

ERGONOMICS AS THE BASIS FOR TOURISM FACILITY DEVELOPMENT POLICY AT LABUHAN JUKUNG BEACH

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ABSTRACT

The implementation of ergonomics in the management of tourism facilities is not only important to improve visitor comfort, but also greatly contributes to the sustainability of destinations and the competitiveness of Indonesia's coastal tourism. This study aims to analyze the application of ergonomic principles in optimizing tourism facilities at Labuhan Jukung Beach, West Coast Regency, as well as formulate policy recommendations to support the development of beach facilities that are effective, comfortable, safe, healthy and efficient. A qualitative approach is used with data collection techniques through in-depth interviews and documentation studies in the form of local government reports and international tourism management standards. The results of the study revealed that although basic facilities and comfort aspects such as prayer rooms and photo spots are adequate, there are significant shortcomings in the arrangement of public spaces, sanitation, and the systematic application of ergonomics in accordance with ISO 13009:2015. The lack of integration of ergonomic principles in tourist facilities has an impact on a less than optimal visitor experience and hampers the competitiveness of destinations, especially in the face of increasingly competitive global tourism challenges. Therefore, this study emphasizes the need to evaluate facility improvement based on ergonomic approaches and the formulation of applicable policies that ensure the implementation of sustainable ergonomics and the improvement of the quality of beach tourism services. The contribution of this research lies in a comprehensive understanding of the management of ergonomic-oriented tourism facilities that support sustainable tourism development in Indonesia's coastal regions.

Keywords: *Ergonomics, Tourism Facilities, Sustainable Tourism, Tourism Management Policy.*

INTRODUCTION

Ergonomics is a discipline that studies the interaction between humans and elements in a system, including equipment, the environment, and work processes, with the main goal of improving efficiency, comfort, safety, health, and productivity (Dul *et al.* 2012). The application of ergonomic principles in the design of facilities and environments aims to adjust human conditions and capabilities, so that the activities carried out can run optimally without causing excessive physical and psychological burdens (Soetisna *et al.* 2018). Several recent studies have shown that ergonomic interventions can significantly reduce fatigue and the risk of musculoskeletal disorders in the actors,

including in the tourism sector, thereby contributing to the improvement of the well-being of workers and visitors (Ciarlante *et al.* 2024).

In the context of beach tourism facilities, ergonomics plays a crucial role in the process of designing and structuring facilities that can provide an effective, safe, and comfortable user experience for various groups of tourists (Izzuddin & Ilahiyah, 2022). Examples of facilities that need to be ergonomically designed include gazebos, shades, toilets, access lines, public spaces, and areas used by Micro, Small and Medium Enterprises (UMKM). The design is based on ergonomic principles that not only consider functional aspects but also aspects of safety and user comfort,

thereby minimizing the risk of injury and optimizing visitor satisfaction (Hidayatullah et al.2024). Studies of ergonomic interventions in conservation tourism activities show that the application of ergonomic principles such as regular breaks and safety instructions can reduce physical burden and increase comfort during tourism activities (Suarbawa, 2024).

The implementation of ergonomics in the management of tourism facilities is not only important in terms of increasing comfort but also supporting the sustainability of destinations and the competitiveness of tourism at the international level (El-Sherbeeney et al.2023). Ergonomically designed facilities can improve the traveler experience, reduce the risk of injury, and streamline managers' operational costs. Research in the tourism and hospitality sectors shows a positive correlation between the perception of ergonomics by employees to the improvement of their work performance, which in turn improves the quality of tourism services (Marina et al.2024).

The lack of implementation of beach tourism public facility standards according to national and international standards causes existing facilities to be often less representative and affect the attractiveness of destinations (Izzuddin & Ilahiyah, 2022). This is due to the limitations of clear and applicable policies related to the management of tourism public facilities at the regional level, including ergonomic standards that ensure comfort, safety, and efficiency in the use of facilities by visitors with various characteristics (Kementerian Pariwisata dan Ekonomi Kreatif, 2021). Based on this background, this study aims to analyze the application of ergonomic principles in optimizing tourism facilities at Labuhan Jukung Beach and provide policy recommendations to support the development of beach facilities that are more responsive to user needs, safe, comfortable, and efficient.

