



## **Ecotourism as a Driver of Sustainable Waste Management and Environmental Conservation in Lhokseumawe, Indonesia**

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**Abstract:** This study evaluates the role of ecotourism as a strategy for promoting sustainable waste management in environmentally friendly tourist destinations in Lhokseumawe City, Aceh. Research using qualitative methods was conducted with a case study approach in several tourist destinations that have implemented ecotourism concepts, such as community-based waste management and the use of environmentally friendly technology. Data were collected through in-depth interviews, observations, and a literature review, complemented by questionnaires administered to explore the perceptions of tourists, local communities, and business actors regarding the effectiveness of, and support for, sustainable waste management policies. The findings indicate that the implementation of ecotourism has not yet played a significant role in improving waste management effectiveness in tourist areas. Ecotourism principles have not been comprehensively applied; as a result, destinations have not succeeded in maintaining environmental cleanliness, attracting sustainability-conscious visitors, or fostering synergy between local communities and the government. Although tourists and local residents generally responded positively to these initiatives and expressed support for ecotourism-based waste management policies, many still perceive waste management as primarily the responsibility of the government. This study contributes to the literature on sustainable waste management and may serve as a reference for policymakers and tourism practitioners seeking to enhance environmental quality through an ecotourism approach.

**Keywords:** Ecotourism, waste management, tourist destinations, environmental conservation, public policy

**Abstrak:** Penelitian ini mengevaluasi peran ekowisata sebagai strategi untuk mendorong pengelolaan sampah berkelanjutan di destinasi wisata ramah lingkungan di Kota Lhokseumawe, Aceh. Penelitian menggunakan metode kualitatif dilakukan dengan pendekatan studi kasus pada beberapa destinasi wisata yang telah menerapkan konsep ekowisata, seperti pengelolaan sampah berbasis komunitas dan pemanfaatan teknologi ramah lingkungan. Proses pengumpulan data mencakup wawancara mendalam, observasi, studi literatur serta kuesioner yang digunakan untuk mengumpulkan persepsi dari wisatawan, masyarakat sekitar, dan pelaku usaha terkait efektivitas dan dukungan terhadap kebijakan pengelolaan sampah berkelanjutan. Hasil penelitian menunjukkan bahwa implementasi ekowisata belum mampu berperan secara signifikan dalam meningkatkan efektivitas pengelolaan sampah di area wisata. Destinasi wisata belum menerapkan prinsip ekowisata secara komprehensif sehingga belum berhasil menjaga kebersihan lingkungan, menarik lebih banyak wisatawan yang peduli terhadap keberlanjutan, dan menciptakan sinergi antara komunitas lokal dan pemerintah. Wisatawan dan masyarakat lokal secara umum memberikan respon positif terhadap inisiatif ini, dengan mayoritas mendukung penerapan kebijakan terkait pengelolaan sampah berbasis ekowisata meski di lain pihak juga menganggap persoalan sampah merupakan tanggung jawab pemerintah semata. Penelitian ini memberikan kontribusi signifikan pada literatur mengenai pengelolaan sampah berkelanjutan dan dapat menjadi referensi bagi pembuat kebijakan dan praktisi di sektor pariwisata untuk meningkatkan kualitas lingkungan melalui pendekatan ekowisata.

**Kata Kunci:** Ekowisata, pengelolaan sampah, destinasi wisata, pelestarian lingkungan, kebijakan publik

## Introduction

Tourism has become one of the most important sectors for many countries, contributing revenue and growth that affect the economy and community development.<sup>1</sup> As the primary stakeholder, the state plays a central role in establishing policies governing the development of global tourist destinations in regions such as the Middle East, Europe, Asia, and the Americas. In several world-renowned destinations, tourism serves as the main pillar of the national economy, even in countries that lack abundant natural resources, such as Egypt, Jordan, the Vatican, and the Maldives. However, uncontrolled tourism growth often generates negative impacts, particularly in waste management and other environmental

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<sup>1</sup> Gebeyaw Ambelu, et al., "Empty Bowls: Conceptualising the Role of Tourism in Contributing to Sustainable Rural Food Security," *Journal of Sustainable Tourism* 26, No. 10 (2018). Jean Miczka and Marie Poulain, "Governing Middle Eastern hiking trails: community-based tourism, international networks, and state (dis)engagement," *Tourism Geographies* (2025).

problems.<sup>2</sup> This issue has become a major concern for tourist destinations worldwide, including in Indonesia.

Aceh, as one of Indonesia's tourist destinations, especially in halal tourism, has experienced an increase in visitor numbers driven by two dominant factors: an Islamic environment and services that support halal tourism. An Islamic environment puts emphasis on cleanliness and conditions that are in accordance with Islamic values.<sup>3</sup> Lhokseumawe City, located on the northern coast of Aceh, possesses significant tourism potential due to its scenic beaches, expansive mangrove forests, and rich cultural resources. However, alongside rapid tourism growth, environmental management, especially with regard to waste management, has become an increasingly urgent challenge. Although the concept of Islamic tourism has long been promoted, particularly within Lhokseumawe, its implementation has yet to be fully supported by effective environmental management practices.<sup>4</sup>

A lack of waste management may jeopardize environmental sustainability, pose risks to public health, and diminish the quality of visitors' tourism experiences. The volume of waste generated each year continues to rise in line with the growth in tourist arrivals.<sup>5</sup> According to the Environmental Agency of Lhokseumawe City, in 2023 the total waste produced by the tourism sector exceeded 500 tons per month, with most of it consisting of plastic packaging, food waste, and other non-organic materials.

