



Community-Based Mangrove Management as a Strategy for Sustainable Livelihoods and Blue Economy Development: Evidence from Pantai Bahagia Village, Bekasi Regency

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Abstract

Community-based mangrove management (CBMM) is increasingly recognized as a tool for coastal conservation, yet its integration with sustainable livelihood strategies and local blue economy development remains empirically under documented in rural coastal settings. This study aims to analyse how sustainable livelihood strategies can be developed through CBMM in Pantai Bahagia Village and how this approach contributes to the local blue economy. A qualitative descriptive approach was used, with data collected through semi-structured interviews, field observations, and document analysis. Data were analyzed using the Sustainable Livelihoods Framework and subsequently examined through a SWOT analysis integrated with a TOWS matrix to formulate context-specific livelihood strategies. The findings indicate that active community participation, particularly through women-led groups such as Kebaya, has diversified local livelihoods by developing mangrove-based processed products, which increase household income while strengthening blue economy practices at the local level. Multi-stakeholder collaboration involving NGOs and corporate CSR programs has contributed to strengthening community capacity. However, challenges remain, including declining mangrove coverage, land ownership or use status, limited access to digital markets, and the absence of a formal regulatory framework. Strategies identified emphasize the need for institutional strengthening, continued community capacity building, and government regulatory support to sustain CBMM and promote inclusive growth of the blue economy in vulnerable coastal areas. These findings contribute to CBMM literature by demonstrating that sustainable mangrove governance at the village level requires the simultaneous development of livelihood security, women-led organizational capacity, as exemplified by the Kebaya group, and formal regulatory recognition of mangrove land tenure.

Keywords: Blue Economy; Coastal Livelihood Resilience; Community-Based Mangrove Management; Sustainable Livelihoods

1. Introduction

The blue economy is gaining popularity as a means of protecting the world's oceans and water resources. This concept arises when economic activities are balanced with the long-term capacity of marine ecosystems to sustain those activities (Lee et al., 2020). According to the United Nations, the blue economy is a marine economy that aims to enhance human well-being and social equity, while significantly reducing environmental risks and ecological scarcity, providing sustainable natural resources, and strengthening local economic systems (Donesia et al., 2023). One aspect of sustainability involves reducing or eliminating greenhouse gas emissions during the implementation of economic activities (Smith-Godfrey, 2016). As the world's largest archipelago with over 17,504 islands and a coastline spanning 108,000 km *Bidang Koordinasi Sumber Daya Maritim Kementerian Koordinator Bidang Kemaritiman*. (2023), Indonesia possesses significant potential, particularly in its coastal regions. Coastal areas can serve as a source of livelihood for

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surrounding communities; however, they also face vulnerabilities to disturbances and changes in ecosystems and the environment caused by natural factors, human activities, or both. Within this broader Indonesian coastal context, Pantai Bahagia Village in Bekasi Regency represents a particularly instructive case: a community simultaneously dependent on mangrove-adjacent aquaculture and confronting accelerating ecological degradation driven by the industrialization of the North Java Coast (Pantura) (Wasik et al., 2024).

One of the ecosystem services in coastal areas is the mangrove forest. In terms of ecological functions, mangroves play a role in protecting and conserving the components of coastal and marine ecosystems (Majesty & Fadmastuti, 2018), including protecting coastal communities against natural disasters such as cyclones, tsunamis, and coastal erosion. Additionally, mangroves play a vital role in coastal livelihoods, as they can be used for timber products such as poles, firewood, and charcoal (Aheto et al., 2016). It is well known that mangroves provide a livelihood for fishermen across various coastal areas of Indonesia, including Pantai Bahagia Village. During the west monsoon season, fishermen do not go out to sea. This condition is due to heavy rainfall and large ocean waves. Therefore, fishermen diversify their livelihoods by engaging in mangrove planting as part of their sustainable livelihood strategy.

In the context of mangrove planting, Community-Based Mangrove Management (CBMM) or community-based mangrove conservation, emerges as an alternative that integrates environmental conservation with local communities' livelihoods. CBMM is a community-centered and community-oriented process grounded in local resources, based on the premise that communities possess inherent capacity to understand and address their own challenges. This approach emphasizes the active role of communities in conserving, restoring, and sustainably utilizing mangrove ecosystems while promoting participatory and equitable governance (Ahmed et al., 2023). CBMM can benefit local communities. Supporters have suggested that CBMM can empower local communities, improve governance, expand livelihood options, and yield ecological, social, and cultural benefits (Aheto et al., 2016).

Previous studies have demonstrated how CBMM successfully protects coastal areas. Damastuti et al. (2023) show that community-initiated management efforts stimulate participation through collective action. These efforts facilitate collective decision-making and incorporate local knowledge when selecting rehabilitation and management strategies. Furthermore, mangrove forest rehabilitation requires additional knowledge, technology, and support from external parties. Collaborative efforts between communities and supporting organizations in partnership-based decision-making processes have proven effective for restoring mangrove forests. Additionally, strong regulations can support the sustainable management of mangrove forests and their potential to protect coastal communities from hazards (Damastuti et al., 2023). Strategic collaboration among communities and external organizations, along with inclusive, integrated planning and management, will lead to more sustainable coastal protection.

Other studies demonstrate how CBMM impacts local livelihoods and the conservation of coastal resources. Aheto et al. (2016) found that the primary factors motivating local stakeholders' participation in mangrove management are livelihoods and economic benefits. Communities are willing and eager to participate in mangrove management when their 'well-being' is assured, in other words, the level of participation in mangrove management activities will increase if such activities can provide income benefits to the community. This dependence on economic benefits is a primary concern for the community, as prior to mangrove management, communities tended to exploit mangrove resources, a situation arising from limited livelihood diversification (Zorini et al., 2004). Therefore, this study recommends that these exploited mangrove resources be restored and managed sustainably, namely if local regulations are enforced and institutional arrangements are established to mediate exploitation and increase mangrove regeneration rates.

While existing studies have examined CBMM (Aheto et al., 2016; Damastuti et al., 2023; Rahman et al., 2024), few have empirically traced how livelihood capital diversification, particularly through women-led community enterprises, translates into tangible blue economy practices and outcomes at the village level. Therefore, community-centered inquiry is uniquely positioned to illuminate this livelihood-conservation pathway. This gap is especially pronounced in coastal settings subject to simultaneous environmental pressure and regulatory fragmentation, as in the case of Pantai Bahagia. Additionally, local-level research is needed to understand the dynamics of mangrove management. This study aims to analyse how sustainable livelihood strategies can be developed through CBMM in Pantai Bahagia Village and how this approach contributes to the development of the blue economy at the local level. Specifically, this study seeks to answer how communities in Pantai Bahagia Village develop sustainable livelihood strategies through CBMM, and in what ways do these strategies contribute to the advancement of the blue economy at the local level. Answering these questions contributes to CBMM scholarship by providing village-level empirical evidence on the livelihood-conservation nexus, while offering actionable insights for policymakers and practitioners seeking to develop inclusive blue economy governance in vulnerable coastal areas and similar archipelagic contexts.

