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Integrated Strategies for Sustainable Coastal Area Management: A Systematic Literature Review

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ABSTRACT

This study aims to identify and synthesize strategies for managing coastal areas through a systematic literature review. The research adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, focusing on articles published between 2019 and 2023. Data collection utilized Google Scholar and Publish or Perish tools to identify studies related to coastal area management strategies. The inclusion criteria required studies to address coastal management strategies, be written in Indonesian or English, and have been published within the last five years. From an initial pool of 2,000 articles, screening processes narrowed the selection to five articles that met all criteria. The findings underscore the necessity of integrated strategies that balance social, environmental, and economic considerations. Key approaches include empowering local communities, promoting sustainable marine tourism, enhancing disaster resilience through mangrove planting, and fostering stakeholder collaboration. The qualitative synthesis of selected studies emphasizes the significance of adopting participatory methods, such as ICZM, and prioritizing environmental conservation. Successful coastal area management requires harmonizing resource utilization with long-term sustainability to protect ecosystem health and support local livelihoods.

KeyWords: *Coastal Area Management, Integrated Coastal Zone Management (ICZM), Sustainability Strategies, Community Empowerment, Conservation*.

INTRODUCTION

The Indonesian archipelago holds a highly strategic geographical position, serving as a vital hub for maritime traffic connecting continents. Indonesia asserts sovereignty over its maritime territories, which include internal waters**,** archipelagic waters, and territorial seas extending up to 12 nautical miles from its baseline. Beyond these limits, the nation exercises jurisdiction in additional zones with specific sovereign rights and responsibilities, such as the Indonesian Exclusive Economic Zone (ZEEI), which spans 200 nautical miles from the baseline. Within the ZEEI, Indonesia retains sovereign rights over natural resources, including fisheries, as well as the authority to manage environmental conservation, conduct marine scientific research, and regulate artificial islands and related installations (Arianto, 2020).

Regional development endeavors aim to improve and shape regional conditions through a spatial framework, considering critical factors such as social, cultural, economic, physical, and institutional environments. This approach adheres to principles of sustainable

development planning and management (Achmad, 2022). Coastal and marine regions present significant opportunities for regional advancement, as they boast a wealth of renewable and non-renewable natural resources. These areas also offer prime accessibility for various economic activities, such as transportation, ports, industry, settlements, and tourism (Achmad et al., 2022). Coastal zones act not only as transitional spaces between terrestrial and marine ecosystems but also as intersections for land- and sea-based economic activities. Historically, these zones have supported port cities and served as pivotal centers for global economic growth. Furthermore, coastal communities often act as custodians of natural resources, championing sustainable practices and adhering to environmental conservation principles (Prihartanto, 2020). Indonesia's coastal ecosystems are home to some of the world's richest tropical marine biodiversity. The nation hosts 30% of global mangrove forests, 30% of coral reefs, and provides 60% of protein consumption derived from fisheries, with 90% of these fish sourced from coastal waters within 12 nautical miles of the shoreline. Coastal ecosystems including coral reefs, seagrass meadows, mangrove forests, and seaweed support extensive marine biodiversity, contributing significantly to the economy through resources such as groupers, Napoleon fish, ornamental fish, seahorses, pearl oysters, giant clams (*Tridacna gigas*), and sea cucumbers (Zamroni et al., 2021). Despite this abundance, the management and development of Indonesia's coastal resources remain suboptimal and require alignment with the Code of Conduct for Responsible Fisheries (CCRF) (Hur et al., 2020).

The utilization and development of Indonesia's natural resources must prioritize public welfare while maintaining a balance between protection, conservation, and sustainable use (Untari et al., 2018). Constitutionally, natural resource management is rooted in Article 33, Paragraph 3 of the 1945 Constitution, which declares: "Earth, water, and the natural resources contained therein shall be controlled by the State and used for the greatest prosperity of the people". This mandate is further supported by Article 28H, Paragraph 1**,** which ensures every citizen's right to a healthy environment and basic health services. Coastal area development warrants particular focus due to the immense potential of marine and coastal resources to support national development (Ekosafitri et al., 2017). According to Susanto (2019), effective coastal area management should involve improving the quality of human resources, advancing infrastructure, and fostering collaboration among stakeholders. Successful management strategies should prioritize regional development sectors based on local resource potential and existing infrastructure. Active stakeholder involvement is crucial, with a focus on sustainability to ensure the long-term preservation of the environment. This study aims to identify and propose strategies for the sustainable management of coastal areas.

