



S-BESE: Strategy for Improving the Quality of Life for Coastal Area Communities in West Kalimantan

S-BESE: Strategi Peningkatan Kualitas Hidup Masyarakat Wilayah Pesisir di Kalimantan Barat

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ABSTRAK

Kawasan pesisir laut Kalimantan Barat memiliki kekayaan sumber daya perikanan laut dan sungai yang sangat potensial untuk dimanfaatkan secara optimal, seperti perikanan, konservasi, kegiatan pelabuhan, budidaya laut, wisata pantai, dan perairan. Namun, berbagai permasalahan di wilayah pesisir yang perlu menjadi prioritas untuk diberikan solusi, antara lain terjadinya ilegal fishing, rusaknya ekosistem terumbu karang dan mangrove, abrasi pantai, pengembangan tambak yang belum optimal yang hanya mencapai 40% dari potensinya, bencana alam yang meningkatkan kemiskinan dan kerusakan ekosistem, serta tumbuhnya korupsi dan ketidakadilan. Jumlah penduduk miskin terus meningkat dengan rata-rata peningkatan sebesar 6,86% selama tiga tahun terakhir, mencapai 353.350 jiwa pada tahun 2023. Penelitian ini bertujuan untuk mengembangkan wilayah pesisir secara umum, menciptakan inovasi pembangunan ekonomi lokal yang dapat mengurangi kemiskinan, pengangguran, kesenjangan, dan melestarikan sumber daya alam. Metode yang dikembangkan dalam penelitian ini dilakukan secara deskriptif dan kualitatif dengan analisis mendalam melalui pendekatan SWOT. S-BESE merupakan konsep yang dikaji dan menjawab tujuan penelitian guna mendorong pengelolaan potensi kekayaan sumber daya alam perairan di wilayah kajian dapat dikelola dengan baik dan dimanfaatkan selaras dengan pembangunan berkelanjutan. Hasil penelitian ini memberikan solusi dan inovasi seperti penerapan ekonomi biru dengan memanfaatkan modernisasi alat penangkapan ikan, mengembangkan perubahan paradigma dari sumber daya lahan ke sumber daya air, dan memproduksi penyaring sampah di sungai agar tidak terbawa arus ke laut. Kajian ini akan diarahkan untuk mampu meningkatkan kualitas hidup secara ekonomi, sosial dan tetap menjaga ekologi di wilayah pesisir.

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ABSTRACT

The coastal area of West Kalimantan has a wealth of marine and river fishery resources that have the potential to be utilized optimally, including fishing, conservation, port activities, marine cultivation, coastal tourism, and water. Various problems in coastal areas that need to be prioritized to provide solutions include the occurrence of illegal fishing, damage to coral reef ecosystems and mangroves, coastal abrasion, not yet optimal development of ponds where utilization only reaches 40% of their potential, natural disasters which result in increased poverty and ecosystem damage, as well as the growth of corruption and injustice. The number of people living in poverty has been steadily increasing at an average rate of 6.86% over the past three years, reaching 353,350 individuals in 2023. This research aims to develop coastal areas, creating local economic development innovations to reduce poverty, unemployment, and inequality and preserve natural resources. The method developed in this study was carried out descriptively and qualitatively by developing an in-depth analysis through SWOT. The results provide solutions for improvements and innovations, which include implementing a blue economy by utilizing the modernization of fishing gear, developing a paradigm shift from land to water resources, and producing garbage filters in rivers so they do not wash away into the sea. This study will improve the quality of life economically and socially while maintaining the ecology in coastal areas.

1. INTRODUCTION

1.1 Background

The coastal sea is a part of the marine ecosystem that is highly sensitive and vulnerable to disturbances due to human behavior and the impact of climate change (Yang *et al.*, 2021). Coastal areas in various regions experience high vulnerability to natural hazards and disasters caused by human behavior, where many are under unsustainable pressure (Zhao *et al.*, 2023). The coastal area of West Kalimantan is a transition area between marine and land ecosystems whose condition is influenced by changes that occur at sea and land. This area is quite long and uniform. It is caused by the characteristics of coastal areas, which are almost identical. The way it is treated and how it is used tend to be the same. Many long rivers lead directly to the open sea. This area has a lot of potential for catching fish, both in the sea and river. The coastal and island areas of West Kalimantan consist of cities and regencies, namely areas located on the coast, including Pontianak City, Kubu Raya Regency, Sambas Regency, Singkawang City, Bengkayang Regency, Ketapang Regency, Mempawah Regency, and a total coastline of 1,398 km. The sea area of West Kalimantan Province is 30,364.59, consisting of 156 small islands, 217 islands are inhabited, and 61 other islands are still uninhabited (DISKOMINFO Provinsi Kalimantan Barat, 2015). Apart from that, there is also the potential for sustainable fish resources whose production is 230,000 tons per year, the potential for coastal ecosystems, which include coral reefs with an area of 269,563 ha, mangroves with an area of 229,396 ha, as well as other artificial resources as well as biological and non-biological resources (Dinas Kelautan dan Perikanan Provinsi Kalimantan Barat, 2018).

