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Article

Delving into the Reality of Waste at Coro Beach: A Comprehensive Analysis and Innovative Solution Recommendations for Community-Based Sustainable Tourism

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Abstract

Sustainable development is a global imperative, demanding tourism to adopt sustainability principles. Ecotourism offers a model for environmental conservation and community empowerment; however, tourism growth often brings serious challenges, especially waste management issues that strongly correlate with visitor numbers. Ironically, a significant amount of marine waste originates from land due to poor management systems and high consumption of single-use items. In Indonesia, the implementation of Law No. 18 of 2008 is hampered by old paradigms, the NIMBY (Not In My Backyard) phenomenon, and low public awareness. Personal observations at Coro Beach, Tulungagung, reveal the natural beauty marred by waste accumulation, particularly plastic in mangrove areas, indicating a gap between natural potential, visitor behavior, and management handling. This research aims to identify the main challenges of waste management at Coro Beach, analyze the contributions of visitor behavior and facilities, and propose innovative sustainable solutions. Using a qualitative approach and literature review, data were collected from credible scientific literature, analyzed descriptively qualitative with thematic content analysis. Personal observations served as a reflective basis in the analysis process. The research findings confirm that the waste problem at Coro Beach reflects broader challenges in natural tourism destinations: irresponsible visitor behavior, gaps in effective facilities and management systems, and negative impacts on natural aesthetics and tourism potential. The dominance of plastic waste exacerbates coastal ecosystem damage. As solutions, a holistic and multidimensional approach is recommended: (1) Increasing visitor awareness and education through educational ecotourism and 3R campaigns, and strengthening the role of local guides. (2) Providing effective waste management infrastructure, including adequate segregated waste bins, scheduled collection, and simple on-site processing. (3) Enhancing local community participation and multi-stakeholder collaboration through the formation of active POKDARWIS (Kelompok Sadar Wisata - Tourism Awareness Groups), economic empowerment based on recycling, and strategic partnerships. (4) Enforcing regulations and continuous monitoring with consistent sanctions and periodic monitoring systems. The implementation of these recommendations is expected to make Coro Beach a model of responsible ecotourism, creating tangible positive impacts, and inspiring action in accordance with the theme of innovative action.

Keywords: waste management; sustainable tourism; ecotourism; coro beach; community participation

1. Introduction

1.1. Background

Sustainable development has become a global imperative, emphasizing the balance between economic growth, environmental preservation, and social justice. In this context, the tourism sector, as one of the world's economic pillars, bears significant responsibility for adopting sustainability principles. Sustainable tourism, as defined by the Brundtland Commission and reaffirmed in the Charter for Sustainable Tourism (1995), seeks to meet the needs of the present generation without compromising the ability of future generations to meet their own needs, by maximizing positive impacts and minimizing negative impacts on the environment, society, and economy (Roblek, et al., 2021; Revida, et al., 2022; Setiawan, et al., 2025). Concurrently, the concept of ecotourism has emerged as a more specific form of tourism, focusing on responsible nature experiences, environmental conservation, and the economic empowerment of local communities (Kautsar, 2023; Direktorat Produk Pariwisata & WWF-Indonesia, 2009).

However, beyond its significant economic and educational potential, the tourism industry also faces serious challenges, one of which is waste management. Tourism destinations, especially in natural areas like beaches, often generate a significant volume of waste, strongly correlated with the number of visitors (Maione, 2019; WWF, 2019, in Hilman et al., 2023). Ironically, most plastic waste in the ocean originates from land-based activities, including tourism, due to poor waste management systems and the high use of single-use items (UNEP, 2014, in Hilman et al., 2023). The impact of waste accumulation not only damages natural aesthetics and reduces tourism appeal but also threatens coastal ecosystems and potentially leads to economic losses (Jang et al., 2014, in Hilman et al., 2023; Hilman et al., 2023).

In Indonesia, despite being regulated by Law No. 18 of 2008, waste management still faces serious implementation constraints. Old paradigms focusing on landfilling without further management remain dominant, exacerbated by the Not In My Back Yard (NIMBY) phenomenon and a lack of public awareness in waste sorting (Alwi et al., 2002; Ferronato and Torretta, 2019; Holm et al., 2021; Atmanti, 2023). This condition is clearly reflected in various natural tourist destinations in Indonesia, including Coro Beach in Tulungagung, East Java. Personal observations at Coro Beach show stunning natural scenery marred by waste accumulation, particularly plastic, under the mangrove trees. This situation indicates a gap between the potential natural beauty, irresponsible visitor behavior, and a lack of optimal handling by management, despite an entrance fee being charged.

This problem at Coro Beach reflects the complexity of waste management challenges in natural tourism destinations more broadly, consistent with various case studies (Rambi, Karimuna, & Nurmalaewi, 2025; Jayantri & Ridlo, 2021). Therefore, a multidimensional approach that is innovative and inspires real action is needed to address this issue, in line with the theme of innovative action. This research aims to identify the root causes of waste problems at Coro Beach, analyze the contributing factors, and formulate relevant and sustainable solution recommendations, by integrating concepts of sustainable tourism, ecotourism, community participation, and existing policy frameworks. It is hoped that the results of this research will not only enrich scientific knowledge but also serve as an inspiration for managers, government, and the community to realize more responsible and sustainable management of natural tourism destinations.

1.2. Problem Statement

Based on the background outlined above, this research formulates the following research questions:

1.2.1. What are the main waste management challenges faced at Coro Beach, Tulungagung?

1.2.2. How do visitor behavior and the availability of facilities contribute to waste accumulation at Coro Beach?

1.2.3. What innovative solutions can be proposed for sustainable waste management at Coro Beach, considering the concepts of ecotourism and community participation?

1.2.4. How can policy frameworks and multi-stakeholder collaboration improve the effectiveness of waste management at Coro Beach?

1.2.5. What is the potential impact of improved waste management on the sustainability and attractiveness of Coro Beach as a natural tourism destination?

1.3. *Research Objectives*

In line with the problem statement above, this research aims to:

1.3.1. Identify the main waste management challenges faced at Coro Beach, Tulungagung.

1.3.2. Analyze the contribution of visitor behavior and the availability of facilities to waste accumulation at Coro Beach.