METHODS

This study employs a systematic review as its research method. As defined by Kitchenham (2004), a systematic review is a structured approach that enables researchers

to identify, assess, and interpret relevant studies within the scope of their research focus. This methodology involves systematically analyzing article content to derive meaningful insights. The literature search was conducted in May 2024, with Google Scholar serving as the primary source of data. Additionally, the Publish or Perish application was utilized to streamline the identification of relevant references. Articles included in the review were published between 2019 and 2023. The literature search employed keywords related to strategies for managing coastal areas, without imposing language restrictions to ensure comprehensive results.

Four inclusion criteria guided the article selection process:

- Focus: The research must specifically address strategies for coastal area management.
- Language: Articles had to be written in either Indonesian or English.
- Type: Only original research articles (excluding review articles) were considered.
- Publication Date: The articles must have been published within the past five years.

The process of literature collection adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The methodology was divided into four distinct stages:

- Identification: Articles were systematically searched to compile a comprehensive list of relevant references.
- Screening: The identified articles were screened for relevance by evaluating their titles and abstracts to ensure alignment with the study's focus.
- Eligibility: Articles were selected based on their potential to provide qualitative and quantitative data pertinent to the research objectives.
- Selection: A thorough review of the full content of the shortlisted articles was conducted to finalize the selection (Liberati et al., 2009).

The data extracted from the selected studies were synthesized using a qualitative approach rather than meta-analysis. Specifically, the Synthesis Without Meta-analysis (SWiM) methodology was applied. This approach involved narratively describing the findings to provide an in-depth explanation of strategies for coastal area development (Campbell et al., 2020).

RESULTS

A search conducted in the database initially identified 2,000 articles. However, after removing irrelevant titles and duplicate entries, 1,650 articles were excluded, leaving a total of 350 articles for further evaluation. Subsequently, the abstracts of these articles were analyzed to determine their alignment with the research questions and objectives of the systematic literature review. Each article was assessed against the established inclusion criteria to ensure its suitability for qualitative and quantitative synthesis. Following this rigorous screening process, only 5 articles met all the criteria and were deemed appropriate for inclusion in the systematic review. The stages and processes involved in the selection of articles are illustrated in Figure 1 below.

