



Investigation into Eco-Architecture at Pulisan Beach Coastal Area

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Abstract

Coastal regions represent transitional zones between terrestrial and marine ecosystems, rendering them particularly susceptible to changes. For tourism development to be viewed as a comprehensive and holistic endeavor, it must prioritize local ecology, especially amidst heightened productivity and activity. The distinctive ecological attributes of Pulisan Beach underscore the strategy to draw diverse tourists to North Sulawesi. The research methodology adopts a qualitative descriptive approach, entailing studies and analyses of environmental potentials through field observations. This survey type seeks factual information and employs Ecological Architecture theory for analysis. Identification and analysis of the coastal tourist area of Pulisan Beach are conducted using fundamental concepts and principles of Ecological Architecture. These principles emphasize holistic unity, drawing upon human experiences and interactions with the natural environment, viewing development as an ongoing process rather than a static reality, and advocating for cooperation between humans and nature to ensure mutual safety. The study on the developmental status of Pulisan Beach tourism area, utilizing an Eco-Architecture framework, concludes that it adheres to fundamental ecological concepts and principles. It yields insights into organizing the beach area as a sustainable tourism destination, emphasizing ecological preservation. The arrangement prioritizes principles of Eco-Architecture that are environmentally conscious, aiming to conserve the surrounding environment.

Keywords: Coastal area, coastal tourism area, ecology, ecological architecture, Pulisan beach

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Introduction

Coastal regions serve as transitional zones between terrestrial and marine ecosystems, subject to the influences of both land and sea dynamics (Government of Indonesia 2007). They represent the convergence point of oceanic and terrestrial ecosystems, characterized by unique environmental attributes that support specific flora and fauna species, as noted by Lautetu, Kumurur, and Warouw (2019). Coastal communities, featuring diverse vegetation, contribute to robust ecosystems, exemplified by mangrove forests. These forests play multifaceted roles, including coastal protection against erosion and storms, wave attenuation, climate regulation, and provision of habitat for various organisms. Similarly, sand dunes and cliffs serve as natural barriers against erosion and intrusion, as highlighted by the University of Bangka Belitung (2009). Altogether, these elements constitute the environmental carrying capacity crucial for maintaining ecological balance within coastal areas.

The coastal zone is designated as a local protection area according to Government Regulation (2007). Given their susceptibility to alterations, coastal areas require careful management, as noted by Nabila Afifah Azuga (2021). This management entails setting limits on utilization or defining coastal boundaries. Specifically, land along the coastal edge should have a width commensurate with the beach's shape and physical condition. Additionally, it should maintain a distance from the highest tide point towards land, with a minimum separation of 100 meters, as stipulated by the Government of Indonesia (2007), or in accordance with coastal boundary distance regulations specific to each region. Coastal regions possess distinctive environmental attributes, making them desirable tourist destinations (Astjario and Yuningsih 2010). However, viewing tourism development as a comprehensive ecosystem necessitates careful consideration of local ecology, particularly given the escalation in productivity and activities. Increased human presence and activities on beaches often exert additional pressures on the coastal environment, potentially resulting in damage and overall ecosystem degradation (Suryati and Maharika 2021). Inadequate management of coastal areas, improper resource utilization, absence of environmental standards, and a lack of balance between tourist activities and physical space exacerbate these issues, leading to further degradation of coastal ecosystems (Pinto 2016).

Ecology finds its roots in Greek, where "oikos" signifies home or habitat, and "logos" denotes science (Maknum, 2017). From this etymology, Ecology emerges as a scientific field dedicated to studying habitats, focusing on the interconnectedness between living organisms and their environment. This entails investigating how animals procure food, reproduce, and engage with their surroundings (Putri and Gischa, 2021). Coastal ecology, therefore, delves into the reciprocal interactions between marine and terrestrial ecosystems within the coastal environment.