1.3.3. Propose innovative solutions for sustainable waste management at Coro Beach, considering the concepts of ecotourism and community participation.

1.3.4. Explore the role of policy frameworks and multi-stakeholder collaboration in improving the effectiveness of waste management at Coro Beach.

1.3.5. Analyze the potential impact of improved waste management on the sustainability and attractiveness of Coro Beach as a natural tourism destination.

1.4. *Research Benefits*

This research is expected to provide the following benefits:

1.4.1. Theoretical Benefits

- Enrich literature and conceptual understanding regarding waste management issues in natural tourism destinations, particularly in the context of ecotourism and sustainable tourism in Indonesia.
- Provide an analytical framework that can be used to examine similar problems in other tourist destinations, by integrating behavioral, facility, policy, and community participation perspectives.
- Serve as a reference for future research that wishes to delve into specific aspects of waste management or the development of community-based ecotourism models.

1.4.2. Practical Benefits

- For Coro Beach Management: Provide concrete and innovative recommendations that can be implemented to improve the effectiveness of waste management, maintain cleanliness, and preserve the natural beauty of the beach.
- For Local Government (Tourism Office, Environmental Agency): Provide data and analysis that can serve as a basis for formulating more effective policies, resource allocation, and community empowerment programs related to waste management in tourist destinations.

- For Local Communities: Inspire increased awareness and active participation in maintaining environmental cleanliness, and open opportunities for economic empowerment through recycling initiatives and community-based ecotourism.
- For Tourists: Increase awareness of the importance of responsible behavior while traveling and encourage participation in maintaining the cleanliness of destinations.

2. Literature Review

2.1. Concepts of Sustainable Tourism and Ecotourism

Sustainable development is fundamentally aimed at achieving equitable development across present and future generations, as well as enhancing community welfare to meet human needs and aspirations (Salim, 1990, in Revida, et al., 2022). According to the Ministry of Environment (1990), as quoted by Revida, et al. (2022), the sustainability of economically oriented development can be measured based on three criteria: absence of natural resource waste, absence of pollution and other environmental impacts, and the ability to increase usable resources or replaceable resources. In line with this, the goals of sustainable development include equitable distribution of development benefits across generations, safeguarding the preservation of natural resources and the environment, utilizing resources for sustainable economic growth, and maintaining intertemporal public welfare (Sutamihardja, 2004, in Revida, et al., 2022). Fundamentally, this concept is widely known through the Brundtland Commission's definition, stating that sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Roblek, et al., 2021; Revida, et al., 2022). This concept gained global prominence after Agenda 21, the Rio Declaration on Environment and Development, and the Statement of Principles for the Sustainable Management of Forests were adopted at the 1992 Rio de Janeiro Conference, which subsequently significantly influenced the development of sustainable tourism worldwide (Roblek, et al., 2021).

In the context of tourism, Sustainable Tourism is rapidly developing tourism that considers the increasing capacity of accommodation, local population, and the environment. New developments and investments in this sector should not have adverse impacts and should integrate with the environment by maximizing positive impacts and minimizing negative impacts (Revida, et al., 2022). The Charter for Sustainable Tourism (1995) affirms that tourism development must be based on sustainability criteria, meaning "development can be ecologically supported in the long term while being economically viable, ethically and socially equitable to the community" (Revida, et al., 2022). This aligns with the view of Setiawan, et al. (2025) who state that sustainable tourism is an essential concept emphasizing responsibility towards three main pillars: environmental, social, and economic, which must be applied in all tourism activities and industries. The implementation of this sustainability concept is crucial in the tourism industry to create a good balance and sustainability (Setiawan, et al., 2025).

Along with the evolution of sustainable tourism, the concepts of ecotourism and green tourism have also emerged. Ecotourism is a form of tourism where nature is the primary recreational destination. Another definition states that ecotourism is a model of nature tourism in pristine natural areas with the aim of enjoying their natural beauty, supporting conservation efforts, and increasing the economic income of local communities (Kautsar, 2023). More formally, Ceballos-Lascuráin (1996) defined ecotourism as environmentally responsible travel and visitation to relatively undisturbed natural areas, for the purpose of enjoying and appreciating nature (and any accompanying cultural features), that promotes conservation, has low visitor impact, and provides for beneficially active socio-economic involvement of local populations (Direktorat Produk Pariwisata & WWF-Indonesia, 2009). The International Ecotourism Society (TIES) specifically defines ecotourism as tourist travel to natural areas for the purpose of conserving or saving the environment and providing livelihoods for local residents (Elisca, Idham, & Iskandar, 2020, quoting TIES, 1991). This emphasizes that ecotourism

activities are special interest nature trips conducted according to environmental conservation principles (Elisca, Idham, & Iskandar, 2020). Key aspects of ecotourism include: limiting or regulating visitor numbers according to environmental and socio-cultural carrying capacity, environmentally and culturally friendly tourism patterns, and direct contributions to the local economy with minimal initial infrastructure capital (Direktorat Produk Pariwisata & WWF-Indonesia, 2009).

The objectives of ecotourism encompass educational aspects and positive experiences for tourists, minimizing negative impacts on the environment and local culture, involving the community in management, providing economic benefits, and ensuring the sustainability of tourist objects (Kautsar, 2023, quoting Departemen Kebudayaan dan Pariwisata Republik Indonesia, 2009). Nevertheless, it is important to distinguish between sustainable tourism and ecotourism. The two cannot be considered synonymous, as some forms of ecotourism may not be fully sustainable if not carefully planned and managed (Roblek, et al., 2021). Ecotourism needs to add social value to the local environment and economy, not just focus on industry profits. A tourism approach that enables this must consider ethnic communities, the quality of tourism interaction with local communities and nature, and an ethics that cares for the protection of the natural environment (Roblek, et al., 2021). Therefore, the adoption of innovative processes and business models, as well as the development of resilience to change and host communities, becomes crucial. This includes developing criteria to avoid the negative globalizing impacts of tourism while preserving the traditions, cultural identity, and heritage of destinations within the ecotourism industry (Roblek, et al., 2021).