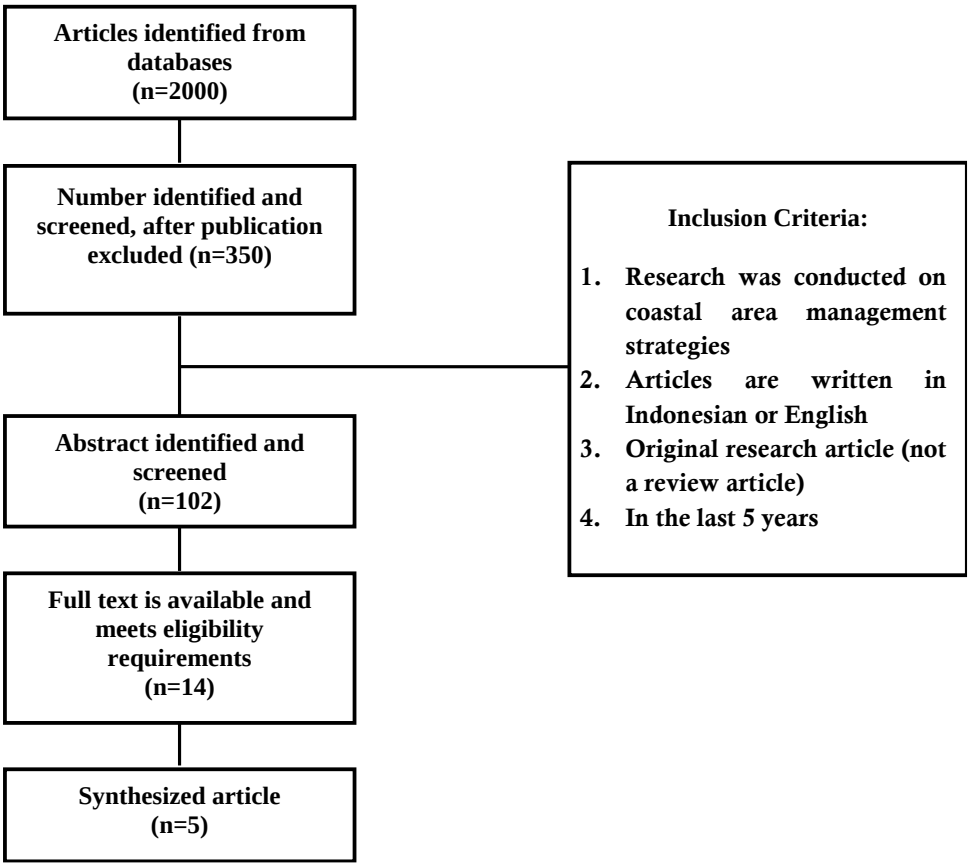

Figure 1. Article selection process

The five studies selected for systematic feasibility employed qualitative and descriptive methods. However, one study, titled Coastal Area Management Strategy at Banggi Market, Rembang Regency with the Analytical Hierarchy Process (AHP) Approach, utilized the Analytical Hierarchy Process (AHP) method. Despite the methodological difference, this study was included in the synthesis because its content aligns with the focus on coastal area management strategies, which is central to this research. A summary of the data extracted from these studies is presented in Table 1 below.

Table 1. Summary description of data from included studies

Title	Author/Year	Method	Results
Coastal Area Management Strategy in Kiluan Bay, Lampung	(Reza & Azkia, 2023)	The method used in this research is descriptive qualitative. Data collection using survey and interview techniques is complemented by questionnaires to facilitate in-depth and structured data searches. Data obtained from interviews with various parties involved in the management of coastal areas in Kiluan Bay were analyzed using SWOT analysis.	Based on the research results, the coastal area management strategy in Kiluan Bay is to evaluate the use of zones and their needs, involve the community directly in coastal area management, carry out outreach and implementation related to the application of utilization zones to the Kiluan Bay community, develop sustainable marine tourism, carry out synergies between stakeholders and the community, and providing outreach on the importance of preserving nature in coastal areas to the community and tourists.

Title	Author/Year	Method	Results
Typology-Based Coastal Area Development and Management Strategy in the Coastal Area of Gunungkidul Regency, Yogyakarta	(Suryani, 2020)	This research uses a descriptive method. Data collection was carried out in the coastal area of Gunungkidul Regency. Determining sample points uses a purposive sampling technique, namely to determine the characteristics of coastal areas. The equipment used in this research is a digital camera, GPS, stationery, voice recorder, anemomater, and TDS meter. Primary data was obtained by observation/survey, documentation and interviews. Meanwhile, secondary data was obtained by means of literature study and document review.	In order to improve management in coastal areas, a comprehensive effort is needed between the community, government, stakeholders based on multidiscipline, multisector and multitemporal. Handling this problem should also collaborate with upstream areas which also have a direct impact on downstream areas, namely coastal areas. It is hoped that the people in the Gunung Kidul area will participate in protecting the regional environment in order to create a balanced ecosystem in their respective regions.
Coastal Area Management Strategy for Kuala Jelai District, Sukamara Regency Based on Integrated Coastal Zone Management (ICZM)	(Susanto, 2019)	The data used in this research are primary data and secondary data. Primary data is data obtained from interviews with the public through questionnaires and observations through field surveys and documentation regarding the objects studied as needed. Data obtained from interviews is in the form of a questionnaire developed based on the Analysis Hierarchy Process (AHP).	Coastal area management policies based on Integrated Coastal Zone Management (ICZM) in Kuala Jelai District must be carried out with co-management involving elements at the government level (government based management), local communities (community based development) and other stakeholders.
Sarmi Regency Coastal Area Management Strategy in Tsunami Mitigation Efforts	(Pamuji *et al*., 2023)	The method used in this research is the AHP (Analytical Hierarchial Process) is a multi-criteria decision making method.	Coastal management to mitigate the tsunami disaster in Sarmi District must pay attention to environmental, social and economic aspects, by using a strategy of planting mangrove forests as a natural barrier for sea waves reaching the coast. Alternative strategies include forming a disaster response community, building signs and vertical evacuation areas, strengthening the early warning system and building breakwater embankments.
Coastal Area Management Strategy in Banggi Market, Rembang Regency using the Analytical Hierarchy Process (AHP) Approach	(Wibowo *et al*., 2022)	To determine coastal management priorities, the Analytical Hierarchy Process (AHP) will be used. AHP is a prioritization method that can be applied to problems by describing them in a hierarchical structure.	Based on the results and discussion, it can be concluded that the most important aspect in coastal area management is the Ecological (Environmental) Aspect by paying attention to mangrove ecosystems, coral reefs and fish resources. This shows that in every planning for the development of coastal areas in Banggi Market, Rembang Regency, environmental aspects must be taken into account. Overall, the priority scale in managing coastal areas in Pasarbanggi Village, Rembang Regency is the development of Silvofishery, Ecotourism and Artisanal Fisheries.