Drawing upon the preceding comprehension of ecology, its connection with architecture as an engineering is translated into humanitarian architecture. This architecture approach prioritizes the synchronization

with nature and considers the welfare of humans as residents (Frick and Suskiyanto 2007). The construction of residential structures, essential for human habitation, operates within a reciprocal relationship with the natural environment, termed Eco-Architecture. In their book "Basics of Eco-Architecture," Heinz Frick and FX. Bambang Suskiyatno emphasize that Eco-Architecture, or ecological architecture, surpasses conventional buildings in beauty and suitability, emphasizing high-quality architectural standards. Assessing such quality is often challenging, particularly within the architectural domain. Frick and Suskiyatno outline four key concepts of Eco-Architecture; 1). holism; 2). human experience utilization; 3). dynamic development; 4). collaboration between humans and their environment for mutual safety. Eco-Architecture's implementation and planning should be distinguished from contemporary architectural practices, requiring a process-oriented approach. Neglecting ecological considerations, as emphasized by (Beda, G. dan Szekeres, A. *Thoughts on the cherry tree, Paper for the international Svedala Symposium on Ecological Design*, Budapest 1992.) may lead to ecological crises, endangering humanity's existence.

Pulisan Beach boasts strategic ecological attributes, brimming with potential for unparalleled natural beauty owing to its hilly terrain, pristine white sands, and diverse coastline featuring several beaches, gently sloping seas, picturesque sands, striking rock formations, and captivating savanna hills. Situated in Likupang sub-district, North Minahasa district, North Sulawesi, Pulisan Beach offers a comprehensive vista for visitors to behold. Accessible with a two-hour drive from Manado towards East Likupang, it entices people with its array of charms, strategically positioned in North Minahasa district, East Likupang sub-district, approximately 46 km from Manado's city center. The astronomical coordinates of Pulisan Beach are 1.66984° North latitude and 125.14574° East longitude, spanning an area of 3.02 km². Pulisan Beach features a coastline spanning 491.95 meters, with a total usable land area of 5,157.03 M². Presently, the developed land encompasses 30 square meters of cottage buildings designated for tourists. Situated in a coastal area with an elevation of 100 meters above sea level, Pulisan Beach is bounded by the Bangka Strait to the north, Kinunang village to the east, Marinsow village to the south, and the Bangka Strait to the west (Directorate General of Spatial Planning, Draft Detailed Spatial Plan (RDTR) East Likupang Tourism Area, 2023).

The unique ecological features of Pulisan Beach have attracted a multitude of tourists to North Sulawesi. According to data from the Central Bureau of Statistics (2023a) of North Sulawesi Province, tourist visits amounted to 1,848 individuals in 2023, with a significant portion of these visitors opting for beach destinations (Central Bureau of Statistics 2023b). To capitalize on this potential, the Government of North Sulawesi, through Regional Regulation Number 01 of 2014, outlined the Regional Spatial Plan (RTRW) for North Sulawesi Province spanning 2013-2033. This plan designated

tourist areas in North Sulawesi, including those in North Minahasa Regency, with Pulisan Beach being earmarked as a tourism hotspot. Furthermore, in 2023, it was identified as one of the national strategic areas under the National Tourism Strategy Area (KSPN) program. This designation aims to prioritize infrastructure development to revitalize Pulisan Beach by incorporating new functions into the area. The transformation of the Pulisan coastal area into a tourist destination may pose a risk of altering its ecological conditions, potentially shifting it from a protected area to one focused on tourism-related cultivation. Hence, it's crucial to conduct a study that meticulously considers the natural environment of Pulisan Beach when implementing physical interventions in the area. This study aims to address the fundamental concepts and principles of Eco-Architecture in the Pulisan Beach tourism zone. Its objective is to assess the state of Eco-Architecture in the development of the Pulisan Beach tourist area.

Methods

The research employs a qualitative descriptive approach, incorporating both object and environmental potential analyses, along with an Eco-Architecture perspective. This descriptive qualitative survey, following the methodology outlined by Nazir (2014), involves field observations to gather data from various objects and identify existing factors, aiming to obtain factual information. The collected data is then analyzed, drawing upon theories from both ecology and architecture.