2. Methodology

2.1 Study Area

The research was conducted in Pantai Bahagia Village, Muaragembong Subdistrict, Bekasi Regency, as shown in Figure 1. This location was selected through purposive sampling, considering that Pantai Bahagia Village, according to the 2031 Bekasi Regency Spatial Plan (RTRW) 2011-2031, has been designated as a strategic environmental area. This is due to its position and layout, which serves as a buffer for Jakarta Bay against various forms of pollution originating from the Bekasi River. The village is also classified as a strategic natural resource area due to its mangrove forest ecosystem, which holds protected forest status. This ecosystem plays a vital role in maintaining coastal ecological balance and protecting the shoreline from erosion and seawater intrusion. Administratively, Pantai Bahagia Village is one of the villages in Muaragembong Subdistrict, Bekasi Regency, with a total area of approximately 30.1 km² Statistics Bekasi Regency, (2025). Land use in this village is dominated by fishponds, which serve as a primary livelihood for the local community. The presence of these ponds not only supports the local economy but is also closely intertwined with the surrounding mangrove ecosystem, creating a reciprocal relationship between community economic activities and the ecological functions of the area. Given these characteristics, Pantai Bahagia Village is a relevant location for this research study.

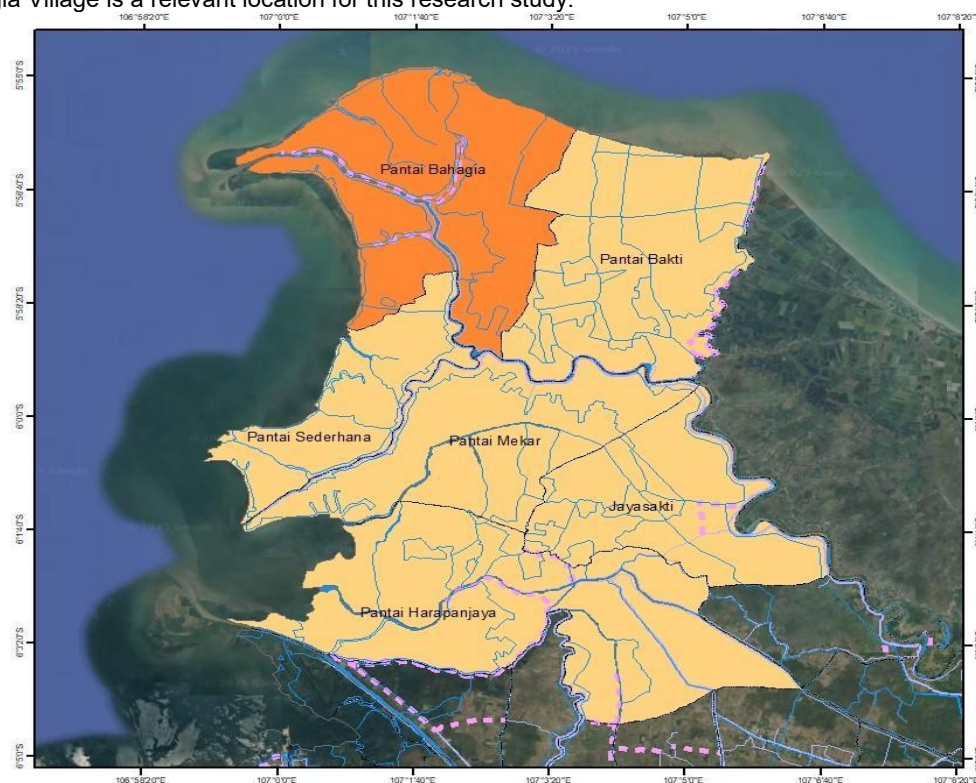


Figure 1. Research location
(Source: Authors' analysis, 2025)

2.2 Data Collection and Analysis

This study employs a qualitative descriptive approach to examine community involvement in mangrove forest management. Informants were selected using purposive sampling, specifically eight key informants based on their knowledge of and direct involvement in mangrove management, as listed in Table 1. Data collection was conducted through three main methods: document analysis, semi-structured interviews, and field observations. Primary data was obtained through direct observations and interviews with key stakeholders representing local community groups, particularly those involved in diversifying mangrove-based products and developing ecotourism. Each interview lasted an average of 45 minutes, was recorded with the informants' consent, and was subsequently transcribed. The interview structure was based on the theoretical framework of sustainable livelihoods, which guided the formulation of questions. Meanwhile, secondary data was obtained from organizational documents and related reports.

Table 1. List of key stakeholders participating in the interviews

Sector	Stakeholders	Function in CBMM	Interviews
Local Community Groups	Kebaya	<ul style="list-style-type: none"> Participating in mangrove rehabilitation and monitoring; developing MSMEs through value-added diversification of mangrove-based processed products 	Interview with the leader of local group, 20 May 2025
	Alipbata Tourism Awareness Group	<ul style="list-style-type: none"> Leading mangrove planting and rehabilitation activities; and developing mangrove-based ecotourism 	Interview with the leader of local group, 20 May 2025
	Save Mugo	<ul style="list-style-type: none"> Initiating community group formation and serving as the primary knowledge facilitator during the early phase of mangrove rehabilitation 	Interview with the local group representative, 30 May 2025
	Government of Pantai Bahagia Village	<ul style="list-style-type: none"> Providing administrative facilitation and community mobilization support for mangrove management activities at the village level 	Interview with the local government representative, 21 May 2025
Local Government	Government of Muaragembong Subdistrict	<ul style="list-style-type: none"> Providing cross-village regulatory coordination and supervisory oversight of mangrove management programs within Muaragembong Subdistrict 	Interview with the local government representative, 21 May 2025
	Forestry Service Branch Office (CDK) Region I, West Java Provincial Forestry Service	<ul style="list-style-type: none"> Responsible for forest management and natural resource conservation within the provincial jurisdiction 	Interview with the local government representative, 17 June 2025
Private Sector	Cikarang Listrindo	<ul style="list-style-type: none"> Funding mangrove rehabilitation activities and delivering technical and non-technical capacity building training for community groups through corporate social and environmental responsibility programs 	Interview with the company representative, 5 June 2025
Non-governmental Organization	LEVA	<ul style="list-style-type: none"> Providing technical assistance, advocacy support, and facilitation for community-led mangrove rehabilitation and livelihood empowerment programs 	Interview with the NGO representative, 26 June 2025

Source: Authors' analysis, 2025

To ensure reliability, we employed a triangulated data collection strategy that combined semi-structured key informant interviews, document analysis, and field observations. Claims from interviews were cross-checked against organizational documents, observational notes, and we compared accounts from different stakeholders to identify convergences and discrepancies. Field observations conducted during site visits allowed the research team to directly verify claims made in interviews. For instance, we confirmed the presence of mangrove rehabilitation plots, assessed the condition of road infrastructure, and observed the operation of local community group product processing activities. Document analysis of organizational documents, CSR program documentation, and spatial data was used to cross-check factual claims and contextualize interview narratives within a broader empirical record. When discrepancies arose between these sources, we returned to available documentation and field notes to reconcile interpretations before drawing final conclusions. To minimize researcher bias, field notes were reviewed collectively by the research team, and emerging interpretations were discussed and reconciled prior to finalizing the analysis. While access to certain internal documents was restricted and interview data may have been influenced by social desirability, these limitations were mitigated through triangulation, the inclusion of multiple perspectives, and cautious interpretation.