Based on data obtained by the central statistics agency for West Kalimantan Province in 2023 (BPS_Provinsi Kalimantan Barat, 2023), it can be seen that the total production of marine capture fisheries in 2022 will be 4.28 trillion rupiahs with a production of 139.32 thousand tons, where the estimated production value of public water fisheries is 1.46 trillion rupiahs with the production of 32.83 thousand tons, while the total number of fishermen in capture fisheries will be 31,984 people in 2022, consisting of 16,638 public water fishermen and 15,310 marine fishermen. According to the data presented from West Kalimantan's marine and fisheries, the potential includes capture fisheries, aquaculture, and mariculture. Capture fisheries have 10,152 marine vessels, a public marine fleet of 6,467, and 49,792 fishermen. Aquaculture has a business area for ponds of 14,669 ha, mariculture covering an area of 2.10 ha, pond covering an area of 7,116.17 ha, floating net cage of 24 m², and cage area of 24.28 m². Apart from capture fisheries, there is potential for other superior aquatic commodities, which include shrimp, catfish, gourami, tilapia, milkfish, catfish, bro and jelawat. Coastal seas and small islands that have the potential to produce fisheries resources include 15 Fish Processing Units (UPI), 156 small islands, and 862 MSMEs processing and marketing fishery products. Various parties utilize the enormous potential of fisheries in coastal areas to utilize the natural resource potential of coastal areas and small islands in the province of West Kalimantan. These uses

include fishing activities, conservation, port, mariculture, and beach and water tourism.

According to data from BPS (BPS_Kalbar, 2020), total fisheries production in 2020 was dominated by capture fisheries amounting to 146,172 tons. Apart from that, this data also shows that the amount of aquaculture production from 2018 to 2020 continues to increase yearly, as well as the value of production in capture fisheries, which has increased annually (Adibrata *et al.*, 2022). However, when the COVID-19 pandemic hit Indonesia, capture fisheries production experienced a decline caused by large-scale social restrictions from 2020 to mid-2022, which caused various sectors to experience a decline. Despite various potential and incidents of decline in capture fisheries, there are still other fundamental problems, namely challenges in developing the West Kalimantan coastal area regarding the socio-economic characteristics and essential natural resources that are already available. However, if these challenges can be overcome and used as motivation, they will bring great opportunities for the welfare of society and the benefits of sustainable development itself. The welfare of local communities can be improved through empowerment programs (Pranita *et al.*, 2022). In the coastal areas of West Kalimantan, there is still much poverty affecting people who work as fishermen, economic activities still need to be improved, and the environment affected by economic activities in coastal and land areas still needs to be better controlled. These three challenges appear separate but are related to each other, namely to social, economic and ecological issues. Empowerment is a social dimension supporting sustainable development for local communities (Sarjana *et al.*, 2020). Helplessness to face existing challenges can result in increasingly difficult problem-solving in future development challenges. Improving community welfare requires good governance and compliance in implementing policies (Sarjana & Widokarti, 2020).

This challenge is supported by the facts of the problems currently occurring in coastal marine areas. There are facts about this problem regarding natural resources in coastal and marine areas that are increasingly decreasing (Jia *et al.*, 2021). There is still illegal fishing in this area by foreign countries who catch fish in Indonesian sea areas. There was also damage to ecosystems in coastal and marine areas, such as coral reefs, mangroves, and coastal erosion. A large number of illegal fishing incidents can be influenced by increasing poverty in the local area. Where based on poverty level data in West Kalimantan Province, it is known that in 2021, the number of people living on the poverty line will be 483,454 people; in 2022, there will be 520,660 people; in 2023, there will be 563,288 people. This increase in poverty can have a direct impact on increasing illegal fishing, which is detrimental to the lives of people living in the surrounding area. The following fact is related to the need for optimal utilization: the pond land that has the potential to be developed is estimated to be 913,000 ha. In contrast, the use of pond land has only reached 40% of the total potential area. The following problem fact is related to the issue of unsustainable sustainable development, namely the existence of a viral pandemic and natural disasters which have resulted in increased poverty and ecosystem damage,

as well as development leaks due to corruption, collusion and nepotism (KKN) and injustice which are still increasing.

Suppose the variety of activities is seen from the economic perspective of the coastal areas of West Kalimantan. In that case, they are developing more rapidly than economic activities in the inland areas of West Kalimantan. It aligns with economic development in urban areas close to coastal areas. However, from a development perspective, coastal areas are often used as peripheral areas of the surrounding urban areas. Even though coastal and urban areas have a functional relationship that integrates regional components within them, they were unable to synergize due to incorrect development strategies in the past. They resulted in development inequality between coastal areas and cities. Finally, coastal areas and their resource components are used as a buffer for poor communities unable to face competition in urban areas. Furthermore, if poverty in coastal areas is not immediately controlled, it can damage ecosystems and disrupt overall regional economic growth. Protected areas support the SDGs, combat climate change and its impacts through forest and ecosystem conservation, and ensure sustainable management (Doinjashvili *et al.*, 2021).

Apart from economic and social challenges, there are still other ecology-related problems. The increasing intensity of economic activities on land can damage the ecosystem and available natural resources. Natural damage that occurs on land can result in coastal waters, rivers and seas also being damaged. The damage that occurs includes environmental degradation caused by sedimentation and water pollution. Likewise, the intensity of activities on coasts, seas and rivers can damage the aquatic and land ecosystems. Damage to land and water ecosystems will also threaten sustainable social and economic development. Global economic competition, extreme climate change and population problems will result in complex development challenges. However, these challenges are immediately followed up with policies, and in that case, concepts of sustainable development, with a future system of improvement and innovation. This potential can provide maximum benefits and avoid problems resulting from existing challenges.

1.2 Research Purposes

The research aims to produce innovation for fishing communities to alleviate poverty by improving the community's economic, social, ecological, and sustainable quality of life. Various efforts must be made to implement the modernization of fishing gear, divide fishing areas for fishermen, and strategies for increasing marine and river resources. The innovations obtained not only help improve the welfare of fishermen directly but also ensure that this increase occurs sustainably and is in line with environmental conservation. This goal can be achieved with a holistic and inclusive approach and create a long-term positive impact on coastal communities and the surrounding environment.

