

Diversification Strategy of Processed Tuna Fish Products for Coastal Community Empowerment in Bone Bolango Regency



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ABSTRACT: Diversification of tuna fish products is a concern for coastal communities in Bone Bolango Regency because this will also get attention and support from the Bone Bolango Regency government considering the potential of tuna fish production in Bone Bolango Regency. This tuna fish product diversification strategy is one of the strategies carried out so that the tuna produced is not only sold through catches, but can be developed through diversification of various tuna fish product processing.

This study aims to explore the understanding of coastal communities in Bone Bolango Regency in diversifying processed tuna products, and also to find out the factors that contribute greatly to empowering coastal communities in diversifying processed tuna products. For this reason, the first objective of this study will be analyzed qualitatively by interviewing respondents, the second will use the Analytical Hierarchy Process (AHP) method.

The results of the analysis explain that in general, the understanding of the coastal community of Bone Bolango Regency about the diversification of processed tuna products is still not optimal. Some people are starting to realize the potential of processing tuna-based products, but limitations in technology and skills prevent them from truly taking advantage of this opportunity. The AHP results suggest that in efforts to empower coastal communities to diversify processed tuna, the dominant factor is coaching and education with the largest weight of 0.466, then the conservation and sustainability factor is the second factor with a value of 0.247, then the infrastructure and market access factor with a weight of 0.166 and finally the availability of resources with a weight of 0.121. Comprehensive policy implications must consider these four factors holistically, with the main priority on coaching and education, followed by environmental conservation, infrastructure development, and ensuring the availability of resources. Through targeted policies, it is hoped that coastal communities can improve their skills and competitiveness, and be able to create processed tuna products with high added value and sustainable.

KEYWORDS: Diversification Strategy; Tuna Fish; Bone Bolango; Analytical Hierarchy Process; Sustainable.

INTRODUCTION

Indonesia is the largest archipelagic country in the world with more than 17,000 islands and a sea area of 7.9 million km², or more than 65% of its total area (Ministry of Maritime Affairs and Fisheries, 2021). The potential of these marine resources makes Indonesia the center of economic activities for the community, especially in the fisheries, tourism, marine transportation, and exploration of natural resources such as oil and gas sectors (Satria et al., 2018). Indonesia's coastal areas, which are inhabited by around 22% of the total population, are the center of economic activities involving capture fisheries, fish farming, and various related economic activities. Among these coastal areas, Gorontalo Province, especially Bone Bolango Regency, has an important role as a development area for the marine and fisheries sector.

Bone Bolango Regency has fisheries potential that continues to be developed. Data shows that in 2019, capture fisheries production reached 13,339.1 tons and decreased slightly in 2020 to 12,560.8 tons (Bone Bolango Regency Fisheries and Marine Service, 2021). However, the number of fishing households remains stable, as does the number of fishermen cards which amount to 2,606. The level of education of the fishing community, the majority of whom only graduated from elementary school (SD), shows that the potential for human resources in this sector still requires coaching and capacity building (BPS Bone Bolango Regency, 2021).

To overcome the problems of poverty and economic dependency, the local government focuses on empowering coastal communities. One of the strategies implemented is the diversification of fishery products, especially tuna, which is expected to increase community income through the development of various processed products. This diversification is considered effective in

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increasing the competitiveness of local products, both in domestic and international markets (Nijman, 1997). For example, the Tuna Culinary Festival was held in Bone Bolango as a concrete step to promote tuna-based processed products and support the sustainability of fisheries businesses.

However, the challenges in developing the marine and fisheries sector in Bone Bolango Regency are not only related to production capacity, but also institutions and policies that regulate coastal areas. Local institutions need to play a role in strengthening regulatory support that supports the sustainability of the coastal economy and maintains the stability of the marine ecosystem (Pollnac & Poggie, 2008). This is important so that the product diversification model can run well and have a positive impact on the local economy.

While many studies have highlighted the potential of fisheries in coastal areas, studies examining area-based institutions and policies are still relatively limited in the local context, especially for Bone Bolango Regency. Related studies have shown that institutional policies involving coastal communities can significantly improve their economic welfare (Phillipson et al., 2024). This is evident in international studies examining the impact of community-based empowerment on coastal economies in other regions such as Southeast Asia and Africa (Agiotis, 2024; Palash et al., 2024).