METHODS

This research was carried out in July-November 2025 at Labuhan Jukung Beach, Central Coast District, West Coast Regency, Lampung Province. This research uses a qualitative approach with data collection techniques through in-depth interviews with key stakeholders, namely the West Coast Regency Tourism Office as the main manager of the regional tourism sector, and the Ministry of Agrarian and Spatial Planning/National Land Agency (ATR/BPN) as the authority that regulates spatial planning and land use in

coastal areas. In addition, interviews were also conducted with other related parties, such as local tourism business actors, beach facility managers, and the surrounding community who interacted directly with tourism activities. This research is also complemented by a literature study in the form of official documents from various sources, including regional performance reports, development strategic plans, and tourism and infrastructure statistical data published by the West Coast Regency Government, which is used to obtain supporting data and strengthen field findings. All data collected are then analyzed qualitatively through a descriptive-integrative approach, in order to produce a comprehensive picture of the implementation of ergonomic principles in the management of tourism facilities at Labuhan Jukung Beach, as well as formulate appropriate and applicable policy recommendations for the development of sustainable tourism in the region.

RESULTS AND DISCUSSION

Location Overview

Labuhan Jukung Beach which is located in Kampung Jawa Village, Pesisir Tengah District, West Coast Regency, Lampung Province (Figure 1). This location is one of the leading marine tourism destinations in the west coast of Lampung. Administratively, this area has been designated as a priority zone for the development of coastal tourism in Regional Spatial Planning Regulation (RTRW) dan Rencana Detail Tata Ruang (RDTR) (Bappeda Pesisir Barat Regency, 2025) Labuhan Jukung Beach has distinctive natural characteristics, characterized by soft white sand and waves that are ideal for various marine tourism activities such as *surfing*, swimming, and beach recreation. The beauty of the natural panorama combined with the potential for marine activities makes this area one of the main attractions for domestic and foreign tourists. With supportive natural conditions, Labuhan Jukung Beach has great potential to be developed as a leading marine tourism destination that is sustainable and competitive. This tourism development activity also has a positive impact on improving the regional economy and employment opportunities, with an increase in micro businesses and an increase in local income based on aspects of the sharia

economy that still need further development (Fransiska *et al.*2020).