2. METHOD

2.1 Research Approach

This study seeks to focus on producing innovation for fishing communities as an effort to alleviate poverty by improving the community's quality of life economically, socially, ecologically and sustainably in the coastal region of West Kalimantan. The blue economy encourages the use of bio-based materials, prohibiting the use of plastic and economic practices based on waste management (Pranita *et al.*, 2023). This research uses a qualitative descriptive research design. The definition of qualitative research is research whose problem-solving orientation is carried out with a tendency to explore and discover (Rosyada, 2020), involves an interpretive and naturalistic approach to the phenomena studied (Amruddin *et al.*, 2022), scope includes data reduction, data presentation, data verification or conclusion (Sarjana *et al.*, 2023), carried out through expert judgment which requires in-depth interviews (Kusumastuti *et al.*, 2023). Qualitative research can help understand the meaning and context of exploring scientific patterns (Sarjana, 2024). Qualitative descriptive research originates solely from references regarding identifying different characteristics of the relationships between groups of people, objects, or events, which will later form a classification scheme. Data collection in this research used a literature study by collecting sources regarding the concept of sustainable development in the fields of blue economy, society and ecology in the coastal region of West Kalimantan. The data processing process in qualitative descriptive research includes data reduction, presenting data, and verifying or concluding data (Mudjiyanto, 2018).

Economic prosperity through efforts to obtain sustainable income and economic improvement by implementing more efficient and modern fishing technology to increase catches and fishermen's income (Lukambagire *et al.*, 2024). Economic diversification through the development of small and medium enterprises (MSMEs), such as aquaculture, ecotourism and processed fish products, provides additional sources of income for coastal communities (King *et al.*, 2024). Access to markets must be developed by building better distribution and marketing networks, including digital platforms, enabling fishermen to sell products at higher prices and reducing dependence on intermediaries (Enayati *et al.*, 2024). Strengthening social welfare is done through education and skills training for fishermen and their families to increase capacity and ability to run fisheries businesses and manage finances better (Yulisti *et al.*, 2024). Health and welfare are priorities, and access to health facilities and nutrition improvement programs should be increased to help improve the quality of health of coastal communities so that they are more productive and able to work well. Providing basic infrastructure such as roads, bridges, clean water facilities and adequate sanitation improves coastal communities' quality of life and comfort. Ecological sustainability through conservation and management of natural resources can be carried out through rehabilitation programs for coral reefs, mangroves and other marine ecosystems to help preserve the environment and fish resources which are the primary source of livelihood for fishermen (Sun *et al.*, 2024). Sustainable fishing practices through the implementation of environmentally friendly and sustainable fishing techniques to reduce negative impacts on marine ecosystems and ensure the long-term availability of

fish resources (Garraud *et al.*, 2023). Community independence and empowerment are carried out through active participation and involvement in coastal communities in planning and implementing development programs to ensure that needs and aspirations are appropriately accommodated. In addition, collaboration between the government, private sector, research institutions and the community in implementing coastal development programs ensures optimal and sustainable use of resources. The need for policy and regulatory support in its implementation that supports sustainable practices and inclusive development creates a conducive environment for improving the quality of life of coastal communities. Improving the quality of life in coastal areas includes a holistic and integrated approach to overcoming the economic, social and ecological challenges coastal communities face. By applying modern technology, sustainable practices, capacity building, and multi-stakeholder collaboration, this concept can bring significant changes to the lives of coastal communities, reduce poverty, and ensure the sustainability of natural resources. These improve the welfare of coastal communities and support overall sustainable development.

2.2 Analysis Technique

In general, the analysis technique used is in-depth analysis, which means an in-depth analysis technique applied through SWOT analysis. In-depth analysis techniques are carried out by analyzing and understanding the aspects of each problem to be researched. The analysis looks at research problems in general and research problems that will be studied in depth from case to case. The qualitative methodology has the nature of problems that differ but are still related to each other. In-depth analysis techniques through SWOT analysis are carried out by identifying various systematic factors used to formulate a strategy (Adibrata *et al.*, 2022), used to map strengths and weaknesses to measure internal factors, opportunities and threats to measure external factors (Lantu *et al.*, 2019). The SWOT analysis in this research uses a matrix that compares external factors, including opportunities and threats, with internal factors, including strengths and weaknesses. Concluding an in-depth understanding of each problem studied by finding solutions for improving and innovating these problems (Machsunah & Subhan, 2018).

In improving coastal areas' quality of life and alleviating fishermen's poverty, SWOT analysis helps identify internal strengths and weaknesses and external opportunities and threats. The importance of external and internal factors in the SWOT analysis to obtain comprehensive conclusions includes revealing the availability of abundant fish resources in coastal areas. The internal factors that can be developed include high marine biodiversity, which can support tourism and research. Local fishermen's experience and knowledge of fishing techniques and marine resource management. Basic infrastructure, such as ports, roads and storage facilities, are already available. The use of traditional fishing equipment could be more efficient and environmentally friendly. The difficulty for fishermen in getting access to financing and business capital. Lack of formal education and relevant skills training to

increase productivity and business diversification. Lack of cold storage facilities, transportation and efficient markets. Meanwhile, external factors are in the form of government policies and programs that support sustainable development and poverty alleviation in coastal areas. High global market demand for fishery products and other marine products. Technological advances in the fields of fishing, seafood processing and digital marketing. Opportunities to partner with the private sector, research institutions, and non-governmental organizations in developing and implementing sustainable programs. The impacts of climate change, such as increasing sea temperatures, rising sea levels and extreme weather, can affect fisheries productivity. Unsustainable fishing practices that can threaten the sustainability of marine resources. Inappropriate or burdensome policies or regulations can hinder the development of the fisheries sector. Understanding and integrating internal and external factors can help design a holistic and effective strategy to improve the quality of life of coastal communities, alleviate poverty, and ensure environmental and economic sustainability in coastal areas.

