**International Journal of Applied and Scientific Research (IJASR)**
Vol. 4, No. 3, 2026: 121-140

# Integrative Model of Coastal Management Based on the Blue Economy: Integration of Mangrove Conservation, Fisheries Ports, and Coastal Tourism in Purworejo

M. Nur Kamila Amrullah[1*], Sapardiyono[2], Dian Mardiati Sari[3]
Sekolah Tinggi Pertanahan Nasional
**Corresponding Author:** M. Nur Kamila Amrullah; amru@stpn.ac.id

A R T I C L E I N F O

Keywords: *Blue Economy, Mangrove Conservation, Coastal Management, Socio Ecological Systems, Community Based Governance*

*Received : 5 January*
*Revised : 23 February*
*Accepted: 23 March*



A B S T R A C T

Mangrove ecosystems play a vital role in maintaining ecological stability and sustaining coastal livelihoods, particularly in areas where communities depend heavily on natural resources. However, increasing pressures from land conversion, resource exploitation, and fragmented governance threaten their sustainability. This study examines the integration of mangrove conservation and the blue economy within coastal management in Purwodadi Subdistrict, Indonesia. This research adopts a qualitative case study approach, using in depth interviews, field observations, and document analysis. Data were analyzed through thematic analysis, supported by triangulation to enhance validity and reliability. The findings reveal that mangroves in Purwodadi provide essential ecological functions, including coastal protection, disaster risk reduction, and habitat provision for marine species. Economically, they support fisheries, small scale aquaculture, and emerging ecotourism initiatives. Community based practices demonstrate an increasing integration of conservation and economic utilization, reflecting a socio ecological governance approach. From a governance perspective, effective mangrove management requires integrating blue economy principles with strategic coastal management and agrarian–coastal governance. Strengthening institutional collaboration, community participation, and cross sectoral policy integration is crucial to achieving sustainable coastal development while preserving mangrove ecosystems

DOI: https://doi.org/10.59890/ijasr.v4i3.207
E-ISSN : 3025-7670
https://nvlmultitechpublisher.my.id/index.php/ijasr/index

## INTRODUCTION

Coastal areas represent strategic spaces with significant ecological, social, and economic functions that are essential for sustainable development. Over the past two decades, the concept of the blue economy has emerged as a development approach that emphasizes the sustainable utilization of marine resources while maintaining the integrity of coastal and marine ecosystems. This approach not only prioritizes economic growth but also promotes a balance between environmental conservation, community welfare, and sustainable resource governance (Sahu & Doppalapudi, 2025; Ali & Sulistiyono, 2025; Bennett, 2022; FAO, 2022). In the context of an archipelagic country such as Indonesia, the blue economy has become a crucial strategy for managing coastal resources that offer substantial livelihood potential while remaining highly vulnerable to environmental degradation (Bappenas, 2021; Cohen et al., 2024).

One of the key coastal ecosystems supporting the blue economy is the mangrove forest. Mangroves provide essential ecological functions, including natural protection against coastal erosion and seawater intrusion, as well as serving as critical habitats for diverse marine species. Beyond their ecological roles, mangroves also generate economic benefits through fisheries, ecotourism, and the utilization of non timber forest products that support coastal livelihoods (Barbier et al., 2024; Alongi, 2020; Kumar et al., 2025). Empirical studies demonstrate that mangroves significantly contribute to the economic resilience of coastal communities by supplying fishery resources, mitigating coastal hazards, and creating opportunities for ecosystem based economic activities (Mhatre, 2024).

Despite their importance, mangrove ecosystems in many coastal regions face increasing pressures from land conversion, resource exploitation, and fragmented coastal management. The conversion of mangroves into aquaculture ponds, settlements, and coastal infrastructure has led to a substantial decline in mangrove coverage across Indonesia (Chinemerem & Osazuwa, 2025; Malik et al., 2023; Kumar et al., 2025). Moreover, sectoral coastal management policies often overlook the interconnections between ecological and economic dimensions, resulting in conservation efforts that are not fully integrated with broader coastal economic development strategies (Bennett et al., 2022).

Within the context of coastal management, integrating ecosystem conservation with economic development has become an urgent necessity to ensure the sustainability of coastal resources. The socio ecological systems approach highlights that the sustainability of coastal ecosystems depends on dynamic interactions between ecological systems and social systems, including local communities, institutions, and governance frameworks (Ostrom, 2009). Therefore, mangrove conservation cannot be separated from the socio economic dynamics of coastal communities that depend on these resources for their livelihoods (Trimedianto et al., 2024).

A number of studies have examined mangrove conservation and the implementation of the blue economy as separate domains. However, research that specifically analyzes the integration of mangrove conservation and blue economy development within a comprehensive coastal management framework

remains limited, particularly at the local level. Existing studies tend to focus either on ecological aspects of mangroves or on coastal economic development without explicitly linking these dimensions within an integrated management framework (Cohen et al., 2024; Voyer et al., 2018). This indicates a research gap in understanding how mangrove ecosystem conservation can be effectively integrated with coastal resource based economic development strategies.

Based on this background, this study aims to analyze the integration of mangrove conservation within a blue economy framework for coastal area management. Specifically, the study examines the current condition of mangrove ecosystems, the potential for mangrove based economic development, and the dynamics of coastal resource management involving local communities. By focusing on a case study in the coastal area of Purwodadi Subdistrict, this research is expected to contribute to the development of a socio ecological system based mangrove management model that integrates ecosystem conservation with the improvement of coastal community welfare.

From a management perspective, coastal area management extends beyond ecosystem protection and economic utilization, encompassing integrated processes of planning, organizing, implementation, and control across sectors and stakeholders. Therefore, the integration of mangrove conservation and the blue economy in this study is positioned as part of an integrated coastal management practice that emphasizes cross sectoral coordination, community participation, and sustainability in managing coastal resources.

## LITERATURE REVIEW

### *Blue Economy as a Framework for Sustainable Coastal Development*

The concept of the blue economy has emerged as a development paradigm oriented toward the sustainability of coastal and marine areas through efficient, adaptive, and equitable resource utilization. Unlike conventional economic approaches, which tend to be exploitative, the blue economy emphasizes a balance between economic growth, environmental conservation, and social welfare (Midlen, 2025; Gul et al., 2024; FAO, 2022). In this context, marine resources are no longer viewed merely as economic commodities, but as integral components of ecological systems whose sustainability must be preserved.