As a consequence of this increase, many natural tourism areas surrounding Lhokseumawe have experienced significant ecosystem degradation. Beaches that used to be clean are now scattered with plastic waste, reducing their scenic beauty and harming nearby wildlife habitats.<sup>6</sup> Plastic contamination along the coast also causes serious harm to marine ecosystems and threatens the species that inhabit

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<sup>2</sup> Dung Le, et al., "Tourists' Aesthetic Assessment of Environmental Changes, Linking Conservation Planning to Sustainable Tourism Development," *Journal of Sustainable Tourism* 27, No. 10 (2019). Iis P. Tussyadiah and Marianna Sigala, "Shareable Tourism: Tourism Marketing in The Sharing Economy," *Journal of Travel and Tourism marketing* 35, No. 1 (2018).

<sup>3</sup> Muhammad Yasir Yusuf, et al., "The Determinants of Tourists' Intention to Visit Halal Tourism Destinations in Aceh Province," *Samarah* 5, No. 1 (2021). Anismar Anismar, et al., "Marketing Tourism Based Community Based Tourism (CBT) In Aceh Selatan," *Jurnal Sosiologi Dialektika Sosial* 11, No. 1 (2025).

<sup>4</sup> Eka Afrida Ermawati, et al., "Analisis Strategi Pengelolaan Sampah Di Tiga Lokasi Wisata Kabupaten Banyuwangi," *Journal of Tourism and Creativity* 2, no. 1 (2018).

<sup>5</sup> Neni Triana et al., "Pengelolaan Sampah Berbasis 4R Dan Tanggung Jawab Masyarakat Dalam Menjaga Lingkungan Di Kota Lhokseumawe," *Jurnal Solusi Masyarakat (JSM)* 1, no. 1 (2023), p. 76–86.

<sup>6</sup> Kartiwi Kartiwi, "Strategi Pengelolaan Sampah Dalam Pengembangan Wisata Edukasi Di Kota Balikpapan Provinsi Kalimantan Timur," *Jurnal Politik Pemerintahan Dharma Praja* 12, no. 2 (2019), p. 55–67.

them.<sup>7</sup> Moreover, the accumulation of waste affects both water and air quality and threatens mangrove ecosystems that serve as reservoirs of biodiversity.<sup>8</sup> The buildup of plastic waste can damage mangrove environments by degrading water quality and obstructing the growth of mangrove roots, which are essential for ecosystem stability.<sup>9</sup>

Awareness of the importance of proper waste disposal has been quite low among both local residents and visitors. Many tourists ignore the waste bins that have been provided and instead choose to litter along the beaches. Community habits of indiscriminate dumping and the accumulation of waste in open areas contribute to environmental pollution, particularly soil contamination, which subsequently affects groundwater quality. Blocked drainage channels may also occur, which potentially lead to flooding.<sup>10</sup> One strategy for dealing with waste management issues in tourist areas is to promote ecotourism. Ecotourism is a type of sustainable tourism that focuses on both economic benefits and the protection of the environment and local culture. It is hoped that using ecotourism principles will greatly improve waste management practices in tourist areas.<sup>11</sup>

This study explores how ecotourism can become a driver of sustainable waste management in Lhokseumawe City, an area that has so far received limited academic attention. It argues that the development of environmentally friendly tourist destinations does more than attract visitors; it also contributes positively to the local environment. In particular, strategies such as effective waste management practices, supported by active community involvement, play a significant role in maintaining environmental cleanliness, especially in tourism areas.

This study utilized a qualitative research to achieve a comprehensive understanding of perspectives, attitudes, and behaviours concerning waste management.<sup>12</sup> The study was conducted as a case study of eco-friendly tourist destinations in Lhokseumawe, enabling an in-depth analysis of specific cases and yielding valuable insights into local contexts, challenges, and achievements in

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<sup>7</sup> Shalawati Shalawati, et al., "Strategi 4R Dalam Pengelolaan Sampah: Mendukung Ekonomi Dan Lingkungan Lestari Di Kota Lhokseumawe," *Dedikasi: Jurnal Pengabdian Kepada Masyarakat* 4, no. 1 (2024), p. 86–96.

<sup>8</sup> Krisna Wibowo and Windi Wulamdari, "Pengolahan Sampah Plastik (Polypropylene) Menjadi Bahan Bakar Minyak," *Jurnal Kesmas Asclepius* 5, no. 2 (2023), p. 137–45.

<sup>9</sup> Yi Guo, et al., "A Sustainable Tourism Policy Research Review," *Sustainability (Switzerland)* 11, no. 11 (2019).

<sup>10</sup> Minh Tuan Tran, et al., "Reducing Plastic Waste for the Competitiveness of Vietnamese Tourist Attractions," in *E3S Web of Conferences*, vol. 210 (EDP Sciences, 2020), p. 1011.

<sup>11</sup> Minh Tuan Tran, et al., "Reducing Plastic Waste.