Community-Based Ecotourism (CBE) is an ecotourism development model that specifically emphasizes the active role and full involvement of local communities in the planning, implementation, and management of ecotourism businesses, including the sharing of profits (Direktorat Produk Pariwisata & WWF-Indonesia, 2009). CBE is based on the understanding that communities have in-depth knowledge of nature and culture, which are potential assets and selling points for tourist attractions, making their involvement absolutely essential (Direktorat Produk Pariwisata & WWF-Indonesia, 2009). CBE recognizes the rights of local communities to manage tourism activities in their customary areas or as managers, and is capable of creating job opportunities and reducing poverty through tourism services such as guides, transportation, homestays, and craft sales (Direktorat Produk Pariwisata & WWF-Indonesia, 2009). Key aspects of CBE include: the establishment of committees or management bodies by the community with external support, the application of the principle of local ownership over ecotourism facilities and infrastructure, making homestays the primary accommodation option, local people serving as guides, and the community being responsible for determining tourism costs and object maintenance (Direktorat Produk Pariwisata & WWF-Indonesia, 2009). CBE also brings positive impacts on environmental preservation and native culture, which is expected to foster self-identity and pride among local residents (Direktorat Produk Pariwisata & WWF-Indonesia, 2009). Nevertheless, CBE is viewed as part of integrated development planning, which requires the involvement of various relevant parties such as communities, government, businesses, and non-governmental organizations to build balanced networks and partnerships according to their respective roles and expertise (Direktorat Produk Pariwisata & WWF-Indonesia, 2009).

2.2. Waste Management in Tourism Destinations

Waste management in Indonesia faces significant challenges despite being regulated by Law No. 18 of 2008. The majority of households still burn or dispose of waste without sorting, reflecting the NIMBY (Not In My Backyard) phenomenon (Holm et al., 2021; Atmanti, 2023). The gap between knowledge and practice of waste sorting remains high, often because people consider it troublesome and the habit of sorting has not yet formed (Kautsar, 2023; Ulhasanah and Goto, 2017; Atmanti, 2023). The old paradigm of waste management, from direct sources to landfills without further processing, has created various serious problems such as waste accumulation, environmental pollution, and greenhouse gas emissions from landfills dominated by open dumping systems (Alwi et al., 2002; Ferronato and Torretta, 2019; Gangwar et al., 2019; Atmanti, 2023). Furthermore, organic waste,

especially kitchen waste, is the largest contributor to waste generation, which if not managed properly, leads to serious problems (Wisanggeni et al., 2022; Atmanti, 2023).

In response to this, the Indonesian government has taken various efforts, including prohibiting the use of plastic bags in modern markets after Indonesia was identified as the largest contributor to marine plastic waste (Jambeck et al., 2015; Atmanti, 2023). Waste management is now shifting to a new hierarchy-based paradigm, starting with avoiding, reducing (reduce), reusing (reuse), and recycling (recycle), supported by waste bank programs and special handling for hazardous and toxic waste (B3) (Das et al., 2019; Atmanti, 2023). These efforts focus on utilizing organic waste into compost or energy (biogas) and encouraging the recycling of inorganic waste, although implementation requires significant costs (El Mahdi et al., 2017; Atmanti, 2023).

As a long-term solution to greenhouse gas emissions from waste, the government also encourages the development of Waste-to-Energy Plants (PLTSa) through Presidential Regulation No. 35 of 2018. PLTSa, such as in Benowo Surabaya, is capable of converting thousands of tons of waste into electrical energy, while also suppressing harmful emissions from landfills (Qodriyatun, 2021; Sucahyo and Fanida, 2021; Atmanti, 2023). The success of waste management in Indonesia, both upstream and downstream, highly depends on a multidimensional approach involving collaboration from various parties: institutional, policy, financial, technological, and especially the community, to achieve holistic and sustainable solutions (Andriani and Atmaja, 2019; Vasconcelos et al., 2022; Atmanti, 2023).

2.3. Community Participation in Environmental Management

The tourism sector, while a significant global economic driver, also brings serious environmental impacts, particularly the issue of solid waste or garbage. Tourist destinations often fail to adhere to waste management guidelines, with various studies showing a strong correlation between the volume of waste generated and the number of visitors (Maione, 2019; WWF, 2019, in Hilman et al., 2023; Epler Wood, 2019, in Hilman et al., 2023). For instance, in Dubrovnik, urban waste volume can surge up to 400 times during peak tourism season (Epler Wood, 2019, in Hilman et al., 2023). Ironically, about 90% of plastic waste in the ocean originates from land-based activities, including tourism, due to inadequate recycling, poor waste management systems, and high consumption of single-use items (UNEP, 2014, in Hilman et al., 2023). The economic impact is also evident, such as a 63% decline in tourist numbers on Geoje Island, South Korea, due to contaminated beaches (Jang et al., 2014, in Hilman et al., 2023). In Indonesia, Yogyakarta City, as a favorite destination, also faces significant challenges, especially limited landfill space, which requires coordination between local governments and active community support (DPRD Kota Yogyakarta, 2025).

In Indonesia, waste management is regulated by Law No. 18 of 2008, but its implementation still faces constraints. The majority of households still burn or dispose of waste without sorting, reflecting the NIMBY (Not In My Back Yard) phenomenon and a lack of collective awareness (Holm et al., 2021; Atmanti, 2023). The gap between knowledge and practice of waste sorting remains high because it is considered bothersome and has not yet become a habit (Kautsar, 2023; Ulhasanah and Goto, 2017; Atmanti, 2023). The old paradigm, focusing on collection and landfilling without further management, leads to various problems such as waste accumulation, environmental pollution, and greenhouse gas emissions from predominantly open dumping systems (Alwi et al., 2002; Ferronato and Torretta, 2019; Atmanti, 2023). Organic waste, especially kitchen waste, is the largest contributor to waste generation, which if unmanaged, will produce toxic leachate (Wisanggeni et al., 2022; Sugiarti & Aliyah, 2015; Atmanti, 2023).

Addressing these issues, the Indonesian government is striving to promote a new paradigm of waste management. After Indonesia was identified as one of the largest contributors to marine plastic waste (Jambeck et al., 2015; Atmanti, 2023), the government implemented a ban on plastic bags in modern markets. Waste management is now shifting to a hierarchy-based approach that emphasizes managing waste as close to its source as possible, also regulated in Minister of Environment and Forestry Regulation No. 14/2021 concerning Waste Banks (Atmanti, 2023; Sugiarti & Aliyah, 2015).

