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Microplastic Literacy and Tri Hita Karana in Bali Coastal Pollution Management

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ABSTRACT: Marine plastic pollution remains a serious concern for Bali's coastal ecosystems, tourism economy, and cultural relationship with the sea. Although public awareness has increased through beach clean-ups and restrictions on single-use plastics, plastic waste continues to reach coastal waters through rivers, tourism activities, and inadequate waste-management systems. This study examines public perceptions of marine pollution, microplastic literacy, and the role of the Balinese philosophy of Tri Hita Karana in supporting coastal pollution management at Padang Padang Beach, Bali. Using a descriptive qualitative approach, data were collected through semi-structured interviews, field notes, and photographic documentation involving 15 participants, including visitors, local residents, and students. The data were analyzed thematically by identifying recurring responses and organizing them into key themes. The findings show that 12 participants expressed sadness or disappointment about polluted water, 10 identified river-borne waste as a major source of pollution, 13 viewed pollution control as a shared responsibility, and only 6 demonstrated basic knowledge of microplastics. These findings reveal a gap between environmental concern and consistent environmental practice. The study argues that coastal pollution management in Bali requires integrated efforts that combine microplastic education, Tri Hita Karana-based environmental responsibility, improved waste infrastructure, and consistent policy enforcement.

Keywords: marine pollution; microplastic literacy; Bali

INTRODUCTION

Marine plastic pollution has become one of the most persistent environmental pressures on coastal ecosystems. Plastics degrade slowly, break down into smaller particles, and circulate through rivers, beaches, surface waters, sediments, and marine organisms (Andrady, 2011; Chamas *et al*., 2020; Law, 2017). Global evidence shows that much of marine plastic originates from mismanaged land-based waste, particularly in coastal regions where population density, consumer packaging, drainage networks, and limited collection systems interact (Jambeck *et al*., 2015; Meijer *et al*., 2021). For this reason, marine pollution cannot be understood only as a problem found on beaches or at the ocean surface. It is also shaped by household disposal practices, tourism consumption, market activity, river systems, and the capacity of institutions to prevent waste leakage before it reaches coastal waters.

Bali offers an important setting for examining this issue because its coastal environment carries ecological, economic, and cultural meanings. Beaches support tourism and local livelihoods, but they are also closely linked to ritual practice, community identity, and values of purity. The sea is therefore not merely a recreational or economic space. It is part of Balinese social and spiritual life. When coastal waters are polluted, the impact extends beyond ecological degradation. Pollution also affects tourism-dependent communities and weakens the sea's cultural meaning as a space associated with balance, cleanliness, and respect for nature.

Studies on Bali and Indonesia have documented the strong relationship between marine debris, plastic waste, land-based sources, river pathways, tourism areas, and seasonal hydrodynamic processes. Suteja *et al*. (2021) found that stranded marine debris on touristic beaches in southern Bali varied by season, with plastic debris dominating the observed waste and rainy-season conditions increasing accumulation. Hendrawan *et al*. (2023) showed that plastic pollution also affects Bali's conservation areas, including West Bali National Park and Nusa Penida Marine

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Protected Area, where debris distribution is linked to land-based factors such as population, rivers, settlements, and tourist sites. At the ecosystem level, Peranginangin *et al*. (2025) found that plastic dominated macro-debris in the Teluk Benoa mangrove ecosystem, indicating that waste can accumulate in habitats that are important for coastal stability.