3. RESULT AND DEVELOPMENT

3.1 SWOT Analysis

Policies in developing the coastal areas of West Kalimantan in the S-BESE (sustainable blue economy, social and ecology) concept are guided by community welfare and sustainable regional development. Regional development and all natural resources contained in the West Kalimantan coastal area are aimed at the community's welfare, especially the people of the West Kalimantan coastal region and Indonesian society in general. This concept is used so that the region's potential wealth of natural aquatic resources can be managed and appropriately utilized for sustainable development. The goals of the S-BESE concept include short-term goals through improvement efforts and long-term goals through innovation efforts. In general, improvement efforts to achieve short-term goals include improving the development system for the coastal region of West Kalimantan in general, namely improving the local economic system in the short term, such as increasing fishermen's income, increasing human resource productivity, and empowering coastal communities. For this reason, operational activities are needed to support the strategic concept of improving the quality of life in coastal areas and significantly contributing to reducing poverty among fishermen. Operational activities enable strategies and plans to be realized in actual actions whose benefits can be directly felt by fishermen and coastal communities. Programs such as providing access to capital, skills training, and improving infrastructure can directly increase fishermen's productivity and income, thereby helping them escape poverty. Training and education help fishermen to adopt new technologies and techniques, improve efficiency and sustainability in business, and provide the ability to diversify livelihoods. For this reason, good infrastructure support is needed, such as adequate ports, cold storage and modern fishing gear, to increase the effectiveness and efficiency of fishermen's operations and minimize post-harvest losses. By building a marketing and distribution network, fishermen can sell

products at better and more stable prices and reduce dependence on intermediaries. Marine resource conservation and management programs help preserve marine ecosystems, which are fishermen’s primary livelihood source, to ensure that these resources remain productive in the long term. Adequate health facilities and nutrition improvement programs help improve the quality of life of fishermen and their families so they can work more effectively and productively. The formation of cooperatives and partnerships with the private sector and research institutions strengthens the institutional capacity of fishermen to manage resources better and obtain greater profits. Operational activities focusing on education, training and access to technology and information can empower fishermen to

become more independent and not depend on external assistance. Overall, this operational activity is essential because it provides concrete and measurable solutions to the problems faced by fishermen and coastal communities. Doing so helps reduce poverty and improves the overall quality of life in coastal areas. Meanwhile, the long-term goal of coastal area development in general is to create local economic development innovations that can reduce poverty, unemployment, and inequality and preserve natural resources. This innovation concerns the development of research, marketing systems, modernization of fishing gear, and sustainably maintaining ecological sustainability through innovation in waste filtering equipment in rivers and planting trees.

Table 1. SWOT matrix

SWOT MATRIX	Strength	Weakness
	<ul style="list-style-type: none"> The background of the coastal communities in West Kalimantan are experienced fishermen Creative innovation as an effort to improve the quality of life and economy of fishermen Abundant wealth of marine and river resources The quality of natural resources is still maintained Strategic geographical conditions (near ports and airports) 	<ul style="list-style-type: none"> Incompetent human resources The method of catching fish is still conventional Utilization is not yet optimal There is no good cooperation between the government, private sector and society The paradigm for utilizing water resources is not optimal The marketing system is still traditional and not yet integrated
Opportunity	Strengths + Opportunity Strategies	Weaknesses + Opportunity Strategy
<ul style="list-style-type: none"> Availability of pond land Regional and central government support for the welfare of fishermen The culinary industry and consumerist national society The high benefits of fish for public health 	<ul style="list-style-type: none"> Application of the S-BESE Concept (Sustainable blue economy, social, and ecology) Develop a business plan by optimally utilizing local resources at sea and land Implementing strategies with periodic control and evaluation Maintain relationships with the community in building a water resource consumption paradigm 	<ul style="list-style-type: none"> Create creative and integrated marketing strategies Improving the quality and awareness of human resources Modernization of fishermen's fishing Increase networking and sharing in government and community relations in implementing these efforts
Threat	Strengths + Threat Strategies	Weaknesses + Threat Strategy
<ul style="list-style-type: none"> Illegal fishing Ecosystem damage Development leaks due to corruption, collusion and nepotism (KKN) practices the government and society are less responsive and adaptive to creative ideas and the modernization of fishing methods and tools 	<ul style="list-style-type: none"> Improving fishermen's fishing equipment technology so that they can obtain effective results without engaging in illegal fishing Innovation of waste filtering equipment in rivers Carrying out practices that are fair and by legal regulations Enforcing regulations and the integrity of law enforcement 	<ul style="list-style-type: none"> Provide strict sanctions and increase supervision of perpetrators destroying ecosystems, KKN and illegal fishing Switch by utilizing the potential that has developed Use of fishing equipment that is familiar among local fishermen