The data analysis process in this study employs the Sustainable Livelihoods Framework (SLF) as its primary theoretical perspective. The SLF was selected because it provides a multidimensional lens for examining how communities mobilize diverse capital assets: human, social, natural, physical, and financial, in response to environmental and institutional vulnerabilities, which closely mirrors the complex adaptive dynamics observed in CBMM settings. The qualitative data collected were systematically reduced and categorized into five types of livelihood capital. This categorization serves as the foundation for an understanding of the livelihood strategies of coastal communities. Next, the categorized data was analyzed using the SWOT (Strengths, Weaknesses, Opportunities, Threats) framework. SWOT categories were derived through systematic thematic coding of all interview transcripts, observational field notes, and organizational documents. Coding was conducted inductively, with recurring themes across multiple

stakeholder groups flagged as candidate SWOT factors. The TOWS matrix was then constructed to generate strategic recommendations by cross-referencing internal and external factors. The SWOT analysis was conducted through the development of a SWOT matrix (TOWS Matrix), which serves to evaluate strengths, weaknesses, opportunities, and threats within the context of community-based mangrove management. By integrating the SLF and the SWOT matrix, as illustrated in Figure 2, this study formulates recommendations for the development of sustainable livelihoods through CBMM. This analysis also aims to identify the contribution of this approach in promoting the development of the blue economy at the local level.

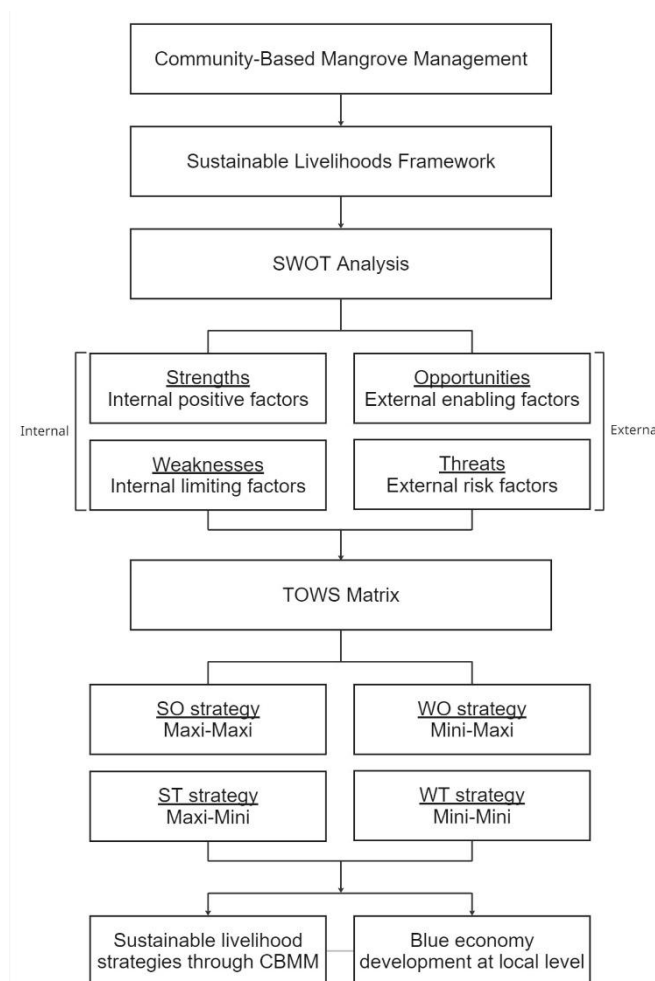


Figure 2. Stages of strategy formulation integrating the SLF and SWOT-TOWS analysis
(Source: Authors' analysis, 2025)

3. Results and Discussion

3.1 Community-Based Mangrove Management in Pantai Bahagia Village

Mangrove management in Pantai Bahagia Village demonstrates the local community's central role as the primary actors in the rehabilitation and conservation of the ecosystem. The active participation of the community, organized into groups such as Kebaya and Alipbata, underpins the achievement of mangrove management in Pantai Bahagia Village. These groups, initially formed and supported by the Save Mugo community, take an active role in planning, implementing, and monitoring mangrove rehabilitation. The chairperson of Kebaya employs a participatory approach that empowers members to voice their opinions and ideas during regular meetings, while also establishing a well-organized internal structure through clear role assignments. Community involvement spans all stages of mangrove rehabilitation, from planning and implementation to post-implementation.

Additionally, the community is engaged in developing mangrove-based economic initiatives that directly contribute to its well-being. Although initial challenges included community ignorance regarding mangrove functions and resistance to planting, this direct involvement contributed to fostered awareness and concern. However, voluntary community participation in mangrove management remains limited. Communities tend to participate only when financial compensation is offered, due to household economic pressures. The reliance on financial compensation indicates that the motivation for participation in CBMM is not always purely altruistic but is also driven by economic incentives and subsistence needs. This dependence on

financial compensation indicates that the success of sustainable mangrove management under the CBMM framework depends on the extent to which communities are prioritized. In essence, ensuring community members' well-being is a key factor in strengthening their participation in forest conservation efforts (Melana et al., 2000).

This reliance on financial incentives provides a critical analytical correction to purely idealist conservation models. In Pantai Bahagia, this dynamic creates a structural fragility: without continuous external funding, whether from CSR programs or NGOs, community participation risks collapsing entirely, underscoring the urgency of developing community-owned financial mechanisms that can sustain motivation independently of donor cycles. As Praptiwi et al. (2021) critically observed in their study of small island communities transitioning to a blue economy in Indonesia, providing alternative livelihoods does not automatically halt destructive environmental practices unless the root causes of economic vulnerability are addressed and equitable benefit-sharing is guaranteed. The necessity of these financial incentives in Pantai Bahagia becomes even more pronounced when placed within the macro-context of the North Coast of Java (Pantura). The Pantura region is currently facing massive industrialization, which has led to a significant decline in habitat quality and a drastic reduction in traditional fish catches (Wasik et al., 2024). Therefore, the transition of local communities toward mangrove rehabilitation and the processing of derivative products enables the community to earn more income to pursue their sustainable livelihoods.

One of the most notable findings is a shift in the community's livelihood model, from the exploitation of mangrove forests that led to unsustainable aquaculture practices to sustainable mangrove-based utilization. Mangrove rehabilitation not only restores their ecological functions as coastal protectors and habitats for marine life but also opens innovative blue economy opportunities. The Kebaya group has successfully developed various processed products from mangrove fruits and other parts, such as juice, *dodol*, and *batik* dyes made from dead mangrove trunks. The success of these product sales directly contributes to the household income of Kebaya members, demonstrating the economic potential of mangrove forest management. This income growth empowers women and provides alternative livelihoods for fishing families affected by unpredictable sea conditions.

The success of this product diversification validates the core requirements for sustainable community-based mangrove management. According to Kusumadewi et al. (2024), continuous economic benefits are predominantly achieved when active restoration is deeply integrated with tangible business model development and product diversification, exactly as practiced by the Kebaya group. Additionally, empirical evidence from similar coastal dynamics confirms that direct mangrove utilization alone is no longer sufficient to meet household economic needs. Consequently, developing and prioritizing conservation-based alternative livelihoods has emerged as a top priority to prevent the poverty trap among coastal communities (Mardhiansyah et al., 2025).

