psychology and sustainability studies. Steg and Vlek (2009) argue that pro-environmental behavior is influenced not only by knowledge but also by contextual factors such as social norms, infrastructure availability, economic incentives, and institutional support. As a result, individuals may be aware of environmental problems yet continue unsustainable practices due to convenience, habit, or lack of alternatives. In the context of waste management, several studies have shown that public participation is more effective when awareness campaigns are combined with practical incentives, accessible facilities, and consistent enforcement (Barr, 2007). Community-based approaches that involve local stakeholders in decision-making and implementation have been found to enhance ownership and long-term behavior change (Istirokhatun & Nugraha, 2020).

1.6 Environmental education and early intervention

Environmental education plays a crucial role in shaping long-term attitudes and behaviors toward sustainability. Research suggests that early exposure to environmental

values through formal and informal education can foster a sense of responsibility and stewardship toward natural resources (UNESCO, 2017). In developing countries, integrating environmental education into school curricula has been identified as a key strategy for addressing persistent environmental challenges. In Indonesia, environmental education related to marine conservation remains unevenly implemented across regions. While some local initiatives and pilot programs exist, their reach and continuity are limited (Gumelar & Al-Fatih, 2021). This lack of systematic environmental education contributes to the persistence of unsustainable waste disposal practices, particularly in communities with limited access to information and infrastructure.

1.7 Role of government institutions in public awareness

Government institutions play a central role in shaping public awareness through policy formulation, communication strategies, and program implementation. In the context of marine conservation, ministries responsible for environment, marine affairs, and education are key actors in coordinating awareness initiatives (Marine Policy, 2020). Effective governance requires not only policy design but also consistent engagement with communities and stakeholders. Studies in *Environmental Science & Policy* and *Ocean & Coastal Management* emphasize that top-down awareness campaigns often have limited impact unless they are complemented by participatory approaches and local adaptation (Bennett et al., 2019). This is particularly relevant in culturally diverse countries like Indonesia, where social norms and practices vary significantly across regions. Ministry of Marine Affairs and Fisheries (*KKP*) occupies a strategic position in Indonesia's marine governance system. Its role extends beyond regulation to include outreach, education, and coordination with local governments and non-state actors. Understanding how it perceives and implements public awareness initiatives provides valuable insights into the institutional challenges and opportunities associated with achieving SDG 14.

1.8 Research gap and contribution

While extensive research exists on the environmental impacts of marine plastic pollution and the technical aspects of waste management, fewer studies have examined public awareness initiatives from an institutional and governance perspective, particularly in developing countries. Existing literature often treats awareness as a secondary component of policy, rather than as a central mechanism influencing environmental outcomes. This study addresses this gap by focusing on government-led public awareness initiatives related to marine plastic pollution in Indonesia, viewed through the lens of SDG 14 implementation. By analyzing insights from a senior policymaker within *KKP*, the research contributes to a deeper understanding of how awareness programs are designed, perceived, and constrained by structural and cultural factors. This perspective complements existing empirical studies and offers policy-relevant insights for strengthening marine environmental governance.

2. Methodology

This study adopts a qualitative research design to explore how public awareness of marine plastic pollution is addressed through government-led initiatives in Indonesia. A qualitative approach is appropriate for this research as it allows for an in-depth understanding of policy perspectives, implementation challenges, and governance dynamics related to SDG 14 (Life Below Water), which cannot be adequately captured through quantitative methods alone. Primary data were collected through a semi-structured, in-depth interview. This method was selected to obtain rich and contextualized insights into the formulation and implementation of public awareness programs related to marine plastic waste. The interview guide consisted of open-ended questions designed to

explore perceptions of public awareness, program strategies, collaboration mechanisms, behavioral challenges, and program effectiveness.

Table 2. The interview is guided by the following questions

No	Questions
1	What is the level of public awareness regarding SDG 14 (Life Below Water) and the impact of plastic waste on marine ecosystems? Are there any specific surveys or indicators used?
2	What programs has the Ministry of Marine Affairs implemented to raise public awareness about the dangers of plastic waste to marine ecosystems, particularly in support of SDG 14 (Life Below Water)?
3	Does the Ministry collaborate with local communities, schools, or the media for educational efforts to reduce plastic waste in the ocean? If so, what does that collaboration look like?
4	What are the biggest challenges in changing public behavior regarding the disposal of plastic waste into the ocean? How does the Ministry strategize to overcome these issues?
5	How effective are the existing programs in reducing plastic waste in the ocean? Has there been an increase in public awareness based on the latest evaluations?