The concept of welfare in S-BESE is closely related to economic, social and ecological. In economic prosperity, this concept emphasizes sustainable consumption and production patterns through improvements and innovations in fishing equipment. In social welfare, the emphasis is on eliminating the poverty of fishermen and coastal communities by improving and innovating the marketing system. In ecological welfare, emphasis is placed on protecting and managing the aquatic and marine resource

base through improving and innovating waste filtering equipment in rivers and planting trees. Ecological development will have a significant influence on social and economic development. The welfare of 3 elements is pursued through improvements and innovations related to existing problems and potential. With training and support for small businesses such as aquaculture, handicrafts and ecotourism, fishermen can have a stable source of additional income. Providing modern fishing gear and efficient fishing

techniques increases catches and reduces operational costs. In addition, efforts to build marketing and distribution networks, as well as the use of digital technology, enable fishermen to sell products at better prices and reduce dependence on intermediaries. Providing microloans and forming cooperatives helps fishermen obtain the capital needed to develop their businesses. Training in new skills, financial management and entrepreneurship helps fishermen and their families to improve their abilities and knowledge and become more independent and productive. Increasing access to health facilities, nutrition improvement programs, and providing clean water improves coastal communities' quality of life and health. The construction of public facilities such as schools, health centers, and places of worship improves social welfare and provides necessary support for communities. The formation of community organizations such as fishing cooperatives and working groups can facilitate active community participation in decision-making and resource management. Rehabilitation programs for coral reefs, mangroves and other marine habitat conservation help maintain healthy and productive marine ecosystems, which are the primary livelihood source for fishermen. Training and implementing sustainable fishing practices reduce overfishing and ensure the preservation of fish resources for future generations. Initiatives to reduce marine pollution through sound waste management and environmental awareness campaigns help maintain ocean cleanliness and ecosystem health. Adaptation programs such as planting mangroves to prevent coastal erosion and helping information about climate change coastal communities adapt and survive in changing environmental conditions. Operational activities that focus on economic, social and ecological improvement are vital to improve the quality of life in coastal areas, which can be done by integrating these three aspects so that the strategies implemented are more comprehensive and practical, ensuring that the benefits obtained by coastal communities are sustainable and long term.

From this matrix, we can find out the strengths and weaknesses as well as opportunities and threats that currently exist in the coastal areas of West Kalimantan. The first strength is the background of people who work as experienced fishermen. Based on secondary data, the age of experience of fishermen in West Kalimantan is more than 5 years and less than 65 years (Nugraha & Kurniadi, 2022). The second strength is that many efforts have been made to improve fishermen's quality of life and economy, which can still be developed (Winata, 2023). The third strength is abundant marine and river resources, the quality of natural resources that are still maintained, and strategic geographical conditions (close to the port and airport) (Rahman, 2018). However, behind the strengths, there are still areas for improvement in the form of less competent human resources, conventional fishing methods, utilization that is still not optimal, and conflicts between fishing groups (Sri, 2020). In addition, the paradigm of water resource utilization still needs to be improved, and the marketing system is still traditional and not integrated (Susilawati, 2019).

In addition to strengths and weaknesses, opportunities and threats were also analyzed. The first opportunity that exists in the coastal areas of West Kalimantan includes the

availability of extensive pond land (Amien *et al.*, 2022). The second opportunity is local and central government support for the welfare of fishermen (Cahyandi & Sucahyowati, 2022). The third opportunity is the culinary industry and consumptive national society, the high benefits of fish for public health (Untari *et al.*, 2022). Meanwhile, the existence of opportunities is certainly inseparable from the existence of threats. The first threat is illegal fishing (Ambarsari *et al.*, 2023). The second threat is ecosystem damage that may occur due to unsustainable utilization methods (Ardhani, 2021). Development leakage is due to KKN, government and communities that need to be more responsive and adaptive to creative ideas and modernization of fishing methods and gear (Maurizka & Adiwibowo, 2021). Based on the explanation of strengths and weaknesses, opportunities and threats, this analysis will look for improvement and innovation solutions by combining strengths with opportunities, weaknesses with opportunities, threats with opportunities, and threats with weaknesses adjusted to the S-BESE concept previously explained. The following is a graphic presentation of the SWOT analysis.

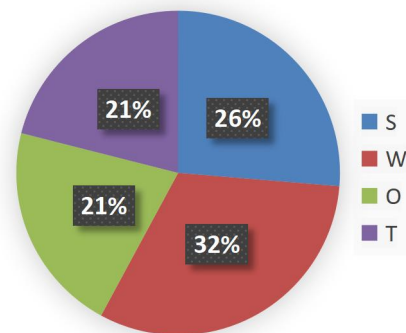


Figure 1. SWOT graphic

Based on the analysis of opportunities and strengths, the recommended improvement and innovation solutions include the application of the S-BESE concept (sustainable blue economy, social and ecology) and the creation of a business strategy. Efforts to Improve the quality of life of marine coastal communities in West Kalimantan through sustainable improvement and innovation in the social community, Implementation strategies with periodic control and evaluation, and maintaining relationships with the community in building a water resource consumption paradigm. Further analysis is carried out by combining opportunities with weaknesses. On this basis, the recommended solutions for improvement and innovation include creating creative and integrated marketing strategies in efforts to improve the quality of life of West Kalimantan Marine coastal communities through sustainable improvement and innovation in ecology, improving quality and human resource awareness, carrying out efforts to modernize fishermen's fishing. Efforts to improve the quality of life of West Kalimantan, marine coastal communities through sustainable improvement and innovation towards the blue economy and increasing networking and sharing in government and community relations in implementing these efforts.

The next analysis is to combine threats with strengths and combine threats with weaknesses. Threat analysis with strengths is still similar to opportunity analysis with weaknesses, namely that there are pluses and minuses to the situation being analyzed. The difference is that analyzing opportunities and weaknesses focuses on social and economic sustainability. Meanwhile, threat and strength analysis focuses on social and ecological sustainability. Recommended improvement and innovation efforts based on a threat analysis with strengths include improving the technology of fishermen's fishing equipment so that they can obtain effective results without engaging in illegal fishing, creating and implementing innovative waste filter equipment in rivers, efforts to improve the quality of life of West Kalimantan, marine coastal communities through sustainable improvements and innovations in ecology, implementing fair practices and by legal regulations, as well as enforcing regulations and the integrity of law enforcement.