Conceptually, the blue economy intersects with sustainable development theory, which emphasizes the integration of economic, social, and environmental dimensions. It also aligns with the social ecological systems framework proposed by Elinor Ostrom, which highlights that the sustainability of resource management depends on adaptive interactions between humans and ecosystems (Ostrom, 2009). In coastal areas, these interactions are particularly complex due to the involvement of multiple stakeholders, competing interests, and dynamic environmental conditions.

In practice, the implementation of the blue economy in Indonesia still faces several structural challenges. Makino et al.(2020) indicate that coastal resource management remains largely sectoral and insufficiently integrated. Similarly, Wulandari et al. (2025) emphasize limited community participation and the dominance of top down approaches in marine governance. In contrast, Azzumar

et al.(2024) demonstrate that integrating fisheries, tourism, and conservation sectors can significantly enhance the economic resilience of coastal households.

Despite growing recognition of the importance of integrative approaches, most studies remain sector specific, focusing on either fisheries or tourism without comprehensively addressing cross sectoral synergies. This research gap highlights the need for integrative models that simultaneously connect conservation, economic, and institutional dimensions, particularly in local coastal contexts such as the southern coast of Java.

***Mangrove Conservation within Coastal Livelihood Systems***

Mangrove ecosystems play a strategic role in sustaining coastal areas from both ecological and economic perspectives. Ecologically, mangroves function as natural barriers against coastal erosion, reduce wave energy, sequester carbon, and provide critical habitats for marine biodiversity (Alongi, 2020). These ecological functions are closely linked to the sustainability of coastal economic activities, particularly fisheries and aquaculture.

However, mangrove ecosystems are increasingly under pressure due to land use conversion, aquaculture expansion, and coastal infrastructure development. Data from the Ministry of Environment and Forestry (2021) indicate significant degradation of mangrove areas in Indonesia. This degradation has not only ecological consequences but also socio-economic impacts, such as declining fishery yields and increased vulnerability to coastal hazards.

From a theoretical perspective, mangrove conservation can be understood through the livelihood system approach and community based resource management, both of which emphasize the role of local communities in resource governance. Aipassa et al. (2020) show that active community participation is a key factor in successful and sustainable mangrove conservation. This is further supported by Nicha and Zulkarnaini (2025), who demonstrate that integrating conservation with ecotourism can increase community income while maintaining ecosystem sustainability.

Additionally, Lukum et al. (2025) highlight that mangrove based economic diversification, such as crab cultivation and the processing of mangrove derived products, can enhance household economic resilience. These findings suggest that conservation should not be perceived as a constraint on economic development, but rather as a productive strategy capable of generating added value.

Nevertheless, most studies on mangrove conservation remain limited to ecological aspects or community participation in isolation, without integrating these elements into broader economic systems within the blue economy framework. This gap underscores the need for a more comprehensive approach that links mangrove conservation with the development of other economic sectors, such as fisheries and tourism.

***Coastal Tourism and Fisheries Ports as Drivers of Local Economic Development***

Coastal areas hold significant potential as centers of economic growth through the development of tourism and fisheries sectors. Within the blue economy framework, these sectors are considered strategic instruments for

promoting economic diversification, increasing income, and strengthening the social resilience of coastal communities.

Empirical studies demonstrate that integrating fisheries and tourism sectors can create broader economic value chains. Lestari and Nugroho (2020) show that tourism based on fishing activities can enhance community income while expanding employment opportunities. Similarly, Mrčelić et al (2024) emphasize that fisheries ports serve as strategic economic hubs, not only for fish landing but also for processing, marketing, and educational tourism.

From the perspective of local economic development theory, the advancement of these sectors should be grounded in local potential and community participation. This approach highlights the importance of strengthening local institutions, improving market access, and fostering innovation based on local resources as key factors for successful coastal economic development.

However, the development of coastal tourism and fisheries ports continues to face several challenges, including limited infrastructure, weak cross sectoral coordination, and the lack of integration of conservation considerations in development planning (Chemirbayeva, 2020). These challenges indicate that sectoral approaches may lead to environmental degradation and socio economic inequality.

The existing research gap lies in the limited number of studies that simultaneously integrate coastal tourism development, fisheries port optimization, and ecosystem conservation within a unified management model. Most studies focus only on the interaction between two sectors, without fully exploring the synergies among all three.

***Integrated Coastal Management Approach***

Integrated Coastal Management (ICM), also known as Integrated Coastal Zone Management (ICZM), is an approach that emphasizes cross sectoral integration, institutional coordination, and stakeholder participation in the sustainable management of coastal resources. This approach emerged in response to the complexity of coastal issues involving interactions between ecological systems, economic activities, and social dynamics (Landman, 2023). Coastal areas are therefore viewed not as fragmented spaces defined by sectoral boundaries, but as interconnected systems requiring holistic management.

Conceptually, integrated coastal management is built upon three main principles: cross sectoral integration, ecosystem based approaches, and collaborative governance. Cross sectoral integration is essential to address policy fragmentation among fisheries, tourism, conservation, and infrastructure development (Botah, 2023). Without such integration, coastal management tends to be partial and may lead to spatial conflicts and environmental degradation. Therefore, coordination among government institutions and non government actors is crucial.

Furthermore, integrated coastal management aligns with the socio ecological systems perspective, which views coastal areas as complex and adaptive systems. In this framework, sustainability is determined not only by ecological conditions but also by institutional capacity, community participation,

and inclusive decision making processes (Ostrom, 2009; Bornemann, 2021). Consequently, coastal management requires a systems based approach that integrates ecological, social, economic, and institutional dimensions simultaneously.

The concept is also closely linked to adaptive management, which emphasizes the ability of governance systems to respond flexibly to environmental and social changes (Folke et al., 2021). In the context of climate change and increasing pressure on coastal resources, this approach is particularly relevant for enhancing both ecosystem and community resilience. Studies show that successful coastal management depends on effective cross sector coordination, strong community participation, and coherent policy integration (Landman, 2023; Botah, 2023).

Thus, integrated coastal management serves not only as a conceptual framework but also as an operational approach for sustainable coastal resource management. In this study, it provides the foundation for analyzing how the integration of mangrove conservation and the blue economy can be implemented through institutional coordination, community participation, and adaptive resource governance.