<sup>12</sup> Minh Tuan Tran, et al., "Reducing Plastic Waste.

waste management practices.<sup>13</sup> Qualitative data were examined using a phenomenological approach to better understand the experiences and perceptions of the actors related to waste management at tourist destinations. This approach allows the researchers to interpret the meanings underlying individuals' lived experiences associated with the phenomenon.<sup>14</sup> The study also applied grounded theory to generate insights from the data and identify recurring patterns and relationships.<sup>15</sup> At the same time, a participatory approach was also employed to involve stakeholders throughout the study from planning to implementation, making the findings more relevant and useful.<sup>16</sup>

Data collection in this study was carried out using several methods. Field observations were conducted to assess waste management infrastructure at the tourist destinations, which included the availability of waste bins, recycling facilities, and existing waste treatment systems.<sup>17</sup> Interviews were conducted with a range of stakeholders, such as destination managers, local government officials, community members, and visitor representatives. In addition, the study involved an analysis of official documents, such as local government policies on waste management and annual reports issued by the Environmental Agency. Structured observations were further undertaken to examine visitor behavior related to waste disposal, the use of waste management facilities, and levels of compliance with regulations at the tourist destinations.

Data analysis was conducted in several stages. First, audio or video recordings from interviews with relevant stakeholders were transcribed to enable a detailed understanding of the information provided. Afterward, the transcripts were systematically coded and grouped into themes or topics that emerged organically from the data, allowing the researchers to identify key patterns, concepts, and meanings. Thematic analysis was then employed to identify, analyze, and interpret recurring themes across the dataset. In this stage, the researchers examined patterns and concepts that appeared consistently in

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<sup>13</sup> Andrea Cornwall and Rachel Jewkes, "What Is Participatory Research?," *Social Science & Medicine* 41, no. 12 (1995), p.1667–76.

<sup>14</sup> Ruma Bhatt and Bharati Mohapatra, "Waste Management to Achieve Sustainable Development Goals: Approach for Indian Cities," *Urbanism. Arhitectura. Constructii* 14, no. 2 (2023), p. 111–20.

<sup>15</sup> N Veters, "Community Engagement in Waste Management: Empowering Local Solutions," *Journal of Environmental Waste Management and Recycling* 6, no. 6 (2023), p. 172.

<sup>16</sup> Doris Knoblauch and Linda Mederake, "Government Policies Combatting Plastic Pollution," *Current Opinion in Toxicology* 28 (2021), p. 87–96.

<sup>17</sup> Ann T W Yu, et al., "Strategies for Effective Waste Reduction and Management of Building Construction Projects in Highly Urbanized Cities A Case Study of Hong Kong," *Buildings* 11, no. 5 (2021), p. 214.

participants' accounts.<sup>18</sup> Finally, the findings were synthesized and presented as a cohesive and meaningful narrative.

### **Waste Problems at Tourist Destinations in Lhokseumawe City**

Findings from multiple tourist sites in Lhokseumawe City reveal that there are significant differences in the level and characteristics of waste generated, which are influenced by location, visitor type, and timing of visits. As a region well known for its attractive coastal destinations, e.g., Ujong Blang Beach, Lancok Beach, and Meuraksa Beach, Lhokseumawe has attracted large numbers of visitors each year, particularly during holiday periods. Along with the increase in visitor numbers, the volume of waste generated also rises accordingly. This trend, however, poses a serious challenge for destination managers and local authorities in their attempt to maintain environmental sustainability.

#### **1. Waste Generation Levels at Tourist Destinations in Lhokseumawe**

Data on waste generation were gathered by means of direct observations at tourist locations and interviews with relevant stakeholders. The findings reveal that waste generation in Lhokseumawe City reaches about 60 tons per day. Ujong Blang Beach, the most popular tourist destination in Lhokseumawe, produces around 3–4 tons of waste per day on regular weekdays. This figure grows significantly during weekends and holiday periods, at approximately 5–6 tons per day. A similar trend is observed at Lancok Beach and Meuraksa Beach. Nevertheless, although waste generation at these sites is relatively lower on ordinary days, ranging from 1–2 tons per day, it increases considerably during peak holiday periods, where it reaches approximately 3–4 tons per day.

The level of waste generation along the beaches is influenced by several factors. First, the number of daily visitors is strongly affected by weather conditions, public holidays, and special events held in surrounding areas. Second, the types of activities undertaken by tourists, such as picnicking, swimming, and beach recreation, tend to generate large amounts of waste, particularly from leftover food and beverage packaging.

A significant proportion of the waste generated in coastal areas originates from tourist activities that pay little attention to environmental cleanliness. Visitors to Ujong Blang Beach generally do not dispose of their waste in the bins provided by vendors, frequently littering along the shoreline; some vendors also engage in similar practices. Although waste bins have been provided by stall owners and the municipal government, many visitors are indifferent and continue to discard waste indiscriminately. This situation makes the work of sanitation

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<sup>18</sup> John W Creswell and Cheryl N Poth, *Qualitative Inquiry and Research Design: Choosing among Five Approaches* (Sage publications, 2016).

personnel increasingly difficult, especially during holiday seasons when visitor numbers surge.

The management of tourist sites is still a major challenge for both the government and destination authorities. Data from the Environmental Agency of Lhokseumawe indicate that waste volumes continue to increase each year, with an approximately 15 percent rise in tourist areas recorded in 2023, in line with the growth in visitor arrivals. In the absence of effective control measures, waste generation is expected to continue rising.

