

The Concept of Blue Economy to Increase Sustainable Economic Resilience in Mangrove Armapala Gresik

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Abstract. This study aims to analyze the implementation of the Blue Economy concept in strengthening sustainable economic resilience in the Mangrove Armapala area of Gresik, Indonesia. Using a qualitative descriptive approach, the research gathers data through observation, interviews, and document analysis from both primary and secondary sources. The findings demonstrate that the application of the Blue Economy contributes to economic diversification, environmental conservation, and community empowerment, leading to improved economic resilience. The study highlights the importance of integrating economic, environmental, and social aspects to achieve sustainable development. Theoretically, it reinforces the relevance of Blue Economy principles and Human Capital Theory. Practically, it offers a model for strengthening coastal economic resilience aligned with the Sustainable Development Goals (SDGs).

Keywords: Blue Economy, Economic Resilience, Sustainable Development, Human Capital Theory

1. Introduction

In the 21st century, global discussions on development have shifted from growth-oriented paradigms toward sustainability-oriented frameworks. Economic development today is not only measured by GDP growth but also by environmental preservation, social inclusion, and long-term resilience [1]. Sustainable development has become a central principle that seeks to ensure that present needs are met without compromising the ability of future generations to meet their own needs. This principle forms the foundation of the Sustainable Development Goals (SDGs), adopted by the United Nations in 2015 as a continuation of the Millennium Development Goals (MDGs). The SDGs comprise 17 goals and 169 targets designed to eradicate poverty, protect the planet, and ensure prosperity for all, between 2016 to 2030 [2].

Among these goals, several have strong alignment with the Blue Economy framework—particularly Goal 1 (No Poverty), Goal 2 (Zero Hunger), Goal 8 (Decent Work and Economic Growth), Goal 12 (Responsible Consumption and Production), Goal 13 (Climate Action), and Goal 14 (Life Below Water) [3]. These interlinked goals highlight that the sustainability of marine and coastal resources is a crucial driver of inclusive and resilient economic growth. As

a maritime nation, Indonesia holds vast potential to implement Blue Economy principles, given its extensive coastline, rich biodiversity, and dependence on marine resources.

The concept of the Blue Economy has gained increasing attention as a comprehensive approach to sustainable development in coastal and marine sectors. It emphasizes the efficient and responsible use of ocean resources to foster economic growth, enhance livelihoods, and preserve environmental integrity [4]. The approach is not limited to fisheries or tourism but extends to renewable energy, marine biotechnology, and sustainable shipping. By promoting innovation, resource efficiency, and ecological protection, the Blue Economy can balance the competing interests of economic expansion and environmental stewardship [5].

In Indonesia, the Blue Economy is recognized as a strategic component in achieving national economic resilience. The Ministry of Marine Affairs and Fisheries has introduced several programs to optimize marine potential through sustainable practices, such as community-based mangrove management, eco-fisheries, and marine tourism. These initiatives align with the broader national agenda to strengthen maritime sovereignty and regional competitiveness [6]. The Blue Economy's emphasis on sustainability and inclusivity makes it a vital instrument for reducing inequality and poverty, particularly in coastal areas where livelihoods depend heavily on marine ecosystems [7].

Previous research underscores the importance of adopting Blue Economy principles in local contexts. Studies in various Indonesian regions demonstrated that Blue Economy-based initiatives could improve community income, strengthen social capital, and enhance environmental awareness [8], [9]. Likewise, research in coastal tourism areas found that the development of marine-based economic activities grounded in Blue Economy principles increased employment opportunities and stimulated local economies while maintaining ecological balance [10]. However, despite these positive outcomes, the effective application of the Blue Economy concept at the community level remains limited by institutional challenges, low awareness, and inconsistent policy implementation [11].