## METHODOLOGY

This study employs a qualitative approach with a case study design to examine the integration of mangrove conservation and the blue economy in coastal area management. A qualitative approach is appropriate as the study aims to understand the complex interactions among ecological systems, community livelihoods, and local governance in coastal areas (Creswell & Poth, 2018). Through this approach, the researcher is able to explore social realities, local knowledge, and community perspectives that influence natural resource management and environmental conservation practices (Denzin & Lincoln, 2018; Flick, 2018). The case study design enables an in depth analysis of contemporary phenomena within real life contexts, particularly when ecological, economic, and institutional factors are closely interconnected (Salsabila et al., 2025).

The research was conducted in the coastal area of Purwodadi Subdistrict, located along the southern coast of Java Island, Indonesia. This site was purposively selected due to the presence of mangrove ecosystems that play a critical role in coastal protection and support local livelihoods (Alongi, 2020). Coastal communities in this area are highly dependent on marine and coastal resources, including fisheries, aquaculture, and mangrove based economic activities (Kumar et al., 2025). At the same time, the coastal zone faces increasing ecological pressures, such as coastal erosion and land use changes (Bhowmik et al., 2022), as well as intensified economic utilization of coastal resources (Mhatre, 2024). These conditions make the study area particularly relevant for examining the relationship between mangrove conservation and economic activities within a sustainable coastal management framework.

Data were collected through three primary techniques: in depth interviews, field observations, and document analysis. The use of multiple data sources aims to provide comprehensive insights into ecological conditions, community activities, and institutional arrangements in mangrove management

(Creswell & Poth, 2018). In depth interviews were conducted with key informants who possess relevant knowledge and experience in coastal resource management and mangrove utilization (Sudrajat et al., 2023). Informants included local community members, fishers, community leaders, and stakeholders involved in coastal management activities. A semi structured interview guide was used to facilitate discussions while allowing participants to express their experiences, perceptions, and knowledge openly (Barrick, 2020).

Field observations were conducted to directly assess the physical condition of mangrove ecosystems and related socio economic activities in the study area (Borg, 2025). Observations focused on the condition and distribution of mangrove vegetation, coastal environmental characteristics, and community activities associated with mangrove resource utilization, such as fisheries, small scale aquaculture, and ecotourism initiatives. Through direct observation, the researcher obtained contextual insights into the interactions between human activities and ecological conditions in the coastal environment (Flick, 2018), thereby complementing the data obtained from interviews (Creswell & Poth, 2018).

In addition, document analysis was carried out to support the primary data obtained from interviews and observations. The documents analyzed included government reports, regional development plans, policy documents, and previous studies related to coastal management and mangrove conservation (Chand, 2025). This analysis provided contextual information on policy frameworks, the historical development of coastal resource management, and institutional arrangements influencing mangrove ecosystems and coastal economic activities (Salsabila et al., 2025; Creswell & Poth, 2018).

The collected data were analyzed using thematic analysis to identify patterns and key themes related to mangrove conservation and blue economy practices in the study area (Kamakaula et al., 2025). The analysis process involved several stages, including data familiarization, coding, identification of recurring themes, and interpretation of the relationships between ecological and socio economic dimensions in coastal resource management (Guest et al., 2012). Thematic analysis enables systematic interpretation of qualitative data and facilitates the identification of meaningful patterns emerging from multiple data sources (Sandhiya & Bhuvaneswari, 2024).

To enhance the credibility and validity of the findings, source triangulation was applied by comparing information obtained from different data sources (Denzin & Lincoln, 2018). Data from interviews, field observations, and documents were cross checked to ensure consistency and to identify converging evidence related to mangrove management and community economic activities. Triangulation is a widely recognized strategy in qualitative research for strengthening the trustworthiness of findings and minimizing potential bias in data interpretation (Sudrajat et al., 2023; Flick, 2018).

## RESULTS

### *Distribution and Condition of Mangrove Ecosystems in Purwodadi Subdistrict*

The coastal area of Purwodadi Subdistrict exhibits diverse mangrove ecosystem characteristics in terms of spatial extent, vegetation density, and patterns of utilization by coastal communities. Based on field observations and research documentation, mangroves are distributed across several coastal villages, including Gedangan, Jogoboyo, Karanganyar, Jatikontal, and Jatimalang, each with varying ecological conditions. The presence of mangroves in these areas functions not only as a component of the coastal ecosystem but also as an integral part of local livelihood systems that depend on coastal resources.

Previous studies indicate that mangroves are among the most productive coastal ecosystems globally, providing habitat for various marine species and playing a crucial role in maintaining shoreline stability (Kumar et al., 2025). Furthermore, mangrove ecosystems have a high capacity for carbon storage, making them an important component of global climate change mitigation strategies (Carong et al., 2024). Other studies highlight that the sustainability of mangrove ecosystems is strongly influenced by integrated coastal governance linking ecological and socio-economic dimensions (Cuenca, 2020; Bunting, 2022; FAO, 2022).

The distribution of mangrove areas in Purwodadi Subdistrict shows significant variation among villages. Based on field data, the largest mangrove area is located in Gedangan Village, while other villages have relatively smaller coverage. This variation reflects differences in coastal management dynamics and land use pressures across villages.

Table 1. Distribution of Mangrove Ecosystems in Purwodadi Subdistrict

| No | Village | Mangrove Area (Ha) | Ecological Characteristics | Dominant Function |
|---|---|---|---|---|
| 1 | Gedangan | 15.6 | Well developed mangroves, partly utilized for tourism | Conservation and ecotourism |
| 2 | Jogoboyo | 8.2 | Inland coastal mangroves, not directly adjacent to the sea | Coastal wind barrier |
| 3 | Karanganyar | 5.4 | Limited mangrove vegetation | Protection of agriculture |
| 4 | Jatikontal | 6.1 | Insufficient for tourism development | Ecological function |
| 5 | Jatimalang | 4.7 | Relatively narrow mangrove area | Coastal wind barrier |

As shown in Table 1, Gedangan Village has the largest mangrove area (approximately 15.6 hectares), part of which has been developed into a community based mangrove tourism area. This relatively extensive mangrove coverage provides opportunities for ecotourism based economic development while strengthening the ecological function of the coastal zone. In contrast,

villages such as Karanganyar and Jatimalang have relatively small mangrove areas, where ecological functions are more dominant, particularly as protection against coastal winds and erosion. These differences indicate that mangrove distribution is influenced not only by ecological factors but also by land management policies and local economic activities (Kumar et al., 2025; Bunting, 2022; Mhatre, 2024; Cuenca, 2020; Carong et al., 2024).

