Public Awareness in Managing Household Waste in Bagan Tanjung Piayu Village, Batam City

Nouval Fadillah Akbar[1], Azizatul Maliha[2], Sonio Gading Paruwa[3], Marcel[4], Stivani Ayuning Suwarlan[5], Lathifah Nursyamsyu[6]

[1-6]Universitas Internasional Batam, Indonesia
✉ Corresponding email: soniogading1@gmail.com

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Abstract
Household waste production in the coastal settlement of Kampung Bagan, Batam City, continues to increase. This problem is exacerbated by limited waste disposal facilities after the previous landfill (TPS) was closed due to being located on private land. As a result, residents struggle to dispose of their waste, leading to the practice of dumping it into coastal waters. This study aims to identify community awareness and perceptions and to understand the factors influencing waste management in Kampung Bagan, Tanjung Piayu, Batam City. The study used a qualitative descriptive method, with data collection techniques including field observations, visual documentation, and interviews with local residents. The data were analyzed descriptively to ovation an overview of waste management conditions and community behavior. The results show that public awareness of waste management remains low, as evidenced by the habit of dumping waste into the sea. This condition is influenced by limited facilities, remote access to the TPS, minimal waste collection, and habitual factors. In addition to residents' domestic activities, coastal waste also originates from ocean currents and surrounding waterways. In conclusion, the waste problem in Kampung Bagan is influenced by behavioral factors and limited supporting facilities. Therefore, it is necessary to increase public awareness, provide adequate facilities, and get government support in sustainable waste management to create a clean and healthy coastal environment.
Keywords: Public Awareness; Waste Management; Household Waste; Coastal Settlements; Kampung Bagan.

Introduction

Kampung Bagan is one of the oldest coastal settlements often referred to as the Old Village in Tanjung Piayu Village, Sei Beduk District, Batam City. Geographically, this area has unique characteristics as a settlement that borders directly on sea waters and mangrove ecosystems. (Fachrudin, 2022) However, along with the increasing population density on the coast of Batam City, Kampung Bagan is facing crucial environmental

problems, namely the low level of systematic household waste management. (Salwayujza, 2025) Public awareness of waste management and environmental cleanliness is still low because many people still do not understand the importance of maintaining environmental cleanliness, especially in coastal residential areas. (Likia Luang et al., 2024)



Figure 1. *Map of Kampung Bagan Tanjung Piayu, Batam City*

Coastal settlements are residential areas located on the border between land and sea. (Rahmat Ramadhan et al., 2024) Communities living in these areas generally utilize coastal resources to meet their daily needs, so their social and economic activities are closely related to the condition of the coastal environment. (Hamid Botutihe et al., 2023)

Population growth in coastal residential areas is one factor contributing to the increasing environmental problems, particularly in waste management. (Apriani Rumata et al., 2025) The increasing population and community activities in meeting daily needs have led to an increase in the volume of household waste produced. (Apriani Rumata et al., 2025) This waste originates from various domestic activities, such as food scraps, plastic, and other household waste. If not managed properly, waste can pollute coastal and marine environments and reduce public health and the surrounding ecosystem. (Khairunnisa et al., 2025)

Waste management problems in coastal areas are also influenced by limited facilities and low public awareness of the importance of maintaining environmental cleanliness. (Likia Luang et al., 2024) Based on several studies, household waste is dominated by organic waste, such as food scraps, which are produced daily. This condition indicates that good waste management through sorting, reduction, and processing of waste needs to be implemented in coastal settlements to reduce environmental pollution and create cleaner and healthier residential areas. (Dian Kurniawati et al., 2022)

Based on Law Number 18 of 2008, waste is the remains of human daily activities and natural processes in solid form. (PP No. 81 of 2012, 2012) Waste management is defined as an activity carried out systematically and continuously which includes the process of reducing and handling waste. In community life, waste is an environmental problem that needs attention because it can cause pollution if not managed properly, especially in coastal residential areas that are directly adjacent to the sea. (Kristiani Purwendah et al., 2022)

Based on its characteristics, waste can be divided into several types, namely organic waste that easily decomposes such as food scraps and leaves, inorganic waste that

is difficult to decompose such as plastic, paper, and metal, and hazardous waste that contains certain chemicals. (Kristiani Purwendah et al., 2022) In coastal settlements, household waste is generally dominated by organic and plastic waste originating from people's domestic activities. Therefore, good waste management is needed through sorting and disposal in appropriate places so as not to pollute the coastal and marine environment. (Marliani, 2015)

Coastal settlements in Kampung Bagan, Tanjung Piayu, face environmental problems related to the increasing volume of household waste. Waste found in coastal areas is generally dominated by household waste, single-use plastics, and waste from community activities originating from dense settlements and carried by sea currents, while the behavior of people who still throw garbage carelessly and limited disposal facilities also exacerbate coastal environmental pollution. (Marthen et al., 2025) Daily community activities produce various types of domestic waste such as food scraps, plastic, and other household waste which if not managed properly can pollute the coastal and marine environment. The condition of dense settlements and the habit of people in throwing garbage carelessly are among the factors that worsen the environmental quality in coastal areas.

