

ASSESSING THE POTENTIAL OF RURAL-BASED BLUE ECONOMY DEVELOPMENT: EVIDENCE FROM DEMAK REGENCY, CENTRAL JAVA, INDONESIA

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Abstract

The Blue Economy represents a strategic pathway for coastal regions to generate economic growth while sustaining marine ecosystems. In Indonesia, village-based Blue Economy development remains underexplored, particularly in coastal areas where local livelihoods are increasingly shifting toward marine resources. This study aims to identify the potential for village-based Blue Economy development in Demak Regency, Central Java, and to develop a sustainable coastal economic development model. This study applies the Social Business Model Canvas (SBMC) and a three-stage ecosystem framework, with primary data collected through in depth interviews, focus group discussions, and field observations in Betahwalang and Bedono Villages from July to August 2025. The findings show that village-based Blue Economy development in Demak follows two main pathways: a production- and supply chain-focused model centered on blue swimming crab in Betahwalang, and an ecological restoration and community-based mangrove model in Bedono. The blue swimming crab enterprise improves market access and cash flow for fishers but remains vulnerable to weak bargaining power and external price dependence. Meanwhile, mangrove rehabilitation generates strong social and ecological benefits but requires sustained institutional and financial support. The study concludes that achieving long-term sustainability depends on strengthening production capacity, broadening market access, increasing value-added activities, and reinforcing institutional support.

Keywords: Blue Economy, Village-based development, Social Business Model Canvas, Coastal communities, Sustainable Coastal Economy

INTRODUCTION

The Blue Economy can be defined as an ocean-based or maritime economy that refers to the sustainable utilization of marine resources to promote economic growth, improve community livelihoods, and maintain the health of marine ecosystems (GGGI & OECS, 2021). The concept began to gain prominence in the early 2000s and was introduced by Gunter Pauli in his book “The Blue Economy: 10 Years, 100 Innovations, 100 Million Jobs”. In his book, Pauli explains that this model was designed to overcome the limitations of the Green Economy concept. The Green Economy approach often requires higher costs, relies heavily on subsidies, and may generate unintended consequences, such as environmental degradation caused by the production of supposedly environmentally friendly materials. In contrast, the Blue Economy emphasizes systemic transformation, enabling economic activities to generate tangible benefits for both the environment and society (Pauli, 2010).

Table 1. Geographic and Sovereignty Conditions of Indonesia

Parameter	Area/Number
Land Area of Indonesia	1,892,410.09 km ²
Sea Area of Indonesia	6.4 million km ²
Sovereign Area	3.4 million km ²
Territorial Sea	290,000 km ²
Total Sovereign Area	6,070,000 km ²
Exclusive Economic Zone (EEZ)	3,000,000 km ²
Coastline Length	108,000 km
Number of Islands	17,001 (16,671 verified by UN)
Outer Small Islands	111

Source: Adapted from Pushidrosal (2026)

In 2020, global fisheries and aquaculture production reached a record high of 214 million tons, largely driven by the rapid expansion of the aquaculture sector, particularly in Asia (FAO, 2022). Indonesia, a country with the sixth-largest Exclusive Economic Zone (EEZ) in the world, covering approximately 3,000,000 km², possesses significant potential for the development of its marine economy (BIG, 2026). This sector has become a strategic pillar for generating income and creating employment through various activities such as capture fisheries, aquaculture, and fish processing, which collectively contribute approximately 83% of the total value of the marine sector (The Ministry of Marine Affairs and Fisheries, 2021).

One of the key challenges that requires greater attention is how to maximize the output of the Blue Economy concept. Challenges also arise from sustainability aspects, such as the COVID-19 pandemic, which hindered Indonesia's progress toward achieving Sustainable Development Goal (SDG) 14, which focuses on the conservation and sustainable use of oceans and marine resources (UNDP, 2026). Therefore, comprehensive and coordinated efforts are required to ensure that Indonesia's marine economic potential can be optimally utilized without compromising the sustainability of marine ecosystems (World Bank, 2021). This potential is further supported by Indonesia's geographical characteristics as an archipelagic state, which has adopted the Indonesia Blue Economy Roadmap 2023–2045 as a strategic vision for marine-based development (UN, 2026).

Although this vision has provided motivation to promote the Blue Economy concept, the implementation of the Blue Economy, particularly in Central Java, remains suboptimal and has not yet fully reflected sustainability aspects evenly across its coastal areas (Juliyanti, 2025). This is further supported by the negative consequences of the northern coastal toll road development project, one of which is the conversion of agricultural land (Fakhrudin and Gultom, 2021). This consequence has encouraged a shift from agriculture toward the Blue Economy by utilizing existing marine potential, especially in areas displaced by the toll road project. According to Suraji et al. (2025), toll road infrastructure tends to generate greater benefits for urban areas and industrial zones than for rural areas.

Several previous studies have examined the concept of the Blue Economy, particularly in the northern coastal areas of Java Island, including Central Java. For example, a study by Ujianti et al. (2024) analyzed the potential of a fisheries-based Blue Economy in Central Java, but the analysis was limited to the fisheries sector. In addition, Juliyanti (2025) mapped and analyzed the gap between Blue Economy potential and the achievement of local development in the northern coastal region of Central Java. Research on the Blue Economy in Central Java is further supported by findings indicating that the implementation of the Blue Economy can significantly enhance the marine tourism sector in Semarang (Pasaribu et al., 2025). Despite these studies, the discussion of a village-based Blue Economy remains limited. Previous research has primarily focused on analysis at the city or district level and has not specifically examined the dynamics at the village level.

This study qualitatively examines efforts to maximise the potential of the Blue Economy in Demak Regency, Central Java Province, with a particular focus on village-based development. Demak

Regency is considered a relevant study area because there are indications of a shift in community economic activities that are increasingly oriented toward the utilisation of marine resources, while many coastal economic activities remain embedded in local communities and village economic structures. To analyse this condition, the study employs two complementary analytical lenses. First, it uses the Social Business Model Canvas (SBMC) to identify how village-based Blue Economy activities create value, organise resources, build market relations, manage financial aspects, and generate social benefits. Second, it applies a three-stage ecosystem perspective, as illustrated in Figure 1, to understand how village-based economic activities develop over time. The first stage is initiation, which involves the roles of the community, universities, and government in encouraging the emergence of village-based economic activities. The second stage includes the provision of infrastructure and product development to enhance production capacity and increase the added value of local economic potential. The final stage is the involvement of the private sector, which plays a role in strengthening both demand and supply, as well as developing supply chains so that village economic activities can grow more sustainably. This combined approach allows the study to capture both the internal structure of village-based Blue Economy activities and the broader developmental process through which they evolve, and it is also aligned with the development policy direction of Central Java towards 2028, which emphasises the strengthening and equalisation of an economy based on village potential (Government of Central Java Province, 2025).