***Ecological Functions of Mangroves in Coastal Protection***

Mangrove ecosystems in Purwodadi Subdistrict play a critical ecological role in maintaining coastal stability, particularly in protecting settlements and agricultural land from coastal winds, shoreline erosion, and environmental changes. The complex root structures of mangroves trap sediments and reduce wave energy, thereby functioning as natural coastal barriers. Demonstrate that mangrove forests can significantly reduce wave height before reaching the shoreline (Wei et al., 2025). In addition, Shokatian-Beiragh et al. (2024) show that mangroves reduce the risk of damage caused by tropical storms and coastal flooding. In the context of climate change, mangroves are increasingly recognized as part of ecosystem based adaptation strategies that enhance coastal resilience (Cuenca, 2020; Kumar et al., 2025; Carong et al., 2024).

In Jogoboyo Village, mangroves primarily function as coastal wind barriers protecting settlements and agricultural land. Their inland coastal location allows them to act as buffer zones between farmland and the sea. Meanwhile, in Karanganyar and Jatikontal Villages, mangroves contribute to soil stabilization and reduce erosion risks that may damage infrastructure and productive land. Research by Mhatre (2024) indicates that mangroves also serve as important habitats for fish and marine organisms, functioning as spawning and nursery grounds. This demonstrates that mangrove ecological functions extend beyond physical protection to sustaining fisheries resources that support coastal livelihoods (Mhatre, 2024; Kumar et al., 2025; Bunting, 2022; Cuenca, 2020).

In addition to coastal protection, mangroves play a vital role in the global carbon cycle. Mangrove ecosystems are among the most effective carbon sinks in coastal environments. Carong et al. (2024) show that mangroves store significant amounts of carbon in biomass and soil sediments. This capability positions mangroves as part of blue carbon ecosystems that contribute to climate change mitigation. Therefore, integrating mangrove conservation with climate mitigation policies is increasingly important to sustain coastal ecosystems and enhance community resilience (Kumar et al., 2025; Cuenca, 2020; FAO, 2022; Bunting, 2022).

***Mangrove Utilization by Coastal Communities***

In addition to their ecological benefits, mangroves in Purwodadi Subdistrict are utilized by local communities as part of their livelihood systems. Economic activities such as capture fisheries, aquaculture, and coastal tourism have developed around mangrove areas. This utilization reflects a strong interconnection between mangrove ecosystem conditions and local economic activities. Indicate that community based mangrove management can generate economic benefits while strengthening conservation efforts (Hartuti & Uday,

2025). In many coastal regions worldwide, mangrove ecotourism has emerged as a strategy to improve community welfare without degrading ecosystems (Kumar et al., 2025; Carong et al., 2024; FAO, 2022; Mhatre, 2024).

Table 2. Ecological Functions and Community Utilization of Mangroves

| Village | Ecological Condition | Main Function | Community Utilization | Local Regulations |
|---|---|---|---|---|
| Jogoboyo | Inland coastal mangroves | Coastal wind barrier | Settlement and agricultural protection | Linked to Jangkaran ecosystem |
| Gedangan | Rehabilitated mangroves | Wind mitigation | Mangrove ecotourism | Ban on mangrove cutting |
| Karanganyar | Limited mangroves | Land protection | No tourism utilization | Ecological function |
| Jatikontal | Insufficient vegetation | Coastal wind barrier | Not yet economically utilized | Natural protection |
| Jatimalang | Limited vegetation | Coastal wind barrier | Coastal protection | Ecological function |

As shown in Table 2, Gedangan Village is the only village actively utilizing mangroves for community based tourism. This initiative is supported by local institutions such as tourism awareness groups and village owned enterprises. This model demonstrates that mangroves can function not only as conservation ecosystems but also as alternative economic resources. Bunting (2022) emphasize that local community involvement enhances conservation effectiveness while generating economic benefits. This approach aligns with the blue economy concept, which promotes sustainable resource use to support community welfare (Voyer et al., 2018; Kumar et al., 2025; Cuenca, 2020; Carong et al., 2024).

***Mangrove Based Coastal Economic Development***

Coastal economic development in Purwodadi Subdistrict is not limited to direct mangrove utilization but also includes coastal tourism activities in several villages. Beaches such as Dewaruci Beach in Jatimalang Village and Mutiara Biru Beach in Jatikontal Village play an important role in local economic dynamics, with communities actively participating in tourism activities. These activities generate economic opportunities through small scale businesses such as food stalls, equipment rentals, and parking services.

Basurto Intriago et al. (2025) demonstrate that integrating ecosystem conservation with nature based tourism can enhance local economic sustainability. Furthermore, the blue economy approach emphasizes environmentally friendly and community based tourism development (Voyer et al., 2018; Kumar et al., 2025; Cuenca, 2020; Mhatre, 2024).

Table 3. Coastal Tourism Based Economic Activities

| Village | Tourism Type | Management Model | Economic Contribution | Community Participation | Post-COVID Condition |
|---|---|---|---|---|---|
| Jatimalang | Dewaruci Beach | Government + community | ± IDR 5 million/year | ±20 people | Declining |
| Jatikontal | Mutiara Biru Beach | Community based | No formal revenue | 15–20 people | Discontinued |
| Gedangan | Mangrove tourism | Community + village enterprise | Initial capital IDR 150 million | ±30 people | Declining |
| Jogoboyo | Tourism access | Community | Indirect | Limited | Stagnant |

Table 3 shows that the economic contribution of coastal tourism varies across villages. Gedangan Village has strong potential for mangrove based ecotourism, while Jatimalang and Jatikontal rely more on beach tourism. However, the COVID-19 pandemic has significantly reduced tourism activities, affecting community income. This highlights the importance of economic diversification to enhance resilience. Kumar et al. (2020) emphasize that sustainable coastal economies require integration between ecosystem conservation and environmentally friendly economic activities.

Steps of Your result test here

In this section, you must provide us with each step taken to accomplish your studies. You must not put too much the result of descriptive statistics here; on the other hand, it should be summarized in an easier to read table or graphs. You must not forget the numbers for every table and chart presented in your paper.