In rehabilitation efforts, adapting planting methods is crucial. Initially, mangrove planting was conducted directly along the coastline, but this approach failed due to vulnerability to waves and sea winds. Based on this experience, the planting strategy shifted to areas behind settlements and former aquaculture ponds, which proved safer and more effective. This rehabilitation process is also accompanied by routine monitoring, including by experts for carbon calculations, as part of efforts to maintain quality and sustainability. The community recognizes that while mangroves cannot completely stop erosion and flooding, their presence can slow erosion and reduce the direct impact of ocean waves on residential areas. The scale and consistency of these rehabilitation efforts are evidenced by the planting records of the Alipbata group, as documented in Table 2 below.

Table 2. List of mangrove planting activities 2013–2025

Year	Number of activities	Number of seeds planted
2013	8	11,353
2014	19	6,740
2015	49	19,815
2016	29	38,250
2017	34	30,737
2018	18	5,502
2022	3	11,100
2023	22	76,950
2024	48	193,222
2025*	9	24,998
Total	239	418,667

Source: Alipbata, 2025 (*data per June 2025). No data are listed for 2019 – 2021 because of COVID-19 period.

Notably, mangrove planting activities surged significantly in 2023 and 2024, with 76,950 and 193,222 seedlings planted respectively, a sharp increase from 2022. This acceleration likely reflects the expanded CSR engagement and intensified NGO support following the COVID-19 disruption period, though the long-term survival rate of these seedlings remains unmonitored and constitutes a critical gap in the current CBMM framework. Furthermore, the sustainability of the CBMM in Pantai Bahagia Village is highly dependent on multi-stakeholder collaboration. This finding aligns with Rahman et al. (2024), who demonstrated that the involvement of multiple stakeholders, including local communities, government agencies, NGOs, and the private sector, working collectively as partners is fundamental to achieving sustainable mangrove ecosystem management, particularly in contexts where government oversight remains suboptimal. Various actors, such as Non-governmental Organisations (NGOs) and companies through their Corporate Social Responsibility

(CSR) programs, serve as key partners. These partners not only provide seedlings and technical guidance but also financial and material support. Within this collaborative framework, two critical aspects underpin CBMM's sustainability. First, community empowerment through various training provided by corporate partners, local communities, and NGOs. This training encompasses technical capacity building (e.g., processing mangrove products into juice, chips, and batik dyes) and non-technical skills (e.g., public speaking and disaster response). Training and social capacity building are also carried out by the Save Mugo community, which served as the primary facilitator during the initial phase of rehabilitation. The facilitation and training provided underscore that community empowerment within CBMM focuses not only on environmental aspects but also on strengthening socio-economic and organizational capacities.

Second, multi-stakeholder collaboration involving communities, NGOs, companies, and the academic community contribute to achieving shared goals. While this collaboration has brought many benefits, challenges remain, such as corporate partners' preference for seeds from outside the region, which are sometimes unsuitable for local conditions, leading to planting failures. This issue underscores the need for understanding of regional characteristics among various stakeholders in mangrove management efforts. As Wasik et al. (2024) noted, genuine ecosystem-based collaboration is needed, rather than top-down intervention. External interventions must be fully aligned with local capacities and specific biophysical realities to be effective.

Furthermore, although progress has been made, implementing CBMM in Pantai Bahagia Village still faces several challenges. Broader community involvement remains limited for various reasons, primarily economic and family-related issues, and not all residents can join local community mangrove management groups. Additionally, coordination with partners occasionally faces procedural hurdles and conflicting interests, and the government's role remains very limited, whether in terms of direct involvement, public outreach, or the provision of supportive policy regulations. Rahman et al., (2024), corroborate this, noting that local government agencies had not optimally conducted supervision, implemented management programs, or established dedicated mangrove regulations, thereby undermining the long-term sustainability of community-based conservation initiatives.

This condition is not isolated; it reflects a broader systemic challenge. Mangrove governance in Indonesia is characterized by overlapping authority claims among multiple government institutions, stemming from the absence of strong regulations specifically dedicated to mangrove management and conservation. This regulatory fragmentation results in weak cross-sectoral coordination and hinders the development of cohesive management frameworks at the local level (Mursyid et al., 2021). This gap is particularly consequential given that, the presence of local regulations serves as a critical enabling condition that substantially strengthens the sustainability of mangrove management and its capacity to protect coastal communities from coastal hazards (Damastuti et al., 2023). Therefore, stronger regulations and proactive government support are necessary.

Previous studies on CBMM have consistently emphasized that meaningful community participation is a key determinant of successful mangrove conservation and rehabilitation and can support local community (Aheto et al., 2016; Damastuti et al., 2022). The findings of this study support this argument, as the success of mangrove management in Pantai Bahagia Village is strongly associated with the active involvement of local communities through groups.

Overall, mangrove management in Pantai Bahagia Village demonstrates a CBMM, in which local communities have the right and freedom to plan, implement, and oversee mangrove rehabilitation and utilization activities. With the strengthening of government and relevant institutions' roles, the potential of mangrove management can continue to be optimized to deliver optimal ecological and economic benefits for coastal communities.

3.2 Capital in the Livelihoods of the Community in Pantai Bahagia Village

According to the sustainable livelihoods framework (Department for International Development [DFID], 1999; Scones, 1998), there are at least five forms of capital recognized in sustainable livelihoods theory, including human capital, social capital, natural capital, physical capital, and financial capital. In this study, these five forms of sustainable livelihood capital were identified in the livelihoods of the community in Pantai Bahagia Village.

Human capital encompasses health, knowledge, skills, information, and the ability to work. In this study, human capital was used to examine the community's knowledge and skills, particularly regarding mangrove management. The findings revealed that community members have varied educational backgrounds, ranging from those who did not complete elementary school to university graduates. Community members with higher levels of education prefer working outside the village because of more promising income opportunities. Moreover, in the context of mangrove management, the community lacks the necessary knowledge and skills. While the community is aware of the depletion of mangrove forests and coastal erosion, they do not know what steps to take to minimize these issues.

However, recent studies suggest that in dynamic coastal environments, accumulated practical experience, market knowledge, and access to training often outweigh formal education or physical assets in determining successful mangrove dependence (Le et al., 2025). Furthermore, the transition toward a sustainable coastal economy requires specific green-blue workforce readiness. As Suryawan et al. (2025) note, community participation is heavily driven by core competencies such as feasibility assessment, stakeholder engagement, and market financing. Therefore, the capacity-building initiatives provided to the

Kebaya group represent an essential effort to bridge this human capital gap by fostering these green-blue competencies locally.

Furthermore, social capital encompasses relationships of trust, participation in groups, networks, and access to broader institutions. In this study, social capital is evident in the relationships established among community members, particularly those affiliated with Kebaya and Alipbata. These relationships foster mutual trust among community members in fulfilling their respective responsibilities, as previously discussed and agreed upon during monthly meetings. Then, access to broader institutions has existed for a long time, dating back to the mangrove replanting initiative. At that time, an external network was established between the residents of Pantai Bahagia Village and Save Mugo, a movement initiated to save Muaragembong. Over time, collaboration in mangrove management has emerged, involving both NGOs and the private sector, particularly regarding training and funding. This social cohesion is critical, as recent studies demonstrate that the socio-cultural dimension exerts the strongest influence on the successful adoption of alternative livelihoods. Local wisdom and community institutions serve as the primary anchors ensuring that economic adaptations do not compromise ecological integrity (Mardhiansyah et al., 2025).