The main principle is 3R (Reduce, Reuse, Recycle) for inorganic waste (Das et al., 2019; Atmanti, 2023), or even 5R (Reduce, Reuse, Recycle, Replant, Replace) which emphasizes reduction, reuse, recycling, replanting, and replacing environmentally unfriendly materials (Merry Magdalena, 2003, in Sugiarti & Aliyah, 2015). Organic waste can be processed into compost or energy (biogas), while inorganic waste is encouraged to be recycled or repurposed into handicrafts (Unnisa, 2015; Sugiarti & Aliyah, 2015; Atmanti, 2023). The handling of hazardous and toxic waste (B3) is also strictly regulated with special processing to prevent pollution (Atmanti, 2023).

The definition of waste according to Law No. 18 of 2008 is the solid or semi-solid remnants of daily human activities or natural processes, both organic and inorganic, considered useless and discarded into the environment (Syafiq et al., 2024). Waste originates from residential areas, public places, and commerce, and can be categorized into organic (easily decomposed like food scraps, vegetables) and inorganic (difficult to decompose like metals, plastics, glass) (Syafiq et al., 2024). Optimal management requires a balance of institutional, legal, financial, technical, operational aspects, and especially community participation. Failure in this management leads to environmental degradation such as air, soil, and water pollution, as well as land damage (Gobai et al., 2021, in Syafiq et al., 2024). In elementary school environments, waste management not only teaches recycling creativity but also fosters early awareness of the importance of loving the environment (Syafiq et al., 2024).

In tourist destinations, the three main sources of waste are tourism-supporting communities (local vendors), tourists, and tourism managers themselves. Low tourist awareness, minimal facilities, and negligence by managers exacerbate the problem (Hilman et al., 2023). Plastic waste is the largest component of inorganic waste in tourist destinations (Fauzan et al., 2018, in Hilman et al., 2023), and is divided into six categories based on codes on packaging (PET/PETE, HDPE, PVC, LDPE, PP, PS) (Ellissi et al., 2022, in Hilman et al., 2023). The impact of plastic waste is extensive due to its slow decomposition, causing soil pollution (heavy metal and microplastic contamination), water pollution (inhibition of flow, pollution of aquatic ecosystems, increase in microplastics damaging coral reefs), and air pollution (release of harmful gases and heavy metals like dioxins from open burning, triggering respiratory problems and cancer) (Hilman et al., 2023). Given that Indonesia is the second-largest producer of plastic waste globally with a recycling rate of only about 10%, waste processing is crucial (Jambeck, 2015; Hilman et al., 2023). Plastic waste can be processed mechanically (sorting, shredding), chemically (pyrolysis, gasification), or biologically, although biological methods are still in early research stages (Hilman et al., 2023). The success of waste management in Indonesia heavily depends on a multidimensional approach and the collaboration of all parties, including the development of Waste-to-Energy Plants (PLTSa) to reduce greenhouse gas emissions from landfills (Atmanti, 2023; Hilman et al., 2023).

2.4. Policies and Regulations Related to Waste Management

Effective and sustainable waste management is inseparable from a strong policy and regulatory framework. In Indonesia, the success of a public policy is highly determined by the effectiveness of its implementation. In fact, Dwidjowijoto (2006) states that 60% of the success of public policy depends on its implementation effectiveness. In a broader context, such as sustainable forest management, policy plays a fundamental role as a legal basis, encouraging decentralization, optimizing community access to resources, ensuring investment, and improving the success of rehabilitation and protection programs (Anonim, 2011, in Ruhimat, 2013). This indicates that without clear and well-implemented policies, waste management efforts will not be optimal. Therefore, various regulations and laws related to waste management in Indonesia, such as Law No. 18 of 2008, form a crucial foundation that needs to be supported by effective implementation and the participation of all stakeholders.

Although the Job Creation Law (Omnibus Law) was issued with the aim of simplifying regulations and licensing, including in the environmental cluster, its implementation presents significant challenges for environmental monitoring and law enforcement (Ardiansyah, 2020).

Substantial changes, such as the abolition of environmental permits and their integration into the Online Single Submission (OSS) system, potentially complicate environmental oversight if the monitoring system is not adequately integrated with these licensing platforms. Furthermore, the limited number of environmental supervisory officials (PPLHD) and Civil Servant Investigators (PPNS) at the regional level poses a serious obstacle to monitoring business compliance and handling environmental violation cases (Ardiansyah, 2020). Challenges also arise from the amendment of Article 88 of Law No. 32 of 2009 by the Job Creation Law, which eliminates the principle of strict liability and requires proof of fault. This demands a higher legal competency from supervisors to present strong evidence in judicial processes, potentially prolonging and complicating law enforcement against environmental destroyers (Ardiansyah, 2020).

In fact, the effectiveness of environmental law in Indonesia, particularly in law enforcement, is still very limited and often faces major challenges in implementation and consistency on the ground (Yunita et al., 2024). A case study in Deli Serdang Regency shows that despite existing regulations, law enforcement is still slow, lacks transparency, and has minimal strict sanctions, which causes public doubt about the sustainability and fairness of the legal system (Yunita et al., 2024). Key factors hindering this effectiveness include weak oversight, lack of firm sanctions, and low public awareness and understanding of environmental law, even though socialization has been conducted (Yunita et al., 2024). Therefore, to achieve optimal environmental legal effectiveness, increased inter-agency coordination, more active community involvement, stricter sanctions, and continuous education to enhance public understanding are needed (Yunita et al., 2024).

The active participation of local communities in maintaining environmental cleanliness and preservation, as evidenced in tourism development at Kaolin Lake, is crucial; however, the sustainability of these efforts heavily depends on inclusive policy support and sustainable empowerment programs (Tarjih, 2025). At the practical level, local communities play a vital role in implementing these policies, as exemplified in Lumbung Stroberi, which proactively applies responsible waste management practices, including the sorting of organic and non-organic waste (Amelia & Susanti, 2024). This holistic approach demonstrates that policy effectiveness highly depends on the synergy between formal regulations, actual implementation on the ground, and support for active community awareness and participation.