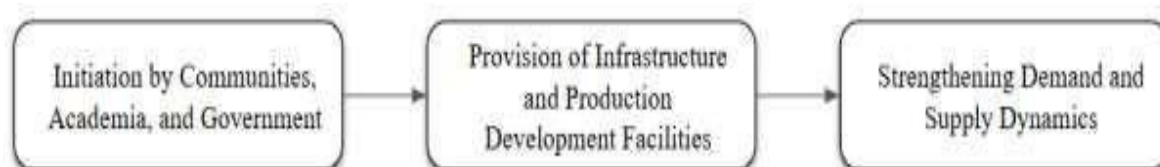


Figure 1. Three-Stage Ecosystem Analysis (Lu et al., 2014), modified for the research need

Different from previous studies that focused on the Blue Economy from a general perspective, primarily at the sectoral level or through comparative analyses across cities or regions, this study introduces several elements of novelty. First, this study places villages as the primary unit of analysis, allowing for a closer examination of coastal economic dynamics that are directly connected to local community activities. Second, this research employs a qualitative approach using the Social Business Canvas framework with several type of business and interviews to analyze how marine-based economic activities can be developed as sustainable social business models. Third, this research focuses specifically on Demak Regency as a single case study, enabling a more comprehensive analysis of the potential, challenges, and opportunities for marine economic development at the village-level. Accordingly, this study aims to identify the potential for developing a village-based Blue Economy in Demak Regency and to formulate a sustainable coastal economic development model through the Social Business Canvas approach. The findings of this research are expected to contribute to local governments and coastal communities in their efforts to develop sustainable Blue Economy activities.

Data and Study Area

This study uses primary data obtained from the analysis of the Social Business Model Canvas and interviews with several business practitioners applying the Blue Economy concept. The data were collected during the period from 1 July to 31 August 2025 in two areas of Demak Regency, namely Betahwalang Village in Bonang District and Bedono Village in Sayung District, as shown in Figure 2. These two districts were selected because they have a strong business base in both aquaculture and capture fisheries. In Sayung District, aquaculture production in 2024 reached 3,539,862 kg, with the largest contribution coming from pond aquaculture amounting to 2,681,993 kg, valued at IDR 81.09 billion. In capture fisheries, one of the most notable commodities was blue swimming crab, with a production volume of 61,556.99 kg and an estimated value of IDR 4.63 billion (BPS Demak Regency, 2025). In Bonang District, total aquaculture production reached 11,147,371 kg, including pond aquaculture production of 2,593,931 kg valued at approximately IDR 78.43 billion (BPS Demak Regency,

2025). The respondents were purposively selected from among local business actors whose activities are associated with the Blue Economy and who are considered to have the potential to contribute to local economic development. Their experiences and business practices constitute the primary empirical basis for analysing how Blue Economy initiatives operate and develop in the coastal context of Demak Regency.

RESEARCH METHODS

This study adopts a qualitative approach using the Social Business Model Canvas (SBMC) framework to analyse the potential for village-based Blue Economy development in Demak Regency. The SBMC framework was chosen because it enables the integration of economic and social dimensions within a single business model structure. In contrast to the conventional business model canvas, which is primarily oriented towards product-based profitability, SBMC incorporates additional elements such as social innovation, community benefits, and reinvestment into society, making it more suitable for examining business models that are closely linked to regional development and local community empowerment (Awirya et al., 2023). The SBMC concept has also been applied in several previous studies. For example, Purnomo et al. (2020) used SBMC to describe and measure the social impact of a community empowerment programme based on agro-industry, so that the business model was assessed not only from an economic perspective but also in terms of the distribution of the social benefits generated. Meanwhile, Supandi and Susilowati (2024) used SBMC to map the business model of a social enterprise start-up into strategic building blocks that could serve as a basis for business development decision-making. The findings from these studies indicate that SBMC is relevant as an analytical tool for examining business models that are oriented not only towards profit, but also towards social impact, local community strengthening, and sustainability.

Within this study, SBMC functions as the main analytical instrument for mapping the ecosystem of marine-based economic activities emerging in the coastal areas of Demak Regency. Findings from field observations and in-depth interviews were translated into the 13 elements of the SBMC framework which capture in Figure 3. These elements were then further analysed and organised into five broader dimensions: value proposition, market, implementation, finance, and social (Awirya et al., 2023). Through this analytical structure, the study seeks to identify not only the economic logic underpinning Blue Economy-based enterprises, but also the extent to which such enterprises generate social value for coastal communities. More specifically, the use of SBMC in this study is intended to illustrate how marine-based economic activities may evolve into sustainable social business models at the village level. The framework also enables an assessment of how these activities contribute to local livelihoods, community welfare, and the strengthening of the local economic ecosystem. Accordingly, SBMC provides a more comprehensive basis for understanding strategies for village-based Blue Economy development in Demak Regency.