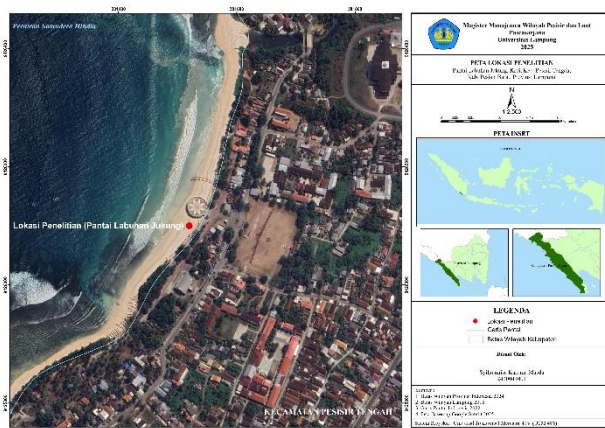


Figure 1. Map of Labuhan Jukung Beach

The initial condition of tourism development in Labuhan Jukung Beach and the West Coast Regency area can be analyzed through the trend of tourist visits during the period 2016 to 2024 (Figure 2). Based on official publication data from the Tourism Office and BPS Pesisir Barat Regency, The average tourist visit in the 2016–2019 period reached around 34,000 visitors per year, showing the strong potential for marine tourism and stable tourist interest before the pandemic. Entering 2020, there was a sharp decrease in the number of visits to around 10,615 visitors, which was directly influenced by restrictions on people's mobility during the COVID-19 pandemic. However, in 2021, the tourism sector began to show signs of recovery with an increase in the number of visitors to around 18,875 people. In 2022, the number of special visitors in the Labuhan Jukung Beach area was recorded at around 15,925 tourists, while the total number of visits throughout West Coast Regency reached more than 62,000 people, including domestic and foreign tourists who came through various regional tourism events. The positive trend continues in 2023, with a total of around 26,726 tourists visiting Labuhan Jukung Beach, based on a recapitulation of local media reports citing Dinas Pariwisata Pesisir Barat Regency. Although the data for the 2023–2024 Christmas and New Year period only recorded around 7,659 visitors, the figure reflects strong seasonal tourism momentum. Overall, the chart trend shows that Labuhan Jukung Beach tourism is experiencing a significant post-pandemic growth phase and has positive prospects for the coming years, especially with the increase in international

activities such as the WSL Krui Pro which has the potential to attract foreign tourists.

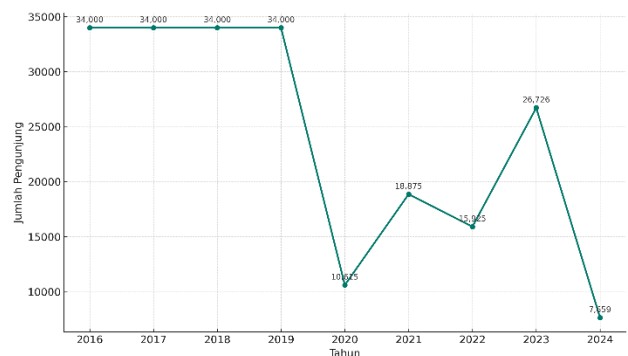


Figure 2. Data on Labuhan Jukung Beach Tourism Visits.

Source: pesisirbaratkab.bps.go.id (2024)

Supporting facilities at Labuhan Jukung Beach such as parking areas, gazebos, prayer rooms, and interesting photo spots have provided added value to the tourist experience. However, the results of the study show that the governance aspects of supporting facilities, especially sanitation, waste management, pedestrian paths, and safety signage still need to be improved to comply with sustainable tourism service standards (Wirawan *et al.*2020). This is important considering that increasing tourist visits requires infrastructure readiness that is adaptive to the needs of diverse users and dynamic coastal environmental conditions. In a global context, (Chuang *et al.*2020a) emphasizing that the comfort and safety of tourists in coastal areas is highly dependent on the design of ergonomic and environmentally friendly facilities, which can minimize ecological pressure and increase visitor satisfaction. Therefore, strengthening environmental management and governance and facilities based on ergonomic principles is highly recommended to support environmental sustainability and economic empowerment of the local community, as well as increase the competitiveness of destinations nationally and internationally (Senthilkumar, 2023).

There is a gap between the regional planning policy that has designated Labuhan Jukung as a priority tourism area and the existing conditions of the field that are not optimal. By Regional Spatial Planning Regulation (RTRW) Pesisir Barat Regency in 2023, This area should be supported by adequate tourism infrastructure, including sustainable and integrated public facilities. The arrangement of public spaces at Labuhan

Jukung Beach is still uneven, with facilities such as MSME areas, pedestrian paths and parking areas that have not been ordered. In addition, the limitation of sanitation facilities such as toilets, rinsing stations, and waste management is the main obstacle in the implementation of ergonomic and sustainable tourism management policies. A study by (Zou & Yu, 2022) shows that the perception of tourists' sense of security and comfort is greatly influenced by the spatial layout and completeness of public facilities in tourist destinations, so improving these aspects is a key factor in strengthening the competitiveness of destinations.

The application of ergonomic principles in the management of coastal tourism facilities is an important strategy to improve the quality of tourist experience while preserving the environment. (Siswandari et al.2015) Explains that ergonomic-based tourism facility design can improve the effectiveness of visual communication (such as safety signage) and reduce the risk of accidents in coastal areas. In addition, the ergonomic approach also contributes to increased tourism inclusivity, where all levels of society can enjoy facilities safely and comfortably. This concept is in line with research (Choi et al.2024) which highlights the importance of coastal tourism facilities that are resilient to disasters and able to protect tourists in emergency situations such as tsunamis.