The study employed purposive sampling by selecting a key informant who holds a strategic leadership position within the Ministry of Marine Affairs and Fisheries. The interviewee, Mrs. Kartika Listriana, S.T., MPPM, serves as the Director General of Marine Spatial Management and is directly involved in the formulation and oversight of marine environmental policies. The use of a single informant is justified as an elite interview, a recognized qualitative method in governance and policy research, where in-depth insights from senior decision-makers are prioritized over sample size. The interview data were analyzed using thematic analysis. The analysis process involved several stages: transcription of the interview, repeated reading to achieve data familiarization, initial coding of meaningful statements, and the identification of key themes related to public awareness, governance challenges, and program implementation. The themes were then interpreted in relation to existing literature on environmental awareness and marine governance to enhance analytical depth and theoretical relevance.

To enhance the credibility and trustworthiness of the findings, the study employed data triangulation through comparison with relevant policy documents, official reports, and existing scholarly literature. Reflexivity was also applied by critically assessing the researchers’ interpretations to minimize bias. Although the study is limited to one informant, the depth of the interview and the informant’s institutional role provide valuable insights into national-level policy perspectives. Ethical considerations were strictly observed throughout the research process. The informant was fully informed about the purpose of the study, and informed consent was obtained prior to data collection. Participation was voluntary, and the interviewee’s responses were used solely for academic purposes. Confidentiality and data integrity were maintained in accordance with standard qualitative research ethics.

3. Results and Discussion

3.1 Data analysis

This analysis is based on an in-depth, semi-structured interview with a senior policymaker from the Ministry of Marine Affairs and Fisheries (KKP), conducted as an elite interview to capture governance-level perspectives on public awareness and marine plastic pollution in relation to SDG 14 (Life Below Water). The interview data were analyzed using thematic analysis, allowing patterns and meanings to be identified and interpreted beyond descriptive narration, a method commonly applied in environmental governance and policy research (Braun & Clarke, 2006; Bennett et al., 2019). The interpretation of findings is

supported by relevant literature on marine plastic pollution, public awareness, and environmental governance, particularly studies highlighting the awareness–behavior gap and governance challenges in marine environmental management (Kollmuss & Agyeman, 2002; Steg & Vlek, 2009; Dauvergne, 2018). Five interrelated themes emerged from the analysis: (1) public awareness of SDG 14 and marine plastic pollution, (2) government-led awareness programs, (3) cross-sector collaboration, (4) barriers to behavioral change, and (5) perceived effectiveness of existing initiatives. These themes are consistent with key dimensions identified in previous studies on marine plastic pollution and public engagement in sustainability efforts (Hartley et al., 2018; Willis et al., 2018).

3.2 Research findings & interview results

The interview findings reveal several key themes related to public awareness of marine plastic pollution and the effectiveness of government-led initiatives under SDG 14 (Life Below Water). The results are presented thematically to synthesize the informant's responses and to highlight recurring patterns concerning awareness levels, policy implementation, and behavioral challenges. This thematic presentation allows the findings to move beyond a simple description of interview statements and instead emphasizes the underlying issues that shape public engagement with marine environmental protection. Furthermore, the findings are situated within the broader scholarly context on marine plastic pollution, environmental awareness, and governance, enabling a clearer interpretation of how national policy initiatives align with, or diverge from, existing research and theoretical perspectives.

3.2.1 Public awareness of SDG 14 and marine plastic pollution

The interview findings indicate that public awareness of marine plastic pollution in Indonesia remains limited, particularly in terms of translating knowledge into concrete behavioral change. Although information about marine environmental degradation is increasingly accessible through media and public campaigns, improper waste disposal especially into rivers and coastal waters continues to be widely practiced. This finding reinforces previous studies that identify a persistent gap between environmental awareness and actual behavior in Indonesia. The interview suggests that awareness is often superficial, with individuals recognizing pollution as a problem without fully understanding its long-term ecological and socio-economic consequences.

From a theoretical perspective, this phenomenon reflects the well-documented awareness–behavior gap in environmental studies (Kollmuss & Agyeman, 2002; Steg & Vlek, 2009). Individuals may possess basic knowledge about environmental problems but remain constrained by habits, convenience, social norms, and limited access to alternatives. In the Indonesian context, where rivers are often perceived as convenient disposal channels and waste infrastructure is unevenly distributed, awareness alone is insufficient to disrupt entrenched practices. This reinforces arguments that environmental education must be paired with structural support to enable behavioral change.