2.5. Similar Case Studies on Waste Problems in Beaches/Natural Tourist Destinations

Waste management is a crucial issue in various tourist destinations, especially in coastal and natural areas, given the large volume of waste generated from tourism activities. The quantity of this waste correlates strongly with the number of visitors, and can even surge drastically during peak season (Maione, 2019; WWF, 2019, in Hilman et al., 2023; Epler Wood, 2019, in Hilman et al., 2023). Ironically, approximately 90% of plastic waste in the ocean originates from land, including tourism, due to inadequate recycling, poor waste management systems, and high consumption of single-use items (UNEP, 2014, in Hilman et al., 2023). The economic impact is also tangible, such as a decrease in tourist numbers due to contaminated beaches (Jang et al., 2014, in Hilman et al., 2023). Specifically, plastic waste is a key indicator of beach pollution; during certain seasons, plastic waste accumulation on beaches can significantly disrupt recreational functions and natural beauty, as seen at Kuta Beach, Bali (Wedayani, 2018).

In Indonesia, similar problems are found in various case studies in coastal areas. Research on domestic waste management in five coastal villages of Soropia District, Konawe Regency (Tapulaga, Leppe, Mekar, Bajo Indah, and Bajoe), indicates that the waste management system is not yet systematic and comprehensive (Rambi, Karimuna, & Nurmalaadewi, 2025). The main obstacles include the absence of adequate waste storage facilities, unorganized collection and transportation, and the lack of Temporary Waste Disposal Sites (TPSS) in these villages. This situation leads most residents to tend to dispose of waste directly into the sea or burn it, exacerbated by a lack of understanding, old habits, and limited facilities, resources, and local government policy support (Rambi, Karimuna, & Nurmalaadewi, 2025). Jayantri and Ridlo (2021) further identify three main

factors causing waste accumulation in coastal areas: lack of visitor/tourist awareness in disposing and sorting waste, minimal availability of adequate and sorted waste bins, and the contribution of household waste from surrounding residents, including that carried by river currents. Generally, waste generated in coastal areas is dominated by inorganic waste such as cans and plastics, originating from tourists and businesses.

An analysis of the implementation of marine waste management policies in the coastal area of Muara Angke, North Jakarta, by Riksfordini and Asmara (2023), highlights the complexity of marine pollution by plastic waste and, specifically, medical waste. This problem is exacerbated by the influx of waste from 13 river flow points in Jakarta and its surroundings, as well as the impact of reclamation development that disrupts marine ecosystems and fishermen's livelihoods. Although the implementation of Presidential Regulation Number 83 of 2018 concerning Marine Waste Management is based on common interests and shows benefits for the community (e.g., through participation with waste collector communities like Vital Ocean Indonesia) and the government, the desired degree of change has not been fully achieved. Key inhibiting factors include a lack of public understanding and awareness in maintaining the environment, the indifference of fishermen who feel their aspirations are not addressed by the government, limited waste budget (only 0.01% of the regional budget), ineffective implementation of waste regulations, and a lack of advanced waste management technology. Additionally, law enforcement or punishment programs have not been optimal. Nevertheless, the government has made efforts through socialization, providing facilities such as waste transport vessels and processing technology (RDF, Elbok), and efforts to utilize plastic for road asphalt and supporting waste banks.

Similar challenges are also revealed by Fadly's (2023) study examining government efforts in waste management at Batu Lamampu Beach, Sebatik District, Nunukan Regency. Although there are efforts to implement the 3R (Reduce, Reuse, Recycle) principle by the village government through education and the formation of Tourism Awareness Groups (POKDARWIS), the implementation has not been fully maximized. The main obstacles include a lack of community awareness and limited waste management facilities and infrastructure, leading to reuse and recycling activities often being done independently. This research also noted a significant increase in waste volume, reaching 496 cubic meters in the first four months of 2023, partly due to disruptions in beach cleaning activities caused by construction. Nevertheless, creative local initiatives were found, such as the use of plastic bottles as fishing buoys, used car tires as children's play facilities, and glass bottles as handicrafts, in addition to planting *casuarina equisetifolia* trees as environmental preservation efforts.

Various management efforts have been implemented in several locations in Indonesia with varying degrees of success. Jayantri and Ridlo (2021) reviewed several case studies, such as at Pariaman City Beach, which implemented a 3R waste transfer station (TPS 3R) program with sorted containers and scheduled transportation; Parangtritis Beach, Bantul, which involves local government agencies and the community in a waste management system from storage to final disposal; Pangandaran Beach, which emphasizes active community participation and widespread implementation of the 3R principle; Pulang Sawal Beach, Gunungkidul, which focuses on sorting organic and inorganic waste, where inorganic waste is processed into handicrafts or sold; Baru Beach, Bantul, which implements waste classification, collection, transportation, and processing up to the landfill with compost recycling as an effective solution; and Candikusuma Beach, Jembrana, Bali, which actively implements 3R, including education on Clean and Healthy Living Behavior (PHBS) and placing banners to increase visitor awareness. All these case studies collectively show that the effectiveness of waste management heavily depends on a combination of community awareness, adequate infrastructure availability, strong policy support, and the application of sustainable waste management principles such as 3R.

3. Research Methodology

3.1. Type and Approach of Research

This study adopts a qualitative research framework with a primary focus on the library research method. A qualitative approach is inherently chosen to allow for in-depth exploration of phenomena, uncovering nuances, and understanding the context behind existing information, as opposed to quantitative measurements that are numerically oriented. Through the library research method, the researcher endeavors to collect, review, and comprehensively analyze information from diverse leading literature sources. These sources include, but are not limited to, academic reference books, both national and international scientific journal articles, as well as various official documents and other publications relevant to the subject matter. A crucial focus of this approach is the systematic application of content analysis. Content analysis enables the researcher to meticulously identify, examine, and synthesize conceptual findings and arguments presented in the literature. This aims to build a complete and coherent understanding of the research issue, map different perspectives, and identify potential knowledge gaps, thereby producing a quality and scientifically robust synthesis of findings.

Furthermore, to provide a richer contextual and empirical dimension, this research also integrates the researcher's personal observation. This observation, conducted at Coro Beach, Tulungagung, East Java, serves as a reflective basis that inspired the writing. It is important to emphasize that this observation is not a systematic field data collection involving surveys, interviews, or formal quantitative instruments, but rather a reflective essence based on personal experience. Through this approach, direct experience and in-depth observation of environmental conditions and social phenomena at the location become the starting point for identifying and analyzing problems. This type of writing can be categorized as a reflective essay based on personal experience supported by thematic literature review, aligning with the spirit of innovative action that encourages the transformation of empirical experience into inspiration for real action.