Waste management issues in coastal areas require sustainable efforts through the provision of facilities, increased public awareness, and collaboration between the community and the government. Proper waste management can be achieved through sorting, reducing waste, and disposing of it in designated areas. With active community participation and adequate facilities, environmental pollution in coastal residential areas can be reduced, resulting in a cleaner and healthier environment. (Rusvinasari & Risnanto, 2024)

This proses signicant challenges to environmental sustainability and the quality of architectural spaces in the Tanjung Piayu coastal area. Observations at the research site revealed several technical constraints that lead the Bagan Village community to dispose of waste directly into the sea. These include the limited availability of integrated Temporary Disposal Sites (TDS) in the coastal area, as well as the narrow infrastructure. The distance between coastal homes and the main waste collection point on the asphalt road is approximately 250 meters, making it difficult for residents to dispose of their waste properly. Furthermore, the nearest official TDS in the Tanjung Piayu area is quite far from the daily reach of coastal residents.

The waste polluting the waters of Kampung Bagan originates not only from the domestic activities of local coastal residents, but also from drainage flows form higher land areas around Tanjung Piayu and waste carried by ocean currents from surrounding areas. This problem directly impacts the quality of the residential environment. During high tide, the waste floats and enters the lower areas of the residences, creating a squalid and unhygienic impression. Conversely, during low tide, plastic waste and other household waste become entangled in mangrove roots and the supporting pillars of stilt houses, creating an unpleasant odor and damaging the coastal ecosystem.

At the research site, the previously government-provided waste disposal facility (TPS) was no longer in use because the land on which it stood was sold and transferred to local residents, thus eliminating its existence. This situation made it difficult for residents to dispose of waste properly, and the residential area was quite far from the main road, making it difficult for sanitation workers to reach the area. (Muabuay et al., 2021) Therefore, this study aims to identify the awareness and perception of the Bagan Village community regarding waste management, as well as to formulate a waste management facility arrangement strategy that is more adaptive to the spatial pattern of coastal settlements in Tanjung Piayu, Batam City.

This study uses a qualitative descriptive research design to provide an in-depth overview of waste management behavior in Bagan Tanjung Piayu Village. (Hendri Fauza et al., 2024) The types of data used consist of primary data and secondary data; primary data are obtained directly from the research location, while secondary data include literature references related to coastal settlements. (Nadia, 2024) Data collection techniques are carried out in three ways, namely direct field observation to see environmental conditions, visual documentation to record waste distribution, and short (informal) interviews with local residents to explore the reasons behind the behavior of throwing waste into the sea. Furthermore, the data analysis technique applied is Lowercase analysis, where data from observations and interviews are reduced, categorized based on the focus of sanitation problems, then conclusions are drawn to formulate appropriate environmental improvement recommendations for the community.

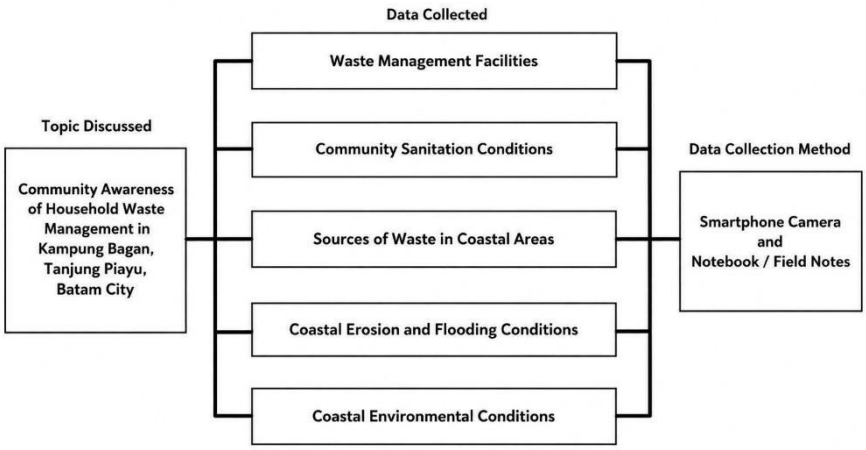


Figure 2. *Chart Data*

Results & Discussion

Waste Management Facility (TPS) in Bagan Village, Tanjung Piayu, Batam City

From the results of field observations and interviews in Bagan Village, Tanjung Piayu, the condition of the garbage there is quite worrying, due to the lack of adequate TPS facilities around the settlement, resulting in garbage piling up around the coast and creating a dirty view and an unpleasant odor.

