International Journal of Contemporary Sciences (IJCS)
Vol. 4, No. 1, 2026: 885-894

Analysis of Infrastructure Readiness and Environmental Cleanliness in Marine Tourism Development: A Case Study of Cikadal Beach, Sukabumi Regency, Indonesia

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A R T I C L E I N F O

Keywords: Accessibility, Cikadal Beach, Environmental Cleanliness, Infrastructure, Marine Tourism

Received : 10 November
Revised : 15 December
Accepted: 30 January

A B S T R A C T

This study analyzes the readiness of infrastructure and environmental cleanliness at Cikadal Beach, Sukabumi Regency, as part of the Ciletuh-Palabuhanratu UNESCO Global Geopark. Using a descriptive qualitative method with visual observation, the results of the study show that massive road damage hinders accessibility and increases the safety risks for tourists. In addition, piles of natural waste in the form of unmanaged marine organic material damage the aesthetics of the beach. Based on the Tourism Area Life Cycle model, Cikadal Beach is in the development stage, which requires physical intervention and community-based cleanliness management. Synergy between road infrastructure improvements and environmental preservation is crucial to improve competitiveness and local economic sustainability

DOI: https://doi.org/10.55927/3jntgj71
E-ISSN: 3047-4078
https://journalijcs.my.id/index.php/ijcs

INTRODUCTION

Cikadal Beach in Mandrajaya Village, Sukabumi Regency, part of the Ciletuh-Palabuhanratu UNESCO Global Geopark, has attractive marine tourism potential thanks to its mangrove forests and wide beaches (Indah, 2024; Savitri & Herdiana, 2018). This area should be a major attraction for tourists seeking natural tranquility, although natural attractions alone are not enough for a competitive destination (Oktavianita & Warlina, 2020). Successful marine tourism development depends on adequate supporting facilities to ensure tourists' comfort and safety (Raharjo, 2018).

The reality on the ground shows that there are serious obstacles hindering the progress of tourism in Cikadal Beach, especially in terms of accessibility and sanitation. The severely damaged road infrastructure along the route to the beach is a major complaint because it makes vehicle mobilization difficult and extends travel time (Savitri, 2018). In addition to access barriers, the coastline is often littered with natural debris such as pieces of wood, branches, and other organic marine materials (Suryawan, 2025). Although this debris is natural, poorly managed piles damage the aesthetic value of the beach and give it a dirty impression that could reduce tourist interest in the future (Aziza, 2020).

The problems of damaged roads and piles of natural waste reflect the low level of infrastructure readiness and sanitation management at the local level (Hutabalian, et al., 2025). If left unaddressed, these obstacles will not only damage the image of Sukabumi tourism, but also weaken the economic potential of the Mandrajaya Village community. Therefore, this study aims to analyze the extent to which infrastructure and environmental cleanliness conditions affect the development of Cikadal Beach. The results of this visual observation are expected to provide input for managers and local governments in formulating concrete improvement measures for the sustainability of marine tourism in the region.

LITERATURE REVIEW

The development of sustainable marine tourism is highly dependent on the readiness of basic infrastructure, especially road accessibility, which is key to mobilizing tourists. Road infrastructure is not merely a means of transportation, but a key element in the tourism value chain that determines the ease of reaching destinations (Allokendek et al., 2024). Damage to road infrastructure in coastal areas is often a major obstacle to local economic growth because it increases travel time and safety risks (Yadi et al., 2025). In the context of marine tourism, poor accessibility can reduce the competitiveness of a destination even if the area has extraordinary natural potential (Pratama et al., 2025).

In addition to the physical aspects of roads, coastal environmental cleanliness is a determining factor in maintaining aesthetics and tourist appeal. The presence of waste, both domestic waste and natural waste such as marine organic material (wood and branches), requires systematic management so as not to damage the ecosystem and visitor experience. Marine debris accumulating on the coastline can give a negative image of destination management and threaten the sustainability of coastal areas (Hayati et al., 2020; Adam, 2021). Therefore,

sanitation and environmental cleanliness readiness are important indicators in assessing the quality of a marine tourism site (Arifianti et al., 2024).

Comprehensive destination readiness must also involve local institutional participation and clear regulatory support. In Bali, traditional institutions through the Awig-awig rules have proven capable of integrating environmental protection with economic development through sanctions and zoning mechanisms (Pertiwi & Mardiana, 2020; Dewi et al., 2023). Although Sukabumi has a different cultural context, the principles of community-based resource management and policy synchronization between local governments and local communities are essential to address infrastructure and cleanliness issues (Novianti et al., 2024). The integration of adequate infrastructure with a culture of environmental cleanliness will create a competitive and sustainable tourism ecosystem (Aldyan, et al., 2025; Widiantara et al., 2025).

Furthermore, the revitalization strategy for marine tourism destinations requires the use of technology and accurate documentation as a basis for policy making (Aryono et al., 2024). Visual documentation in research is an important tool for objectively mapping points of infrastructure damage and waste distribution in the field (Adinuha, et al., 2023). With valid field data, the government and managers can formulate more targeted infrastructure repair and cleanliness management programs to increase tourist visits and the welfare of coastal communities (Ardiyanto et al., 2024; Ramadhan & Fanida, 2025).

METHODOLOGY

Data collection for this study was conducted on November 21-24, 2024, in Mandrajaya Village, Sukabumi Regency, West Java. This study used a qualitative approach with descriptive analytical methods to evaluate the actual conditions in the field. The main data in this study was primary data obtained through direct observation and visual documentation along the access road and coastal area of Cikadal Beach, Mandrajaya Village, Sukabumi Regency. The use of this method aims to systematically identify infrastructure and environmental cleanliness barriers in order to produce valid and objective analysis (Sakinah et al., 2025).