3.2. Data Collection Methods and Techniques

In this research, data collection techniques are strictly carried out through document tracing and literature study. This process is designed to ensure that all information collected has high scientific validity and relevance. The primary data sources for this study exclusively originate from scientifically credible publications. This includes articles published in reputable national and international journals, peer-reviewed research reports, and academic books containing fundamental theories and concepts. Additionally, articles published on official government websites or leading institutions relevant to the study's focus also form part of the data corpus.

Data collection is conducted selectively, adhering to strict criteria that include: validity (authenticity of information), relevance (direct correlation with the research topic), and currency (up-to-dateness of data and findings). This ensures that the analysis performed is based on accurate, relevant information that reflects the latest developments in related scientific disciplines. Through this approach, the researcher can build a solid theoretical and empirical foundation for discussing waste management issues in natural tourism destinations.

3.3. Data Collection Procedures

The data collection process in this literature study is structured through several key stages, designed to ensure the completeness and depth of analysis:

3.3.1. Identification of Research Topic and Objectives

The initial stage involves definitively establishing the research topic to be examined, which is the issue of waste management in natural tourism destinations, with an emphasis on the context of sustainable tourism and ecotourism. Once the topic is set, the researcher carefully formulates the

research objectives and specific, measurable research questions. This detailed formulation serves as the primary guide, limiting the scope of literature search, and ensuring that every step of data collection aligns with the desired research goals.

3.3.2. Data Source Search and Selection

With the topic and objectives defined, the researcher proceeds to the stage of extensive data source searching through leading online academic databases. Platforms such as Google Scholar, Directory of Open Access Journals (DOAJ), and other digital libraries become primary instruments in this process. For search effectiveness, a combination of relevant and strategic keywords is used, including "sustainable tourism," "ecotourism," "destination waste management," "community participation in environment," "waste policy" and "tourism waste impact." Only literature that explicitly meets the criteria of eligibility and relevance to the research topic is selected for download and further analysis, ensuring data efficiency and quality.

3.3.3. Data Organization and Categorization

Once data sources are collected, the next step is the systematic organization and categorization of data. The information obtained is then grouped based on pre-established thematic categories or subtopics, in accordance with the structure of the problem statement and research objectives. For instance, data will be separated into sections discussing sustainable tourism concepts, ecotourism, waste management challenges, community roles, and policy frameworks. This process facilitates the researcher in reviewing, comparing, and integrating various perspectives and findings from different literatures.

3.3.4. Data Source Validation and Critical Review

Every piece of literature selected for use in this research undergoes a process of critical review. The researcher validates the authenticity of information, the objectivity of the authors, and the credibility of the publication. This step is essential to ensure that the data forming the basis of the analysis is unbiased and scientifically accountable. The contribution of each source to the study topic is also assessed to determine its weight and relevance in the overall research argument.

3.3.5. Synthesis and Compilation of Analysis Results

After data validation, findings from various literature sources are then carefully compiled and synthesized. This synthesis process involves combining information, identifying patterns, similarities, and differences in views among various authors. The results of this synthesis are then arranged into a structured and coherent line of thought, which is directly used to answer the research problem statement. This stage is the heart of content analysis, where the researcher builds arguments based on the collected evidence.

3.3.6. Data Revision and Reinforcement

Qualitative research, especially literature studies, is iterative. Therefore, the stage of data revision and reinforcement is crucial. If, during the initial writing and analysis process, data deficiencies, inconsistencies between sources, or areas requiring further exploration are found, the researcher will conduct additional searches. This process may involve searching for new literature or re-examining existing sources to obtain necessary clarification or supporting information, ensuring the completeness and robustness of the arguments presented.

3.4. Analysis Techniques and Conclusion Drawing

Data analysis in this research is conducted through a qualitative descriptive analysis approach, specifically applying thematic and interpretive content analysis techniques. This analysis process is

inseparable from the researcher's personal observation experience at Coro Beach, Tulungagung, which served as a point of reflection and inspiration for ideas. The stages of analysis include:

3.4.1. Data Reduction

At the data reduction stage, the researcher performs intensive filtering and focusing of all information collected from the literature review. This process involves identifying core concepts, crucial points from arguments presented in the sources, and relevant findings from previous case studies. Irrelevant or duplicate data will be eliminated to ensure efficiency and sharpness of analysis. This reduction also includes selecting key details from personal observations at Coro Beach to be integrated as illustrations.

3.4.2. Data Display

The reduced data is then presented in a systematic and coherent scientific narrative. This presentation is structured according to the designed study framework, integrating various theories, concepts, and empirical findings from the literature. In this context, the author strives to establish a relationship between empirical observations at Coro Beach and underlying theories, so that the reality on the ground can be compared with ideal practices or findings from other studies.

3.4.3. Drawing Provisional Conclusions

Based on the reduced and presented data, the researcher formulates initial or provisional conclusions. These conclusions are formed based on the logical connections between data findings and the research problem statement and objectives. At this stage, the identification of gaps between factual conditions (as observed at Coro Beach) and ideal practices in the literature begins to emerge, forming the basis for further analysis.

3.4.4. Data Verification and Validation

The provisional conclusions drawn then undergo a process of verification and re-validation. This stage involves cross-checking information by comparing various different literature sources to ensure the consistency and authenticity of the arguments. This validation is important to increase confidence in the research results and ensure that the conclusions drawn are based on strong evidence.

3.4.5. Drawing Final Conclusions

After a careful verification process, the researcher formulates comprehensive final conclusions. These conclusions not only answer the research questions thoroughly and in-depth but also integrate insights from the literature review with reflections from personal observations. The aim is to provide a complete understanding of waste management problems in tourist destinations and their implications for sustainable tourism.