Microplastics make this problem more complex because pollution does not end when visible waste is removed. Thompson *et al*. (2004) drew scientific attention to small plastic fragments in the marine environment, while later studies showed that microplastics are widespread contaminants that can be ingested by marine organisms and may carry chemical risks (Cole *et al*., 2011; Rochman *et al*., 2013; Wright *et al*., 2013). In the Bali Strait, Yona *et al*. (2019) identified fibers, films, and fragments in seawater samples, showing that microplastic pollution is already present in waters around Bali. This evidence suggests that beach cleanliness should not be measured only by the absence of visible debris. Even after clean-up activities, fragmented plastics may remain in water columns, sediments, and food webs. For this reason, the present study focuses on microplastic literacy rather than direct measurement of microplastic contamination. Because microplastics are small, less visible, and difficult for the public to recognize without scientific explanation, coastal pollution management also depends on whether beach users understand that visible plastic waste can fragment into persistent and less visible pollutants. Examining microplastic literacy therefore helps clarify the social gap between scientific evidence of microplastic contamination and everyday public understanding at a coastal tourism site.

Indonesia and Bali have introduced regulatory measures to address marine debris and plastic waste. Presidential Regulation No. 83 of 2018 established a national framework for marine debris management, while Bali Governor Regulation No. 97 of 2018 restricted single-use plastic waste. These regulations indicate institutional recognition of the problem (Peraturan Gubernur Bali, 2018; Peraturan Presiden Republik Indonesia, 2018). However, the existence of policy does not automatically lead to consistent behavioral change. Environmental behavior is influenced by values, habits, social norms, convenience, infrastructure, enforcement, and perceptions of responsibility (Ajzen, 1991; Kollmuss & Agyeman, 2002; Steg & Vlek, 2009). In the context of plastic consumption, awareness of environmental risk is often insufficient when practical alternatives are limited or when daily routines continue to support disposable plastic use (Heidbreder *et al*., 2019).

This study addresses the need to connect microplastic literacy with local cultural values and everyday perceptions of marine pollution in Bali. Previous studies in Bali and Indonesia have provided important evidence on marine debris, microplastic contamination, tourism pressure, river pathways, and waste policy. However, within the Bali coastal tourism context, particularly at Padang Padang Beach, limited attention has been given to how visitors, local residents, and students understand marine pollution, recognize microplastics, and relate pollution reduction to Tri Hita Karana. As a Balinese philosophy, Tri Hita Karana emphasizes harmony among the divine, human beings, and nature. Its *palemahan* dimension highlights the relationship between humans and the natural environment, while pawongan emphasizes social responsibility and collective action. Recent studies in tourism, environmental communication, and spatial planning suggest that Tri Hita Karana can support sustainability practices when it is translated into practical behavior, governance, environmental conservation, and community participation, rather than treated only as symbolic language (Octaviani *et al*., 2024; Wiryawan & Ernawati, 2024). The gap addressed in this study is therefore not a global absence of microplastic or marine debris research, but a site-specific lack of qualitative knowledge about public literacy, perceived responsibility, and culturally grounded environmental values at Padang Padang Beach.

Based on this background, this study analyzes how visitors, local residents, and students at Padang Padang Beach perceive marine pollution, identify its possible causes, understand responsibility, and relate pollution reduction to microplastic literacy and Tri Hita Karana values. Rather than measuring microplastic contamination directly, this study focuses on the social and cultural dimensions of marine pollution by examining how public understanding, local values, and perceived governance conditions may support coastal pollution management. The study is guided by the following research question: How do public perceptions, microplastic literacy, and Tri Hita Karana values inform coastal pollution management at Padang Padang Beach, Bali? By focusing

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on Padang Padang Beach, this article contributes to marine socio-ecological research through a culturally grounded interpretation of coastal pollution management in a tourism setting. It also offers practical insights for environmental education, local policy, tourism management, and community-based waste prevention.

MATERIALS AND METHODS

This study employed a descriptive qualitative approach to examine perceptions of marine pollution at Padang Padang Beach, Bali. A qualitative approach was considered appropriate because the study focused on meanings, perceptions, attitudes, and perceived barriers to pollution reduction, rather than on laboratory measurement of water quality, debris abundance, or microplastic concentration. This approach allowed the study to explore how participants understood marine pollution, assigned responsibility, and related environmental problems to tourism, local culture, and daily practices. Therefore, the study should be understood as a qualitative socio-ecological inquiry into coastal pollution perception and microplastic literacy, not as a laboratory-based assessment of microplastic abundance or marine water quality.