Further research specific to the Indonesian context, especially in Gorontalo, is still very minimal. For example, research by Phillipson et al. (2024) which examines the impact of local action groups in small fisheries areas shows the importance of institutional development to support the coastal economy. A study in Ghana by Mensah et al. (2019) also shows that the integration of community empowerment with area-based policies can have a significant impact on the welfare of coastal communities.

The literature gap above shows the need for further study on the role of institutional policies and local government support in encouraging fishery product diversification among coastal communities. Previous studies have highlighted that product diversification and community-based empowerment efforts have great potential to improve economic welfare. However, studies related to product diversification specifically for tuna as the main fishery resource in Bone Bolango Regency are still very minimal. Community empowerment that focuses on product diversification not only increases the added value of fishery products but also plays an important role in strengthening the economic resilience of coastal communities to market fluctuations and the impacts of climate change.

In Bone Bolango Regency, efforts to diversify processed tuna products have received attention and support from the local government, as shown in the Tuna Culinary Festival held in 2022. This festival not only aims to promote local tuna-based products, but also as a means to encourage innovation and creativity in utilizing marine resources. Product diversification carried out by the community is expected to increase their competitiveness in the local market and even open up export opportunities. However, for this diversification strategy to be successful, strong institutional and policy support is needed (Phillipson et al., 2024).

Institutional development and regulatory support that support communities in product diversification are expected to help create a sustainable business ecosystem. Educational institutions such as the Faculty of Economics, Gorontalo State University can also play a role in providing training and capacity building for coastal communities, so that they can improve their skills and knowledge in managing fisheries businesses independently. A study by Rumondang et al. (2024) emphasized the importance of a sustainable management model that considers ecological, economic, social, and institutional factors in coastal area management.

Based on the above needs, this study has several main objectives. First, to explore the understanding of coastal communities in Bone Bolango Regency in diversifying processed tuna products. Second, to identify factors that contribute greatly to empowering coastal communities in diversifying processed tuna products.

To achieve these objectives, this study will use qualitative and quantitative method approaches. The first step involves qualitative analysis through in-depth interviews with respondents consisting of coastal communities, local stakeholders, and fisheries business actors in Bone Bolango Regency. These interviews aim to gain insight into the challenges, opportunities, and support they receive in product diversification efforts. The second step will use the Analytical Hierarchy Process (AHP) method to evaluate and determine the factors that have the greatest contribution to the success of tuna product diversification. AHP allows for structured analysis in assessing these factors based on the priority weights given by respondents. This method is very relevant in supporting decision-making involving many criteria, especially in the context of complex coastal community economic development.

RESEARCH METHODS

Place and Time of Research

This research was conducted in the coastal area of Bone Bolango Regency, Gorontalo Province, which has great potential in the marine sector, especially fisheries. This area was chosen because of its geographical conditions on the coast and rich in marine resources such as tuna. Empowerment of coastal communities is carried out by encouraging diversification of tuna fish product processing as a strategy to improve the local economy and the sustainability of fisheries businesses. This research was conducted over a period of time adjusted to the needs of primary and secondary data collection in the field.

Primary Data Sources

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Primary data were obtained directly from sources in the field, including in-depth interviews with respondents and direct observation of coastal communities in Bone Bolango Regency. Respondents in this study were individuals who were considered to have knowledge of the fisheries sector and tuna product processing, and understood issues related to the economic empowerment of coastal communities. With these interviews and observations, accurate and relevant data can be collected to support the research.

Secondary Data Sources

Secondary data is archival data obtained through literature studies and official document searches from various sources. This secondary data includes information from government agencies, scientific publications, annual reports, and other documents relevant to the economic and social conditions of coastal communities in Bone Bolango Regency. This secondary data functions as a support to enrich the findings obtained from primary data.

Population and Sample

The population in this study were people living in the coastal areas of Bone Bolango Regency, including groups of fishermen who depend on the fisheries sector as a livelihood. Respondents involved in this study had an age range between 20 and 65 years, which is a productive age group and has the potential to be active in diversifying tuna fish products. The sampling method was carried out randomly with the Stratified Systematic Random Sampling approach and using the Proportional to Population Size (PPS) allocation technique. This technique considers the number of residents in each sub-district in Bone Bolango Regency to ensure proportional representation of each sub-district.