Natural capital encompasses natural resources utilized as capital for livelihoods. One example is converting land into ponds for various aquaculture activities, such as fish and shrimp farming. In the context of mangrove management, land is used to replant mangrove trees in specific areas that function as barriers against coastal erosion. Physical capital encompasses the basic infrastructure used in mangrove management. In this study, poor accessibility remains a challenge in Pantai Bahagia Village. This challenge is evidenced by the poor condition of the road leading to the village and the lack of adequate lighting. In the context of mangrove management, physical capital is defined by the availability of mangrove seedlings as the primary resource for rehabilitation, supported by adequate equipment. Financial capital encompasses access to financial resources. In this study, the community derives income primarily from the fishing sector. Additionally, community members in Kebaya earn income from the profits of selling processed mangrove products, and Alipbata earns income from selling seedlings and mangrove ecotourism-based activities. In the context of mangrove management, funding is obtained through CSR initiatives, specifically by providing tools and materials for mangrove planting.

There are several forms of livelihood capital in Pantai Bahagia Village. Generally, these resources serve as assets used to support the community's livelihood. Currently, the resource that appears insufficient is physical infrastructure, specifically the availability of adequate road infrastructure to facilitate community mobility to and from Pantai Bahagia Village. The availability of good roads can serve as a comprehensive physical resource to support the livelihood activities of the Pantai Bahagia Village community. Critically, the five capitals in Pantai Bahagia do not operate in isolation. The weakness in physical capital directly constrains financial capital by limiting market access for Kebaya's processed products. Conversely, the strength of social capital has partially compensated for human capital deficits by enabling collective learning and knowledge transfer from external partners. This interdependence suggests that interventions targeting a single capital type are unlikely to yield sustainable outcomes; rather, an integrated capital-building approach is required.

3.2.1 Livelihood Outcomes of the Community in Pantai Bahagia Village

Sustainable livelihoods provide a framework for understanding and developing community strategies to ensure survival, growth, and improved quality of life without damaging natural resources or the surrounding environment. The following are the livelihood outcomes of the community in Pantai Bahagia Village, along with their classifications, are presented in Table 3.

Table 3. Categorization of Livelihood Capital and Outcomes

Category	Results
Human capital	<ul style="list-style-type: none">• The community is aware of the importance of mangroves for life. However, there is still confusion about the implementation of mangrove management, highlighting the need for training for residents.• Technical, non-technical, and disaster management training is provided by Cikarang Listrindo to build residents' capacity.
Social capital	<ul style="list-style-type: none">• A strong sense of mutual trust and close-knit community cooperation has led to greater community involvement.• The expansion of networks has facilitated knowledge transfer between external parties and the community, resulting in enhanced internal capacity.
Natural capital	<ul style="list-style-type: none">• Land used for fishponds boosts the income of residents.• Available land is used to plant mangroves, which are then processed into various products that increase residents' income.
Physical capital	<ul style="list-style-type: none">• Road access to the village remains poor and continues to be a problem. Inadequate lighting is also a concern.• Physical resources, such as mangrove seedlings, are readily available. In addition, the necessary equipment is sufficient, making it easier for residents to hold discussions and manage the mangroves.
Financial capital	<ul style="list-style-type: none">• Most of the community derives their income from fishing.• Residents who are part of the Kebaya community benefit from the sale of processed mangrove products, while those who are part of Alipbata benefit from the sale of seedlings and planting activities.• The capital invested in mangrove management takes the form of the provision of tools and materials.

Source: Authors' analysis, 2025

3.2.2 The Relationship Between the Findings and the Blue Economy

The integration of community-based mangrove management and the strengthening of livelihood resources in Pantai Bahagia Village forms the foundation for the realization of the blue economy at the local level. The blue economy, which emphasises the sustainable use of coastal and marine resources to support economic growth, job creation, and ecosystem conservation, is evident in the community's daily practices for mangrove management in this village.

From an ecological perspective, the random forest classification results indicate that mangrove forests in this region were highly dynamic during the 2017–2023 period. The linear trend line indicates that the mangrove area decreased from 2017 to 2023. The mangrove area in 2017 was 267.50 hectares (Figure 3). By 2019, there was an increase, reaching 319.01 hectares of mangroves. However, from 2020 to 2023, the average mangrove area decreased to 236.99 ha (Amalo, 2024). This fact highlights the importance of consistent mangrove rehabilitation efforts, in which CBMM plays a crucial role in promoting and maintaining ecosystem sustainability.

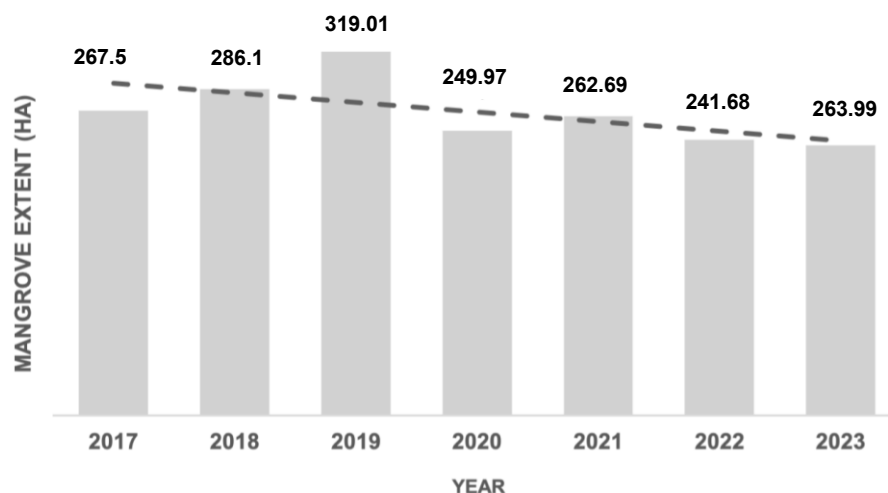


Figure 3. Mangrove Area Dynamics 2017-2023
(Adapted from Amalo, 2024)

The strengthening of human and social capital is evident in the development of various mangrove-based products by the Kebaya group, whose members are predominantly women. The products produced are highly diverse, including sesame *dodol*, *ginger dodol*, *rujak dodol*, mangrove juice, mangrove fruit crackers, mangrove leaf sticks, *balado* sticks, mangrove leaf *peyek*, mangrove leaf chips, *umpet* chips, *umpet* nuts, mangrove jam, and even *batik* dyes. These products have been marketed throughout the Bekasi Regency. This achievement demonstrates innovation, skill adaptation, and the expansion of social networks.

However, this study further reveals the role of female leadership in facilitating community participation and organisational sustainability. Female leaders, such as the chairperson of Kebaya, not only mobilized and accompanied community members throughout the mangrove rehabilitation process but also encouraged a transformation in mangrove utilization by identifying economic opportunities through the diversification of mangrove-based products (Figure 4). This initiative has generated additional income and improved the welfare of community members, demonstrating that mangrove conservation can simultaneously support livelihood development. The active participation of rural women in livelihood development not only diversifies income streams but also enhances the adaptive capacity and economic sustainability of local communities (Naika & Pawar, 2026).