The study was conducted at Padang Padang Beach, Bali, from August to September 2025. This site was selected because it is a well-known coastal tourism area where beach use, visitor behavior, local community activities, and waste-management concerns intersect. As a popular beach destination, Padang Padang provides a relevant setting for examining how marine pollution is perceived by different groups who use, visit, or live near the coastal environment.

The participants consisted of 15 individuals, including 6 visitors, 5 local residents, and 4 students. Participants were recruited based on their availability, willingness to participate, and direct connection to Padang Padang Beach as visitors, residents, or students who had experience observing or interacting with the coastal environment. The inclusion criteria were that participants had direct experience visiting, living near, studying around, or observing Padang Padang Beach; were able to answer semi-structured interview questions; and agreed to participate voluntarily after the purpose of the study had been explained. Participants were also selected from individuals who were considered able to provide informed responses to the interview questions. The composition of participants was intended to capture varied perspectives from groups who interact with the beach in different ways. Visitors provided perspectives related to tourism experience and beach use, local residents offered community-based views on environmental conditions and local responsibility, while students contributed responses shaped by youth awareness and educational exposure. The sample was not intended to represent all beach users in Bali statistically. Instead, it was designed to provide qualitative insights into how different user groups perceive marine pollution, microplastic literacy, and environmental responsibility in a specific coastal tourism setting.

Data were collected through semi-structured interviews, field notes, and photographic documentation. The interviews used open-ended questions so that participants could explain their views in their own words. The questions addressed participants' emotional responses to polluted water, perceived causes of beach pollution, responsibility for pollution reduction, awareness of microplastics, and possible solutions for Bali. Examples of interview questions included: "How do you feel when you see trash in the water?", "What do you think causes water pollution at the beach?", "Who do you think is responsible for reducing pollution?", "Have you heard of microplastics?", and "What solutions do you think would work best in Bali?" Field notes were used to record visible waste, water conditions, beach-use conditions, and relevant participant comments during data collection. Photographic documentation focused on environmental objects and site conditions, including visible shoreline waste, plastic bottles, food packaging, waste bins, beach-use areas, water conditions, and general coastal surroundings. Photographs were taken by the researcher during field observation to support field notes and provide contextual evidence for the interview findings. They were not used to count debris items, estimate waste volume, or produce quantitative debris data. Ethical considerations in photographic documentation were addressed by avoiding close-up images of participants' faces, identifiable personal information, private activities, and sensitive cultural or religious practices. When people appeared in the background, photographs were taken from a

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distance or from angles that minimized identifiability.

The data were analyzed using thematic analysis. First, the interview notes were read repeatedly to gain familiarity with the responses. Second, recurring statements were identified and coded. Third, related codes were grouped into broader themes, including emotional concern, land-based waste, shared responsibility, weak enforcement, limited microplastic awareness, cultural motivation, and the gap between awareness and action. Thematic analysis was used because it offers a systematic way to identify patterns of meaning in qualitative data (Braun & Clarke, 2006; Nowell *et al*., 2017). The number of participants associated with each theme was presented only as a descriptive indication of how often a theme appeared in the interview data. These numbers were not treated as statistical measurements, percentages, or a basis for generalization beyond the 15 participants. The main interpretation remained qualitative, focusing on the meaning, context, and patterns of participants' responses.

To strengthen trustworthiness, interview responses were compared with field notes, photographic documentation, and relevant literature on marine debris, microplastics, environmental behavior, and Tri Hita Karana. Ethical considerations were addressed by explaining the purpose of the study, asking for participants' consent before the interviews, and avoiding the collection of identifying personal information. The study was limited by its small sample size, short fieldwork period, and focus on a single beach. It also did not include laboratory testing of water, sediment, seafood, or microplastic samples. Therefore, the findings should be understood as qualitative insights into public perceptions, perceived responsibilities, and behavioral conditions related to marine pollution, rather than as a comprehensive ecological assessment of marine pollution in Bali.