Data Analysis Techniques

The data obtained were analyzed using two main methods to obtain a more comprehensive picture and understanding of tuna product diversification strategies in coastal areas.

Descriptive Analysis

Descriptive analysis is used as an initial analysis to describe the conditions of tuna product diversification in empowering coastal communities. This analysis includes a description of the economic conditions of coastal communities, the product diversification process, and supporting or inhibiting factors for tuna product diversification. The indicators analyzed include the level of community participation, the level of acceptance of product diversification, and its impact on household income in coastal communities.

Analytical Hierarchy Process Analysis (AHP)

The Analytical Hierarchy Process (AHP) method is used to determine the importance weight of various factors that influence the tuna fish product diversification strategy. AHP is a functional hierarchy method that breaks down complex problems into simpler criteria groups. Each criterion and variable is given a numerical value that indicates its level of importance in the context of community empowerment. Through this weighting, AHP allows researchers to determine the priority of the most influential factors in supporting product diversification. The results of this AHP analysis will be the basis for formulating a tuna fish product diversification strategy to improve the welfare and economic independence of coastal communities in Bone Bolango Regency.

RESEARCH RESULT

This descriptive analysis aims to describe the condition of coastal community empowerment in Bone Bolango Regency in the diversification strategy of processed tuna fish products. Through this approach, the study will identify indicators related to coastal community empowerment, such as community participation, institutional support, and the impact of product diversification on community welfare.

The results of the analysis show that although there is initial awareness among the coastal communities of Bone Bolango Regency about the opportunities for diversification of tuna-based products, there are several inhibiting factors that slow down the optimization of the utilization of this potential. The following is a further exploration and continuation of this analysis, supplemented by support from previous research results.

1. Technology and Skills Factors as the Main Barriers

One of the main obstacles in the development of tuna product diversification in Bone Bolango is the limited technology and skills of the community in processing marine products. Study by (Bi, 2024) revealed that adequate processing technology can improve product quality and extend shelf life, which is important in creating competitive products in the market. Therefore, without access to appropriate technology and training, coastal communities will continue to lag behind in utilizing the potential of tuna as a value-added product.

2. Lack of Infrastructure Support and Supporting Facilities

Inadequate infrastructure, such as access to cooling facilities and processing equipment, is also a common obstacle. Research by (Hakim et al., 2022) shows that supporting infrastructure such as cold storage facilities are very important to maintain the quality of fish raw materials before further processing. The absence of this infrastructure causes products to be easily damaged, so that only a few people dare to try diversifying fish-based products.

3. Limited Capital and Access to Financing

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Limited capital is also a major obstacle in developing tuna processing businesses.(Pomeroy et al., 2020)highlighted that the difficulty of accessing financing, especially in coastal areas, is a significant barrier for fishermen and small entrepreneurs in increasing the scale of their businesses. This financing is essential for purchasing processing equipment and product development. Solutions such as microcredit or special financing programs for fishermen can help address this issue.

4. Lack of Understanding of Marketing Strategy

Despite awareness of the potential of tuna-based products, many people do not yet understand effective marketing strategies to reach a wider market. (Halim et al., 2019)identified that marketing training can help improve the success of small businesses in the fisheries sector. The use of digital media for marketing processed fish products is one strategy that can be utilized to increase market penetration, but is still rarely done due to the lack of digital skills.

5. The Importance of Training and Technical Assistance

Processing training and technical assistance are essential so that coastal communities can optimize the potential of processed tuna products.(Wiyono et al., 2006)emphasizes the importance of training in seafood processing to increase the selling value of local products. This training not only covers processing techniques, but also food safety and product quality standards.

6. Role of Government and Policy Support

The active role of the government in supporting training programs, providing infrastructure, and financing facilities is essential for the success of tuna-based product diversification.(Khoirunnisa, 2024)stated that training programs by the government in collaboration with higher education institutions and non-governmental organizations can accelerate the improvement of skills in coastal communities.

AHP (Analytic Hierarchy Process) Analysis Results

One of the methods used to determine the development strategy is the Analytical Hierarchy Process (AHP). The use of this method can help simplify a complex problem so as to speed up decision making (Luki, 2018).