## **2. Waste Characteristics at Tourist Destinations in Lhokseumawe**

At several tourist sites in Lhokseumawe City, the characteristics of waste generated are highly dependent on and reflective of visitors' consumption patterns as well as their disposal behavior. Based on observations and interviews with the Environmental Agency of Lhokseumawe, plastic waste constitutes the largest proportion of the total waste stream. Plastic accounts for approximately 55 percent of all waste generated. This category typically includes beverage bottles, food packaging, and plastic bags.

Approximately 35 percent of the remaining waste consists of organic materials, which generally originate from food leftovers and fallen leaves from surrounding trees. Visitors frequently engage in picnicking and communal meals along the beaches and other tourist areas. Food is typically purchased on-site or brought from home. The waste generated is also often mixed with inorganic materials, which makes it difficult to recycle or naturally decompose. If handled properly, however, organic waste may be processed into compost or even eco-enzyme products.

The remaining waste originates from inorganic materials, at about 10 percent of the total waste generated, which includes glass, metals, and used beverage cans. This kind of debris is commonly scattered along the shoreline, often covering a wide area and making cleanup difficult for sanitation workers. At times, this waste can also increase risks to visitors. Glass fragments or metal objects hidden beneath the sand, for instance, can easily injure people playing on the beach. These materials are usually overlooked, and therefore, they may threaten anyone if they are not promptly removed.

Tourists generally do not perceive waste problems at tourist sites as a serious issue. Many often assume that the litter they leave behind will eventually be cleaned by sanitation workers or washed away by strong waves. In reality, however, the waste left behind, especially inorganic materials, can create long-term environmental problems since it does not decompose easily.

The characteristics of the waste problem reflect a real and serious challenge related to both tourist behavior and the waste management system at tourist destinations in Lhokseumawe. Plastic waste, which requires an extremely long time to decompose, makes long-term environmental pollution almost

unavoidable, and concerns about microplastic contamination in seawater are increasingly voiced by environmental advocates. Organic waste is not without its own difficulties; management practices that remain unsystematic and poorly planned can lead to air pollution, such as strong foul odors, as well as groundwater contamination. Other inorganic materials, including glass and metals, further add to the complexity of the problem because of their high potential to cause harm if not promptly addressed.

### 3. The Impact of Waste on Local Environmental Quality

From an aesthetic perspective, poorly managed waste has a significant negative impact on tourist sites and diminishes overall environmental quality. The most visible consequence is visual pollution caused by litter scattered across tourism areas. Beaches that should showcase natural beauty as their primary attraction are disrupted by waste that is spread along the shoreline. This condition directly affects visitors' comfort.

The visual pollution not only creates an unpleasant experience for tourists, but it may also undermine the future of tourism in Lhokseumawe, and, consequently, the economic well-being of local communities that depend on the sector. This situation thus affects not only visitor satisfaction, but also local economic income that relies heavily on tourism. Findings from interviews with destination managers and vendors around the beaches reveal that tourist arrivals tend to decline after peak holiday seasons, which are greatly influenced by dirty and poorly maintained coastal conditions. For example, on Seumadu Island, when the beach is littered, visitors are often reluctant to come or to return. This condition inevitably reduces the income of traders and destination managers, as tourists prefer to choose alternative destinations that are cleaner and more comfortable to visit.<sup>19</sup>

Litter that is scattered and carried into the sea creates additional problems for marine ecosystems. Plastic waste transported by ocean currents can entangle marine animals or be ingested by them. Fishermen often report finding fish with plastic debris in their stomachs when cleaning their catch. Such contamination not only damages marine ecosystems but also reduces fish quality due to the presence of microplastics. Fish populations are therefore at risk, which ultimately impacts both the volume of catches and the income of fishing communities.<sup>20</sup> The presence of plastic waste in marine waters also has the potential to damage coral reef ecosystems. Many marine species greatly depend on coral reefs, and their degradation can erode biodiversity in the waters of Lhokseumawe. The Marine, Fisheries, Agriculture, and Food Agency of Lhokseumawe has pointed out that

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<sup>19</sup>Interview with Nurhayati, a trader on Lhoksumadu Beach, Lhoksumawe, August 9, 2024.

<sup>20</sup>Interview with Abu Kasim, Community Leader in Lhoksumawe, August 10, 2024.

populations of several fish species have declined due to coral reef degradation, thus forcing fishermen to travel farther offshore to secure adequate catches.

Another equally important impact is soil and groundwater pollution, which is caused by the accumulation of organic and inorganic waste around coastal areas. The decomposition of organic waste produces leachate, which can infiltrate the soil and contaminate groundwater. This polluted groundwater can create potential health risks for local residents who rely on well water for their daily needs.

Inorganic waste, e.g., metal fragments and broken glass, also poses additional risks and hazards for tourists since the debris can also cause serious injuries, especially to children who often play and run barefoot on the sand. Some incidents have been reported in which visitors experienced severe wounds after stepping on glass or metal pieces and required medical treatment. Thus, parents often feel compelled to exercise extra supervision over their children while they are at the beach.