3.4.6. Critical Evaluation and Reflection

The final stage is a critical evaluation and reflection on the entire research process and results. The researcher identifies the strengths of the analysis performed, acknowledges the limitations or weaknesses of the methods used, and reflects on the potential for further study development. This includes suggestions or recommendations directed at tourism managers, local governments, and the general public. The main goal is to awaken collective awareness and encourage real action through a collaborative approach, to realize more environmentally friendly and sustainable tourism management, in line with the theme of innovative action.

4. Results and Discussion

This section presents the synthesized results from the literature review, integrated with findings from personal observations at Coro Beach, Tulungagung, to discuss waste management issues in natural tourism destinations. The analysis will focus on identifying problems, discussing relevant solutions, and conveying the author's findings that are expected to inspire concrete actions.

4.1. Overview of Coro Beach, Tulungagung: Beauty Marred

A personal visit to Coro Beach in Tulungagung, East Java, conducted two days before the end of the holy month of Ramadan 2025, offered a mesmerizing natural panorama alongside an unfortunate reality. This beach, which tends to be secluded, not very wide, and felt very quiet during the visit, offers extraordinary natural charm. The cool air, the clear sound of waves, the not-too-large waves, and the expanse of relatively fine white sand all contribute to a calming atmosphere. A vast, clean sea stretches before one's eyes, adorned with unique moss-covered rocks, some forming natural bathtub-like depressions where waves can splash visitors. On the shoreline, rows of mangrove trees display their sturdy and robust roots, creating an interesting elevation difference with the white sand. Large and shady trees on the side of the beach also offer a comfortable spot for visitors to relax. This beauty requires thousands of words to fully describe.

However, behind the eye-pleasing panorama, there was a deeply regrettable condition: a significant accumulation of waste under the mangrove trees. This waste, predominantly plastic and other residues, appeared to stem from irresponsible visitor behavior and, implicitly, a lack of handling by the beach management. Ironically, visitors are charged an entrance fee of five thousand rupiah, yet the conspicuous presence of waste indicates a gap between the facilities provided and efforts to maintain cleanliness. Nevertheless, this personal experience did not diminish the desire to return, with the hope that this waste problem can be resolved in the future by the beach management. The situation at Coro Beach serves as a tangible illustration of the challenges of waste management in natural tourist destinations, consistent with various case studies discussed in the literature review.

4.2. Challenges of Waste Management in Natural Tourism Destinations: Reflection on the Coro Beach Case

The clearly visible waste problem at Coro Beach reflects the complexity of waste management challenges faced by many natural tourism destinations, as outlined in the literature review (Chapter II). Fundamentally, Coro Beach exhibits several key issues consistent with the literature:

4.2.1. Waste Volume and Visitor Behavior

As revealed by Maione (2019) and WWF (2019) in Hilman et al. (2023), the volume of waste in tourist destinations correlates strongly with the number of visitors. Although Coro Beach was relatively quiet during the observation, the presence of waste indicates that even a limited number of visitors can lead to waste accumulation if awareness and management facilities are minimal. Irresponsible tourist behavior in waste disposal, as highlighted by Jayantri and Ridlo (2021), is a dominant factor contributing to this waste accumulation. The waste found at Coro Beach, especially plastic in the mangrove area, is highly consistent with the findings of Fauzan et al. (2018) in Hilman et al. (2023) stating that plastic waste is the largest component in tourist destinations.

4.2.2. Gap in Facilities and Management

The limited or absent adequate waste bins, along with a lack of organized waste collection and transportation, are key triggers of the problem at Coro Beach, similar to the findings of Rambi, Karimuna, & Nurmalaadewi (2025) in the coastal villages of Konawe. The fact that beach managers collect an entrance fee but fail to maintain cleanliness indicates that the operational aspects of waste management at the micro-level are not optimal. This underscores the importance of investing in adequate waste management infrastructure, not just in developing tourist attractions.

4.2.3. Impact on Natural Beauty and Tourism Potential

The accumulation of waste at Coro Beach, especially in sensitive areas like mangrove forests, not only damages natural aesthetics but also threatens coastal ecosystems. This aligns with the negative impacts described by Hilman et al. (2023) related to soil, water, and air pollution due to slow-decomposing plastic waste. The degradation of natural beauty has the potential to reduce tourist appeal and even lead to economic losses, as seen in the case of declining tourist numbers on Geoje Island (Jang et al., 2014, in Hilman et al., 2023). In the context of ecotourism and sustainable tourism (Roblek, et al., 2021; Revida, et al., 2022), this condition is a paradox that must be immediately addressed. Waste management at Coro Beach can also be analyzed through the lens of Indonesia's still-dominant old waste management paradigm (Alwi et al., 2002; Ferronato and Torretta, 2019; Atmanti, 2023), where waste ends up in the environment without adequate handling. This situation demonstrates the NIMBY (Not In My Back Yard) phenomenon explained by Holm et al. (2021) and Atmanti (2023), where communities tend to dispose of waste in places considered out of sight or easily ignored, such as under mangrove trees.

4.3. Analysis of Innovative Solutions and Recommendations for Waste Management at Coro Beach

Based on the identified problems and literature review, a multidimensional approach is needed to address the waste problem at Coro Beach, aligning with the spirit of innovative action that encourages innovative and inspiring solutions.

4.3.1. Increasing Visitor Awareness and Education

- Implementation of Educative Ecotourism Concepts: Referring to ecotourism objectives that emphasize educational aspects and positive experiences for tourists (Kautsar, 2023), Coro Beach management can implement short educational programs at the entrance or through interactive information boards. Educational materials should highlight the impact of waste on coastal ecosystems and the importance of tourist participation in maintaining cleanliness.
- On-site 3R Campaigns: Adapting the 3R (Reduce, Reuse, Recycle) principle promoted by the government (Das et al., 2019; Atmanti, 2023), management can install educational banners (like those at Candikusuma Beach, Jembrana, Bali, as exemplified by Jayantri & Ridlo, 2021) in strategic areas to remind visitors to sort waste. These campaigns should be engaging and easy to understand.
- Strengthening the Role of Local Guides/Staff: Staff or local guides can be trained to proactively educate visitors about beach waste management policies. This also aligns with the Community-Based Ecotourism (CBE) concept, which empowers local residents (Direktorat Produk Pariwisata & WWF-Indonesia, 2009).