Data collection techniques were carried out through participatory observation and purposive field photography at points considered most representative of accessibility and sanitation issues. Visual documentation focused on two main objects: first, the physical damage to the road leading to the location, and second, the distribution of natural waste (marine organic material) along the coastline. Each photograph taken served as empirical evidence, which was then analyzed in relation to the theory of destination readiness and tourist comfort (Putri & Setiawan, 2024; Palopa, et al., 2025).

The data analysis process followed the stages of a Systematic Literature Review adapted for field observations, including visual data reduction, data presentation in the form of damage level classifications, and conclusion drawing. The results of the field survey were then synthesized with regulations related to tourism infrastructure service standards to identify the gap between ideal conditions and reality. Through this method, researchers can provide a comprehensive picture of the urgency of revitalizing facilities at Cikadal Beach

to support the sustainability of marine tourism (Risandewi, 2017; Winoto & Suryana, 2025).

RESULTS AND DISCUSSION

Field observations show that accessibility to Cikadal Beach is in poor condition. Based on visual documentation, massive road damage was found along the main road of Mandrajaya Village, marked by peeling asphalt, holes 10–20 cm deep, and dysfunctional drainage. This condition doubles the travel time compared to normal and increases safety risks for tourists, especially those using two-wheeled vehicles. The unpreparedness of the road infrastructure is a psychological barrier for potential visitors, which ultimately reduces the competitive value of Cikadal Beach compared to other marine destinations in Sukabumi Regency. The documentation can be seen in Figure 1.

Figure 1. Visual documentation of the access routes to Cikadal Beach, highlighting significant accessibility challenges due to unpaved, potholed, and muddy road conditions. (*source: author's documentation, 2025*)

In addition to access issues, environmental cleanliness in the Cikadal Beach coastal area remains a major challenge. Findings in the field show piles of natural waste, predominantly in the form of marine organic material such as wood, tree branches, and vegetation debris carried by the tides (Figure 2).

Although this waste is biodegradable, its unmanaged presence covers the coastline and reduces the space available for tourist activities. Aesthetically, these piles of material create a dirty impression that reduces the beauty of the coastal landscape, thereby disrupting the visual experience of tourists and detracting from the image of an ideal marine tourism destination.

Figure 2. Visual evidence of environmental conditions at Cikadal Beach, highlighting the presence of organic waste along the coastline. (*source: author's documentation, 2025*)

Analysis of these variables indicates that Cikadal Beach does not yet meet the standards for readiness as a sustainable marine tourism destination. The significant gap between abundant natural resource potential and minimal supporting infrastructure underscores the urgency of policy synchronization between local stakeholders and the regional government. Based on Butler's (1980) theoretical framework of the Tourism Area Life Cycle (TALC), Cikadal Beach is currently identified as being in a development stage that requires comprehensive physical intervention. Without optimizing accessibility, digital promotion strategies risk becoming counterproductive, where the mismatch between expectations built on social media and the reality on the ground has the potential to trigger negative perceptions among tourists that can hinder the destination's image in the long term (Juhara & Marsoyo, 2023). The results of research by Pratama et al., (2025) suggest that the construction of the southern cross-island road improves accessibility to the southern coast of Malang, facilitating the transition from the exploration to the involvement phase in TALC, thereby affecting the feasibility of marine tourism sites. Accessibility is given a high weight (25%) in Multi-Criteria Decision Analysis (MCDA), where beaches such as Watu Lepek (score 90%) excel thanks to better road infrastructure, while Sipelot and Gatra lag behind due to poor access.

The environmental cleanliness management strategy at Cikadal Beach requires a more intensive community-based approach. Given the volume of natural waste, its management can no longer rely on natural decomposition

processes, but requires routine management through collective cleaning actions and innovations in the use of wood waste as economically valuable decorative elements. In line with this, a waste sorting system between organic and inorganic categories must be implemented to facilitate the recycling and reuse processes (Jayantri & Ridlo, 2021). One such approach has been implemented at Pangandaran Beach, which has successfully applied community-based 3R (reduce, reuse, recycle) practices that have reduced waste by 40% and increased local business income from recycling. In addition, Paremas Beach in Jerowaru, East Lombok, has implemented a persuasive-educational approach by involving local communities and tourists in environmental conservation efforts. This strategy is implemented through beach clean-up activities integrated with socialization on the urgency of maintaining the cleanliness of coastal ecosystems for the sustainability of tourism (Mulyani et al., 2023).

Strengthening accessibility infrastructure accompanied by hygienic environmental management is predicted to create a positive domino effect on the economic growth of the Mandrajaya Village community. The synergy between the modernization of physical facilities and the preservation of the coastal ecosystem is a major determinant in transforming Cikadal Beach from a potential destination into a leading destination in the Ciletuh-Palabuhanratu UNESCO Global Geopark area.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that the development of marine tourism potential at Cikadal Beach, Mandrajaya Village, is still hampered by poor infrastructure and environmental management. Based on visual observations, massive road damage is a major obstacle to accessibility, reducing tourist comfort and interest in visiting. In addition, piles of natural waste along the coastline that are not properly managed also reduce the aesthetic value and attractiveness of the area. To optimize the existing potential, urgent intervention from the local government is needed to improve road infrastructure and strengthen the role of the local community in maintaining beach cleanliness on a regular basis. Synergy between the availability of adequate access and coastal environmental sustainability is the key to developing Cikadal Beach into a competitive and sustainable marine tourism destination in Sukabumi Regency.

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