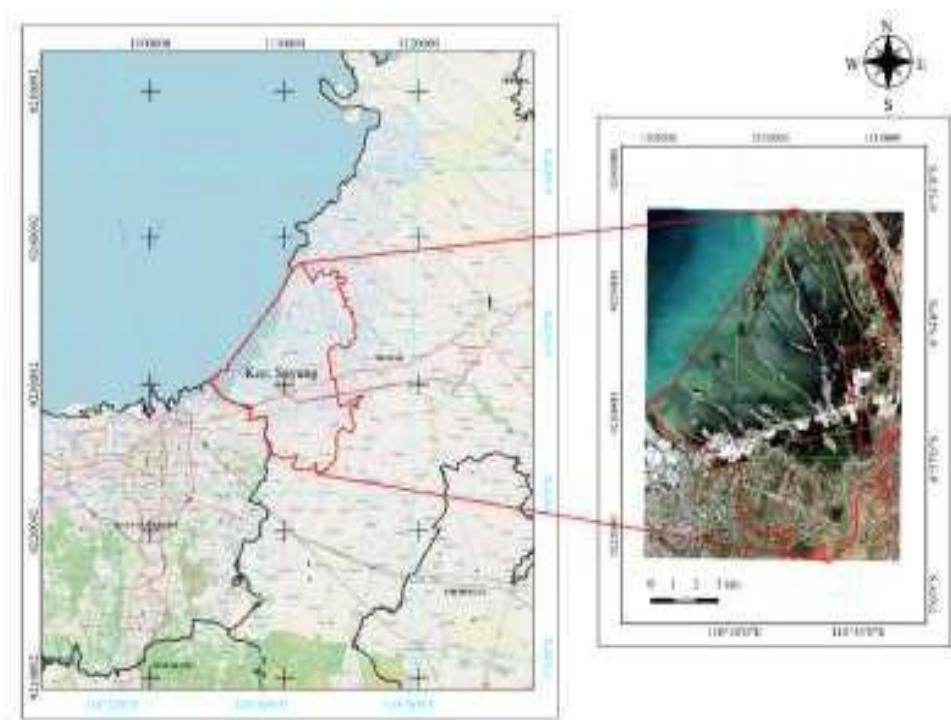


Figure 2. Study Area. Source: OpenStreetMap, accessed on 25 March 2026

In addition to the SBMC framework, this study also employs a three-stage ecosystem approach, as illustrated in Figure 1, consisting of: (1) initiation, (2) provision of infrastructure and production development facilities, and (3) strengthening of demand and supply. These three stages are understood as a sequential process through which Blue Economy activities emerge, expand, and become embedded within a rural economic setting. The first stage emphasises the role of local initiative and stakeholder engagement in triggering economic activities. The second stage concerns the provision of supporting facilities, productive infrastructure, and capacity development needed to sustain production. The third stage focuses on the strengthening of market demand and supply capacity as a determinant of long-term business viability. In this study, particular attention is given to the demand and supply stage, as this phase is critical to business sustainability. At this stage, the continuity of Blue Economy-based enterprises depends on the ability of business actors to develop market access, maintain product quality and consistency, and align production capacity with consumer demand. Therefore, the interview findings are discussed not only through the SBMC elements, but also through their position within the three-stage ecosystem. This approach allows the study to capture both the internal structure of the business model and the broader developmental process through which Blue Economy initiatives can be strengthened in village-based coastal communities.

RESULTS AND DISCUSSION

Overview of the Village-Based Blue Economy in Demak Regency

Bedono Village in Sayung District and Betahwalang Village in Bonang District were selected as the study areas because they represent two distinct trajectories of coastal economic development, both of which are strongly rooted in the village economic structure. Bedono is a coastal village directly bordering the Java Sea, covering an area of 7.61 km², located approximately 4 km from the district center and 18 km from the regency center. In 2024, it had a population of 3,180, with a population density of around 417.81 people per km². Meanwhile, Betahwalang covers an area of 5.54 km², is located about 8 km from the district capital and 14 km from the regency capital, borders Wedung District to the north, and had a population of 5,838, with a density of approximately 1,054.74 people per km². Administratively, Bedono consists of 7 hamlets, 5 neighborhood associations (RW), and 18 community units (RT), whereas Betahwalang consists of 4 RW and 26 RT. These differences reflect that

Bedono faces greater ecological pressure with a lower population density, while Betahwalang has developed as a denser coastal village with stronger linkages to marine production and seafood trade activities (BPS Demak Regency, 2025).

In Bedono, practices aligned with the Blue Economy concept have emerged as a response to ecological crisis. The management of Bedono Mangrove Forest Tourism Village has been documented as a community-based model oriented toward the utilization of local potential and the strengthening of village institutions. The study also shows that the development of mangrove tourism cannot be separated from the significant impacts of coastal abrasion and tidal flooding, making conservation an integral part of the economic adaptation strategy of coastal communities (Sari & Rifai, 2020). In 2025, the Demak Regency Government reaffirmed this direction by promoting the development of Bedono ecotourism through mangrove rehabilitation programs and the strengthening of tourism villages based on ecotourism. Thus, the Blue Economy in Bedono has evolved through a combination of coastal restoration, the utilization of ecosystem services, and environmentally based tourism activities. In contrast to Bedono, Betahwalang demonstrates a more commodity-based trajectory centered on value chain strengthening. On this foundation, blue swimming crab has developed as the leading commodity driving the village economy. At the district level, blue swimming crab production in Bonang reached 627,680.50 kg, valued at approximately IDR 46.84 billion in 2024, while aquaculture production reached 11,147,371 kg (BPS Demak Regency, 2025). These figures are further complemented by evidence of its contribution to national exports, with average landings in the village reaching 176 tons per year (Agustina et al., 2014). This indicates that Betahwalang is embedded in a coastal economic system that is already developed and relatively large-scale in its utilization of marine resources.

In Betahwalang Village, the highest-quality blue swimming crab, or first-grade product, is directed to export markets, whereas meat that does not meet export standards, or second-grade product, is sold only in the domestic market at a much lower price (Agustina et al., 2014). Beyond blue swimming crab, the mangrove ecosystem in Betahwalang also has substantial economic value, estimated at IDR 1.51 billion per year, highlighting its important role in supporting the sustainability of the coastal economy (Santri & Pribadi., 2020). Therefore, the Blue Economy in Betahwalang has developed through a combination of blue swimming crab harvesting, supply chain strengthening, and support from the mangrove ecosystem.