In this context, Gresik Regency—particularly the Mangrove Armapala area—represents an important site for understanding how Blue Economy practices can support sustainable economic resilience. The area is characterized by abundant mangrove ecosystems that provide ecological protection, tourism potential, and natural resources for local livelihoods. Yet, these resources are vulnerable to overexploitation, pollution, and climate change. Implementing Blue Economy principles in such a region requires integrating environmental management with socio-economic strategies that empower local communities.

The purpose of this study is therefore to analyze the concept and implementation of the Blue Economy in strengthening sustainable economic resilience in the Mangrove Armapala Gresik community. Specifically, the research explores (1) how the Blue Economy contributes to economic diversification and community empowerment, (2) the role of environmental

conservation in sustaining local livelihoods, and (3) the policy implications of integrating Blue Economy practices into regional development planning. By adopting a qualitative descriptive approach, this study provides a contextual understanding of how Blue Economy principles can be translated into practical community-level actions. The findings are expected to contribute both theoretically—by reinforcing the relationship between the Blue Economy and Human Capital Theory—and practically—by offering insights for policymakers, researchers, and local stakeholders in promoting sustainable coastal development.

2. Literature Review

Concept of the Blue Economy

The Blue Economy refers to the sustainable use of ocean and coastal resources for economic growth, improved livelihoods, and environmental protection [12]. It integrates economic, social, and environmental objectives to achieve long-term sustainability, ensuring that marine ecosystems continue to provide services for future generations [13]. The concept encompasses various sectors such as fisheries, coastal tourism, renewable energy, maritime transport, and aquaculture. Its success depends on effective governance, innovation, and community participation [14].

Sustainable Economic Resilience

Sustainable economic resilience describes a community's ability to withstand and recover from shocks while maintaining inclusive growth and resource integrity [15]. In coastal regions, resilience depends on the capacity to balance economic activities with environmental protection, particularly through the sustainable management of fisheries, mangroves, and tourism sectors [16].

Human Capital and the Blue Economy

Human Capital Theory asserts that education, knowledge, and innovation are vital for productivity and economic transformation [17]. In the Blue Economy framework, skilled and environmentally aware human capital ensures efficient resource management and sustainable entrepreneurship. Training and capacity building in coastal communities enhance adaptive capacity and foster innovation [18].

Previous Studies

Research on the Blue Economy has shown that sustainable marine-based industries can significantly improve community welfare and environmental quality [19]. Empirical findings also demonstrate that community-based mangrove management increases ecological stability and diversifies household income [20]. Studies in marine tourism further reveal that participatory approaches can generate local employment while maintaining ecosystem

integrity [21]. Despite these benefits, challenges such as limited funding, institutional fragmentation, and inadequate policy support remain prevalent in implementing Blue Economy initiatives [22]. Strengthening governance, enhancing public awareness, and integrating human capital development are therefore essential for sustaining Blue Economy outcomes at the local level.

3. Research Method

This research employs a qualitative descriptive design to examine how the Blue Economy concept is applied in the Mangrove Armapala Gresik area and how it contributes to sustainable economic resilience. This approach enables an in-depth understanding of contextual relationships between people, economy, and the environment [23].

The study site, Mangrove Armapala Gresik, is a community-based mangrove conservation and eco-tourism area located in Gresik Regency, East Java, Indonesia. Participants included local fishermen, tourism entrepreneurs, environmental activists, and community leaders. Their involvement provided diverse perspectives on economic, environmental, and social dimensions.

Data were collected from primary and secondary sources. Primary data were obtained through field observation, semi-structured interviews, and group discussions. Secondary data came from academic journals, institutional reports, and government documents. Triangulation was used to ensure the reliability and accuracy of the data [24].

The study applied thematic analysis following three steps: data reduction, data organization, and interpretation. Data were coded and categorized into four major themes—economic, environmental, social, and policy dimensions—allowing cross-validation across participants and sources [25].

4. Results And Discussion

The concept of the Blue Economy is an approach to economic development that emphasizes the sustainable use of marine and coastal resources. It promotes a balance among economic, social, and environmental dimensions to ensure that marine ecosystems can continue to support human well-being and economic progress. The success of marine-based economic development is therefore not only measured by growth indicators but also by improvements in community welfare, reductions in inequality, and the preservation of environmental quality, such as ocean health and ecosystem sustainability [26].