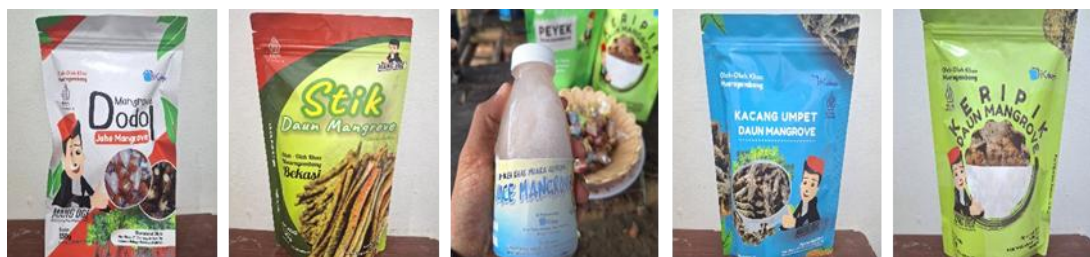


Figure 4. Mangrove Processed Products
(Source: Field observation, 2025)

Most of the male workforce in Pantai Bahagia Village works as fishermen and aquaculture farmers. The predominance of men in fishing and aquaculture led Save Mugo to initiate women's empowerment activities to produce mangrove-based processed goods, thereby creating new economic opportunities while strengthening inclusivity within the local blue economy. In terms of financial capital, mangrove processing

provides additional income for group members and contributes to household economies. Additionally, financial capital is also obtained from the sale of mangrove seedlings by farmer groups for mangrove planting activities, as well as from CSR support. Natural capital-based management not only preserves the ecological function of mangroves as coastal protectors but also optimizes land as a source of income through aquaculture and the diversification of processed products. Physical capital, in the form of seedling availability, production tools, and basic infrastructure, though still limited, has sufficiently supported the implementation of rehabilitation activities and economic enterprises.

This dynamic aligns strongly with the Ecosystem Services Approach for community-based ecotourism and management. As Phelan et al. (2020) highlighted, community-based management offers one of the few entry points for low-resource coastal communities to participate in the blue economy. Crucially, these mangrove-based businesses are not intended to replace primary professions (fishing and aquaculture) but act as complementary livelihood pathways that provide a financial buffer during seasonal disruptions or periods of industrial stress.

Although progress has been made in implementing the blue economy in Pantai Bahagia Village, its implementation still faces several challenges. One of these is limited technological expertise combined with poor internet access, which severely hinders the online marketing of mangrove products. Without continuous empowerment and adequate market access, alternative livelihood programs cannot effectively translate into long-term community prosperity (Mardhiansyah et al., 2025). Additionally, fluctuations in mangrove forest area due to natural factors and human activities threaten the sustainability of mangrove resources, which underpin the blue economy in this region. Conditions such as poor infrastructure, including roads and inadequate lighting, directly limit efforts to access markets and develop business logistics.

The interconnection between the five forms of capital is clear in supporting the blue economy in this village. For example, the transfer of innovation in product processing (human capital) is greatly facilitated by the strength of social networks (social capital). The provision of production tools through CSR (financial and physical capital) facilitates business diversification that sustainably utilizes natural potential (natural capital). Furthermore, it can be concluded that the activities carried out in Pantai Bahagia Village align with the blue economy concept. According to Bari (2017), the blue economy concept encompasses social integration, upholding humanity, achieving gender equality, and marine conservation. Thus, the integration of these five forms of capital serves as the foundation driving the sustainability of coastal communities' livelihoods while strengthening the blue economy at the village level. More specifically, the Pantai Bahagia case demonstrates three blue economy principles in practice: first, sustainable use of coastal resources through mangrove-based product diversification rather than extraction; second, social inclusion through women-led enterprise development; and third, ecosystem conservation integrated with livelihood generation.

3.3 Sustainable Livelihood Strategies of the Community in Pantai Bahagia Village

In mapping out strategies for sustainable livelihoods, this study used SWOT and TOWS analyses to identify the strengths, weaknesses, opportunities, and threats of mangrove management in Pantai Bahagia Village. The hope is that by identifying these TOWS strategies, the community's livelihoods can be improved sustainably. The strengths, weaknesses, opportunities, and threats of mangrove management in Pantai Bahagia Village are outlined in Table 4.

Table 4. SWOT Mapping Analysis

Strengths	Weaknesses
S1. The community is aware of the environmental changes taking place	W1. The community's lack of initial understanding regarding mangrove management
S2. The community is open to external parties for knowledge exchange	W2. Absence of local regulations serving as a foundation for mangrove management
S3. The community exhibits strong cooperation	W3. Uncertainty regarding partnerships with the NGO and companies.
S4. There is a space for members to discuss mangrove management	W4. Failure to heed the aspirations of members with the least influence
S5. Women-led community organisations have demonstrated capacity to diversify mangrove-based livelihoods through value-added product development	W5. Limited digital literacy and internet access among community members, restricting online market reach for mangrove-based products
Opportunities	Threats
O1. There are opportunities for mangrove-based business development through ecotourism and processed mangrove products	T1. Uncertainty regarding land status for planting and managing mangrove forests
O2. Community training and empowerment programs are provided by NGOs, CSR initiatives, and local governments	T2. Threats from ocean waves and tidal surges that affect mangrove planting
O3. Support is provided for infrastructure to support mangrove management activities	T3. Threat of land conversion
O4. Growing policy emphasis on gender-inclusive blue economy development and women's empowerment in coastal areas	

Source: Authors' analysis, 2025

Based on the table above, several strengths, weaknesses, opportunities, and threats related to mangrove management in Pantai Bahagia Village have been identified. The strengths of mangrove management include community awareness of environmental changes, which has led them to work together

on mangrove conservation activities, hold discussions, and divide tasks. This collective effort has led the community to establish mangrove-based processing businesses, such as chips, syrup, juice, and mangrove *dodol*, which open opportunities for business development based on local resources.

However, in practice, the community in Pantai Bahagia Village faces several challenges, particularly regarding understanding mangrove management, leaving them unsure of what actions to take. Additionally, there are currently no established guidelines or regulations from the local government regarding mangrove management. Furthermore, despite the partnership schemes between the community and its partner (the NGO and companies), discussions regarding the program's sustainability remain unclear. Another challenge stems from within the community itself, where some members feel they no longer share the same vision and goals, leading to internal conflicts.

In addition to these challenges, several threats face the local community. First, regarding the unclear land status: although the community has been granted permission to manage the land, its status remains unclear. The uncertainty regarding land status for mangrove planting is part of a broader structural problem in Indonesian mangrove governance. Mursyid et al. (2021) highlight that mangroves in Indonesia are divided into two main territorial zones, forest zones administered by the Ministry of Environment and Forestry and non-forest zones (APL) under other ministerial mandates, creating unclear institutional boundaries that leave local communities without secure land tenure for mangrove rehabilitation activities. This ambiguity directly undermines the long-term sustainability of CBMM initiatives such as those in Pantai Bahagia Village. The next threat involves ocean waves and tidal surges. Both threats impact mangrove planting; if mangroves are planted near ocean waves, the seedlings are at risk of failing to grow and dying. Furthermore, after identifying the strengths, weaknesses, opportunities, and threats in mangrove management in Pantai Bahagia Village, the table below outlines strategies that can be implemented to improve mangrove management in the village.