The AHP method was chosen to analyze and determine the priority of the criteria that have been set and derived with several alternative choices and to interpret the consistency of assessments from experts/respondents that are qualitative to quantitative.

5.2.1. Comparison of Importance Weights for Each Aspect in Coastal Community Empowerment Strategy in Diversification of Tuna Fish Product Processing

The strategy of empowering coastal communities in diversifying processed tuna products in Bone Bolango Regency, the first thing to do is to provide weighting of the interests of aspects in determining a strategy model. The aspects used are the aspect of resource availability, the aspect of coaching and education, the aspect of infrastructure and market access, the aspect of conservation and sustainability.

The results of the interest weighting analysis for each aspect in determining the empowerment strategy model in Bone Bolango Regency are as follows:

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Model Name: Upaya Pemberdayaan Masyarakat Pesisir dalam Diversifikasi Olahan Produk Ikan Tuna

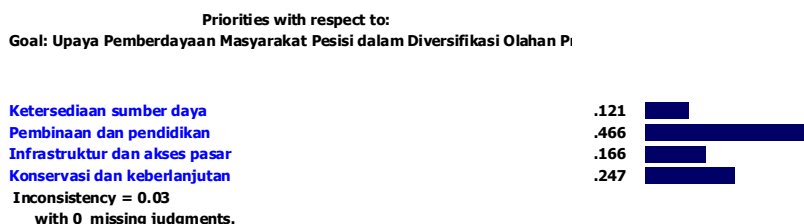


Figure 1. Comparison of Importance Weights for Each Aspect in Coastal Community Empowerment Strategy

Based on the results above, it can be seen that the main priority aspects in empowering coastal communities are coaching and education with a weight of 0.466 or 46.6 percent. In empowering coastal communities to diversify processed tuna products in Bone Bolango Regency, 46.6 percent of respondents expect improvements in the coaching and education aspects to increase the competitiveness of processed tuna products in Bone Bolango Regency. The coaching and education aspects include coaching and mentoring programs for tuna processing businesses, education and training programs for business management for tuna processors, and nutrition and health education programs to increase the added value of tuna products.

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After the development and education aspects, the conservation and sustainability aspects are the second priority that must be considered by the Bone Bolango Regency Government in order to support the sustainability of coastal community empowerment for diversification of superior tuna fish products with a weight of 0.247 or 24.7 percent of respondents assessing that the conservation and sustainability aspects can be improved in empowering coastal communities.

This implies that the group of housewives of fishermen really need guidance and education in an effort to empower coastal communities, especially in the management of processed tuna fish products. Coastal communities, especially housewives of fishermen, will be given the knowledge and skills needed in managing processed tuna fish products through guidance and education.

With increased knowledge and skills, they will be able to maximize the processing process and maintain product quality. Sustainable marine resource management and conservation are also included in this education. With a deeper understanding of the importance of maintaining tuna populations and the marine environment, coastal communities have a significant role in maintaining the sustainability of marine resources for the long term.

1. Alternative Strategies Viewed from the Aspect of Resource Availability

In the aspect availability of resources after being analyzed using AHP, the priority order in this aspect can be seen in the graph below:

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Model Name: Upaya Pemberdayaan Masyarakat Pesisir dalam Diversifikasi Olahan Produk Ikan Tuna

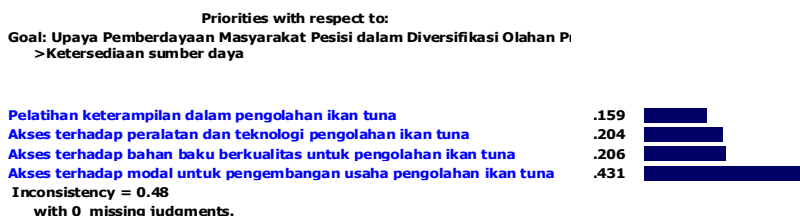


Figure 2. Alternative Strategies Viewed from the Aspect of Resource Availability

From this graph it is explained that in an effort to empower coastal communities through diversification of processed tuna products, there are four alternative aspects that are the main focus. The main priority is access to capital to develop tuna processing businesses with a weight of 0.431 or 43.1 percent. In this case, the groups consider access to quality raw materials for tuna processing with a weight of 0.206 or 20.6 percent to be the second priority. Furthermore, the aspect of access to tuna processing equipment and technology with a weight of 0.204 or 20.4 percent is also a focus. Finally, skills training in tuna processing with a weight of 0.159 or 15.9 percent is also needed.