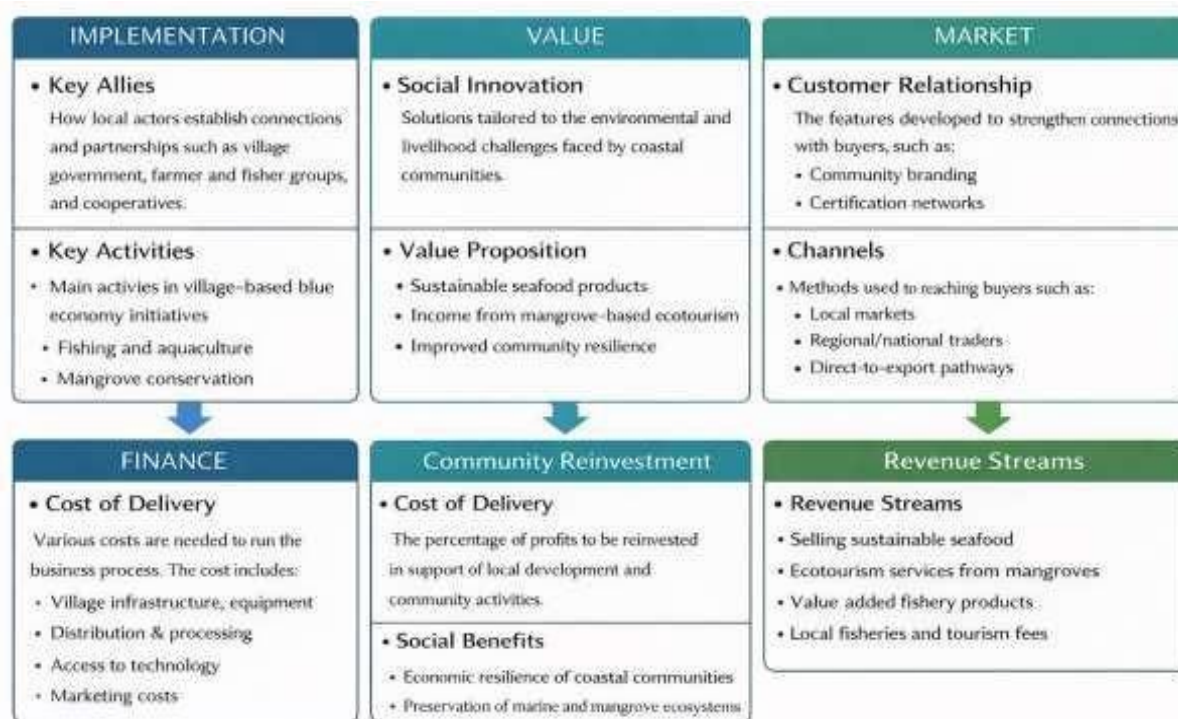


Figure 3. Social Business Model Canvas Aspects, adapted from Awirya et al. (2023), modified

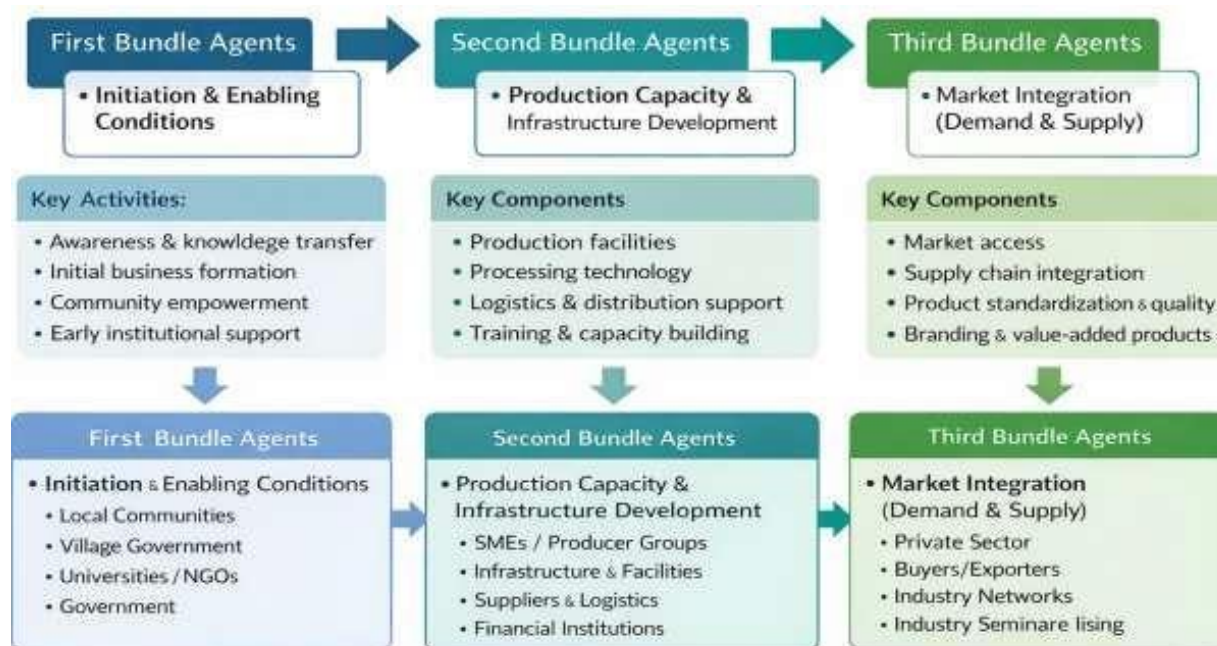


Figure 4. Villaged-Based Blue Economy Ecosystem, adapted from Lu et al. (2014), modified

Mapping the Social Business Model Canvas of Village-Based Blue Economy Enterprises

The mapping of the Social Business Model Canvas (SBMC) in this study was developed based on the results of in-depth interviews and focus group discussions (FGDs) conducted with business actors, local communities, and supporting actors in Betahwalang Village and Bedono Village. Through the interviews, this study captured information regarding business patterns, inter-actor relationships, key resources, operational challenges, as well as the economic and social benefits generated from coastal-based activities. Meanwhile, the FGDs were used to enrich the understanding of the position of each enterprise within the village economic ecosystem, including the relationships among business actors, community groups, village government, and other supporting parties.

The results of the interviews and FGDs were then identified and mapped into the elements contained in the SBMC framework. In this study, these elements are not only interpreted as components of a business model, but also as a tool for understanding how village-based Blue Economy activities are carried out, developed, and generate benefits at the local level. To facilitate interpretation, the SBMC analysis is grouped into five main aspects, namely value, implementation, market, finance, and social. Through these five aspects, the study is able to examine not only how an enterprise generates economic value, but also how it relies on local resources, builds market relationships, manages financing, and produces social impacts for coastal communities.