To answer these challenges, it is necessary to strengthen governance based on local community participation and sustainable facility design innovations that prioritize space efficiency, comfort, and safety. Management based on the principle of "environmental ergonomics" as suggested by (Senthilkumar, 2023) It can be a strategic approach in developing tourist facilities that are not only aesthetically pleasing, but also adaptive to coastal climatic conditions and the needs of modern tourists. Thus, the integration between spatial planning policies, infrastructure design, and local community participation is the main prerequisite for creating highly competitive, sustainable, and inclusive coastal tourism.

Ergonomics and Sustainable Beach Tourism

Ergonomics in the context of sustainable beach tourism has an important role in creating harmonious relationships between people, facilities, and the coastal environment

(Harit & Arjun, 2025). The application of ergonomic principles is not only oriented towards the physical comfort of tourists, but also includes the dimensions of safety, health, space efficiency, and sustainability of resource use (Sudiajeng et al.2024). Ergonomically designed tourist facilities such as safe pedestrian paths, rest areas with intuitive layouts, and easily accessible information boards and safety signs have been proven to improve the comfort and perception of safety of tourists (Spinelli & Benevolo, 2024). Studies (Marina et al.2024) shows that the implementation of the ISO 13009:2015 standard related to *Tourism and Related Services for Beach Operation* encourages more efficient and environmentally friendly beach management through user-oriented cleanliness, safety, and accessibility governance. In the context of Labuhan Jukung Beach, the application of this principle can help optimize the flow of tourist movement, minimize the risk of accidents, and maintain the quality of the coastal ecosystem which is the main attraction of the area.

In the management of coastal areas, ergonomics serves as an integrative approach that supports the balance between the needs of tourists and the carrying capacity of the environment (Chuang et al.2020). The application of *human-centered design principles* helps ensure that tourist facilities meet the aspects of universal accessibility, energy efficiency, and sustainability of construction materials (Abramuszkinová Pavlíková et al.2023). The design of public areas such as gazebos, seating, and pedestrian paths that pay attention to thermal comfort and natural air circulation can reduce environmental stress levels and extend the stay time of tourists (Weah, 2025). This principle is in line with the green *tourism agenda* in Indonesia which emphasizes the integration of user comfort with ecosystem conservation (Ministry of Tourism and Creative Economy of the Republic of Indonesia., 2024). Thus, ergonomics is not only a technical design issue, but also a moral and ecological basis in realizing environmentally friendly beach tourist destinations.

The integration of ergonomics into tourism development policies is an important strategy to achieve a balance between environmental, social, and economic aspects (Abramuszkinová Pavlíková et al.2023). The design of public areas at Labuhan Jukung Beach still needs repairs, as can be seen from several damaged gazebos, unarranged

seating, and the unavailability of pedestrian paths that pay attention to thermal comfort and natural air circulation. This condition has an impact on the decline in the quality of the tourist experience, which according to a study (Weah, 2025) can reduce environmental comfort and shorten the tourists' stay time. This principle is in line with the green tourism agenda in Indonesia which emphasizes the integration of user comfort with ecosystem conservation (Ministry of Tourism and Creative Economy of the Republic of Indonesia, 2024). Thus, ergonomics is not only a technical design issue, but also a moral and ecological basis in realizing environmentally friendly beach tourist destinations. The application of ergonomic principles at Labuhan Jukung Beach has great potential to support the development goals of the area as a leading marine tourism destination in Pesisir Barat Regency. Based on the Regional Spatial Planning Regulation (RTRW) 2023 and the results of the Tourism Office's field study, most available facilities are still basic and have not yet met the optimal aspects of tourist comfort and safety. This condition is exacerbated by the lack of adequate digital-based tourism information systems and the lack of sanitation facilities according to sustainable beach tourism standards (Putri et al.2022). Strengthening ergonomics can be realized through the provision of pedestrian paths, the provision of disability-friendly rest areas, and supportive public spatial planning according to ENASE principles for visitors. The implementation of this design has been proven to improve the positive perception of tourists and encourage an increase in the length of visit by up to 20% (Choi et al.2024).