## DISCUSSION

### *Integrating Mangrove Conservation within a Blue Economy Governance Framework*

The findings indicate that mangrove management in the coastal area of Purwodadi Subdistrict reflects a dynamic tension between ecosystem conservation needs and the economic interests of coastal communities. This condition is characteristic of coastal management in many developing countries, where coastal resources often become contested spaces between economic activities and environmental protection. From a blue economy governance perspective, coastal resource utilization should be directed toward development models that not only pursue economic growth but also ensure the sustainability of marine ecosystems and the welfare of coastal communities. The blue economy emphasizes that marine resource use must be efficient, sustainable, and grounded in ecological principles to generate economic benefits without degrading coastal ecosystems (Voyer et al., 2018). In this context, mangroves are

not only ecological resources but also economic assets that support tourism, fisheries, and coastal ecosystem services (Basurto Intriago et al., 2025; Kumar et al., 2025; Carong et al., 2024; Mhatre, 2024; FAO, 2022).

Empirical evidence from Gedangan Village demonstrates that community based mangrove tourism represents a practical application of blue economy principles in coastal management. Mangrove ecotourism provides economic opportunities for local communities while simultaneously promoting conservation through increased environmental awareness. This approach supports the argument that the blue economy should integrate economic activities with marine conservation to generate long term benefits for coastal communities (Voyer et al., 2018). Basurto Intriago et al. (2025) show that mangrove ecotourism enhances the economic value of coastal ecosystems while strengthening environmental protection. Similarly, Kumar et al. (2020) emphasize that integrating mangrove conservation with local economic development is an effective strategy for achieving sustainable coastal development. Thus, the mangrove management model in Purwodadi illustrates how a combination of ecosystem conservation and community based economic development can operationalize the blue economy framework.

However, the implementation of the blue economy at the local level faces several challenges, particularly related to institutional capacity, limited resources, and weak cross sectoral coordination. Coastal development policies often remain sectoral, leading to conflicts between fisheries, tourism, and environmental conservation interests. Voyer et al. (2018) argue that successful implementation of the blue economy depends on governance systems capable of integrating diverse interests within a coherent policy framework. Therefore, strengthening collaborative coastal governance is essential for ensuring sustainable mangrove management. This requires coordination among local governments, coastal communities, and other stakeholders to develop inclusive and sustainable coastal resource management policies (Basurto Intriago et al., 2025; *Cuenca*, 2020; Bunting, 2022; FAO, 2022).

***Mangroves as a Socio Ecological System in Coastal Management***

Mangrove ecosystems in coastal areas should not be understood solely as ecological systems but also as socio ecological systems that reflect interactions between humans and the environment. The socio ecological systems framework emphasizes that the sustainability of natural resource management depends on the capacity of communities and institutions to manage the relationship between human activities and ecosystem dynamics. Within this framework, natural resources are viewed as components of complex and adaptive systems involving multiple actors, institutions, and ecological processes (Ostrom, 2017). Therefore, mangrove management requires approaches that go beyond ecosystem protection to include strengthening social and institutional capacities within coastal communities (Bornemann, 2021; Folke et al., 2021; Basurto Intriago et al., 2025; Cuenca, 2020; Carong et al., 2024).

The findings from Purwodadi Subdistrict show that coastal communities maintain close relationships with mangrove ecosystems as part of their livelihood systems. Activities such as mud crab harvesting, traditional fisheries,

and mangrove tourism indicate that mangroves function as both economic resources and social spaces. Bornemann (2017) highlights that local communities often possess traditional ecological knowledge that plays a crucial role in sustaining natural resources. This knowledge supports adaptive management practices in response to environmental changes. In Purwodadi, local regulations—such as the prohibition of mangrove cutting in Gedangan Village—demonstrate community based governance mechanisms that contribute to ecosystem sustainability (Folke et al., 2021; Basurto Intriago et al., 2025; Mhatre, 2024; Bunting, 2022; Cuenca, 2020).

The socio ecological systems approach also emphasizes the importance of ecosystem resilience in responding to environmental pressures such as climate change, habitat degradation, and economic stress. Mangroves exhibit high adaptive capacity, for instance through sediment accumulation and root growth that can adjust to sea level rise. However, this capacity depends on stable ecosystem conditions and minimal habitat fragmentation. Cuenca (2020) demonstrate that fragmented mangrove ecosystems have lower adaptive capacity to climate change. Therefore, maintaining the integrity of mangrove ecosystems is essential for sustaining both their ecological and economic functions (Kumar et al., 2025; Carong et al., 2024; Bunting, 2022; Basurto Intriago et al., 2025; FAO, 2022).

***Coastal Management from a Strategic Coastal Management Perspective***

Effective coastal management requires a strategic approach capable of integrating multiple development sectors operating within coastal areas. Strategic coastal management emphasizes integrated planning that considers ecological, social, economic, and institutional dimensions in managing coastal resources. This approach is rooted in the concept of Integrated Coastal Zone Management (ICZM), which aims to reduce spatial use conflicts through coordination across sectors and governance levels (Landman, 2023). In this context, mangroves are critical components of coastal management systems due to their ecological functions in maintaining coastal stability and supporting fisheries productivity (Mhatre, 2024; Kumar et al., 2025; Cuenca, 2020; Basurto Intriago et al., 2025).

The findings reveal that mangrove management in Purwodadi Subdistrict still faces challenges related to policy coordination and the integration of coastal planning. In several villages, such as Jogoboyo and Karanganyar, mangroves are primarily perceived as natural barriers against coastal winds and erosion, while their economic potential remains underutilized. This indicates that local coastal management is still largely reactive and not fully based on long term strategic planning. Landman (2023) argue that effective coastal management depends on cross sectoral policy integration and community participation in decision making processes. Therefore, strengthening a strategic coastal management framework is essential to enhance both the effectiveness of mangrove conservation and the utilization of its economic potential (Basurto Intriago et al., 2025; Cuenca, 2020; Bunting, 2022; FAO, 2022).

Strategic coastal management also emphasizes the importance of ecosystem based approaches in development planning. This approach integrates conservation and economic activities through sustainable spatial management. In the context of Purwodadi, integrating beach tourism, mangrove ecotourism, and traditional fisheries can serve as a sustainable strategy for coastal economic development. Basurto Intriago et al. (2025) demonstrate that ecosystem based management enhances both ecological sustainability and economic benefits for local communities. This approach is consistent with blue economy principles, which emphasize sustainable resource utilization within coastal development frameworks (Voyer et al., 2018; Kumar et al., 2025; Mhatre, 2024; Cuenca, 2020; Carong et al., 2024).