RESULTS AND DISCUSSION

The results are based on interviews with 15 participants consisting of visitors, local residents, and students. Across the interviews, 12 participants expressed sadness, disappointment, embarrassment, or concern when seeing polluted water or waste in the coastal environment. Ten participants associated pollution with waste carried by rivers, while nine mentioned tourism-related waste such as plastic bottles, food packaging, and other disposable items. Thirteen participants described pollution control as a shared responsibility among different actors, while only six participants demonstrated basic knowledge of microplastics. These recurring responses show that marine pollution at Padang Padang Beach was understood not only as a visible waste problem, but also as an issue related to tourism image, shared responsibility, cultural values, and limited public understanding of less visible plastic contamination. The responses were organized into eight main themes: emotional concern, land-based waste and tourism-related pollution, shared responsibility, behavior and system gaps, limited microplastic awareness, integrated solutions, cultural motivation, and the intention-action gap. Table 1 presents the main themes identified from the interviews and their relevance to the research question. The numbers in the table are used only as descriptive indications of theme occurrence within the 15 participants, not as statistical results.

The most common response concerned participants' emotional reaction to polluted water. Twelve participants expressed sadness, disappointment, embarrassment, or concern about Bali's image when they saw waste in the coastal environment. These responses appeared across visitors, local residents, and students, suggesting that marine pollution was not viewed merely as a technical waste problem, but also as a matter of environmental dignity and public image. In the Balinese context, such responses can be read as concern over the disruption of harmony between humans and nature.

Participants also identified the sources of pollution as primarily land-based. Ten participants mentioned waste carried by rivers, while nine referred to tourism-related waste, including plastic bottles, food packaging, and other disposable items. These responses show that participants did not generally understand marine pollution as a problem originating only from the sea. Instead, they associated it with disposal behavior on land, waste movement through rivers, and tourism consumption around coastal areas.

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Table 1. Summary of Interview Results at Padang Padang Beach

Interview Focus	Participant Groups	Key Responses	Descriptive Occurrence	Theme Identified	Connection to Research Question
Feelings when seeing polluted water	Visitors, local residents, students	Sadness, disappointment, embarrassment, and concern about Bali's tourism image	12 participants	Emotional concern	Shows moral discomfort when harmony with nature is disturbed
Main source of pollution	Visitors, local residents	Waste from rivers, plastic bottles, food packaging, and tourism-related waste	River flow: 10; tourism-related waste: 9	Land-based waste and tourism-related pollution	Supports the view that plastic pollution enters the ocean largely through land-based pathways
Perceived responsibility	All groups	Local communities, tourists, businesses, and government share responsibility	13 participants	Shared responsibility	Reflects collective responsibility for maintaining balance between humans and the environment
Reasons pollution continues despite bans	Visitors, local residents	Weak enforcement, limited waste bins, convenience, and habits	Weak enforcement: 11; habits: 8	Behavior and system gap	Shows that awareness and regulation require practical support and enforcement
Knowledge of microplastics	Students, visitors	Some had heard the term, but many were unsure about health and ecosystem impacts	Basic knowledge: 6 participants	Limited scientific awareness	Shows the need for stronger microplastic education
Effective solutions	All groups	Education, stricter rules, more bins, clean-up activities, and reduced single-use plastic use	14 participants	Integrated approach	Suggests that pollution reduction requires science, policy, infrastructure, and cultural values
Role of Balinese culture	Local residents, students	Balinese culture was seen as teaching respect for nature and encouraging better environmental behavior	9 participants	Cultural motivation	Connects pollution reduction with Tri Hita Karana values
Willingness to change behavior	All groups	Most expressed willingness to change, although some were unsure due to convenience barriers	Willing: 12; unsure: 3	Intention-action gap	Shows the challenge of translating values and awareness into consistent practice

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Responsibility for reducing pollution was widely understood as shared. Thirteen participants stated that local communities, tourists, businesses, and government all have roles in preventing marine pollution. This finding indicates that participants did not place responsibility on a single actor. Instead, they viewed marine pollution as a shared problem involving everyday behavior, tourism practices, business responsibility, and policy implementation. However, participants also pointed to a gap between responsibility and practice. Eleven participants mentioned weak enforcement as a reason why pollution continues, while eight referred to habits and convenience.