Although the field findings identified several forms of enterprises and initiatives related to the Blue Economy, the core discussion in this section focuses on the two most representative cases. First, the Mas Dafi Blue Swimming Crab Enterprise was selected to represent the fisheries/seafood sector because it illustrates how coastal commodities, particularly blue swimming crab, are connected to broader market networks through village-level collection and distribution mechanisms. Second, Community-Based Mangrove Rehabilitation was selected to represent the mangrove sector because it demonstrates how the ecological functions of mangroves can be translated into a community-based socio-economic model. These two cases are considered capable of reflecting the two main orientations of village-based Blue Economy in the study area, namely a commodity- and supply chain-oriented approach on the one hand, and a conservation- and ecological function-strengthening approach on the others.

Social Business Model Canvas in the Fisheries Sector: Mas Dafi Blue Swimming Crab Enterprise

Based on the results of the in-depth interviews and FGDs, the Mas Dafi Blue Swimming Crab Enterprise represents a village-based Blue Economy business model that is rooted in capture fisheries,

particularly blue swimming crab. In this context, the business does not function merely as a trading actor, but also as a key intermediary between small-scale fishers at the village level and larger markets outside the production area. This position makes the enterprise important within the coastal economic ecosystem, as it not only absorbs catches but also helps maintain the smooth flow of goods and liquidity at the local level. As shown in Figure 5, the researcher analyzed the results of the SBMC mapping across several aspects.

Social Business Model Canvas: Mas Dafi Blue Swimming Crab Enterprise

SOCIAL MISSION				
IMPLEMENTATION		VALUE	MARKET	
Key Allies	Key Resources	Social Innovation	Customer Relationship	Channels / Relationships
- Blue swimming crab fishers in Betalawing and nearby villages - Village authorities, informal labor, transport providers, and larger processors or factories - Local community groups that help maintain coordination and social trust within the supply chain	- A collection point for buying, sorting, washing, boiling, and temporarily storing crab before shipment - Picking vehicle, boiling equipment, containers, water access, and basic cooking capital - Macapagal know-how, buyer contacts, and operational expertise familiar with grading and handling crab	- Providing an accessible village-based aggregation point so fishers can sell small catches quickly without searching for distant buyers - Offering fast liquidity that helps fishers sustain daily fishing operations and working capital turnover - Creating a local coordination node that links scattered fishers with larger downstream markets	- Stable and repeated transactions with larger buyers that require regular raw crab supply - Trust-based relations with fishers, built through quick payment, routine collection, and daily communication - Operational reliability is more important than branding because the business serves both suppliers and downstream buyers	- Direct procurement from fishers - Phone and WhatsApp communication for timing, prices, and buyer coordination - Shipment to larger processors outside the village through established trade networks
	Key Activities	Value Proposition	Consumer Benefits	
	- Preserving crab from fishers, sorting by quality and size, boiling, handling, and dispatching to larger buyers - Coordinating daily collection schedules, price communication, and transport logistics - Maintaining relationships with both fishers upstream and processors downstream	- Fast market access and immediate cash turnover for fishers with small and fluctuating catches - A dependable village-based intermediary that reduces fishers' transaction costs and marketing uncertainty - Basic processing and aggregation that make local catches acceptable for larger buyers	- Fishers do not need to market small catches individually or travel to urban buyers - Immediate liquidity supports fuel purchases, supplies, and the next fishing trip - Downstream buyers gain a more organized and regular village-level supply channel	
FINANCE				
Cost of Delivery		Community Reinvestment	Revenue Streams	
- Variable costs dominate, including electricity, diesel, fuel, water, transport, handling materials, and labor - Basic fixed costs include space maintenance, equipment upkeep, and simple administrative spending - Working capital requirement is high because purchases from fishers must be paid quickly		- Reinvestment remains limited and mostly informal, such as maintaining local operations, retaining labor, and supporting village social relations - There is potential to strengthen reinvestment through local facilities, fisher support, training, or better handling equipment	- Primary income comes from selling aggregated crab to larger processors or factories - Margins depend on the spread between the purchase price paid to fishers and the selling price to buyers - Business continuity is highly sensitive to price movements and volume fluctuations	
SOCIAL				
Social Risk			Social Benefits	
- Variable competition among local enterprises may weaken village-level coordination and trigger price-based rivalry - If factory purchase prices fall, the lower price is often transmitted back to fishers - Dependence on a single community and external buyers limits diversification and bargaining power			- Supports daily cash flow for fishers and helps sustain local fishing livelihoods - Keeps marine-based economic circulation active within the village - Strengthens the role of the village as a node in the broader blue swimming crab supply chain	

Figure 5. SBMC in the blue swimming crab business, source: processed data.

In terms of value, the main value offered by this enterprise lies in its ability to provide fishers with fast and relatively certain market access. In practice, the value generated consists not only of blue swimming crab as a commodity, but also of easier transactions, more certain absorption of catches, and faster circulation of money. For fishers, the presence of a collector such as Mas Dafi reduces the burden of having to find buyers on their own, especially when catches are still small in volume and unstable. Thus, the value proposition of this enterprise is derived largely from the efficiency of its distribution function and the reduction of market uncertainty at the village level.

In terms of implementation, this enterprise is supported by resources that are relatively simple yet strategic. Its main resources include an operating space, transport vehicles, initial handling equipment, labor, and a network of relationships with fishers and buyers. Its main activities include purchasing blue swimming crab from fishers, sorting, boiling, initial handling, and shipping to larger buyers. The key partners that emerge in this model are blue swimming crab fishers, village actors, informal workers, and large buyers or factories outside the village. This pattern shows that the implementation of the business depends heavily on field coordination and social proximity, while at the

same time still facing capacity limitations, particularly in terms of more advanced handling facilities and downstream development opportunities at the village level.

In terms of the market, this enterprise has a relatively clearer market than many other small coastal businesses, because it is already connected to large buyers and factories outside the village. Customer relationships in this model are not oriented toward end consumers, but rather toward business-to-business relationships with buyers that require a regular supply of raw blue swimming crab. Nevertheless, this market clarity is not always accompanied by strong bargaining power. Prices are still largely determined by actors outside the village, meaning that the business remains highly dependent on broader market mechanisms. On the upstream side, relationships with fishers are built through repeated transactions, trust, and quick payment. Therefore, the market for this enterprise can be said to be fairly stable in terms of its network, but still vulnerable in terms of price control and bargaining power.