***Agrarian Coastal Resource Governance Dimension***

Coastal resource management is closely linked to agrarian governance dynamics. From an agrarian coastal resource governance perspective, coastal areas are viewed as socio ecological spaces shaped by issues of access, control, and resource utilization. This approach highlights how power relations, policies, and social practices influence the distribution of benefits derived from coastal resources. Studies in agrarian research indicate that resource conflicts are often associated with unequal access to land and coastal resources (Hall et al., 2017). Therefore, mangrove management must incorporate principles of social justice and ensure community participation in decision making processes (Li, 2018; Hall et al., 2017; Bornemann, 2021; Basurto Intriago et al., 2025; Cuenca, 2020).

In the context of Purwodadi, the use of mangroves reflects complex livelihood systems in which communities rely on these ecosystems not only for economic purposes but also for social and cultural functions. Li (2018) emphasizes that sustainable resource management requires recognition of local communities' rights to access and manage resources. This perspective underscores the importance of collaborative governance involving government institutions, communities, and the private sector (Bornemann, 2021; Hall et al., 2017; Basurto Intriago et al., 2025; Kumar et al., 2025; FAO, 2022).

The integration of agrarian and coastal management approaches is essential for sustainable coastal development. Coastal areas are often vulnerable to land use conflicts due to expanding development, tourism, and economic activities. Therefore, policies must balance economic development with environmental protection. Hall et al. (2017) demonstrate that inclusive governance can enhance environmental sustainability while improving community welfare. In Purwodadi, mangrove based economic development and coastal tourism offer pathways to strengthen equitable and sustainable coastal resource governance (Li, 2018; Bornemann, 2021; Basurto Intriago et al., 2025; Kumar et al., 2025; Cuenca, 2020).

## CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that mangrove ecosystems in the coastal area of Purwodadi Subdistrict play a strategic role in maintaining the balance between environmental sustainability and the economic well being of local communities. Mangroves function not only as natural coastal protection against erosion, seawater intrusion, and the impacts of climate change, but also as a key source of

livelihood for coastal communities through various resource based economic activities. In the context of sustainable coastal development, mangroves serve as a crucial component of a socio ecological system that integrates ecological, economic, and institutional dimensions.

The findings reveal that mangrove conditions in several coastal villages in Purwodadi remain under pressure due to land conversion, resource exploitation, and the lack of integrated governance. Nevertheless, local communities have initiated various adaptive practices that combine productive use with conservation, including mangrove ecotourism, the utilization of non timber mangrove products, and community based rehabilitation efforts. These findings suggest that mangrove conservation can be effectively aligned with local economic development when supported by adaptive and collaborative governance mechanisms.

From a blue economy governance perspective, integrating mangrove conservation with coastal economic development represents a relevant approach to promoting sustainable coastal development. This approach emphasizes that marine and coastal resource utilization should be efficient, inclusive, and environmentally sustainable. Within the socio ecological systems framework, the sustainability of mangrove management is shaped by the interaction between ecological conditions, community economic practices, and institutional capacity in collectively managing resources.

Furthermore, this study highlights that mangrove management in coastal areas is closely linked to broader agrarian and coastal resource governance dynamics. The control, utilization, and regulation of coastal space are integral to agrarian resource management, influencing both the distribution of economic benefits and environmental sustainability. Therefore, a strategic coastal management approach is essential to ensure that mangrove management not only focuses on ecological conservation but also addresses social equity and community welfare.

Based on these findings, several policy recommendations are proposed. First, local governments should promote the integration of mangrove conservation policies with coastal economic development strategies through a blue economy approach. This can be implemented by developing mangrove ecotourism, promoting mangrove based product processing, and supporting community based economic empowerment programs grounded in ecosystem sustainability.

Second, strengthening local institutions is critical to supporting community based mangrove management. The involvement of community groups, village governments, and local organizations should be enhanced through collaborative mechanisms that enable participatory coastal resource management. This approach aligns with the principles of common pool resource governance, emphasizing collective rules, social trust, and shared monitoring systems.

Third, it is necessary to strengthen the coastal governance framework by integrating environmental, economic, and agrarian dimensions into a coherent policy system. This is essential to avoid fragmented sectoral policies that often

undermine effective coastal resource management. With a more integrated approach, mangrove management in Purwodadi can serve as a model for sustainable and inclusive coastal governance.

Overall, this study confirms that integrating mangrove conservation and the blue economy holds significant potential for advancing sustainable coastal development. By strengthening coastal governance through socio ecological approaches and strategic management, mangroves can be preserved not only as vital ecosystems but also as long term sources of prosperity for coastal communities.

## FURTHER STUDY

This study is limited to a qualitative case study in a specific coastal area, which may restrict the generalizability of the findings. Future research is recommended to employ comparative studies across multiple regions and incorporate quantitative approaches to strengthen empirical evidence. Additionally, further investigations could explore the long term impacts of integrated mangrove management on economic resilience and ecological sustainability within different governance contexts.

## ACKNOWLEDGMENT

The authors express their sincere gratitude to colleagues and stakeholders who provided valuable insights and feedback during this study. Appreciation is also extended to all parties who supported this research, including Sekolah Tinggi Pertanahan Nasional that made this work possible.

## REFERENCES

Airawati, M. N., Fauzi, I., & Putranto, A. (2023). Potensi penerapan ekonomi biru dalam mendukung pariwisata berkelanjutan di wilayah pesisir Daerah Istimewa Yogyakarta. Buletin Ilmiah Marina Sosial Ekonomi Kelautan dan Perikanan, 18(1), 45–60. https://doi.org/10.15578/marina.v9i2.12723

Aipassa, M. I., Siahaya, M. E., Aponno, H. S. E. S., Ruslim, Y., & Kristiningrum, R. (2023). Participation of community in mangrove conservation in coastal area of the Valentine Strait, West Seram, Maluku, Indonesia. *Biodiversitas*, 24(4). https://doi.org/10.13057/biodiv/d240462

Ali, I., & Sulistiyono, S. T. (2025). From green economy to blue economy: A transformation of the 21st century global economy. International Journal for Multidisciplinary Research, 7(1). https://doi.org/10.36948/ijfmr.2025.v07i01.35237

Alongi, D. M. (2020). Carbon cycling in the world's mangrove ecosystems revisited. Forests, 11(9), 977. https://doi.org/10.3390/f11090977

Azzumar, M. A., Annamira, R. N., Syafiq, M., Sari, D. S., & Sulaeman, D. Y. (2024). Strategi Ekonomi Biru (Blue Economy) Indonesia dalam Menangani Overfishing di Perairan Indonesia [Indonesia's Blue Economy Strategy in Handling Overfishing in Indonesian Waters]. *Verity: Jurnal Ilmiah Hubungan International*, *16*(31), 52–62. https://doi.org/10.19166/verity.v16i31.8694

Bappenas. (2021). Pembangunan ekonomi biru Indonesia. Kementerian Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional.