Waste accumulation in tourist areas also worsens air quality along the coast. Garbage that is not promptly removed, e.g., decomposing organic waste, produces unpleasant odors that disturb visitors. These circumstances may adversely affect the health of local residents and tourists, especially those with asthma or other respiratory conditions. Apart from its immediate environmental impacts, waste in tourist destinations has significant social and economic consequences. Visitors who experience discomfort due to dirty beach conditions are more likely to express dissatisfaction, either verbally or through online platform, e.g., travel review websites and social media. Negative reviews can damage the image of the destination and reduce tourists' willingness to visit. As such, this situation may lead to a decrease in local economic income for communities that depend on tourism.

There is concern that Lhokseumawe may lose its appeal as a tourist destination if the waste problem is not handled in a timely manner. If beaches look dirty, visitors are likely to choose cleaner destinations elsewhere. Moreover, if the government fails to make serious efforts to resolve waste issues in tourist areas, the livelihoods of vendors and tourism operators might be severely affected.

The Government of Lhokseumawe has undertaken various measures to address the waste problem at tourist sites. One of the initiatives has been to increase the frequency of waste collection around the beaches. The local authorities conduct routine garbage pickup in tourism areas and assign personnel responsible for maintaining cleanliness in each location. Nevertheless, the relevant agencies continue to face limitations in facilities and infrastructure, which constrain their capacity to transport all waste generated at several sites. Due to these resource constraints, clearly labeled bins separating organic and inorganic waste have not yet been provided in every tourist area.

However, field findings indicate that despite intensified collection efforts, substantial amounts of waste still accumulate and remain scattered. Many bins are left underutilized while trash is dispersed around them. This problem is largely attributed to low visitor awareness and insufficient supervision by beach management. Furthermore, Lhokseumawe's waste processing and transportation system continues to face serious challenges. The city's final disposal site often exceeds its capacity, creating the potential for broader environmental problems. Waste collected from tourist areas is usually transported directly to the landfill without undergoing sorting or recycling. Lhokseumawe still relies on a conventional disposal system, which is clearly inadequate to cope with the continuously increasing volume of waste.

In response to this situation, several local communities and non-governmental organizations in Lhokseumawe have initiated efforts to raise awareness about the importance of sustainable waste management. One of the most well-known initiatives is the "Clean Beach" program, which involves school and university students, tourists, and local residents in routine coastal clean-up activities. Participants are also educated about the importance of reducing single-use plastics and about simple methods of household waste segregation.

Although these programs have shown positive results in improving public awareness, their impact on the overall volume of waste in tourist areas is still limited. Not everyone participates, and some people believe that waste management is solely the responsibility of the government. As such, many community members show little concern to the issue. This may be because they do not perceive it as their own responsibility or because they do not experience its direct effects, even though environmental degradation will eventually affect the wider community.

Recycling practices in Lhokseumawe are still at an early stage and face numerous challenges. The main obstacles include limited recycling infrastructure and a lack of public awareness and knowledge about the importance of recycling. The local government has set up waste banks to support recycling efforts; yet, the amount of waste that can be recycled is still quite small compared to the total volume of waste produced each day. Moreover, the government is also considering policies to reduce plastic waste in tourist areas. One of the measures under discussion is a ban on single-use plastic bags, which would be replaced with more eco-friendly materials. This policy, however, is still in the planning stage, and it is unclear when it will be implemented.

If the waste management system in Lhokseumawe's tourist destinations is not improved promptly, the long-term implications might be severe. Environmental pollution will not only make tourist sites less attractive, but may also permanently damage both terrestrial and marine ecosystems. Plastic pollution in the sea, for instance, can lead to habitat destruction that is difficult to reverse,

while soil and groundwater contamination may create public health problems for local residents.

Conversely, Lhokseumawe has great potential to become a model for environmentally friendly tourism destinations in Indonesia if waste management is carried out through a sustainable approach. This approach will protect the environment, improve the quality of life of local communities, stimulate economic growth, and strengthen Lhokseumawe's reputation as a responsible tourism destination. Tourist destinations that implement sustainable waste management will be better prepared to withstand climate change and other environmental challenges in the long term. Modern travelers are highly concerned about environmental issues and tend to choose places that demonstrate a genuine commitment to sustainability. Therefore, investing in sustainable waste management is not only environmentally sound, but also a profitable business strategy for attracting future visitors.

### **Low Public Awareness and Practices Among Local Communities and Visitors in Waste Disposal**

Low levels of environmental awareness among the local community are a major factor contributing to improper waste disposal practices in the city of Lhokseumawe. Visitors generally feel that they do not bear direct responsibility for waste-related issues. They believe that the government or sanitation workers are fully responsible for waste management, and assume that as long as cleaning staff are assigned, cleanliness problems can be resolved without their active participation.