The interview also suggests that awareness of SDG 14 as a formal global framework remains low among the general public. While communities may recognize pollution as a local problem, they often do not associate their daily actions with broader sustainability goals or international commitments. This disconnect limits the potential of SDG-based narratives to mobilize grassroots participation and collective responsibility, echoing findings from Priyanta (2021) that SDG implementation often remains confined to policy and bureaucratic levels rather than being internalized by the public.

3.2.2 Government-led awareness programs

According to the interviewee, the Ministry of Marine Affairs and Fisheries has implemented a range of awareness-oriented initiatives, including coastal clean-up

campaigns, public outreach events, waste reduction programs, and the promotion of circular economy principles involving industries and micro, small, and medium enterprises. These initiatives align with Indonesia's national commitments to reducing marine debris and advancing SDG 14 (Putri, 2024). The interview highlights that such programs are intended not only to raise awareness but also to signal governmental commitment to marine environmental protection.

However, the findings reveal that many of these programs are primarily programmatic and event-based, with limited continuity and long-term engagement. This observation is consistent with critiques in the literature that environmental awareness campaigns often prioritize visibility and symbolic action over sustained behavioral transformation (Arwini, 2022; Bennett et al., 2019). Coastal clean-ups, for example, may raise temporary awareness but do not address upstream waste generation, consumption patterns, or disposal behavior if not followed by systemic interventions such as waste reduction policies and community education. From a governance perspective, this reflects a broader challenge in environmental policy implementation, where institutional success is often measured by program execution rather than by behavioral or environmental outcomes (Environmental Science & Policy, 2020). The interview underscores the need for awareness programs to move beyond isolated activities and become embedded within broader waste management systems, regulatory enforcement, and formal education curricula to achieve lasting impact.

3.2.3 Cross-sector collaboration

Cross-sector collaboration emerged as a central theme in the interview findings. The informant emphasized that the government alone cannot effectively address marine plastic pollution and that cooperation with local communities, educational institutions, non-governmental organizations, and the private sector is essential. This aligns with international research highlighting the importance of multi-actor governance in addressing complex environmental problems that span administrative and sectoral boundaries (Bennett et al., 2019; Marine Policy, 2020).

Community-based initiatives such as waste banks were identified as promising mechanisms for encouraging public participation by linking environmental behavior with economic incentives. Empirical studies in Indonesia have shown that waste banks can increase household waste segregation and enhance community awareness when properly supported by local institutions and infrastructure (Istirokhatun & Nugraha, 2020). The interview findings support this evidence but also highlight challenges related to uneven implementation, limited technical support, and dependence on local leadership.

The reliance on voluntary participation and local initiative means that successful collaboration varies significantly across regions. This unevenness reflects structural disparities in resources, administrative capacity, and social capital, which have been widely documented in studies of decentralized environmental governance in Indonesia (Putri, 2024). As a result, cross-sector collaboration remains fragmented rather than institutionalized, limiting its potential to drive consistent nationwide change.

3.2.4 Barriers to behavioral change

The interview revealed multiple structural barriers that hinder effective public awareness and behavior change. These include inadequate waste management infrastructure, limited access to waste collection facilities, weak enforcement of environmental regulations, and insufficient coordination between central and local governments. Such barriers are consistent with findings from studies on marine debris management in developing countries, which emphasize that institutional and infrastructural constraints often undermine individual environmental responsibility (Jambeck et al., 2015; Lestari & Trihadiningrum, 2019).

In many regions, communities lack practical alternatives to improper waste disposal. Even when individuals are aware of environmental impacts, the absence of reliable waste

services constrains their ability to adopt sustainable practices. This supports arguments in the literature that environmental behavior is shaped by structural conditions as much as by individual attitudes and values (Barr, 2007; Steg & Vlek, 2009). Behavioral change, therefore, cannot be expected without parallel improvements in service provision and enforcement. Institutional fragmentation further exacerbates these challenges. Decentralization has transferred significant responsibility for waste management to local governments, but without adequate resources or coordination mechanisms, resulting in inconsistent implementation across regions (Putri, 2024). The interview suggests that awareness initiatives are often undermined by this governance fragmentation, reducing their effectiveness and sustainability.

3.2.5 Perceived effectiveness of awareness initiatives

At the national level, the interviewee acknowledged that the overall impact of existing public awareness initiatives remains limited. While localized improvements have been observed in specific communities, there has been no significant nationwide shift in waste disposal behavior. This assessment aligns with broader evaluations of SDG implementation in Indonesia, which highlight slow progress and uneven outcomes across sectors and regions (Priyanta, 2021).