Furthermore, a threat and weakness analysis provides suggestions for improvements and innovations that minimize risks and make implementation more easily realized. Suggestions for improvement and innovation include imposing strict sanctions and increasing supervision of perpetrators destroying ecosystems, KKN and illegal fishing. Second, people can change professions by utilizing the potential that has developed. Third, fishing gear familiar to local fishermen but not damaging the ecosystem can be used more easily and is safe. From the four combinations of analysis, in essence, the suggestions for improvement and innovation according to the S-BESE concept are related to improving the role and management of government in society, improving response to innovation and modernizing existing ideas, equipment and human resources, and enforcement of fair laws and practices. These suggestions were developed using the sustainability concept explained in the S-BESE concept so that society can implement it, both current and future generations.

3.2 Efforts to Improve Quality of Life through Sustainable Blue Economy Improvement and Innovation

Based on the problems explained in the previous chapter, economic improvement through a sustainable blue economy can be achieved by developing and increasing cooperation in the fish processing industry, developing environmentally friendly and efficient fish catching and cultivation technology, and increasing the quality and number of human resources. In planning, managing and utilizing marine and river resources. Furthermore, improvements to the information system include methods for searching, collecting, managing and evaluating data containing information on the use of marine and river resources by utilizing developments in marine-based science and technology for the welfare of the coastal communities of West Kalimantan.

Meanwhile, economic-focused innovation through the sustainable blue economy in the S-BESE concept is about eliminating fishermen's poverty. This innovation relates to modernizing fishing methods and fishermen's marketing strategies at sea and rivers. Operationalization of activities to

produce economic-focused innovation through a sustainable blue economy is key to improving the quality of life in coastal areas. This approach includes modernizing fishing methods and fishermen's marketing strategies. Sustainable blue economy innovation through improving fishing technology by using more efficient and environmentally friendly fishing equipment such as selective nets and sonar technology to detect fish can increase catches and reduce negative impacts on marine ecosystems. Utilization of vessels with modern technology that is more fuel efficient and equipped with a cooling system to maintain fish freshness. Low or no-interest microloans government or financial institutions subsidies provide capital assistance to help fishermen purchase modern equipment and technology. Establishment of cooperatives that can manage funds and provide loans to fishing members with easier and more profitable terms. Increasing knowledge and skills through training programs for fishermen on efficient and sustainable fishing techniques, the use of new technology, and fisheries business management. Collaboration with fisheries experts, academics and research institutions is needed to transfer knowledge and develop best practices in fishing.

Modernization of marketing strategy in digital marketing through developing a special e-commerce platform for fishery products that allow fishermen to sell directly to end consumers, restaurants and wholesale markets. Promote fishery products through social media to reach a wider market and increase sales. Supply chain development in the form of a distribution network by building an efficient distribution network to ensure fish products can be sold quickly and freshly to local and international markets. Provide cold storage facilities and refrigerated transportation to customers to maintain the quality of fish from the sea. Increased branding and added value to encourage product diversification by developing processed fish products with added value, such as fillets, salted fish or ready-to-eat packaged products. Obtain sustainable product certification and labeling that confirms product quality and sustainability, thereby increasing competitiveness in the market. Multi-party collaboration that collaborates between the government and the private sector in the form of implementing government policies that support a sustainable blue economy, such as providing incentives for sustainable fisheries practices and development of supporting infrastructure. Invite investment from the private sector in developing fishing technology, processing facilities and marketing. Community participation is needed for community involvement through the participation of fishing communities in planning and implementing blue economy programs so that they have a sense of ownership and commitment to the program's success. Operationalization of activities that focus on sustainable blue economy innovation is a strategic step to improve the quality of life in coastal areas. By modernizing fishing methods and marketing strategies, fishermen can increase productivity, income and business sustainability. Collaboration between government, communities, experts and the private sector is crucial to achieving this goal, creating a stronger, fairer and more sustainable economic ecosystem in coastal areas. Modernization of the fishing methods is by increasing the application of fishing gear

technology, capital assistance, and new knowledge related to fishing methods, which is carried out based on cooperation between the government, community, experts and the private sector. For comparison, a study designed fishing by utilizing the behavior of living things. The findings of the study resulted in a squid-catching tool based on LED light (Salam & Fachrussyah, 2021). Based on previous research, the modernization of fishing gear this time is to apply fishing gear that combines trap nets with sound frequency devices to attract fish so that fishermen can get more fish faster in terms of time. In addition, a light-emitting device is also installed that can attract fish from a distance. This tool will work more effectively when operated at night.