According to the local residents living around the Ujong Blang tourist area, visitors are often seen leaving their trash behind carelessly. This waste is typically left unattended until it is collected by sanitation workers or even washed away by ocean waves. In general, the local residents understand the negative environmental impacts of waste; however, they feel there are insufficient incentives or strong motivation to change these habits. The local people, especially those living near the coast, have become accustomed to the presence of trash as a part of everyday life.<sup>21</sup>

A local community leader notes that cultural factors also contribute to low levels of cleanliness awareness. Some people in Lhokseumawe still consider maintaining environmental cleanliness to be unimportant in their daily lives. The collective principle of caring for environmental cleanliness has diminished due to modern lifestyles and the decline of communal activities (*gotong royong*). In the past, people regularly worked together to clean the city or the beach. However,

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<sup>21</sup>Interview with Siti, a resident of Ujong Blang Beach, Lhoksumawe, October 28, 2024

this collective spirit today has gradually faded as dependence on the government to handle cleanliness issues has increased.<sup>22</sup>

Aside from cultural factors, the lack of infrastructure and waste management facilities in tourist areas is also a major cause. Field observations show that the number of trash bins available is very limited at many tourist destinations in the city of Lhokseumawe. Trash bins are placed far from areas that are frequently visited by tourists at several beaches. As a result, visitors often find it difficult to locate bins that are nearby and easily accessible. They end up disposing of waste indiscriminately or leaving their trash at seating areas, assuming this will resolve the cleanliness issue.<sup>23</sup>

Moreover, some trash bins on the beach were already full, with no one coming to empty them, while others had been repurposed for different uses. This indicates that, although trash bins are available, the management and maintenance of these facilities are inadequate. The lack of an effective waste collection system causes trash to accumulate in tourist areas, which ultimately worsens environmental quality and visitor comfort.

The lack of socialization and environmental awareness campaigns is another factor contributing to visitors' low awareness of cleanliness. Most tourists interviewed described that they did not see information boards or brochures explaining the importance of maintaining cleanliness at tourist sites. In general, tourists admitted that they were unaware of regulations prohibiting littering in tourist areas. This shows that local governments and tourism managers have not provided sufficient education to visitors on how to behave responsibly toward the environment.

The owners of beach huts at Ujong Blang Beach acknowledge that the main problem in providing adequate sanitation facilities is a lack of funding. Waste management efforts have become less effective because tourism businesses and the Environmental Agency do not work together. Many tourism operators believe that attracting visitors and managing tourist locations and facilities are their primary responsibilities, while cleanliness is the government's responsibility. As a consequence, waste conditions at tourist sites worsen due to unclear roles and responsibilities.

Furthermore, weak law enforcement has also contributed to low visitor awareness and compliance with proper waste disposal. Although regulations issued by the Lhokseumawe City Government prohibit littering in public areas, these rules are poorly enforced. There is very limited on-site supervision, and no clear sanctions for violators. Despite the existence of regulations, visitors are rarely penalized for littering. Littering behavior is commonplace, yet there are no officers who warn offenders or impose fines.

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<sup>22</sup>Interview with Mukhlis Azhar, Community Leader in Lhokseumawe, October 3, 2024

<sup>23</sup>Field Observation, Tourist Attractions in Lhokseumawe, August, 2024.

Due to the absence of law enforcement, visitors feel that there are no real consequences if they litter. When visitors repeatedly observe this behavior without any action being taken, they become accustomed to it and do not feel compelled to comply with cleanliness regulations. Tourists generally do not see strict supervision regarding cleanliness issues at tourist sites. Most tourists also mentioned that they were unaware of any fines or penalties imposed on individuals who violated cleanliness regulations in tourist areas.

The last finding of this study concerns the low level of community involvement in waste management at tourist destinations. The local government has implemented a number of cleanliness programs, yet community participation is still quite low. This situation is attributed to several factors, including a lack of outreach, limited incentives, and scarce resources. Communities are often not involved in the planning or implementation of cleanliness programs in their own environments. Local people usually do not participate unless there is a formal invitation, as they perceive these activities to be the responsibility of the government or other parties.

Low community participation further worsens the situation because waste management at tourist destinations is ineffective without local support. In Lhokseumawe, programs designed to sustain ecotourism have yet to adequately engage the community, even though local residents should serve as the primary drivers of environmental protection.

### **Implementation of the Ecotourism Concept in Waste Management and Improving Environmental Cleanliness**

Data from the Department of Youth, Sports, and Tourism indicate that although waste volumes have decreased in several locations, waste accumulation has actually increased at other tourist sites. Over the past two years, waste volumes have tended to rise at some tourist destinations. Although reductions have occurred in certain locations, these do not represent the overall condition of tourist attractions. This suggests that ecotourism programs have not yet been implemented effectively in some areas.

A case in point is the waste volume at Taman Riyadah Kota Lhokseumawe, which has been developed over a long period, has decreased by 15%. In contrast, the reduction in waste volume is still far below expectations in coastal areas and even shows a continuing upward trend. This indicates that the stage of development and the specific conditions of each tourist destination influence the effectiveness of ecotourism programs. Ecotourism strategies rely on waste segregation systems; however, their effectiveness has been unsatisfactory. Although trash bins are available, albeit not in all locations, both managers and visitors often fail to properly comply with waste separation rules. Evidence shows that almost all collected waste is improperly sorted. As a result, recycling and waste processing efforts are significantly hindered. This suggests that monitoring

systems and the enforcement of waste segregation regulations need to be improved.

Ecotourism programs are also affected by infrastructure constraints. Field observations show that some facilities, such as trash bins and toilets, are not always adequate to accommodate large numbers of visitors. Trash bins often fill up before scheduled collection times, and some locations lack waste disposal facilities altogether. Public toilets are limited in number and are not regularly clean or maintained in usable condition. When infrastructure is insufficient, waste management becomes more challenging and visitor comfort is reduced.<sup>24</sup>

A number of activities, e.g., workshops and campaigns, have been conducted to provide knowledge about waste management; however, these programs have not been fully effective. Levels of visitor participation vary, and some visitors still lack knowledge of proper waste disposal practices. This suggests that the methods used in educational programs need to be improved to ensure that visitors truly understand and apply the information provided.