Law Number 1/2014, which amends Law Number 27/2007 on the Management of Coastal Areas and Small Islands, outlines essential processes for managing these regions.

The framework includes planning, utilization, supervision, and control activities, all aimed at fostering sustainable interactions between human activities and natural processes. The overarching objective is to improve community welfare while preserving the integrity of the Unitary State of the Republic of Indonesia (Waluyo, 2014).

Planning Stage

The general provisions of Law Number 27/2007 emphasize that coastal and small island management should adopt an Integrated Coastal Zone Management (ICZM) approach. This methodology promotes coordination across various sectoral plans while ensuring the alignment of responsibilities between central and local governments. This harmonization strengthens resource utilization and fosters sustainable practices (Subagiyo et al., 2017). The initial phase of planning involves identifying and analyzing existing challenges, such as natural resource degradation, land-use conflicts, and pollution. Understanding the underlying causes and sources of these issues is crucial. Planners also evaluate the area's natural resource potential, carrying capacity, current usage, and socio-economic conditions. This comprehensive analysis helps minimize conflicts, prevent harm to communities, and address the needs of future generations (Handayani et al., 2022).

Strategic plans for managing coastal and small island resources must include infrastructure development tailored to local needs. For example, maritime development should integrate community empowerment, recognizing that coastal communities possess invaluable knowledge about their environments. Participatory planning approaches—such as involving local communities in marine tourism projects—are essential. These approaches facilitate knowledge sharing, enhance community potential, and place empowerment at the core of development initiatives. Efforts should also include traditional law communities living in coastal regions (Ikbal et al., 2021).

Utilization Stage

The utilization of coastal areas focuses on activities such as conservation, education and training, mariculture, tourism, fisheries, organic farming, and national defense. Conservation initiatives must adhere to environmental management standards, employ sustainable water systems, and leverage eco-friendly technologies. Research, education, and training are pivotal in supporting environmental sustainability (Khairi, 2020). Coastal utilization can be categorized into direct and indirect use: 1) Direct utilization involves activities that rely directly on specific coastal areas, such as fishing or tourism; and 2) Indirect utilization supports primary activities, including research facilities and logistical operations. Community rights and responsibilities in coastal area management are clearly defined in Article 60, Paragraph 1 of Law Number 1/2014, which outlines the roles of communities in managing these regions (Katiandagho, 2020).

Supervision and Control Stage

The supervision and control stage ensures that coastal management adheres to sustainable and integrated principles. These activities are conducted by authorized civil

servants tasked with overseeing coastal area management. Civil servants are responsible for patrolling their assigned jurisdictions, investigating reports of ecosystem damage, and monitoring conservation zones, public use areas, and national strategic regions (Sarahwati et al., 2019).

CONCLUSIONS

The management of coastal areas encompasses several core processes: planning, utilization, supervision, and control. These processes are designed to regulate human interactions with coastal and small island resources while promoting sustainability. By aligning management efforts with natural processes, the overarching goal is to enhance community welfare and safeguard the integrity of the state. Effective coastal management necessitates an integrated approach that balances environmental conservation, economic development, and community empowerment. Planning should focus on addressing environmental challenges and mitigating potential conflicts. Utilization must prioritize sustainable practices while fostering active community participation. Additionally, consistent supervision and control are critical to ensuring compliance with regulations and protecting fragile coastal ecosystems. In conclusion, the successful management of coastal areas requires a collaborative effort involving government authorities, local communities, and other stakeholders. By prioritizing sustainability and aligning management practices with long-term development objectives, coastal and small island resources can be utilized effectively to support both national growth and environmental preservation.

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