From a financial perspective, a blue swimming crab business of this kind has characteristics that differ from those of household-scale processing enterprises. Its main cost needs are largely dominated by variable costs, such as the purchase of blue swimming crab, fuel, electricity, water, transport, and other daily operating expenses. In addition, the business also requires substantial working capital because fishers' catches must be paid for quickly. Revenue streams are derived from the sales margin earned by selling blue swimming crab to larger buyers, meaning that business sustainability is highly sensitive to fluctuations in purchase and selling prices. Within the SBMC context, the community reinvestment aspect of this enterprise still appears limited and relatively informal, for example in the form of maintaining local operations, providing relational support to fishers, or sustaining the circulation of economic space within the village. In other words, socio-economic benefits are indeed present, but they have not yet been fully translated into structured reinvestment mechanisms.

In social terms, the benefits generated by this enterprise are quite tangible for fishing communities. It helps maintain fishers' cash flow, accelerates the turnover of working capital, and makes catches easier to absorb into the market. On a broader scale, it also strengthens the village's position as part of the blue swimming crab supply chain in the coastal area of Demak. However, these benefits coexist with fairly clear social risks. Competition among collectors may trigger volatile price dynamics, while price changes from larger buyers often directly affect the prices received by fishers. Dependence on a single commodity also makes the enterprise vulnerable to market shocks and limited diversification. Thus, the SBMC interpretation shows that the Mas Dafi Blue Swimming Crab Enterprise is a strong business model as a distribution node and provider of local liquidity, but still weak in terms of bargaining power and value-added development at the village level.

Social Business Model Canvas in the Mangrove Sector: Community-Based Mangrove Rehabilitation

In contrast to the blue swimming crab business model, which is centered on commodities and market distribution, Community-Based Mangrove Rehabilitation represents a form of village-based Blue Economy that is grounded in the ecological function of mangroves as the foundation of coastal economic sustainability. In this context, mangrove rehabilitation cannot be understood merely as a conservation activity, but rather as part of a socio-economic model that generates collective benefits for the village. Therefore, the SBMC presented in Figure 6 is more appropriately interpreted as a model that strengthens the supporting ecosystem of the village economy, rather than simply as a commercial business in the conventional sense.

Social Business Model Canvas: Community-Based Mangrove Rehabilitation

SOCIAL MISSION				
IMPLEMENTATION		VALUE	MARKET	
Key Allies	Key Resources	Social Innovation	Customer Relationship	Channels / Relationships
• Village government, mangrove farmer groups, environmental NGOs, schools, students, and local residents • Community leaders and tourism actors who connect rehabilitation with education and local livelihood opportunities • Public and private supporters involved in seedling provision, campaigns, or collaborative planting events	• Mangrove seedlings, planting tools, simple monitoring equipment, and access to rehabilitation sites • Community labor, student participation, local ecological knowledge, and organizational capacity for collective action • Social legitimacy, village networks, and the ability to mobilize public awareness around coastal protection	• Combining mangrove rehabilitation with environmental education, coastal health awareness, and collective village action • Transforming conservation from a one-off activity into a community-based program linked to resilience and livelihood recovery • Using rehabilitation as a platform for education, ecotourism, and public participation rather than treating it only as planting activity	• Citizen engagement is built through mutual cooperation, participatory monitoring, school activities, and environmental campaigns • The initiative relies on social participation and repeated involvement rather than a conventional buyer-seller relationship • Trust is maintained through visible environmental outcomes, community ownership, and collaborative events	• Mass planting campaigns, village meetings, school outreach, social media campaigns, and educational tourism activities • Partnership channels with NGOs, universities, local government programs, and community groups • Demonstration plots and field-based learning sites that make rehabilitation visible and accessible
	Key Activities	Value Proposition	Consumer Benefits	
	• Seedling preparation, mangrove planting, maintenance, survival monitoring, and site protection • Environmental education, school-based outreach, coastal health awareness, and community training • Developing simple conservation procedures and encouraging participatory monitoring by local residents	• A more resilient village, healthier coastal ecosystems, and stronger public awareness of environmental stewardship • Protection of marine habitat and improved ecological conditions that support longer-term village livelihoods • A foundation for linked activities such as education, ecotourism, and nature-based local development	• Residents benefit from a healthier environment, cleaner air, better coastal protection, and stronger ecological awareness • Schools and visitors gain educational value through direct exposure to conservation practices • The village gains wider opportunities for ecotourism and community-based environmental initiatives	
FINANCE				
Cost of Delivery		Community Reinvestment	Revenue Streams	
• Seedling purchase or nursery development, tools, transport, educational campaigns, training, and monitoring costs • Maintenance costs are significant because replanting alone is insufficient without follow-up care and site protection • Program sustainability depends on labor commitment, coordination time, and periodic external support		• Reinvestment takes the form of seedling maintenance, training, environmental education, community awareness activities, and conservation tourism support • Any surplus or support obtained can be redirected to nursery development, monitoring, and broader village participation	• Revenue is not fully commercial and may come from donations, educational tourism tickets, planting programs, and local souvenir sales • Financial value is partly indirect, through stronger ecological protection and future livelihood opportunities	
SOCIAL				
Social Risk		Social Benefits		
• Low participation, weak long-term maintenance, and planting fatigue may reduce program effectiveness • Climate change, abrasion, and tidal dynamics can undermine survival rates and increase replanting needs • If linked economic benefits remain unclear, public participation may decline over time		• Recovery of coastal ecosystems, stronger village resilience, and greater environmental awareness across community groups • Broader social participation, including youth, women, and local residents who may not be directly involved in planting • Longer-term support for blue economy activities by protecting the ecological base on which coastal livelihoods depend		

Figure 6. SBMC in the mangrove sector, source: processed data.

In terms of value, the main value generated by this model lies in its ability to create ecological and social benefits simultaneously. Mangrove rehabilitation functions not only to restore the coastal environment, but also to strengthen village resilience to abrasion, protect habitats for marine life, increase environmental awareness, and open opportunities for the development of education and nature-based tourism. In other words, the value proposition of this model is collective and long-term in nature. The value created is not merely a product that can be sold directly, but rather a healthier ecological condition and a social space that enables other economic activities to develop more sustainably.