Hopefully, these improvements and innovations can increase fishermen's production patterns sustainably without destroying the existing marine ecosystem. Meanwhile, improving and innovating sustainable consumption patterns focuses on improving and innovating the marketing system. Improving consumption patterns will be developed through increasing the development of the marine industry, which will be implemented in stages and in an integrated manner through inclusive cooperation between the marine industry and other industries, planning proposals for MSMEs that have the opportunity to obtain capital investment for the development of the fishing industry, increasing the quantity of shipbuilding and fiber production glass, which supports the fishing industry, increasing the efficiency of the national sea transportation system so as not to damage the marine ecosystem, increasing the capacity and quality of port services, monitoring and supporting the potential development of areas that have high progress and evaluating areas that have low progress, improving shipping safety and services ship navigation. Meanwhile, innovation in consumption patterns through marketing is achieved by creating superior product brands for fish caught in the West Kalimantan region that people can consume throughout Indonesia with good, safe and long-lasting packaging. Apart from that, it is necessary to accurately promote fish's advantages, processing methods and benefits so that people can be interested and know how to consume them. Innovation in sustainable consumption patterns through gradual and integrated improvement and development of the marketing system and marine industry is crucial. Innovation in sustainable fishing production patterns through environmentally friendly technology using selective fishing gear to avoid bycatch and maintain fish populations that are not hunted. Apart from that, it is necessary to adopt technology such as GPS and sonar to monitor fish populations and ensure that fishing is carried out in areas that are not overfished. Strengthen efforts in marine resource management by implementing a quota system to ensure the number of fish caught is by the natural regeneration capacity of marine ecosystems establish conservation zones and fishing zones to protect important habitats and encourage sustainable fishing practices. There is a need to provide easy access to funding for fishermen who implement sustainable practices, including grants and loans with low interest and incentives for fishermen who use environmentally friendly technology and sustainable fishing practices. Innovations in sustainable consumption patterns are carried out to support improving the marketing system by developing an e-

commerce platform to facilitate the marketing of fishery products directly from fishermen to consumers, reducing intermediaries and increasing fishermen's profits, and increasing consumer awareness about the importance of choosing sustainable fishery products through labeling and educational campaign. The development of the marine industry can be carried out by encouraging cooperation between the fishing industry and other industries, such as tourism and agriculture, to create profitable and sustainable synergies. It is also necessary to develop processed fishery products with added value, such as fish fillets, smoked fish, or ready-to-eat packaged products, to expand the market and increase income. Support MSMEs by providing training and technical assistance to MSMEs in the maritime sector to help develop attractive business plans for investors and facilitate MSME access to investment capital through government programs and collaboration with financial institutions. The fishing industry is being developed to increase production capacity by increasing the number and quality of fishing vessels with modern technology that is more efficient and environmentally friendly. Apart from that, developing the synthetic and natural fiber industry for making nets and other fishing equipment. Processing and storage facilities need to be developed by building cold storage facilities in ports and fish landing areas to maintain product freshness and developing modern fish processing plants to improve fishery products' quality and added value. Supply chain development by optimizing logistics and distribution systems to ensure fishery products can reach the market quickly and in good condition. Another effort is to build and improve infrastructure such as roads, ports and fish markets to support the smooth supply chain. Operational activities for innovation in sustainable production and consumption patterns are very important to ensure marine ecosystems' sustainability and improve fishermen's welfare. A sustainable blue economy ecosystem can be created by using environmentally friendly technology, effective marine resource management, improving the marketing system, developing the marine industry, and supporting MSMEs. Inclusive collaboration between government, society, experts and the private sector is the key to successfully implementing this strategy.

3.3 Efforts to Improve the Quality of Life through Sustainable Community Social Improvement and Innovation

Improving the quality of life of coastal communities focuses on improvements that can be made by local governments using policies that can encourage the growth of a community paradigm towards a blue economy to improve the welfare of local community groups. Based on previous research, the main factor of fishermen's welfare comes from their income. Two main factors greatly affect fishermen's income: experience and working hours (Lein, 2018). Another factor that affects fishers' income is the different fishing seasons (Wafi *et al.*, 2019). Based on previous research, the suggested remedies in this study are to improve marketing strategies, provide fishing areas that are free from competition, and apply technological modernization to fishermen's traditional fishing gear; stimulate small-scale

fishermen's business production by fostering small-scale fishermen to organize the seafood management industry independently and in stages; improve cooperation between small-scale fishermen and Village Unit Cooperatives and entrepreneurs distributing catches and processed fish; and develop fisheries production comprehensively.

Meanwhile, sustainable social innovation in the community is related to changing the paradigm of the community from land resources to marine and river resources and encouraging the development of marine and river resources, as in Japan, where people have a paradigm of high fish consumption, especially tuna. The change in societal paradigm is due to the high public knowledge of the benefits of consuming fish (Larasati, 2015). For this reason, this study suggests innovation efforts through marketing strategies by conducting training for mothers on how to process fish with new recipes and cooking techniques that have high benefits for family health, developing research on the benefits of local fish for the health of adolescents and the elderly who often experience bone disorders; inviting community leaders and public figures to disseminate information related to the benefits of fish, how to process, and how to get it. For example, mackerel fish, often found in Java, Sumatra and Kalimantan waters, have high levels of iron, omega-3, vitamin D and vitamin B12. This fish has great benefits for bone health. For children and teenagers, this fish can support bone growth. For the elderly, this fish can reduce the risk of contracting osteoporosis. However, many still need to understand these benefits and how to prepare mackerel properly and deliciously. The community needs to change its paradigm towards marine resources as food security for the Indonesian people to make them healthier and more prosperous.

3.4 Efforts to Improve Quality of Life through Sustainable Ecological Improvement and Innovation

Improving the ecological quality of life of coastal communities can be done by not throwing rubbish into rivers and seas, planting and preserving mangroves on sea coasts and planting bamboo trees on river banks to prevent abrasion and erosion, not carrying out illegal fishing and using dangerous tools that damage water ecosystems, as well as increasing the role of law enforcement and local government in making rules and policies related to resource sustainability water power. Meanwhile, marine and river coastal ecological innovations are implemented through waste filters. There is rubbish in the sea and rivers which pollutes the water and decreases the quality of sea and river water. On the coast of West Kalimantan, there is a long river that continues into the sea. If someone throws rubbish in the river, the rubbish will be passed on to the sea, which results in a buildup of rubbish in the sea. There is an innovative design for a waste filter tool that can be placed in one strategic location. This location must, of course, be accessible to waste transport vehicles and be located near river and sea borders. The following is the design of the river trash filter as a result of the findings of this research.