The lack of waste facilities and the distance to Temporary Disposal Sites (TPS) are among the obstacles in waste management in residential areas. This condition can affect people's behavior in disposing of waste and cause environmental cleanliness problems to still occur frequently. (Muabuay et al., 2021b) Based on observations, waste management facilities in the coastal residential area of Kampung Bagan are still considered inadequate. The limited availability of TPS and their considerable distance from residential areas are among the causes of waste management not running well. People tend to choose the path of least resistance. If the TPS is very far, the costs, time, and energy that residents must spend to dispose of waste properly become too high. Garbage trucks from the Environmental Agency often have difficulty entering the narrow and dense wooden platform area. As a result, dumping waste in the tidal area of seawater under/around the house is the most logical practical option for them, despite the negative impacts in the long term.



Figure 3. *Research Location*

Sanitation Conditions of Coastal Communities in Bagan Village, Tanjung Piayu, Batam City

Based on the survey results, sanitation conditations in coastal residential areas still require attention. Most homes have private bathroom/toilet facilities, but waste disposal system do not fully meet proper sanitation standards. Some domestic waste is still discharged directly into the sea or into open drains, potentially causing environmental pollution.

Poor sanitation conditions can have a negative impact on the environment and public health. Low public awareness of implementing proper sanitation results in the habit of disposing of waste directly into seawater. This condition is exacerbated by limited sanitation facilities and infrastructure in coastal residential areas, resulting in poor environmental health. (H & Savitri, 2022) Based on observations, sanitation conditions in the coastal residential area of Kampung Bagan are still classified as poor. Low public awareness of maintaining sanitation and limited sanitation facilities and infrastructure cause the residential environment to become unhealthy. Coastal communities have traditionally often considered the sea to have unlimited self-purification capabilities through tidal mechanisms. Therefore, when population density in Kampung Bagan increases, the volume of domestic waste (both feces and used washing/detergent water)

exceeds nature's ability to degrade the waste. As a result, static waste settles under the settlement at low tide, producing a pungent odor, and triggering contamination with coliform bacteria (E. coli). Seawater contaminated with fecal waste contains high levels of pathogenic bacteria. Because Kampung Bagan is a fishing area, shallow marine life such as shellfish, crabs, and fish living around the platform are at high risk of exposure to E. coli bacteria. If these organisms are caught and consumed by local residents (especially if they are not properly prepared), this can lead to high cases of chronic diarrhea, gastroenteritis, and even the risk of stunting in children due to repeated digestive infections.



Figure 4. *Research Location*

Sources of Waste in the Coastal Area of Bagan Village, Tanjung Piayu, Batam City

Based on interviews with a second party, the sources of waste in the coastal settlements of Kampung Bagan, Tanjung Piayu. Come from two main sources, household waste and waste transported by ocean currents and waterways. Household waste generally consists of plastic, food scraps, and other domestic waste generated by daily community activities. In addition, there is also waste transported by currents, such as wood, tree trunks, and twigs. According to residents, these tree trunks are thought to originate from the mainland or hilly areas and are carried by the water currents to the coastal areas.

This situation causes waste to accumulate in coastal area and impact the cleanliness of coastal residential environments. The problem of waste in coastal areas is one of the environmental issues that frequently occurs in water areas. Waste found in coastal areas generally originates from the activities of people on land who dispose of waste into the surrounding beach and waterways. This waste is then carried by currents and tides until it spreads to coastal waters. The movement of waste in coastal areas is strongly influenced by the conditions of ocean currents and local water circulation. (Noya et al., 2021) Based on observations, the sources of waste in the coastal area of Kampung Bagan come from community activities and waste carried by ocean currents. This condition causes waste to be spread across the coastal area and impacts the cleanliness of the residential environment. This domestic waste has a constant falling pattern every day and accumulates directly below its source (under the stilt house). Because there is no transportation system to land, this waste forms a base layer (strata) that settles in the

coastal mud. This domestic plastic waste is the most dangerous to the aesthetics and direct health of residents due to its static position and child-friendly environment. The coastline of Kampung Bagan and the stilt structures of the stilt houses act like a natural "giant net." At high tide, ocean currents carry floating trash (both from the open sea and from nearby river estuaries) into the residential area. At low tide, the water level drops dramatically, leaving the large pieces of trash entangled between the house posts and the mangrove vegetation.