In terms of implementation, the main strength of this model lies in the community's capacity for social mobilization and collective action. The key partners involved include village government, mangrove farmer groups, environmental NGOs, schools, university students, and local residents. Its main resources consist not only of mangrove seedlings, planting tools, and rehabilitation sites, but also of community participation, local knowledge, social legitimacy, and the ability to organize collective activities. The core activities in this model include seedling preparation, planting, maintenance, participatory monitoring, environmental education, and the strengthening of simple conservation procedures. This shows that the implementation of mangrove rehabilitation depends heavily on sustained participation, not merely on the availability of physical inputs. Therefore, the main challenge is not initiating the activity, but maintaining consistency in care and ensuring that community involvement remains active over the long term.

In terms of the market, this model operates according to a logic that differs from that of a commercial business. Relationships with “customers” are more appropriately understood as relationships with residents, schools, volunteers, campaign partners, and visitors involved in educational or tourism activities. The channels used are also more social and institutional in nature, such as mangrove planting actions, environmental campaigns, school collaborations, social media, and educational tourism. Therefore, the market aspect of this model is not primarily built through direct buying and selling transactions, but through public engagement and the expansion of participation. Even so, there remains economic potential that can develop from this model, for example through educational tourism tickets, mass planting programs, institutional partnerships, and supporting products such as local souvenirs. Thus, the market dimension in mangrove rehabilitation is indirect in nature, but still important because it serves as an entry point for the formation of demand for environmental services and conservation-based economic activities.

From a financial perspective, the mangrove rehabilitation model has a financial structure that tends to be semi-commercial. Its main cost components include the purchase of seedlings, planting tools, educational activities, training, transportation, and monitoring. In many cases, maintenance costs are in fact more important than the initial planting costs, because without sustained care the success rate of rehabilitation will be low. On the other hand, revenue streams are not yet entirely regular or commercial in nature, but rather consist of a combination of donations, planting programs, educational tourism tickets, and the potential sale of souvenirs. In this model, community reinvestment becomes a highly important element, because the support received is generally reallocated to seedling preparation, mangrove maintenance, community training, and the strengthening of public participation. This indicates that the financial orientation of this model is directed more toward ecosystem sustainability and social benefits than toward short-term profit accumulation.

In social terms, the benefits generated by the mangrove rehabilitation model extend far beyond direct economic gains. Mangrove rehabilitation contributes to coastal protection, ecosystem recovery, increased environmental awareness, and the strengthening of village resilience to ecological pressures. In addition, this model also creates broad opportunities for participation by groups that were not always directly connected to marine activities, such as students, youth, volunteers, and local communities involved in education and monitoring. Nevertheless, this model also faces substantial social risks. Community participation may decline if benefits are not immediately visible, while long-term maintenance often becomes a weak point in community-based programs. In addition, climate change, coastal abrasion, and tidal dynamics may further increase costs and reduce the effectiveness of rehabilitation activities. Thus, the SBMC interpretation shows that Community-Based Mangrove Rehabilitation is a Blue Economy model that is particularly strong in its social and ecological dimensions, but it requires high organizational capacity and strong collective commitment in order to ensure that its long-term benefits can truly be sustained.

Village-Based Blue Economy through a Three-Stage Ecosystem

The development of a village-based Blue Economy in this study is understood as a gradual process shaped by the interaction between local actors, production capacity, and market forces. Conceptually, this framework is grounded in the view that ecosystems evolve through interrelated phases, ranging from the formation of initial conditions, to capacity strengthening, and finally to market integration. Lu et al. (2014) show that the evolution of a business ecosystem requires the transformation of stakeholder roles across different stages, while Rong et al. (2015) emphasize that ecosystem formation proceeds through three sequential stages, namely incubating complementors, identifying key partners, and integrating ecosystem actors. In a study more closely related to the empirical context of this research, Awirya et al. (2023) also employ a three-stage approach to examine the development of electric vehicle ecosystems in remote areas. However, to avoid making this discussion overly mechanical, this study also draws on Chen and Hu (2022), who show that ecosystem transitions take place through the processes of path breaking, path creation, and path dependence. Accordingly, the three stages in this study are interpreted not as a fully linear sequence, but as an adaptive process shaped by the villages’ initial conditions, local capacities, and market pressures.

Initiation and the Transformation of the Village Economic Base

The first stage is initiation, namely the phase in which Blue Economy activities begin to emerge in response to changes in local conditions. In the context of this study, initiation is not merely the “starting phase of a business,” but rather the phase in which communities begin to reinterpret coastal resources as a more feasible economic base. In Bedono, initiation tends to emerge from ecological pressures in the form of abrasion, tidal flooding, and the increasingly limited availability of productive living space, which has encouraged the community to develop activities more closely linked to mangroves, coastal tourism, and processed products based on local resources. By contrast, in Betahwalang, the starting point is more strongly rooted in the strength of the blue swimming crab commodity, the already established fishing networks, and the emergence of local actors who connect marine catches to broader markets. In the terminology of Chen and Hu (2022), this phase may be understood as path breaking, namely a moment when local actors begin to move away from older patterns and form a new economic pathway considered more suitable to local conditions.

At this stage, the role of the community becomes dominant, although it does not stand alone. Village governments, community groups, university students, and other facilitating actors function as initial catalysts that help transform local potential into more organized economic activities. This finding is consistent with Lu et al. (2014), who show that the early stage of an ecosystem is supported by the transformation of stakeholder roles, and with Rong et al. (2015), who emphasize the importance of incubating complementary partners before the ecosystem moves toward a more mature stage. This means that the presence of blue swimming crab enterprises, mangrove products, and mangrove rehabilitation initiatives in Demak cannot be understood as isolated phenomena, but rather as the result of an initial process in which local actors begin to build new pathways based on marine and coastal resources.

As reflected in the field interviews, this change has also been directly experienced by local residents. One resident stated: “In the past, people here still relied heavily on rice fields and fishponds, but over time what became closer to everyday life was actually the sea. As conditions on land became more difficult, people began to see blue swimming crab, mangroves, and coastal processed products not merely as supplementary activities, but as their main source of livelihood” (Jumari, personal interview, 2025). This quotation underlines that the initiation of the Blue Economy at the village level emerged as an adaptive response, rather than as a policy suddenly imposed from above.