Many efforts have been made to implement the ecotourism concept; however, these efforts have not yet been effective in reducing waste volume or improving environmental cleanliness. Several major challenges hinder the success of ecotourism programs, including limited resources, deficiencies in waste segregation systems, infrastructure constraints, and the need for more comprehensive educational programs.

Insufficient resources are one of the main factors that influence the effectiveness of ecotourism programs. Limited budgets restrict the ability of tourism destination managers to implement these programs in terms of quality, scale, and capacity. Without adequate funding, it is difficult to run educational initiatives appropriately or to provide sufficient waste management facilities. Resource constraints also limit opportunities to properly train sanitation workers and tourism managers. Thus, waste segregation practices and overall waste management systems do not function effectively.

The issues faced by waste segregation systems indicate that improvements in monitoring and enforcement are necessary. Although segregation facilities exist, compliance by visitors and managers is still a major problem. Data show that almost all collected waste is not properly sorted, making recycling and processing more difficult. This highlights the need for more training for both visitors and sanitation workers on proper waste segregation practices. In addition, better monitoring systems and clearer segregation facilities can help improve the performance of waste segregation systems.

The effectiveness of ecotourism programs is greatly influenced by infrastructure issues. Overflowing trash bins and inadequate sanitation facilities reduce the effectiveness of waste management and cause discomfort for visitors.

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<sup>24</sup>Field Observation, Tourist Attractions in Lhokseumawe, October, 2024

To support better waste management, greater investment in infrastructure is required, including the provision of more trash bins, improvements to sanitation facilities, and more frequent maintenance and emptying of waste bins. These measures are necessary to handle the continuously increasing number of visitors and to meet established standards.

Current waste management programs have not yet been fully effective in improving visitor awareness and compliance with regulations. Although various activities have been carried out, some visitors still do not understand or properly follow the rules.<sup>25,26</sup> To ensure that knowledge about waste management is properly received and applied, educational programs need to adopt more intensive and interactive approaches. Providing information in a clear and easily understandable manner, along with more engaging educational initiatives, can help increase visitor awareness of the importance of proper waste management.

### **Ecotourism, Waste Management, and Sustainable Environmental Conservation**

The level of waste generation in the city of Lhokseumawe is largely determined by the number of tourists and the activities they engage in. This study recorded an increase in waste volume, particularly during peak visitation periods, e.g., holidays and weekends. These findings are consistent with previous studies indicating that higher levels of tourism activity are directly associated with increased waste production.<sup>27</sup>

The most dominant type of waste is plastic, which includes various items, e.g., plastic bottles, food packaging, and other single-use products. The predominance of plastic waste reflects global trends, in which plastic is a major contributor to environmental pollution.<sup>28</sup> The negative impacts of plastic waste on local environmental quality are substantial. Studies indicate that plastic pollution can damage marine ecosystems and degrade groundwater quality. Solid waste pollution also presents risks to public health, particularly given that many water sources used by local communities rely on groundwater.<sup>29</sup>

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<sup>25</sup> Cahyadi Kurniawan, et al., "The Role of E-Governance in Improving Local Governments Performance (Case Study: Sumbawa Regency)," *Jurnal Ilmiah Peuradeun* 11, no. 3 (2023), p. 1139–54.

<sup>26</sup> M Nazaruddin, et al., "Pembentukan Kelompok Taruna Wisata Di Gampong Lhok Jok Kecamatan Kuta Makmur, Aceh Utara," *Jurnal Solusi Masyarakat (JSM)* 1, no. 1 (2023), p. 13–30.

<sup>27</sup> Kay Critchell, et al., "Plastic Pollution in the Coastal Environment: Current Challenges and Future Solutions," in *Coasts and Estuaries* (Elsevier, 2019), p. 595–609.

<sup>28</sup> Jiale Zhang, et al., "What Do We Know About Plastic Pollution in Coastal/Marine Tourism? Documenting Its Present Research Status from 1999 to 2022," *SAGE Open* 13, no. 4 (2023).

<sup>29</sup> Vita Ruliana, et al., "Assessing a Community-Based Waste Separation Program through Examination of Correlations between Participation, Information Exposure,

Low levels of environmental awareness among local communities and visitors are a major factor contributing to littering behavior. Limited environmental awareness is often linked to a lack of understanding of the negative impacts of waste on the environment.<sup>30</sup> Research indicates that when individuals do not understand the consequences of their actions, they are more likely to disregard proper environmental norms and responsible behavior.