Results and Discussion

Pulisan Beach, situated in North Minahasa Regency's East Likupang District, serves as one of the prominent tourist destinations. This study encompasses a survey aimed at acquiring identification results. Subsequently, the gathered identification data underwent analysis, aligning with the fundamental concepts and principles of Ecology pertinent to the Pulisan coastal tourism area, including: (1) A comprehensive rapport between humans and the environment is fostered at Pulisan Beach. Both the local community and visitors demonstrate a commitment to conserving the biological and non-biological aspects of the Pulisan Beach tourism area. This dedication is evident in their efforts to maintain cleanliness and preserve the natural surroundings. Notably, there has been no endeavor to alter the physical condition of the Pulisan coastal area, ensuring it remains safe and offers unimpeded circulation. The coastline seamlessly integrates with the surrounding area, adorned with shade-providing coconut trees and indigenous plants that enhance the visual aesthetics while maintaining unobstructed views towards the beach; (2) Drawing upon human experiences, particularly traditional practices in development, and the inherent relationship between humans and the natural environment, Pulisan Beach incorporates a design featuring modest yet high-quality cottages. These cottages are characterized by their simplicity and utilize local materials such as coconut trees and bamboo, aligning with the traditional architectural style of the region. This approach not only enhances the unity with nature but also engages local traditions and human involvement in the construction process, thereby

maintaining a connection to the locality while utilizing indigenous materials; (3) Viewing development as an ongoing process rather than a fixed reality, the transformation of the Pulisan coastal area into the Pulisan Beach tourism zone, as outlined in the North Sulawesi RTRWP, has initiated the gradual implementation and management of tourism-related activities by the local community. This process commences with the establishment of tourist accommodation facilities, specifically Homestays, designed with a blend of Eco-Architecture and modern architectural elements. The Eco-Architecture concept is reflected in the primary structure's use of wooden construction and the architectural style featuring buildings on stilts. Conversely, modern architectural features include zinc roofing materials and glass panels for lighting. The Homestay design, created as a prototype, is situated in Pulisan village and Marinsow village, both located within the Pulisan coastal area. The design of tourist lodges for accommodation purposes adopts a fusion of Eco-Architecture and modern architectural principles. While the physical structure of the lodges adheres to Eco-Architecture concepts, the interior design follows modern architectural styles. These lodges are situated directly on Pulisan Beach. Additionally, structures such as Gazebos, Culinary Stalls, Garden Chairs, Stairs, Walkways, and Play facilities are all constructed based on Eco-Architecture principles. Their shapes, materials, and physical textures are inspired by the natural surroundings of Pulisan Beach. (4) The collaboration between humans and the natural environment for mutual safety is evident in the conscientious efforts of both the local community and visitors at Pulisan Beach tourism area to refrain from littering. Despite the absence of communal trash bins in this tourist spot, there is a noticeable commitment to preserving the cleanliness of the natural surroundings. Individuals make use of available trash bins to dispose of garbage, showcasing a shared responsibility towards maintaining a clean environment.

Conclusions

From the delineation of the problem, objectives, and the scope of discussion provided, it can be inferred that: Research concerning the developmental status of the Pulisan Beach tourism zone, approached through an Eco-Architecture lens, is feasibly conducted using qualitative methodologies, yielding outcomes that align with fundamental concepts and principles of Ecology. Examination of Eco-Architecture within the Pulisan Beach locale yields insights into configuring the beach area as a sustainable tourism destination, characterized by the preservation of ecological attributes via the integration of indigenous and eco-friendly architectural practices. The emphasis is placed on ecological architecture principles that prioritize environmental sustainability. These architectural ecological principles guide strategic decisions, including the establishment of safe and eco-conscious tourism amenities, zoning delineations, and coastal conservation efforts aimed at upholding environmental preservation.

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Author(s) contribution

Resza Rachmadyanti contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

Jumianti contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.

Frederika S. Rahantoknam contribute to methodology, supervision, and validation.

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