The Blue Economy represents a new paradigm for achieving economic progress that integrates social inclusion and environmental conservation. Through this framework, sustainable development can be realized while improving community welfare without compromising marine ecosystem integrity for future generations. Mangrove ecosystems play a crucial role in

supporting this concept. They serve as ecological buffers that protect coastlines, provide habitats for biodiversity, and contribute to local livelihoods through fisheries and eco-tourism. In addition to their ecological functions, mangroves hold cultural and social significance for coastal communities. However, these ecosystems face increasing threats from human activities such as deforestation for aquaculture and settlement expansion, as well as the impacts of climate change. In Gresik Regency, the loss of mangrove forests due to pond construction has disrupted ecological balance and reduced natural protection against coastal hazards.

In this context, the implementation of the Blue Economy in Mangrove Armapala Gresik strengthens both environmental sustainability and local economic resilience. Mangrove management and coastal tourism have created new employment opportunities and diversified sources of income, contributing to community empowerment and local economic growth. Based on field interviews and observations, several key aspects were identified regarding the impact of the Blue Economy in the region, including economic, environmental, social, and policy dimensions. The discussion of these aspects is presented as follows:

Economic Dimension

The implementation of Blue Economy initiatives in Mangrove Armapala Gresik has significantly improved local economic diversification. Community members have transitioned from single-source livelihoods such as fishing to multi-sector activities including eco-tourism, handicraft production, mangrove-based product processing, and hospitality services. This diversification aligns with the core objective of the Blue Economy: to achieve inclusive and sustainable growth through optimal utilization of marine and coastal resources [27]. Field observations and interviews show that mangrove-based tourism generates additional income while promoting environmental education for visitors. Micro, small, and medium enterprises (MSMEs) in the area have begun to market eco-friendly products, such as mangrove syrup and organic fertilizer. These innovations strengthen household income security and contribute to regional economic stability.

The economic impact of these activities corresponds with findings in other coastal regions, where Blue Economy practices have increased employment and stimulated entrepreneurship opportunities [28]. Moreover, the integration of community participation and local knowledge supports the concept of endogenous growth, where resilience is driven by local innovation and self-organization rather than external dependence. However, challenges remain regarding access to capital and market expansion. Although the economic potential is significant, limited financing mechanisms and digital marketing literacy hinder scalability. Addressing these constraints requires financial inclusion programs, public-private partnerships, and technology-based market support from the government and academia.

Environmental Dimension

The Blue Economy in Armapala Gresik also strengthens environmental sustainability through mangrove restoration and coastal management. Mangrove ecosystems in this area act as carbon sinks, biodiversity habitats, and natural barriers against coastal erosion. Community-based rehabilitation efforts have increased mangrove coverage and restored ecological balance, demonstrating that economic growth can coexist with environmental protection. The research found that residents participating in conservation activities were more likely to engage in sustainable income-generating programs, such as eco-tourism and aquaculture, than those not involved in environmental efforts. This suggests a positive feedback relationship between environmental awareness and economic resilience.

This result is consistent with global findings showing that mangrove ecosystems play a crucial role in climate adaptation and disaster risk reduction [29]. The integration of local participation into mangrove conservation practices reflects a shift toward co-management governance, where communities share responsibility for resource management with local authorities. Nevertheless, long-term sustainability depends on continuous environmental education and institutional support. Without consistent monitoring and funding, restored ecosystems remain vulnerable to degradation. Hence, embedding environmental management within local economic planning is essential to maintain resilience and reduce ecological risks.