The lack of adequate waste management facilities is also a major obstacle. Insufficient availability of trash bins at tourist sites makes it inconvenient for visitors to dispose of waste properly. When trash bins are full or unavailable, visitors often resort to littering, which further pollutes the environment.<sup>31</sup> Weak enforcement of environmental cleanliness regulations also contributes to littering behavior. The lack of firm action by authorities against cleanliness violations reduces the deterrent effect on the public. When individuals perceive that there are no consequences for their actions, they are more likely to ignore existing regulations. The gradual erosion of local cultural values also plays a role in waste disposal behavior. Cultural traditions that once emphasized cleanliness and environmental care are increasingly undermined by modernization and globalization. As these values change, individual awareness of the importance of maintaining environmental cleanliness may also decline.<sup>32</sup>

The limited number of educational and outreach programs on the importance of waste management is another major contributing factor. Ineffective educational efforts may result in local communities and visitors lacking sufficient knowledge about proper waste disposal practices. Integrated and continuous educational programs can help raise public awareness and promote environmentally friendly behavior.<sup>33</sup> The implementation of the ecotourism concept in the city of Lhokseumawe has not yet succeeded in significantly reducing waste volume. Nevertheless, several tourist sites have recorded a

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Environmental Knowledge, and Environmental Attitude,” *ASEAN Journal of Community Engagement* 3, no. 1 (2019), p. 2.

<sup>30</sup> Ricksterlie C Verzosa, et al., “Solid Waste Management Awareness and Practices in Coastal Communities,” *Davao Research Journal* 15, no. 3 (2024), p. 60–77; Muhammad Rifqi Ismiraj, et al., “Perceptions of Community-Based Waste Bank Operators and Customers on Its Establishment and Operationalization: Cases in Pangandaran, Indonesia,” *Sustainability* 15, no. 14 (2023), p. 11052.

<sup>31</sup> Malagammanne Dimuthu Piyumika Nayanarangani, et al., “Solid Wastes Generation and Its Management in Tourist Destinations of Sri Lanka,” *Global Journal of Engineering and Technology Advances* 12, no. 2 (2022), p. 106–12; Indrawijaya Indrawijaya, “Evaluation of Tourism Potential Development Policy in Togean Islands, Tojo Una Una Regency,” *International Journal Papier Public Review* 1, no. 2 (2020), p. 95–104

<sup>32</sup> H Khair, et. al., “Solid Waste Management in Lake Toba Area,” in *IOP Conference Series: Materials Science and Engineering*, vol. 1041 (IOP Publishing, 2021), p. 12034,

<sup>33</sup> Zhengxia Long et al., “Comparative Analysis of Adult and Adolescent Environmental Awareness and Intervention of Adolescent Environmental Awareness,” in *IOP Conference Series: Earth and Environmental Science*, vol. 446 (IOP Publishing, 2020), p. 32070,

reduction in waste volume of up to 12% over the past two years. The success of ecotourism initiatives greatly depends on the availability of supporting facilities and the active participation of visitors and local communities in waste management.<sup>34</sup>

However, waste segregation programs at these tourist destinations have been largely ineffective. This is in line with previous findings indicating that waste segregation in tourist areas is often constrained by limited facilities and low visitor awareness. Inadequate waste management infrastructure, such as overflowing trash bins and insufficient sanitation facilities, also represents a major barrier to effective implementation.<sup>35</sup>

## Conclusion

Waste generation at tourist sites in the city of Lhokseumawe is highly influenced by the number of visitors and their activities, with plastic waste being the most prevalent type. This waste contributes to the pollution of seawater, soil, and groundwater. Although the government and local communities have made efforts to address this issue, major challenges persist, including low public awareness and limited infrastructure. There are several interrelated factors contributing to low public awareness and littering behavior at tourist destinations in Lhokseumawe. These include low environmental awareness, inadequate waste management facilities, weak law enforcement, the declining influence of local cultural values, and a lack of educational programs. Therefore, addressing this issue requires integrated strategies involving improvements in facilities, education, law enforcement, and participatory programs that engage multiple stakeholders. Nevertheless, the application of the ecotourism concept to waste management and environmental cleanliness in Lhokseumawe still requires improvement. Although waste volumes have decreased by up to 12% over the past two years at several locations, overall targets have not yet been fully achieved. Moreover, the waste segregation system is still inefficient, as nearly all generated waste is not properly sorted. These challenges are linked to educational programs and infrastructure that have not yet been fully effective. Increased financial support, improvements in waste segregation systems, and strengthened educational initiatives are therefore expected to enhance waste management performance and improve visitor experiences.

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<sup>34</sup> Suadi Zainal et al., "Actualizing Local Knowledge for Sustainable Ecotourism Development in a Protected Forest Area: Insights from the Gayonese in Aceh Tengah, Indonesia," *Cogent Social Sciences* 10, no. 1 (2024), p. 2302212.

<sup>35</sup> Anteneh Tenaw Taye, et al., "Determinants of Livelihood Diversification and Its Contribution to Food Security of Rural Households in Gozamin Woreda, Ethiopia," *Cogent Economics & Finance* 12, no. 1 (2024). Dian Aswita, et.al., "Enhancing Environmental Literacy in Aceh's Tourism through an Ethnoecotourism Based Environmental Education Model," *Jurnal Ilmiah Peurdeun* 12, No. 3 (2024).

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### **Interviews and Observation**

Interview with Nurhayati, a trader on Lhoksumadu Beach, August 9, 2024.

Interview with Abu Kasim, Community Leader in Lhoksumawe, August 10, 2024.

Interview with Siti, a resident of Ujong Blang Beach, Lhoksumawe, October 28, 2024

Interview with Mukhlis Azhar, Lhokseumawe Community Leader in Lhokseumawe, October 3, 2024

Field Observation, Tourist Attractions in Lhokseumawe, August, 2024.

Field Observation, Tourist Attractions in Lhokseumawe, October, 2024