Barbier, E. B., Hacker, S. D., Koch, E. W., Stier, A. C., & Silliman, B. R. (2024). Estuarine and coastal ecosystems and their services. In Treatise on estuarine and coastal science (pp. 14–34). Elsevier. https://doi.org/10.1016/b978-0-323-90798-9.00104-9

Barrick, L. (2020). *Interviews: In-Depth, Semistructured* (pp. 403–408). Elsevier. https://doi.org/10.1016/B978-0-08-102295-5.10832-7

Basurto Intriago, D. M., Velásquez-Gutiérrez, M. T., Segovia, M., Andrade Vera, S. A., Mendoza, L. R., & Bellettini Vela, G. (2025). Recreational tourism for sustainable development in Poza Honda Wildlife, Manabí, Ecuador. *Journal of Posthumanism*, *5*(9). https://doi.org/10.63332/joph.v5i9.3412

Bennett, N. J. (2022). Mainstreaming Equity and Justice in the Ocean. *Frontiers in Marine Science*, *9*. https://doi.org/10.3389/fmars.2022.873572

Bhowmik, A. K., Padmanaban, R., Cabral, P., & Romeiras, M. M. (2022). Global mangrove deforestation. *Sustainability*, 14(8), 4433. https://doi.org/10.3390/su14084433

Borg, C., Heine, C., & Risku, H. (2025). Observations and diaries. *In Research methods in applied linguistics* (pp. 108–132). https://doi.org/10.1075/rmal.10.05bor

Bornemann, B. (2021). *Environmental Governance in the Anthropocene: Challenges, Approaches and Critical Perspectives*. Palgrave Macmillan, Cham. (pp. 311–329). https://doi.org/10.1007/978-3-030-53014-3_17

Botah, K. Y. (2023). *Integration of Sectoral Policies: Potentials and Obstacles in a Complex and Interconnected World*. https://doi.org/10.58835/jspi.v3i3.210

Bunting, P. (2022). Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. *Remote Sensing*, 14(15), 3657. https://doi.org/10.3390/rs14153657

Carong, S. R., Anwar, A. K., Ahmed, Y. M., Arbit, N. I. S., Mannan, A., Rusmidin, R., Anwar, T., & Rimbawan, F. (2024). Carbon stock and biomass of Baluno Mangrove Forest ecosystems in West Sulawesi, Indonesia. *Biodiversitas*, *25*(9). https://doi.org/10.13057/biodiv/d250928

Chand, S. P. (2025). Methods of data collection in qualitative research. *Advances in Educational Research and Evaluation*, 6(1), 303–317. https://doi.org/10.25082/aere.2025.01.001

Chemirbayeva, M., Malgarayeva, Z., & Azamatova, A. (2020). Economic strategy of diversification of enterprise activities under conditions of globalization. *Entrepreneurship and Sustainability Issues*, 8(2), 1083–1102. https://doi.org/10.9770/JESI.2020.8.2(65)

Chinemerem, A. K., & Osazuwa, C. M. (2025). Mangrove Deforestation And Pollution: Impacts on Above-Ground Biomass and Ecosystem Health. *The American Journal of Social Science and Education*

*Innovations*, *7*(10), 1–22. https://doi.org/10.37547/tajssei/volume07issue10-01

Cohen, P. J., Allison, E. H., Andrew, N., Cinner, J. E., Evans, L., Fabinyi, M., Garces, L. R., Hall, S. J., Hicks, C. C., Hughes, T. P., Jentoft, S., Mills, D. J., Masu, R., Mbaru, E. K., & Ratner, B. D. (2024). *Securing a Just Space for Small-Scale Fisheries in the Blue Economy*. https://doi.org/10.60692/fsmra-0dp39

Creswell, J. W., & Poth, C. N. (2018). Qualitative inquiry and research design (4th ed.). Sage.

Cuenca-Ocay, G. (2019). Mangrove ecosystems' role in climate change mitigation. *Davao Research Journal*, *12*(2), 72-75. https://doi.org/10.59120/drj.v12i2.168

Denzin, N. K., & Lincoln, Y. S. (2018). The Sage handbook of qualitative research (5th ed.). Sage.

Dinas Pariwisata Kabupaten Purworejo. (2023). Laporan statistik pariwisata.

FAO. (2022). The state of world fisheries and aquaculture 2022. https://doi.org/10.4060/cc0461en

Flick, U. (2018). An introduction to qualitative research (6th ed.). Sage.

Folke, C., Polasky, S., Rockström, J., Galaz, V., Westley, F., Lamont, M., Scheffer, M., Österblom, H., Carpenter, S. R., Chapin, F. S., Seto, K. C., Weber, E. U., Crona, B., Crona, B., Daily, G. C., Dasgupta, P., Gaffney, O., Gaffney, O., … Walker, B. (2021). Our future in the Anthropocene biosphere. AMBIO: A Journal of the Human Environment, 50(4), 834–869. https://doi.org/10.1007/S13280-021-01544-8

Guest, G., MacQueen, K., & Namey, E. (2012). Applied thematic analysis. Sage.

Gul, S., Shafiq, U., Mir, S. A., Iqbal, G., & Lone, H. Q. (2024). Enhancing Global Food Security through Sustainable Fisheries and Aquaculture: A Comprehensive Review. *Asian Journal of Agricultural Extension, Economics and Sociology*, *42*(10), 60–70. https://doi.org/10.9734/ajaees/2024/v42i102563

Hall, D., Hirsch, P., & Li, T. M. (2017). Powers of exclusion. University of Hawai'i Press.