Social Dimension

Social impacts represent another critical outcome of Blue Economy implementation in Armapala Gresik. The research highlights increased collaboration, inclusion, and capacity building within the community. Blue Economy programs have created a platform for diverse stakeholders—local residents, youth groups, NGOs, and government agencies—to engage in decision-making processes. This participatory governance fosters collective ownership and trust, which are key to sustaining community-based initiatives [30]. Moreover, the empowerment of women and youth stands out as a major social achievement. Women-led cooperatives manage mangrove product processing and souvenir shops, while youth organizations conduct eco-tourism activities and environmental education campaigns. These social dynamics reinforce Human Capital Theory, which posits that investment in people's skills and knowledge yields broader social and economic benefits [31].

The transformation of community attitudes—from exploitative to stewardship-oriented behavior—also indicates a growing sense of environmental ethics. The social cohesion that emerges from joint conservation activities has improved resilience to external shocks such as fluctuating fish prices or extreme weather events. This finding resonates with studies emphasizing that social capital and collective action are vital determinants of resilience in coastal areas [32].

Policy and Governance Dimension

From a policy perspective, the study reveals both opportunities and gaps. Current government programs support mangrove conservation and community empowerment, yet policy coordination across sectors remains limited. Many initiatives operate independently without integration between environmental, economic, and social goals. Effective Blue Economy governance requires an enabling environment that encourages innovation and collaboration. This includes clear legal frameworks for coastal resource management, accessible funding for community projects, and stronger institutional networks linking universities, businesses, and policymakers [33].

Local regulations should also promote environmentally responsible investment and sustainable tourism standards. The inclusion of Armapala Gresik in national or regional Blue Economy strategies could enhance resource allocation and visibility, facilitating broader adoption of sustainable practices.

Theoretical and Practical Implications

Theoretically, the study affirms that the Blue Economy provides a practical manifestation of Human Capital Theory in the context of sustainability. Skills, environmental literacy, and innovation act as mediating variables connecting human development to economic and ecological outcomes. The community's adaptive capacity, shaped by knowledge and cooperation, exemplifies resilience-based development, a key feature of sustainable economics [34]. Practically, the findings underscore the need for integrated approaches combining education, policy, and local innovation. Investing in capacity building, digital literacy, and financial accessibility can accelerate community transformation. The Armapala model demonstrates how local empowerment can complement national policy goals such as SDGs 8 (Decent Work and Economic Growth) and SDG 14 (Life Below Water).

In summary, the Blue Economy in Mangrove Armapala Gresik contributes not only to economic diversification but also to ecosystem restoration, social inclusion, and adaptive governance. Its comprehensive approach reflects the interdependence of people, profit, and planet—making it a replicable model for other coastal regions seeking sustainable economic resilience.

5. Conclusion

This study concludes that the Blue Economy serves as a comprehensive framework for achieving sustainable economic resilience in coastal regions, particularly in Mangrove Armapala Gresik. The results show that implementing Blue Economy principles contributes significantly to four dimensions—economic, environmental, social, and policy—each of which strengthens the overall sustainability of the community.

Economically, the Blue Economy promotes diversification of livelihoods, local entrepreneurship, and innovation, reducing dependency on a single sector such as fisheries. Environmentally, it encourages conservation practices, particularly mangrove restoration, which enhance coastal protection and biodiversity. Socially, it fosters community empowerment, gender inclusion, and collaboration across local actors, building social capital that supports adaptive capacity. From a policy perspective, the integration of multi-sector governance and institutional cooperation remains essential to ensure long-term program sustainability.

Theoretically, this research reinforces the connection between Human Capital Theory and sustainable coastal development. It demonstrates that education, skills, and innovation are not only drivers of productivity but also foundations for resilience and environmental stewardship. Practically, the study highlights the need for coordinated actions among government, community organizations, and the private sector to expand access to financing, training, and market opportunities in the Blue Economy.

Future research is recommended to adopt mixed-method or quantitative approaches to measure the socio-economic and ecological impacts of Blue Economy programs, and to conduct comparative studies across different coastal regions. Such analysis will further strengthen the empirical understanding of how Blue Economy principles can serve as a cornerstone for achieving long-term sustainability and community prosperity.

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