With the increasing competition between marine tourism destinations in the Southeast Asian region (United Nations World Tourism Organization, 2023). The application of ergonomic principles in the design of tourist facilities is one of the new competitive advantages for Indonesia. Marine tourism encompasses all forms of tourism activities related to the sea and coast, including beach tourism, diving, snorkeling, and coastal ecotourism (Truong & Jang, 2019). Thus, beach tourism is part of marine tourism that focuses on recreational activities along the coastline, while marine tourism has a wider scope to marine waters and coastal ecosystems.

Although the regional planning and regional policies contained in the Regional Spatial Planning Regulation (RTRW) of the

West Coast Regency have prioritized the development of the Labuhan Jukung coastal tourist area, an in-depth interview with Department of Tourism of Pesisir Barat Regency as the main manager of the regional tourism sector and Ministry of Agrarian and Spatial Planning/Badan Pertanahan Nasional (ATR/BPN) Pesisir Barat Regency revealed that ergonomic principles are still not fully applied in the design and management of tourism supporting facilities. The existing facilities are more basic functional without paying enough attention to the aspects of safety, comfort, and efficiency of use. This inequality leads to a decline in the quality of service and tourist experience, which in turn can weaken Labuhan Jukung's position as a world-class destination. Study by (Ciarlante et al.2024) emphasized that the systematic application of ergonomics is the key to ensuring that facilities are not only available, but also safe, comfortable, healthy, effective, and efficient (ENASE), which has a positive impact on visitor satisfaction and safety, in accordance with the ISO 13009:2015 standard which regulates the management of tourist beaches as a whole.

In addition, the limitations of the application of ergonomics are even more important considering that Labuhan Jukung is one of the international surfing destinations recognized by the *World Surf League (WSL)*, with the annual Krui Pro event that attracts foreign tourists from various countries (World Surf League, 2024). The existence of supporting facilities such as wave attractions, aesthetic photo spots and representative prayer rooms increases the comfort and satisfaction of visitors. However, the research found that public facilities in Labuhan Jukung still show significant need for improvement, especially in the arrangement of public spaces, waste management and sanitation, and environmental sustainability. National regulations regulated in the Regulation of the Minister of Tourism and Creative Economy No. 4 of 2021 (Ministry of Tourism and Creative Economy Republic of Indonesia, 2021) Requires the provision of cleaning facilities, informative signage, and safety guarantees for visitors. The integration of ergonomic principles in management is important so that facility improvements not only meet technical aspects, but can improve comfort, safety, health, and efficiency of use on a sustainable basis (Izzuddin & Ilahiyah, 2022). This principle is also very much in line with the concept of sustainable tourism that prioritizes social, economic, and ecological aspects in a

balanced manner, as well as the application of ENASE indicators as a benchmark for the success of tourism facility management (Ministry of Tourism and Creative Economy of the Republic of Indonesia, 2024).

Previous research in tourism and hospitality has underlined the positive impact of ergonomic interventions on service quality and human resource productivity, which are important factors in the sustainability of the local economy and the long-term quality of destinations (Mahadewi & Irwanti, 2020). The ergonomic design of the facility lowers the need for frequent repairs, improves resource efficiency, and encourages responsible visitor behavior, such as easily accessible waste management and space management that optimizes the internal mobility of tourists. The integration of these principles into local policies, including RTRW and management Standard Operating Procedure, will help realize environmentally friendly, safe, comfortable, and competitive coastal tourism.