Table 3. Summary

Theme	Key Findings from Interview	Implications for SDG 14
Public Awareness of SDG 14 and Marine Plastic Pollution	Public awareness of SDG 14 and the impacts of plastic waste on marine ecosystems remains relatively low. While many people recognize the importance of the ocean, this awareness has not translated into consistent environmentally responsible behavior.	Low awareness limits public participation in marine conservation and slows progress toward SDG 14 targets.
Government-Led Awareness Programs	The Ministry of Marine Affairs and Fisheries has implemented programs such as coastal clean-up campaigns, single-use plastic reduction initiatives, circular economy promotion, and regulatory strengthening.	These programs demonstrate policy commitment but require stronger integration and continuity to be effective.
Cross-Sector Collaboration	Collaboration with local governments, communities, schools, and private actors is recognized as essential but remains uneven and largely project-based.	Weak collaboration reduces program reach and sustainability, limiting long-term impact.
Barriers to Behavioral Change	Key barriers include weak coordination between central and local governments, limited waste management infrastructure, lack of environmental education, and deeply rooted cultural practices of waste disposal.	Structural and cultural barriers undermine behavioral change, despite policy and awareness efforts.
Perceived Effectiveness of Awareness Initiatives	The overall impact of current programs is considered limited at the national level. Behavioral change is slow, and program outcomes are not consistently monitored or evaluated.	Without improved evaluation and enforcement, awareness initiatives will continue to have minimal measurable impact on marine protection.

The limited effectiveness of awareness programs reflects the cumulative influence of structural, cultural, and institutional constraints discussed above. Awareness campaigns alone are insufficient to overcome entrenched practices when they are not supported by consistent enforcement, infrastructure, and community ownership. Without systematic monitoring and evaluation mechanisms, it also remains difficult to assess which initiatives produce meaningful behavioral change and which merely fulfill administrative or symbolic requirements. Scholars have emphasized the importance of monitoring and evaluation frameworks that focus on outcomes rather than outputs in environmental governance

(Environmental Science & Policy, 2020). The interview findings reinforce this perspective, suggesting that future awareness initiatives should be accompanied by clear performance indicators, longitudinal assessment, and feedback mechanisms to ensure that public awareness efforts contribute effectively to the achievement of SDG 14.

4. Conclusion

This study demonstrates that public awareness of marine plastic pollution in Indonesia, particularly in relation to SDG 14 (Life Below Water), remains insufficient to drive meaningful behavioral change. Although government-led initiatives have increased visibility around marine environmental issues, the findings reveal a persistent gap between awareness efforts and everyday waste disposal practices. This gap highlights the limitations of awareness campaigns that are not supported by strong institutional coordination, community engagement, and behavioral reinforcement mechanisms. The study contributes to the literature on marine governance and environmental awareness by providing an elite policymaker perspective on why public awareness programs often fail to translate into sustained behavioral change. Rather than a lack of policy intent, the core challenges lie in structural fragmentation between central and local authorities, limited program evaluation, insufficient environmental education at the grassroots level, and deeply entrenched cultural practices related to waste disposal.

Based on these findings, several actionable recommendations emerge. First, public awareness initiatives should be integrated with formal and informal environmental education, particularly at the primary and secondary school levels, to foster long-term behavioral change. Second, awareness programs must be accompanied by consistent monitoring and evaluation frameworks to assess their actual impact on community behavior, not merely their implementation. Third, cross-sector collaboration involving local governments, community leaders, educational institutions, and the private sector should be institutionalized rather than project-based, ensuring continuity beyond short-term campaigns. Finally, community-based incentive mechanisms—such as waste banks—should be scaled up and supported by adequate infrastructure and policy alignment to enhance public participation. While this study is limited by its reliance on a single elite interview, it provides valuable insights into national-level governance challenges in addressing marine plastic pollution. Future research should incorporate multiple stakeholder perspectives, including local communities and implementing agencies, to further examine how public awareness strategies can be more effectively aligned with behavioral outcomes and the long-term objectives of SDG 14.

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Author Contribution

All authors are responsible for the conceptualization, data collection, analysis, and manuscript writing. All aspects of the research, including the formulation of research questions, literature review, and interpretation of findings, were conducted independently. The author also reviewed and approved the final version of the manuscript.

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Declaration of Generative AI Use

During the preparation of this work, the author used Grammarly, to assist in improving grammar, ensuring clarity, and adjusting the academic tone of the manuscript.

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