4.3.2. Providing Effective Waste Management Infrastructure

- Placement of Sorted Waste Bins: Addressing the lack of facilities (Jayantri & Ridlo, 2021; Rambi, Karimuna, & Nurmalaewi, 2025), Coro Beach must have adequate sorted waste bins (organic and inorganic) at strategic points, especially around kiosk areas and main paths to the beach, as well as near mangrove areas. Waste bin designs can be made attractive and aesthetic to blend with the natural beauty.
- Scheduled Collection and Transport System: Adopting the 3R waste transfer station (TPS 3R) model at Pariaman City Beach (Jayantri & Ridlo, 2021), management must establish a routine and structured schedule for waste collection and transport. This prevents waste accumulation like that occurring under the mangrove trees.

- Simple Processing Infrastructure: For organic waste, management can consider on-site composting (as at Baru Beach, Bantul, and Pulang Sawal Beach, Gunungkidul, Jayantri & Ridlo, 2021). For inorganic waste, especially plastic, further sorting can be done for subsequent delivery to nearby recycling facilities or utilized by local communities for handicrafts, aligning with creative initiatives at Batu Lamampu Beach (Fadly, 2023).

4.3.3. Enhancing Local Community Participation and Multi-Stakeholder Collaboration

- Formation of Active Tourism Awareness Groups (POKDARWIS): Referring to the success of POKDARWIS at Batu Lamampu Beach (Fadly, 2023), management can initiate the formation or revitalization of POKDARWIS specifically focused on cleanliness and waste management. This group can involve local communities, vendors, and youth.
- Economic Empowerment Through Recycling: Empowering local communities to process inorganic waste into handicrafts with economic value, as seen at Pulang Sawal Beach and Batu Lamampu Beach (Fadly, 2023). This not only reduces waste but also increases community income, in line with CBE principles.
- Partnerships with Government and NGOs: The success of holistic waste management highly depends on multidimensional collaboration (Andriani and Atmaja, 2019; Vasconcelos et al., 2022; Atmanti, 2023). Coro Beach management needs to establish close partnerships with local government (Tourism Office, Environmental Agency) to gain policy support, funding, and technology facilitation. The involvement of non-governmental organizations (NGOs) can also provide technical support and education.

4.3.4. Rule Enforcement and Continuous Monitoring

- Clear Rules and Consistent Sanctions: Although Law No. 18 of 2008 exists, its effectiveness is often hampered by implementation and law enforcement (Yunita et al., 2024). Management must implement clear rules regarding waste disposal at Coro Beach, and if possible, apply consistent, albeit light, sanctions to increase deterrence and visitor awareness.
- Periodic Monitoring System: Implementing a periodic cleanliness and waste management monitoring system by management to identify waste hotspots and evaluate the effectiveness of ongoing programs. This will allow for continuous adaptation and improvement.
- The implementation of these solutions will transform Coro Beach from merely a tourist destination into a responsible ecotourism model, where natural beauty is preserved and provides real positive impacts for the environment and local communities. This is a true reflection of the spirit of innovative action, which is transforming critical understanding into inspiring concrete actions.

5. Conclusion

5.1. Conclusion

This research has identified and analyzed the challenges of waste management in natural tourism destinations, particularly as reflected by personal observations at Coro Beach, Tulungagung. Based on the synthesis of literature review and reflections on the field conditions, it can be concluded that waste problems in tourist destinations are not only caused by irresponsible visitor behavior but

are also exacerbated by gaps in the provision of adequate waste management infrastructure, a lack of structured collection and transportation systems, and suboptimal multi-stakeholder participation. The impact of waste accumulation, especially plastic in sensitive areas like mangrove forests, significantly damages natural aesthetics and threatens the sustainability of coastal ecosystems, which in turn can reduce tourist appeal and economic potential. Therefore, a holistic and multidimensional approach is needed, combining increased awareness and education, strengthened infrastructure, enhanced local community participation, and close collaboration among government, educational institutions, tourism stakeholders, and the public, supported by rule enforcement and continuous monitoring. This conclusion affirms that to realize truly sustainable tourism, a transformation from critical understanding to innovative and collaborative real action is an absolute necessity.

5.2. Recommendations

Based on the findings and conclusions of this research, here are several recommendations expected to inspire concrete actions and bring positive impacts in waste management at natural tourism destinations:

5.2.1. For the Government

The government, both central and local, is recommended to strengthen the policy and regulatory framework related to waste management in tourism destinations, not only in terms of formulation but also consistent law enforcement. Adequate budget allocation for waste management infrastructure (sorted waste bins, simple processing facilities, collection fleet) and massive public education programs are crucial. Furthermore, the government needs to actively facilitate partnerships among tourism destination managers, local communities, the private sector, and non-governmental organizations (NGOs) to create an integrated and sustainable waste management ecosystem.

5.2.2. For Educational Institutions

Educational institutions have a vital role in fostering environmental awareness and research capacity. It is recommended that curricula in tourism, environment, and economics be integrated with sustainability and waste management issues, including through practical courses or community service projects. Institutions can also encourage more in-depth interdisciplinary research on innovative waste management models, responsible tourist behavior, and the economic impact of sustainable tourism. Organizing collaborative training and workshops with local communities and tourism stakeholders is also highly recommended.

5.2.3. For Tourism Destination Managers

Tourism destination managers, especially at Coro Beach and similar locations, are strongly advised to take proactive steps in implementing integrated waste management strategies. This includes providing adequate and easily accessible sorted waste bins, implementing regular waste collection schedules, and investing in simple on-site waste processing technologies (e.g., composting). Enhancing visitor education through engaging and interactive media, and empowering local communities to actively participate in cleanliness and recycling programs (e.g., through the formation of strong Tourism Awareness Groups / POKDARWIS), are key to creating a clean and sustainable tourist environment.

5.2.4. For the Community and Future Researchers

The community, especially those living around tourism destinations, is encouraged to increase collective awareness and active participation in sorting waste at its source, and supporting existing waste management initiatives. Participation in recycling programs and transforming inorganic waste into economically valuable products can also provide dual benefits. For future researchers, it is

recommended to conduct broader empirical research involving surveys of tourist behavior, detailed waste composition analysis, and comparative studies across tourist destinations to identify best practices in waste management. Research on the effectiveness of local policies, the potential for technology utilization, and the long-term impacts of community-based ecotourism models can also be relevant research focuses.

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