Table 5. TOWS Strategy Mapping

	Strengths	Weaknesses
	SO	WO
Opportunities	S1 × O2 Establishing other communities like Kebaya and Alipbata to involve a broader community in mangrove management	W1 × O2 Enhancing community understanding through training on mangrove management
	S2 × O2 Building community capacity through training and community empowerment	W2 × O2, O3 Advocating for the establishment of local regulations related to mangrove management with the local government
	S3 × O1 Developing a local economic development plan with active community involvement	W3 × O1 Establishing clear partnerships and self-funding mechanisms related to mangrove-based business development opportunities
	S4 × O1, O2, O3 Ensuring transparency in planning, implementation, and evaluation processes	W4 × O2 Utilizing the obtained support to ensure program sustainability
	S5 × O1, O4 Institutionalizing women-led enterprise models such as Kebaya as a replicable template for inclusive blue economy development in neighbouring coastal villages within Muaragembong Subdistrict	W5 × O1, O2 Strengthening digital literacy and online market access for mangrove-based products through targeted training programs supported by NGO and CSR partners
	ST	WT
Threats	S1 × T2 Determining strategic locations for mangrove planting while taking natural conditions into account	W1 × T2 Providing the community with knowledge regarding mangrove planting amid changing natural conditions
	S4 × T1 Holding regular discussions regarding the uncertainty of mangrove planting sites in the future	W2 × T1 Establishing local regulations governing the status of mangrove planting sites
	S5 × T3 Leveraging women-led mangrove enterprises as an economic buffer against land conversion pressures by demonstrating the higher long-term livelihood value of conserved mangrove ecosystems compared to converted land	W5 × T3 Developing digital documentation and economic valuation of mangrove ecosystem services

Source: Authors' analysis, 2025

Based on the table 5, several strategies for improving mangrove management in Pantai Bahagia Village can sustainably enhance community livelihoods. These strategies are implemented by leveraging the strengths, weaknesses, opportunities, and threats inherent in the current conditions of the community and mangrove management in Pantai Bahagia Village and then cross-referencing these four aspects. These strategies aim to address the challenges of implementing the blue economy in Pantai Bahagia Village, including enhancing community capacity through training and empowerment, and establishing local regulations for mangrove management. Among the strategies identified, three are prioritized based on their foundational nature, feasibility within existing stakeholder networks, and potential for cross-cutting ecological

and socio-economic impact: first, advocacy for local regulatory frameworks governing mangrove land tenure (W2×T1), as it constitutes the foundational prerequisite for all other interventions; second, institutional capacity building through expanded community training (W1×O2), given existing NGO and CSR infrastructure; and third, development of self-sustaining financial mechanisms for CBMM (W3×O1), to reduce dependency on external funding cycles.

The necessity of executing these cross-cutting strategies is strongly corroborated by broader empirical evidence. The highest ecological and socio-economic success rates are achieved only when communities move beyond mere planting. Kusumadewi et al., (2024) demonstrate that the most comprehensive outcomes occur when active restoration is simultaneously combined with passive restoration (such as establishing local regulatory frameworks for land status), business model implementation, and strong institutional capacity building. Moreover, the TOWS analysis suggests that strong institutional strengthening and regulatory support are more critical than ecological interventions alone. This expands previous CBMM studies that largely focus on technical rehabilitation measures by highlighting governance and policy dimensions as key determinants of long-term sustainability. It is hoped that these strategies will improve mangrove management in the future, thereby making the community's livelihoods more sustainable and resilient in the face of various future shocks. In this regard, the establishment of local regulatory frameworks represents a foundational step, as empirical evidence from Central Java confirms that local regulations can substantially reinforce the long-term sustainability of community-based mangrove management while simultaneously enhancing the community's resilience against coastal hazards (Damastuti et al., 2023).

This study contributes to CBMM literature in three important ways. First, it demonstrates that community participation in mangrove management is closely linked to livelihood security rather than solely environmental awareness. Second, it shows how women-led community organisations can transform mangrove conservation into diversified livelihood opportunities through value-added products. Third, it highlights that effective multi-stakeholder collaboration requires the integration of local ecological knowledge rather than relying exclusively on externally designed interventions. These findings extend existing CBMM studies by illustrating how conservation, livelihood resilience, and blue economy can be pursued simultaneously in vulnerable coastal areas.

4. Conclusion

This study set out to examine how sustainable livelihood strategies are developed through CBMM in Pantai Bahagia Village and how those strategies contribute to local blue economy development. The findings show that CBMM in this context functions as an integrated livelihood platform rather than a purely ecological intervention: community participation is sustained not by environmental awareness alone but by the tangible livelihood benefits derived from mangrove-based enterprises, particularly those led by the Kebaya women's group. CBMM therefore operates dually as an ecological intervention and a livelihood strategy that links coastal conservation with blue economy development. The study further reveals that women-led community organizations, serve as transformative agents in converting mangrove conservation into diversified livelihood opportunities through value-added product development. These findings advance understanding of gender dynamics in coastal resource management and underscore the centrality of female leadership in fostering both organizational sustainability and inclusive participation in the blue economy. This study confirms that effective community-based mangrove management depends not only on external support from NGOs and corporate partners, but also on the integration of local ecological knowledge and community-driven institutional structures. In terms of policy implications, the findings point to a sequenced set of policy priorities. Most urgently, local governments must formalize regulatory frameworks clarifying mangrove land tenure, as this constitutes the foundational prerequisite for all other governance interventions. In the medium term, digital literacy programs and market access infrastructure must be developed to enable mangrove-based enterprises to scale beyond local markets. Over the longer term, the institutionalization of multi-stakeholder coordination mechanisms, integrating community groups, NGOs, corporate partners, and government agencies, is required to sustain CBMM independently of individual donor relationships.

This study is subject to several limitations. First, the qualitative nature of the research limits the generalizability of findings beyond the Pantai Bahagia context, though the analytical framework may be transferable to similar rural coastal settings. Second, the study relies primarily on self-reported data from community members, which may be influenced by social desirability bias. Third, the absence of longitudinal ecological data on mangrove survival rates and carbon sequestration means that the ecological dimensions of the blue economy contribution cannot be fully assessed. Fourth, the study's informant selection focused primarily on active participants in CBMM groups such as Kebaya and Alipbata, potentially excluding the perspectives of community members who do not participate in organized groups, a group whose absence from formal structures may reflect unaddressed barriers to participation that this study was unable to fully capture. Future research should specifically examine the economic valuation of ecosystem services from rehabilitated mangroves in Pantai Bahagia using payment for ecosystem services (PES) frameworks and should track long-term seedling survival rates to assess the actual ecological efficacy of the documented rehabilitation activities. Comparative studies across multiple villages in the Muaragembong Subdistrict would also allow for a more systematic assessment of the scalability of the Kebaya enterprise model as a template for inclusive blue economy development.

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6. Conflict of Interest

The authors state that they have no conflicts of interest concerning the research, authorship, or publication of this manuscript.