Knowledge of microplastics was more limited than general awareness of visible waste. Six participants demonstrated basic knowledge of microplastics as small plastic particles, but most were unable to explain how microplastics are formed, how they may move through marine ecosystems, or why they are associated with possible ecological and health concerns in previous studies. This limited understanding was reflected in the interview notes. For example, one participant had heard about microplastics but was unsure about their possible health impacts (P1). Another participant recognized visible plastic waste such as bottles and food packaging as a problem, but could not explain how plastic waste may break down into smaller particles and enter marine ecosystems (P2). These responses suggest a gap between awareness of visible marine debris and understanding of invisible plastic contamination. While participants recognized plastic waste as a problem, they had less knowledge of its long-term ecological and health implications once it breaks down into smaller particles.

Despite these limitations, participants expressed strong support for combined solutions. Fourteen participants suggested measures such as environmental education, stricter rules, more waste bins, regular clean-up activities, and reduction of single-use plastics. These responses indicate that participants saw marine pollution reduction as requiring more than individual awareness. They emphasized the need for practical infrastructure, public education, policy enforcement, and collective participation.

Cultural values also emerged as an important theme. Nine participants, mostly local residents and students, stated that Balinese culture teaches respect for nature and should be reflected more consistently in daily waste behavior. This finding shows that *Tri Hita Karana* can provide a cultural foundation for environmental responsibility, especially through the idea of maintaining harmony between humans and the natural environment. However, cultural values alone were not enough to guarantee behavioral change. Twelve participants said they were willing to change their behavior, while three remained unsure because reusable alternatives and proper disposal options were not always convenient.

Overall, the results reveal three main patterns. First, concern about marine pollution at Padang Padang Beach was high across participant groups. Second, knowledge of microplastics remained limited, particularly regarding their ecological and health impacts. Third, behavior change depended on both cultural motivation and practical systems. These findings suggest that marine pollution reduction in Bali requires an integrated approach that combines environmental education, microplastic literacy, *Tri Hita Karana*-based responsibility, accessible infrastructure, and consistent enforcement.

The findings suggest that marine plastic pollution in Bali cannot be reduced through a single intervention. At Padang Padang Beach, participants perceived pollution as harmful, disturbing, and inconsistent with the image of Bali as a coastal tourism destination. However, the findings also suggest that environmental concern does not automatically lead to consistent action. This gap is central to the study. Marine pollution is not only related to limited knowledge, but also to how knowledge, cultural values, responsibility, infrastructure, and enforcement are translated into everyday practice.

Participants' identification of rivers and tourism-related waste as major sources of pollution is consistent with wider studies on land-based marine plastic leakage. Jambeck *et al*. (2015) showed that mismanaged plastic waste in coastal regions is a major pathway into the ocean, while Lebreton *et al*. (2017) and Meijer *et al*. (2021) emphasized the role of rivers in transporting plastic debris from land to sea. In Bali, Suteja *et al*. (2021) found that stranded debris on touristic beaches varied by season and was influenced by rainfall, circulation, proximity to rivers, and land use. The participants'

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perceptions therefore align with previous evidence that beach pollution is not produced only at the shoreline. It is also connected to disposal practices, drainage, river transport, settlement patterns, and tourism consumption.