In the priority of access to capital for the development of processing businesses, tuna should be given top priority because it has the highest weight of 0.431 or 43.1 percent. The Importance of Capital in Encouraging Diversification of Tuna Processed Products in Coastal Communities If coastal business actors have sufficient capital, they can invest in the development of facilities and infrastructure to improve tuna processing, expand their business, and increase production. In achieving empowerment goals, the main priority is access to capital.

To achieve more integrated empowerment, the first step that needs to be taken is to divide priorities into several aspects. This means that the focus is not only given to one thing, but includes various aspects that support each other. Sometimes, the resources available to provide empowerment are limited. By paying attention to the various aspects that exist, you can ensure that resource allocation is done wisely and in accordance with actual needs.

1. Alternative Strategies Viewed from the Aspect of Educational Development

After the weighting of the alternative strategies is reviewed from the aspects of Coaching and Education, the output results are...*expertchoice* can be seen in the following graph:

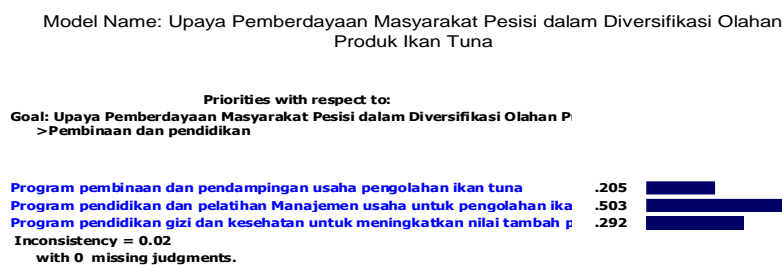


Figure 5. Alternative Strategies Viewed from the Aspect of Educational Development

According to respondents, there are three main alternatives in the aspect of coaching and education that play an important role in efforts to empower coastal communities in diversifying processed tuna products. The main focus is Education and training in tuna processing business management with a weight of 0.503 or around 50.3 percent. Meanwhile, with a percentage of 29.2 or a weight of 0.292, namely Nutrition and Health Education to increase the added value of tuna products occupies the second priority. Furthermore, the aspect of coaching and mentoring for tuna processing businesses is the last priority with a weight of 0.205 or 20.5 percent.

Education in business management will also guide entrepreneurs in recognizing business potential and designing sustainable growth strategies. With this knowledge, they are able to expand their operations and create added value for tuna products. Sustainability aspects are also considered in good management, for example involving resource management and production processes that prioritize environmental sustainability. This action will provide support to coastal communities in maintaining the sustainability of marine ecosystems and preserving tuna resources.

1. Alternative Strategies Viewed from the Aspects of Infrastructure and Market Access

The infrastructure and market access aspects in this study consist of three alternative strategy indicators and the expert choice output results can be seen in the following graph:

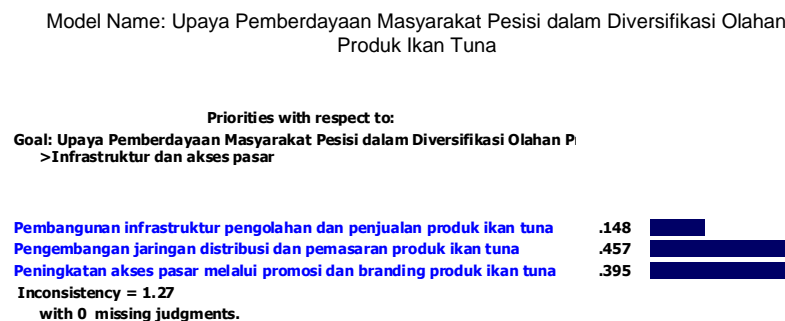


Figure 6. Alternative Strategies Viewed from the Aspects of Infrastructure and Market Access

Based on the respondent graph above In order to improve the empowerment of coastal communities Efforts to diversify processed tuna products, there are three main alternative points that are the focus, namely the infrastructure and market aspects. Primarily, the development of distribution networks and marketing of tuna weighing 0.457 or 45.7 percent is the main focus in terms of infrastructure and market. The next focus is increasing market access through promotion and branding of tuna products, with a weight of 0.395 or 39.5 percent. Meanwhile, attention is focused on the development of infrastructure for processing and selling tuna products, which has a weight of 0.148 or 14.8 percent, as the third priority in terms of infrastructure and market.