Figure 5. *Research Location*

Conditions of Abrasion and Flooding in Bagan Village, Tanjung Piayu, Batam City

As shown by observations and local residents' statements, abrasion can be concluded that it does happen in the coastal residential area of Kampung Bagan, Tanjung Piayu. However, abrasion only takes place in a small scale and does not affect the coastal community largely. Moreover, flooding also does not happen often as quotes by locals, flooding had only occurred once which was at the start of last year. During other times, the residential area tends to be at normal condition without any massive inundation. This shows that the dominant problem that occurs in this area is from solid waste build up in coastal areas and residential areas rather than abrasion and flooding.

The coastal area still has poor environmental quality from several areas that have been improved. Scattered garbage and minimal environmental facilities make this location look uncared for. Meanwhile, abrasion and gradual sea levels have caused public complaints about settlements which feel unsafe and the state of coastal areas around them. (Sari et al., 20 23) From what can see, coastal areas of Kampung Bagan are still experiencing coastal environmental problems such as abrasion and floods but on a smaller level. Gradual abrasion also can decrease the areas around the coastline; besides rainy season flood occasionally disturbs activity in community and influence comfortable life of residential environment. In addition, environmental that is not taken care well also influence residential environment quality along with garbage disposal that often found in several points of coastal. That garbage will decrease aesthetic area looks and may cause pollution environment, health problem and decrease coastal quality. Thus, attempts should be made to control environment by raising awareness amongst people about it, providing garbage disposal facilities to people and conserving coastal areas in an eco-

friendly way so that we can have clean and healthy living atmosphere which is more convenient for living.



Figure 6. *Research Location*

Coastal Environmental Conditions of Bagan Village, Tanjung Piayu, Batam City

The coastal ecosystem around residential areas is in poor condition. The seawater appears murky and dirty due to pollution from garbage and household waste. If this condition continues. It could disrupt marine life. This ecosystem damage also impacts the economic sustainability of the local community.

The coastal settlements of Kampung Bagan, Tanjung Piayu is dominated by stilt houses built over the water or the seashore, these stilt structure adapt to tidal conditions and minimize the impact of flooding. Wood is generally used as a building material. However, due to inadequate accessibility, rotting or damaged wood is simply dumped near the settlement, creating an unhygienic and squalid appearance.

As an archipelagic country, coastal areas in Indonesia face various environmental problems due to increasing pollution from domestic, industrial, and other activities. Population growth and economic activity have contributed to the decline in the quality of the coastal environment. This condition not only impacts the sustainability of marine ecosystems but also affects the lives of coastal communities who depend on environmental resources to meet their daily needs. (Khairunnisa et al., 2025) Based on observations, the condition of the coastal environment of Kampung Bagan is still considered poor due to pollution from garbage and household waste that causes the seawater to appear cloudy and dirty. This condition has the potential to disrupt the coastal ecosystem and the life of marine biota, as well as impact the economic sustainability of the local community. In addition, settlements dominated by stilt houses made of wood also cause environmental problems, because damaged or rotting building materials are often dumped around the settlements, making the area look unhygienic and slum-like. When structural wood (such as piles, girders, or planks) is replaced due to decay by salt water, the lack of a land transportation system makes residents choose to throw it directly into the underpass or the seashore. These wooden debris cannot be easily washed away due to their large size and weight. As a result, they accumulate with daily plastic waste, creating a squalid "visual pollution," blocking water circulation, and posing a physical

hazard (rusty nails or sharp pieces of wood) to the safety of residents and children who move around the platform. The murky seawater caused by domestic waste (greywater detergent and blackwater feces) and sachet waste blocks sunlight from entering the water. This reduces dissolved oxygen levels and disrupts photosynthesis in the surrounding seagrass and mangrove ecosystems.



Figure 7. *Research Location*

Conclusion

The environmental conditions in the coastal residential area of Kampung Bagan, Tanjung Piayu, remain very concerning. Waste disposal facilities are still very limited, so waste management is not running well. Environmental sanitation conditions also do not meet good standards, especially in the waste and garbage disposal system, which is still carried out irregularly. Sources of waste in this area come from household activities and waste carried by sea currents and waterways, such as plastic, wood, twigs, and tree trunks from inland or hilly areas. In addition, abrasion in the coastal residential area does occur, although on a small scale, while flooding is relatively rare, having only experienced once at the beginning of last year. Overall, the environmental conditions in the coastal residential area of Kampung Bagan, Tanjung Piayu, Batam City are still considered poor and require better attention and environmental management to improve the cleanliness and quality of the residential environment.

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Competing Interest

The authors state that there is no conflict of interest in the publication of this article.

Generative AI Statement

During the preparation of this manuscript, the author(s) used ChatGPT and Gemini to translate the text into English and optimize the manuscript's flow and readability. Following this process, the author(s) critically reviewed, edited, and validated the output to ensure accuracy and scientific integrity. The author(s) maintain full accountability for the final content. AI was used solely as a supportive tool and is not credited with authorship. No original data analysis or interpretations were performed by the AI without human oversight.