Although the favourite facilities at Labuhan Jukung Beach have provided some basic supporting aspects, a thorough review indicates the need for significant improvements especially in the arrangement of public spaces, waste management and sanitation and environmental sustainability efforts. Good management of public spaces includes zoning of tourist activity areas, easy accessibility for all segments of visitors, and layout of facilities that minimize functional conflicts and maximize comfort (da Costa Cristiano *et al.*2020). Effective sanitation management must be supported by clean toilets, closed and separate bins, and better tourism security systems. Environmental sustainability aspects need to receive serious attention through reducing the use of hazardous materials, conserving natural resources, and education for responsible visitor behavior (Steven *et al.*2024).

The standard for beach tourism business regulations in Indonesia, as stipulated in the Regulation of the Minister of Tourism No. 4 of 2021, requires the provision of a number of minimum facilities such as cleanliness, user-friendly public spaces, clear information signs, and safety guarantees through supervision and the provision of adequate safety equipment. However, to make these facilities able to provide an optimal experience, it is necessary to apply ergonomic principles, namely design that is centered on comfort, safety, efficiency, and user health. The ergonomic approach not only meets technical

criteria but also increases the effectiveness of facility use, minimizes the risk of accidents, and extends the service life of the facility (Izzuddin & Ilahiyah, 2022).

Ergonomics-based beach management policies must be applicable, integrated, and comprehensive. This includes standardization of the design and maintenance of beach tourism public facilities with the use of ENASE-based performance indicators (Effective, Comfortable, Safe, Healthy, Efficient) as an objective evaluation benchmark. According to research (Izzuddin & Ilahiyah, 2022), The implementation of this indicator is able to guarantee that facilities are not only available, but also function optimally in supporting visitor experience and environmental sustainability simultaneously. Policies need to prioritize collaborative governance involving local governments, private business actors, and the community, so that management resources and responsibilities can be harmonized and sustainable (Ciarlante *et al.*2024).

The successful practice of public policy based on ergonomics and sustainability can be seen from the case study of Kuta Beach, Bali. There, the Bali Provincial Government adopted facility design standards that are in accordance with ISO 13009, including user-friendly spatial planning with a focus on safety, the use of ergonomic hygiene facilities, and integrated waste management combined with environmental education for tourists (Marina *et al.*2024). This approach is supported by close supervision and collaboration between stakeholders, resulting in a well-maintained tourism attraction and high quality of service in Indonesia's busiest beach destinations (Apliant *et al.*2023).

Referring to the conditions and potential at Labuhan Jukung Beach, the development of a similar policy that integrates ergonomic principles in all aspects of the design and operation of the facility is highly recommended. Periodic evaluation using state-of-the-art measurable indicators is essential to ensure consistency of implementation and adaptability to the dynamics of tourist needs and environmental changes. Studies from Novitasari *et al.*(2022) also emphasized that continuous sanitation supervision and facility maintenance greatly determine the quality of beach tourism services in Indonesia.also emphasized that continuous sanitation supervision and facility maintenance greatly determine the quality of beach tourism services in Indonesia.

CONCLUSION

Labuhan Jukung Beach has great potential as a leading marine tourism destination on the West Coast of Regency with natural beauty, ideal waves, and strong tourist attractions, but still faces challenges in the application of *ergonomic* principles and sustainable facility management. Although regional policies through RTRW and RDTR have set this area as a priority for tourism development, the existing conditions in the field show that public facilities such as sanitation, pedestrian paths, information systems, and spatial planning are still basic functional and have not met the standards of comfort and safety of tourists. The application of *ergonomic principles* with the ENASE framework (Effective, Comfortable, Safe, Healthy, Efficient) is the key to improving design efficiency, optimizing the tourist experience, and maintaining a balance between social, economic, and environmental aspects. The integration of this principle into tourism policies and governance based on local community participation is expected to create inclusive, environmentally friendly, and globally competitive destinations. With the support of measurable policies, the implementation of ISO 13009:2015 standards, and cross-sector collaboration, Labuhan Jukung Beach has the potential to develop into a national model of ergonomics-based beach tourism management that is able to improve the welfare of coastal communities and strengthen Indonesia's image at the international level.

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