The development of a distribution network will provide assistance to tuna fish business actors to reach a wider market. To increase sales of tuna fish products, a good distribution network is needed. In increasing sales volume, coastal communities will achieve better income. In a business world full of competition, having an efficient distribution network can provide an advantage for local tuna fish products in a wider market.

Having a good distribution network will provide a positive contribution in increasing sales of tuna products. With the increase in sales volume, coastal communities will get better income.

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2. Alternative Strategies Viewed from the Aspect of Conservation and Sustainability

Alternative comparisons seen from the institutional aspects that need to be considered in efforts to develop coastal community empowerment for diversification of regional tuna fish products are as follows:

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Model Name: Upaya Pemberdayaan Masyarakat Pesisir dalam Diversifikasi Olahan Produk Ikan Tuna

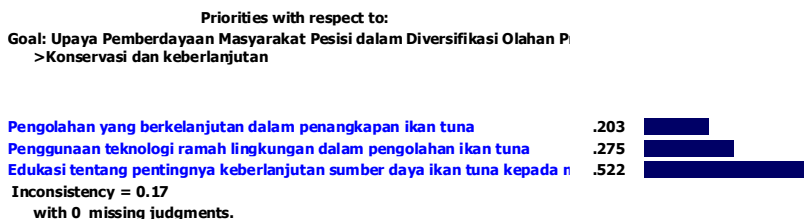


Figure 7. Alternative Strategies Viewed from the Aspect of Conservation and Sustainability

From the graph above, the priority sequence that needs to be implemented by the Bone Bolango Regency Government can be seen, in the context of education on resource sustainability, attention to the importance of tuna for coastal communities has a main point with a weight of 0.522 or 52.2 percent. The second point of this topic discusses the use of environmentally friendly technology in tuna processing with a weight of 0.275 or 27.5 percent. In efforts to empower coastal communities in diversifying tuna fish processing, the third important point is sustainable processing in tuna fishing, with a weight of 0.203 or 20.3 percent. The key to education is prioritizing the importance of tuna fish resource sustainability. With a weight of 0.522 or 52.2 percent, this shows a deep awareness and understanding of the importance of maintaining tuna fish resources so that they remain sustainable. It is important for coastal communities to understand through education that maintaining marine resources is very important for the sustainability of their livelihoods. Using environmentally friendly technology in tuna fish processing is a significant progress. This shows concern for more efficient and sustainable processing methods that can reduce negative impacts on the environment. In tuna fishing, it is important to give a weight of 0.203 or 20.3 percent when doing sustainable processing. In addition to the processing process after catching, sustainable fishing methods are also very important. In this way, we can help maintain the tuna population from being threatened with extinction.

5.2.2 Comparison of Importance Weights for Evaluation of Community Empowerment Factors in Coastal Areas

From the overall evaluation of community empowerment factors in coastal areas, the priority order can be seen in the following table:

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Model Name: Evaluasi Faktor-faktor Pemberdayaan Masyarakat di Wilayah Pesisir

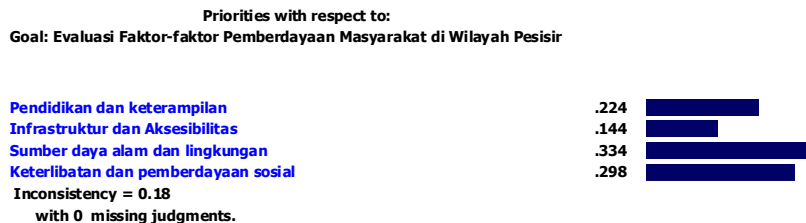


Figure 8. Comparison of Importance Weights for Evaluation of Community Empowerment Factors in Coastal Areas

From the results of data analysis on the evaluation of community empowerment factors in coastal areas, there is a comparison of four criteria. In the evaluation of community empowerment factors in coastal areas, the criteria on natural resources and the environment are the first point with a weight of 0.334 or 33.4 percent. Then, social involvement and empowerment with a weight of 0.298 or 29.8 percent are the second. Then, continued with the criteria of education and skills which have a weight of 0.224 or 22.4 percent as the third point in the evaluation of community empowerment factors in coastal areas. Finally, infrastructure and accessibility are the fourth point with a weight of 0.144 or only 14.4 percent in the evaluation.