A key finding of this study is the limited public understanding of microplastics. Most participants recognized visible plastic waste, but fewer were able to explain plastic fragmentation, smaller plastic particles, or the possible movement of microplastics through marine ecosystems. This distinction is important because plastic pollution may persist even after visible debris has been removed. Thompson *et al*. (2004) helped establish microplastics as a scientific concern, and later studies reported that microplastics are widespread, persistent, and may interact with marine organisms (Cole *et al*., 2011; Wright *et al*., 2013). Rochman *et al*. (2013) showed under experimental conditions that ingested plastic can transfer hazardous chemicals to fish, while Smith *et al*. (2018) reviewed potential human-health implications through seafood consumption. These studies do not prove direct health impacts in the present study site, but they indicate why public understanding of marine plastic pollution should move beyond visible beach litter.

The findings point to the importance of microplastic education in coastal communities and tourism spaces, especially because participants' understanding of plastic pollution was stronger for visible waste than for smaller and less visible plastic particles. Environmental education should not be limited to general messages such as "do not litter." It can also explain how plastic bottles, bags, straws, food packaging, fishing gear, and synthetic fibers may fragment into smaller particles and remain in water, sediments, and marine food chains. At the same time, education should be designed carefully. Awareness of risk may increase concern, but previous research suggests that knowledge alone rarely produces sustained pro-environmental behavior unless people also have practical alternatives, supportive social norms, and systems that make responsible behavior easier to perform (Kollmuss & Agyeman, 2002; Steg & Vlek, 2009).

The cultural dimension of the findings is also important. Participants who referred to Balinese culture described pollution as inconsistent with respect for nature. This connects closely with Tri Hita Karana, particularly its emphasis on harmony among the divine, human beings, and the natural environment. The *palemahan* dimension, which concerns the relationship between humans and nature, may support ecological responsibility. The *pawongan* dimension, which emphasizes harmony among humans, may strengthen shared responsibility among residents, tourists, businesses, and government. The *parahyangan* dimension, which concerns harmony with the divine, may reinforce the moral meaning of protecting the sea as more than an economic resource. In this sense, Tri Hita Karana can help frame marine pollution not only as a technical waste-management issue, but also as a cultural and moral concern.

However, the results also suggest that cultural values should not be treated as a complete solution by themselves. Participants recognized the importance of cultural values, but pollution was still perceived to continue because of convenience, weak enforcement, limited waste facilities, and established habits. This pattern is consistent with environmental behavior theory. Ajzen (1991) argues that behavior is shaped not only by attitudes, but also by perceived behavioral control and social norms. Kollmuss and Agyeman (2002) similarly show that the gap between awareness and action is influenced by internal and external barriers. In this study, internal barriers included habit and convenience, while external barriers included inadequate facilities and inconsistent enforcement. Tri Hita Karana may provide moral motivation, but that motivation needs to be supported by practical conditions that allow people to act responsibly.

This interpretation is also supported by studies on place-based plastic pollution solutions. Hardesty *et al*. (2022) argue that plastic pollution interventions should be culturally appropriate, economically realistic, and environmentally place-based. Willis *et al*. (2022) found that local waste-management interventions can reduce coastal litter when they encourage stewardship and make correct disposal easier. These insights are relevant to the Padang Padang Beach context. A culturally grounded program should not only encourage people to feel responsible, but also provide sufficient bins, clear signage, reusable alternatives, regular waste collection, enforcement against dumping, and visible cooperation among local authorities, tourism businesses, schools, and customary institutions.

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The findings further indicate that responsibility should not be placed too narrowly on individual behavior. Thirteen participants described responsibility as shared among communities, tourists, businesses, waste-producing actors, and government. This is important because marine plastic pollution is produced through interconnected systems of consumption, disposal, business practice, infrastructure, and policy implementation. Tourists may use disposable packaging, but businesses often provide it. Communities may dispose of waste improperly, but collection services may be limited. Government may issue regulations, but enforcement may be inconsistent. Rivers may carry waste to the sea, but that waste enters rivers through upstream behavior and infrastructure gaps. For this reason, the study supports an integrated governance approach rather than a blame-based approach.