7. References

- Aheto, D. W., Kankam, S., Okyere, I., Mensah, E., Osman, A., Jonah, F. E., & Mensah, J. C. (2016). Community-based mangrove forest management: Implications for local livelihoods and coastal resource conservation along the Volta estuary catchment area of Ghana. *Ocean and Coastal Management*, 127, 43–54. <https://doi.org/10.1016/j.ocecoaman.2016.04.006>
- Ahmed, J., Kathambi, B., & Kibugi, R. (2023). Policy Perspective on Governance Standards Setting Using Community Participation for Sustainable Mangrove Management In Lamu, Kenya. *International Journal of Conservation Science*, 14(1), 315–326. <https://doi.org/10.36868/IJCS.2023.01.20>
- Amalo, L. F. (2024). *Penilaian Kerusakan Hutan Mangrove di Desa Pantai Bahagia, Kecamatan Muaragembong, Kabupaten Bekasi berbasis Remote Sensing dan GIS*. [Thesis Institut Pertanian Bogor]
- Bari, A. (2017). Our oceans and the blue economy: Opportunities and challenges. *Procedia Engineering*, 194, 5–11. <https://doi.org/10.1016/j.proeng.2017.08.109>
- Bidang Koordinasi Sumber Daya Maritim Kementerian Koordinator Bidang Kemaritiman, D. (2023). Menuju Puncak Pengintegrasian Rencana Tata Ruang Darat dan Laut. <https://maritim.go.id/uploads/magazine/20240106110809-2024-01-06magazine110800.pdf>
- Damastuti, E., de Groot, R., Debrot, A. O., & Silvius, M. J. (2022). Effectiveness of community-based mangrove management for biodiversity conservation: A case study from Central Java, Indonesia. *Trees, Forests and People*, 7, 100202. <https://doi.org/10.1016/j.tfp.2022.100202>
- Damastuti, E., van Wesenbeeck, B. K., Leemans, R., de Groot, R. S., & Silvius, M. J. (2023). Effectiveness of community-based mangrove management for coastal protection: A case study from Central Java, Indonesia. *Ocean and Coastal Management*, 238, 106498. <https://doi.org/10.1016/j.ocecoaman.2023.106498>
- Department for International Development. (1999). Sustainable livelihoods guidance sheets. DFID
- Donesia, E. A., Widodo, P., Saragih, H. J. R., Suwarno, P., & Widodo. (2023). Konsep Blue Economy Dalam Pengembangan Wilayah Pesisir dan Wisata Bahari di Indonesia. *Jurnal Kewarganegaraan*, 7(2), 1950–1959.
- Kusumadewi, S. D., Purnomo, H., Nadhira, S., & Putrizulfan, R. (2024). Systematic review on the implementation of mangrove community-based restoration in Indonesia and beyond. *IOP Conference Series: Earth and Environmental Science*, 1315(1), 012052. <https://doi.org/10.1088/1755-1315/1315/1/012052>
- Le, H. D., Tran, T. M. A., Thi Hao, N., Thuy Phuong, N., & Thanh Thao, N. (2025). Determinants of Mangrove Dependence and Implications for Sustainable Livelihoods: Insights from Xuan Thuy National Park's Buffer Zone. *Journal of Sustainable Forestry*, 44(10), 1033–1056. <https://doi.org/10.1080/10549811.2025.2567973>
- Lee, K. H., Noh, J., & Khim, J. S. (2020). The Blue Economy and the United Nations' sustainable development goals: Challenges and opportunities. *Environment International*, 137, 105528. <https://doi.org/10.1016/j.envint.2020.105528>
- Majesty, K. I., & Fadmastuti, M. (2018). Degree of community participation in mangrove resources management as livelihood support in West Java, Indonesia. *E3S Web of Conferences*, 74, 10005. <https://doi.org/10.1051/e3sconf/20187410005>
- Mardiansyah, M., Amin, B., Effendi, I., & Efizon, D. (2025). Alternative Livelihoods in Mangrove Protection on Bengkalis Island, Riau Province. *Egyptian Journal of Aquatic Biology and Fisheries*, 29(6), 3229–3247. <https://doi.org/10.21608/ejabf.2025.449593.7166>
- Melana, D. M., Melana, E. E., & Mapalo, A. M. (2000). Mangrove Management and Development in the Philippines. *Proceedings of the Meeting on Mangrove and Aquaculture Management* (pp. 53-71). SEAFDEC Aquaculture Department
- Mursyid, H., Daulay, M. H., Pratama, A. A., Laraswati, D., Novita, N., Malik, A., & Maryudi, A. (2021). Governance issues related to the management and conservation of mangrove ecosystems to support climate change mitigation actions in Indonesia. *Forest Policy and Economics*, 133, 102622. <https://doi.org/10.1016/j.forpol.2021.102622>
- Naika, R., & Pawar, S. (2026). Women-led and rural sustainable agricultural livelihoods pathways to

- achieving sustainable development goals by 2030. *Discover Global Society*, 4(1). <https://doi.org/10.1007/s44282-025-00313-2>
- Phelan, A., Ruhanen, L., & Mair, J. (2020). Ecosystem services approach for community-based ecotourism: towards an equitable and sustainable blue economy. *Journal of Sustainable Tourism*, 28(10), 1665–1685. <https://doi.org/10.1080/09669582.2020.1747475>
- Praptiwi, R. A., Maharja, C., Fortnam, M., Chaigneau, T., Evans, L., Garniati, L., & Sugardjito, J. (2021). Tourism-based alternative livelihoods for small island communities transitioning towards a blue economy. *Sustainability*, 13(12), 6655. <https://doi.org/10.3390/su13126655>
- Rahman, W. W., Husen, A., & Seta, A. K. (2024). Community Based Management of Sustainable Mangrove Ecosystems in Kendari City, Southeast Sulawesi. *Eduvest - Journal of Universal Studies*, 4(11), 10057–10075. <https://doi.org/10.59188/eduvest.v4i11.1451>
- Scones, I. (1998). Sustainable rural livelihoods: A framework for analysis (IDS Working Paper 72). Institute of Development Studies.
- Smith-Godfrey, S. (2016). Defining the blue economy. *Maritime Affairs*, 12(1), 58–64. <https://doi.org/10.1080/09733159.2016.1175131>
- Statistics Bekasi Regency. (2025). *Muaragembong District in Figures 2025*.
- Suryawan, I. W. K., Rahman, A., Suhardono, S., Nguyen, V. V., & Lee, C. H. (2025). Green-blue workforce readiness for mangrove conservation: Community competency clusters and participatory drivers in Indonesia. *Forest Policy and Economics*, 178, 103593. <https://doi.org/10.1016/j.forpol.2025.103593>
- Wasik, Z., Gunawan, S., & Handriana, T. (2024). Blue Economy and the Impact of Industrialisation on Sustainable Livelihoods: A Case Study of Fisheries in the North Coastal Region of Java. *Journal of Ecohumanism*, 3(8), 2729–2744. <https://doi.org/10.62754/joe.v3i8.4925>
- Zorini, L. O., Contini, C., Jiddawi, N., Ochiewo, J., Shunula, J., & Cannicci, S. (2004). Participatory appraisal for potential community-based mangrove management in East Africa. *Wetlands Ecology and Management*, 12, 87–102.