Provision of Infrastructure and Strengthening of Production

The second stage is the provision of infrastructure and the development of production. In this study, infrastructure is understood broadly, encompassing fishing gear, collection spaces, processing equipment, packaging, training, legal compliance, transaction digitalization, and the social support that enables economic activities to operate more consistently. At this stage, local potential begins to be transformed into production capacity. In Bedono, this can be seen in the development of mangrove- and shellfish-based MSMEs, the strengthening of digital marketing, product branding, and mangrove educational tourism. In Betahwalang, this stage is reflected in the strengthening of fishing gear, collection facilities, blue swimming crab distribution, and the role of actors who connect marine catches to markets outside the village. Within the framework of Chen and Hu (2022), this phase may be interpreted as path creation, namely the stage in which a new pathway that previously existed only as an initial response begins to be built into a more operational system through adjustments in resources, capabilities, and supporting arrangements.

Conceptually, this stage is also aligned with the second bundle agents in Lu et al. (2014) and with the stages described by Awirya et al. (2023), in which ecosystem development depends heavily on the availability of facilities, product development, and support to strengthen supply. In the context of this research, the main bottleneck lies not in the absence of raw materials or business ideas, but rather in the continued limitations of equipment, standardization, processing capacity, legal compliance, and distribution networks. In other words, the villages in fact already possess a resource base and local knowledge, but the elasticity of their production capacity remains low. This helps explain why many

village-based Blue Economy enterprises are able to grow, but are not always able to scale up in a stable manner.

Strengthening Demand and Supply

The third stage is the strengthening of demand and supply, and this becomes the most crucial stage in this study. At this phase, the question is no longer whether communities are able to start a business, but whether the business can survive when confronted with market conditions, supply fluctuations, and quality requirements. In Betahwalang, the demand side is relatively clearer because blue swimming crab is already connected to collectors, factories, and larger buyers. However, clear demand does not necessarily mean a strong market position. On the contrary, dependence on prices formed outside the village leaves local actors with limited bargaining power. Meanwhile, in Bedono, markets for processed mangrove, shellfish, and fish products have indeed begun to emerge through souvenir shops, social media, and tourist flows, but demand has not always been deep or stable. Here it becomes apparent that the two villages face different forms of mismatch: Betahwalang has a clearer market but one that is highly asymmetric, whereas Bedono has more diverse market opportunities but these remain shallow and not yet institutionalized. This condition is consistent with Rong et al. (2015), who show that the integration stage of an ecosystem becomes truly mature only when actors are able to connect with one another more stably in responding to uncertainty in products, demand, and working networks.

On the supply side, the challenges are also substantial. In the blue swimming crab business, the main problems concern catch continuity, price volatility, seasonality, and the need for rapid liquidity. In processed-product businesses, the problems are more closely related to production capacity, consistency of quality, and the ability to meet demand as the market begins to grow. In mangrove-based initiatives, the challenge lies in maintaining a balance between economic utilization and ecological function. Chen and Hu (2022) help explain this condition through the idea of path dependence: once a new economic pathway has been formed, its sustainability will be strongly influenced by the compatibility between local sense-making, resource orchestration, and adaptive capacity. In other words, once village-based Blue Economy enterprises enter the market stage, they can no longer rely solely on community spirit, but require more stable mechanisms so as not to be easily disrupted by shocks in prices, quality, or distribution.

CONCLUSION

Three key conclusions emerge from this study as follows:

1. Village -based Blue Economy development in Demak Regency follows two main pathways. In Betahwalang, development is driven more by commodity-based and distribution-oriented activities, especially blue swimming crab. In Bedono, it is more closely linked to ecological restoration, community participation, and mangrove-based activities. This shows that village-based Blue Economy development depends strongly on local resources and village conditions.
2. The blue swimming crab enterprise plays an important role in supporting local economic circulation, but it remains structurally vulnerable. Its main strengths lie in providing fishers with faster market access, more certain catch absorption, and quicker cash flow. However, its sustainability is still constrained by weak bargaining power, dependence on external buyers, and limited value-added development at the village level.
3. The mangrove-based model generates strong social and ecological benefits, but its long-term sustainability requires stronger institutional support. This model contributes to coastal protection, environmental recovery, and community participation, yet it still depends on continued maintenance, collective commitment, and more stable financial support.
4. The main challenge in village-based Blue Economy development lies not in initiation, but in strengthening production capacity and market sustainability. Both villages already show strong local potential, but the major bottlenecks remain in infrastructure, product quality, market access, and institutional support. Therefore, long-term sustainability depends on the ability to strengthen these supporting factors.

This study also recommends several policy directions as follows:

1. Downstream capacity and value-added development should be prioritized in village-based coastal enterprises. Support is needed for better handling, processing, storage, packaging, standardization, and business legality so that local enterprises are not confined to raw commodity distribution.
2. Policies should strengthen the bargaining position and market access of village business actors. This can be pursued through collective organization, local business cooperation, digital promotion, local branding, and broader access to buyers so that village enterprises are less dependent on external actors.
3. Mangrove-based initiatives require more stable institutional and financial support. Community-based rehabilitation, ecotourism, and other conservation-linked activities should be integrated into local development strategies through maintenance funding, training, partnerships, and stronger village institutions.
4. Village-based Blue Economy development should be integrated into regional coastal planning. Fisheries, tourism, MSMEs, and mangrove conservation need to be linked through coordinated policies so that village-level development is more coherent and sustainable.

Limitations and recommendations for future research

1. This study is limited to two villages in Demak Regency, namely Betahwalang and Bedono. Although both cases provide important insight into different forms of village-based Blue Economy development, the findings cannot yet be generalized to all coastal villages in Central Java or Indonesia, since local ecological, institutional, and market conditions may differ substantially across regions.
2. This study is based primarily on qualitative evidence drawn from interviews, FGDs, and the mapping of local business patterns. As a result, the study does not yet measure more precisely the quantitative effects of village-based Blue Economy development on income, employment, business growth, or environmental performance. The findings therefore provide interpretive and contextual insight, but they do not yet offer a generalized measurement of impact.
3. Future research is recommended to expand both the scope and the analytical approach of the study. Further studies could compare a larger number of coastal villages, include different types of Blue Economy enterprises, and combine qualitative analysis with quantitative approaches in order to assess business performance, social benefits, and environmental outcomes more systematically. Longitudinal research would also be valuable to examine how village-based Blue Economy initiatives evolve over time and how policy intervention affects their long-term sustainability.

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