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Coastal communities' dependence on natural resources, especially tuna, as their main source of income, is often very strong. Moreover, it is important for us to maintain the sustainability and balance of natural resources, especially marine resources, so that their lives can continue. Coastal areas are often fragile environments to environmental changes and are threatened by climate change. To protect the livelihoods and lives of coastal communities, the key is to ensure the sustainability of the marine environment. A harmonious life system is maintained thanks to the existence of natural resources and a well-maintained marine environment. This ecosystem also ensures the sustainability of the tuna population in line with the harmony of nature. In maintaining the balance of the marine ecosystem, the tuna population can remain sustainable and have a positive impact on the livelihoods of coastal communities. The Importance of Maintaining Natural Resources and the Environment is Not Only for Now, But also for the Long Term. By maintaining these resources, coastal communities can continue to rely on the wealth of marine resources for their lives.

1. Alternative Strategies Viewed from the Aspect of Education and Skills

The education and skills aspects in this study consist of three alternative indicators which can be seen in the following graph:

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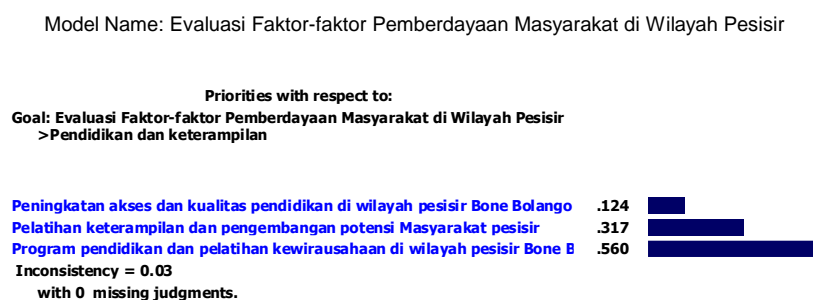


Figure 9. Alternative Strategies Viewed from the Aspect of Education and Skills

Evaluation of Community empowerment factors in coastal areas, especially in terms of Education and skills, has three main points as its objectives. First of all, the main focus in this criterion is the Education and entrepreneurship training program in the coastal area of Bone Bolango, with a weight of 0.560 or 56 percent. Next, the second important point is skills training and potential development. This has a weight of 0.317 or 31.7 percent. The third point in the Education and skills criteria, with a weight of 0.124 or 12.4 percent, is increasing access and quality of Education in the coastal area of Bone Bolango.

The entrepreneurship program aims to encourage creativity and innovation. Social empowerment through entrepreneurship training allows coastal communities to find new opportunities in processing and marketing tuna products. This also creates added value and provides access to diverse markets. With this, the ability of coastal communities to manage their own businesses will increase, thereby increasing their self-confidence. In addition, this can also strengthen social ties within the community.

With increased skills and knowledge in entrepreneurship, individuals can improve their own social and economic roles. In addition, it also contributes to the creation of gender equality and the reduction of inequality. To maintain the sustainability and preservation of natural resources, including tuna stocks, it is important to carry out environmentally friendly business management. Entrepreneurship programs have the ability to provide training on sustainable practices that play a role in maintaining the environment and natural resources for the sustainability of future generations.

2. Alternative Strategies Viewed from Infrastructure and Accessibility Aspects

The Infrastructure and Accessibility aspects in this study consist of three alternative indicators which can be seen in the following graph:

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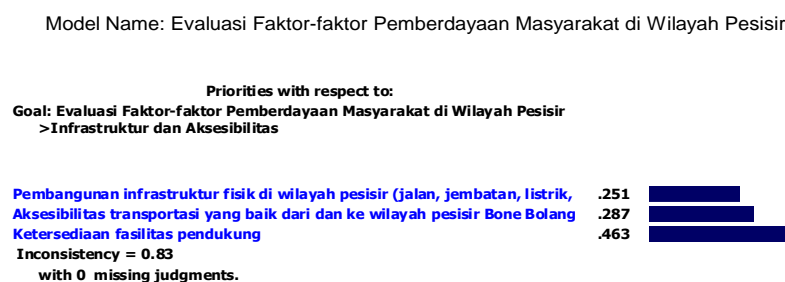