Hartuti, P., & Uday, C. (2025). The Role of Stakeholders in Community Based Mangrove Management in Tapak Area of Semarang City. *E3S Web of Conferences*, *650*, 02047. https://doi.org/10.1051/e3sconf/202565002047

Kamakaula, Y., Sagrim, M., Fenetiruma, O. A., Kamakaula, Y., Sagrim, M., & Fenetiruma, O. A. (2025). The Role of Community Participation in Mangrove Forest Conservation on Coastal Kaimana Regency West Papua. *West Science Nature and Technology*, *3*(03), 150–158. https://doi.org/10.58812/wsnt.v3i03.2247

Kementerian Kelautan dan Perikanan. (2021). Laporan status perikanan Indonesia.

Kumar, R. N., Moulidharshan, R., Kabinesh, V., Bargavi, S., Thamizharasu, T., R, D., R, K., Kumar, R. N., Moulidharshan, R., Kabinesh, V., Bargavi, S., Thamizharasu, T., R, D., & R, K. (2025). Mangrove Forests in a

Changing World: Distribution, Change, Drivers and Climate Relevance. International Journal of Enviornment and Climate Change, 15(11), 160–169. https://doi.org/10.9734/ijecc/2025/v15i115104

Landman, A. J. E. M. C. (2023). *Integrated Ocean Management* (pp. 523–552). Springer eBooks. https://doi.org/10.1007/978-3-031-16277-0_14

Lukum, A., Mahdalena, M., & Bokiu, Z. (2025). Improving the Local Economy Through Diversifying the Use of Mangrove Forests as Marine Resources. *Jambura Science of Management*, *7*(1), 76–88. https://doi.org/10.37479/jsm.v7i1.30392

Makino, M., Hori, M., Nanami, A., Hori, J., & Tajima, H. (2020). *Mapping the Policy Interventions on Marine Social-Ecological Systems: Case Study of Sekisei Lagoon, Southwest Japan* (pp. 11–29). Springer, Singapore. https://doi.org/10.1007/978-981-15-1133-2_2

Malik, A., Rahim, A., Rasyid, A., Mannan, A., & Arif, D. S. (2023). Analisis dpsir (driver, pressure, state, impact, dan response) hutan mangrove di sulawesi selatan: studi kasus di kabupaten takalar. *Jurnal Environmental Science*, 6(1). https://doi.org/10.35580/jes.v6i1.53020

Mhatre, M. A. (2024). Role of Mangroves as Fishery Resource: A Systematic Review. *Uttar Pradesh Journal of Zoology*, *45*(16), 35–41. https://doi.org/10.56557/upjoz/2024/v45i164285

Midlen, A. (2025). Rethinking Environmental Governance for Development: *The Blue Œconomy Dispositive*. https://doi.org/10.20944/preprints202410.1422.v2

Ministry of Environment and Forestry. (2021). Status mangrove Indonesia.

Mrčelić, G. J., Živanović, L., & Nerlović, V. (2024). The role of fishing ports in the sustainable blue economy. *Technologica Acta*. https://doi.org/10.51558/2232-7568.2023.16.2.47

Nicha, A., & Zulkarnaini, Z. (2025). Kebijakan Pengembangan Ekowisata Mangrove Berkelanjutan untuk Konservasi Ekosistem dan Pemberdayaan Masyarakat Lokal. *Jurnal Ilmiah Research Student*, *2*(2), 105–114. https://doi.org/10.61722/jirs.v2i2.5133

Ostrom, E. (2009). A general framework for social-ecological systems. *Science*, 325(5939), 419–422. https://doi.org/10.1126/SCIENCE.1172133

Sahu, R. K., & Doppalapudi, R. (2025). Blue Economy: Framework for Integrating Economic Growth with Marine Ecosystem. *International Journal of Marine Engineering Innovation and Research*, *10*(1), 165–174. https://doi.org/10.12962/j25481479.v10i1.4758

Salsabila, I., Meiliani, D., Maharani, S. M., & Lubis, R. (2025). Desain Penelitian Studi Kasus. *Jurnal Arjuna*, *3*(3), 245–254. https://doi.org/10.61132/arjuna.v3i3.1937

Sandhiya, V., & Bhuvaneswari, M. (2024). Qualitative Research Analysis. *Advances in Library and Information Science (ALIS) Book Series*, 295–316. https://doi.org/10.4018/979-8-3693-1135-6.ch014

Shokatian-Beiragh, M., Banan-Dallalian, M., Golshani, A., Allahdadi, M. N., & Samiee-Zenoozian, M. (2024). The effectiveness of mangrove forests as a nature-based solution against flood risk under an extreme weather

event. *Regional Studies in Marine Science*, *77*, 103630. https://doi.org/10.1016/j.rsma.2024.103630

Sudrajat, J., Jamaludin, J., Anshari, G. Z., Gusmayanti, E., & Sawerah, S. (2023). Analisis Keberhasilan Pengelolaan Hutan Mangrove: Kasus Rehabilitasi dan Konservasi oleh Komunitas Peduli Pesisir. *Buletin Ilmiah Marina: Sosial Ekonomi Kelautan Dan Perikanan*, *9*(1), 73. https://doi.org/10.15578/marina.v9i1.11845

Trimedianto, A., Marsudi, D., Lusiani P, F., & Panjaitan, M. B. (2024). Climate Change Impacts on Coastal Vulnerability and Adaptation Readiness: Maritime Perspective. *Golden Ratio of Data in Summary*. https://doi.org/10.52970/grdis.v4i2.520

Voyer, M., Quirk, G., McIlgorm, A., & Azmi, K. (2018). Shades of blue: what do competing interpretations of the Blue Economy mean for oceans governance? *Journal of Environmental Policy & Planning*, *20*(5), 595–616. https://doi.org/10.1080/1523908X.2018.1473153

Wei, X., Mo, W., Xiong, L., Hu, X., & Cheng, H. (2025). Field Investigation of Wave Attenuation in a Mangrove Forest Dominated by Avicennia marina (Forsk.) Viern. *Plants*, *14*(1), 135. https://doi.org/10.3390/plants14010135

Wulandari, P., Mayako, P. A., & Cahyaningrum, M. (2025). *Challenges, Opportunities, and the Future of the Blue Economy in Indonesia*. *Jurnal Ekonomi Manajemen Bisnis Dan Akuntansi*, *2*(2), 192-204. https://doi.org/10.70895/jemba.v2i1.18