For Bali, the practical implications can be organized into four linked strategies. First, microplastic literacy should be included in school programs, beach signage, visitor education, and community workshops. This literacy should connect visible plastic waste with smaller and less visible forms of plastic contamination. Second, Tri Hita Karana should be translated into community rules and tourism practices, especially through the *palemahan* principle of human-nature harmony. Third, infrastructure should make proper disposal easier than littering through sufficient bins, reliable collection, recycling access, refill stations, and upstream river-waste interception. Fourth, enforcement should be more consistent, especially in relation to single-use plastic restrictions, illegal dumping, and business waste practices.

The tourism sector also has an important role in reducing marine plastic pollution. Bali's beaches depend heavily on tourism, but tourism activities may also contribute to waste through food packaging, bottled drinks, transport, accommodation, and recreational services. Hotels, restaurants, surf schools, tour operators, and beach vendors should therefore not be treated only as beneficiaries of clean beaches. They can also be positioned as active participants in plastic reduction, waste separation, refill systems, and local monitoring. This direction is consistent with Bali Governor Regulation No. 97 of 2018, but the interview findings suggest that regulation needs to become more visible in everyday practice.

Overall, this study contributes to marine socio-ecological research by linking three levels of analysis: microplastic literacy, cultural ethics, and behavioral-governance systems. Scientific literature explains why plastic pollution remains an important ecological concern even when some particles are too small to see. Tri Hita Karana helps explain why marine pollution can be understood as culturally and morally unacceptable in Bali. Behavioral and governance perspectives help explain why concern may fail to become sustained action. The contribution of this study lies in showing that these three levels need to work together. Scientific literacy without cultural ownership may have limited public influence. Cultural values without infrastructure may remain symbolic. Infrastructure without education and enforcement may be underused or bypassed. Effective marine pollution reduction in Bali therefore requires an integrated approach that combines microplastic literacy, cultural responsibility, accessible systems, and consistent governance.

CONCLUSION

This study examined microplastic literacy and Tri Hita Karana values in relation to coastal pollution management at Padang Padang Beach, Bali. The findings show that participants perceived marine pollution not only as an environmental problem, but also as a cultural and tourism-related concern. Most participants expressed sadness or disappointment when seeing polluted water, while many identified rivers, land-based waste, plastic packaging, and tourism activities as important sources of pollution. Responsibility was generally understood as shared among local communities, tourists, businesses, and government. However, the findings also reveal a gap between environmental concern and consistent practice. Weak enforcement, limited waste facilities, convenience, and daily habits continue to make pollution difficult to control. The study highlights the importance of microplastic literacy in coastal pollution management. Participants were generally more familiar with visible plastic waste than with smaller and less visible plastic particles. This suggests that environmental education should move beyond general anti-littering messages and

explain how plastic waste may fragment into microplastics and persist in coastal environments. At the same time, the study shows that Tri Hita Karana can strengthen environmental responsibility by framing ocean protection as part of harmony among humans, nature, and the divine. However, cultural values need to be supported by practical infrastructure, clear rules, public education, tourism-sector participation, and consistent enforcement.This study contributes to marine socio-ecological research by linking microplastic literacy, Balinese cultural values, and public perceptions in a coastal tourism setting. Its findings suggest that coastal pollution management in Bali should combine scientific education, cultural responsibility, accessible waste-management systems, and stronger governance support. However, these findings should be interpreted within the study's limitations, including its small sample size, single-site focus at Padang Padang Beach, short fieldwork period, and absence of laboratory microplastic testing. Future research should examine multiple coastal sites across Bali, include seasonal comparisons, combine interviews with debris or microplastic sampling, and evaluate the long-term effectiveness of single-use plastic restrictions and community-based waste programs. Within these limits, the study suggests that protecting coastal tourism areas such as Padang Padang Beach requires sustained cooperation among science, local cultural values, policy implementation, tourism actors, and everyday community practice.

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