The design drawing shows that Figure 2 is the design of a net support pole built on the river bank using cast material. Figure 3 shows the design of a net attached to a

support pole extending into the river bed. Figure 4 shows the installation of the net when it is used to lift rubbish. When the rubbish is to be picked up, a cover is installed from the front side, and the net will then be shortened so that it can be lifted to the surface of the river water. Rubbish can be picked up by opening the nets on the right and left of the river bank and can be picked up directly using a shovel. This study is relevant to the research results of O'Leary *et al.* (2023), which recommends priorities in advancing marine and coastal areas by increasing understanding of the importance of coastal biodiversity and ecosystems to promote system resilience, coordinating strategies and projects to facilitate innovative design and effectiveness, and developing ways to improve communication, collaboration, literacy and marine and coastal management (O'Leary *et al.*, 2023). Coastal communities strongly support protecting marine resources, especially coastal protection, to be prepared to face climate change in coastal areas (Teniwut *et al.*, 2023).



Figure 2. Design of garbage filter tool

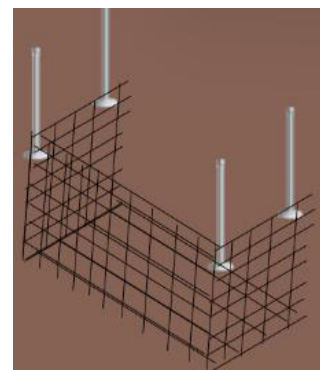


Figure 3. Initial garbage filter mesh design

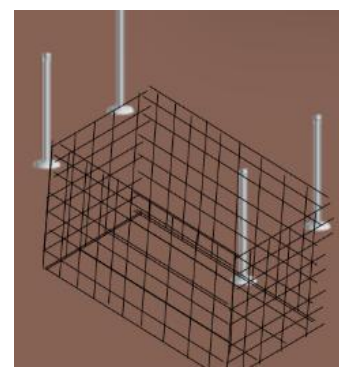


Figure 4. Final waste filter mesh design

The design of net support poles built on river banks using cast materials is an effective and innovative solution for managing rubbish in rivers, which in turn can improve the quality of life in coastal areas. Support posts made of cast material provide the strength and stability necessary to withstand the weight of the net and collected rubbish. Nets installed on support poles and extending to the bottom of the river effectively capture rubbish that flows on the surface and bottom of the river. A cover on the front of the net prevents rubbish from falling out when it is lifted to the surface, ensuring all rubbish is caught. The mechanism for shortening the net makes it easier to lift waste to the surface of the river water so that the waste collection process becomes more efficient. This design allows rubbish to be collected manually by opening nets on the right and left of the river bank, making it easier for cleaning staff or the public to collect rubbish with shovels. This design helps reduce river pollution by effectively trapping rubbish before it reaches river mouths and oceans, where it can damage marine ecosystems. Better waste management reduces the risk of environmental pollution and improves river water quality, which positively impacts the health of coastal communities. Clean rivers increase tourist attraction in coastal areas, increasing people's income through tourism and related activities. The quality of life for coastal communities improves with a cleaner and healthier environment, which supports other economic activities such as fishing and agriculture. Coastal communities can participate in this waste management program, creating awareness and a sense of collective responsibility towards the environment. The strong and efficient design of the net support poles can be replicated at other locations along rivers and in coastal areas and increase the positive impact widely. Local governments and non-governmental organizations can adapt and implement this approach as part of sustainable waste management programs. The design of net support poles built on river banks using cast materials has various significant benefits for managing and directly improving the quality of life in coastal areas. Construction's strength and durability, ecological and economic benefits, positive social impact, and sustainability and replication potential make this design an innovative solution to address environmental challenges in coastal areas. By reducing river pollution and improving water quality, we can create a cleaner and healthier environment, ultimately improving coastal welfare and quality of life.

4. CONCLUSION

Modernization of fishing equipment is carried out by using environmentally friendly and efficient fishing technology to increase fishermen's productivity without damaging the marine ecosystem. This modernization includes implementing selective fishing equipment and boats with modern fuel-efficient technology and cooling systems. Division of fishing areas through establishing conservation zones and appropriate fishing zones can help preserve marine resources. The quota system and regional fishing regulations ensure that fishing is carried out sustainably to maintain fish populations. The strategy to increase marine and river resources is implemented through marine habitats

rehabilitation programs such as coral reefs and mangroves, sustainable fishing practices, and improving the quality of marine and river ecosystems. These strategies will provide long-term benefits for the sustainability of fisheries resources. The development of the marine industry and marketing requires innovation in the marketing system through e-commerce platforms, social media and efficient distribution networks to help fishermen sell products at better and more stable prices. Developing the fishing industry by improving processing and storage facilities adds product value and opens new markets. Support for MSMEs and access to capital is carried out by providing training, technical assistance and access to capital for MSMEs in the maritime sector, enabling them to grow and develop. Collaboration between the government, private sector and financial institutions is essential to support MSMEs. Improving the social and economic quality of life is implemented through education and training for fishermen, improving health facilities, building social infrastructure such as schools and health centers, and improving the welfare of coastal communities. These contribute to poverty alleviation and sustainable improvement of quality of life. Integrating these innovations into sustainable production and consumption patterns can create a stronger and fairer blue economy ecosystem. Inclusive collaboration between the government, community, experts, and the private sector ensures the fishing community can benefit widely from the resulting innovation. By applying the SWOT results, the target of the Sustainable Development Goals through the S-BESE approach in 2030 in the coastal region of West Kalimantan can be achieved.

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