Figure 10. Alternative Strategies Viewed from Infrastructure and Accessibility Aspects

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In the evaluation of community empowerment factors in coastal areas, especially in the criteria of infrastructure and accessibility, there are three main points. First, the availability of supporting facilities is the first point in this criterion with a weight of 0.463 or 46.3 percent. Meanwhile, the second weight for the infrastructure and accessibility criteria is 0.287 or 28.7 percent, which involves a good level of transportation accessibility from the Bone Bolango coastal area. Then, the group places the development of physical infrastructure in coastal areas, such as roads, bridges, electricity, and clean water, as the third point with a weight of 0.251 or 25.1 percent.

Coastal communities can easily access essential services and resources thanks to the availability of supporting facilities such as markets, health centers, schools, and other public places. It is important to note that coastal areas are often isolated, so having good access to these facilities can improve their quality of life. In addition, the existence of supporting facilities can also support economic development in coastal areas. For example, the existence of a good market can provide benefits for entrepreneurs in the tuna fish processing sector to increase the efficiency of their product sales. As a result, this can increase their income.

Adequate facilities also contribute to community welfare. Optimal health facilities can provide access to the health care needed, while affordable and quality education can increase the potential of young people. In addition, supporting facilities are also often places for social and cultural interaction in the community. They are able to support cultural identity and increase social cohesion.

3. Alternative Strategies Viewed from the Aspect of Natural Resources and the Environment

The natural resources and environmental aspects in this study consist of three alternative indicators which can be seen in the following graph:

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Model Name: Evaluasi Faktor-faktor Pemberdayaan Masyarakat di Wilayah Pesisir

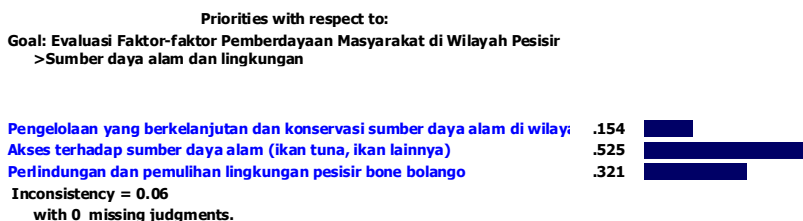


Figure 11. Alternative Strategies Viewed from the Aspect of Natural Resources and the Environment

The purpose of evaluating the factors of community empowerment in coastal areas, especially in the criteria of natural resources and the environment, has three important aspects in the group. The first in this group of criteria is access to natural resources (tuna, other fish) which has the highest weight among other groups with a total of 0.525 or 52.5 percent. Furthermore, the second priority weighs 0.321 or 32.1 percent, namely the protection and restoration of the Bone Bolango coastal environment. Meanwhile, the third priority in evaluating the factors of community empowerment in coastal areas, especially in the aspect of natural resources and the environment, is sustainable processing and conservation of natural resources in coastal areas with a weight of 0.154 or only 15.4 percent.

The sustainability of coastal communities, especially those working in the fishing industry, is highly dependent on the existence of natural resources, especially fish, as their main source of income. Therefore, to ensure their survival, it is very important for them to have good and sustainable access to natural resources, especially tuna. This will not only increase their income potential, but also ensure their survival. Not only does it have an impact on the economic welfare of coastal communities, it also has a positive impact on their standard of living.

Awareness of the importance of maintaining the sustainability of marine resources is reflected in the main priority of providing access to natural resources. Supporters of the long-term goal of maintaining tuna populations and preserving marine ecosystems are by implementing good and sustainable management of natural resources. One important aspect of this management is maintaining the balance of the marine ecosystem. The main goal is to ensure that the ecosystem that supports the sustainability of tuna remains balanced and functions well.

4. Alternative Strategies Viewed from the Aspect of Social Involvement and Empowerment

The natural resources and environmental aspects in this study consist of three alternative indicators which can be seen in the following graph:

Model Name: Evaluasi Faktor-faktor Pemberdayaan Masyarakat di Wilayah Pesisir

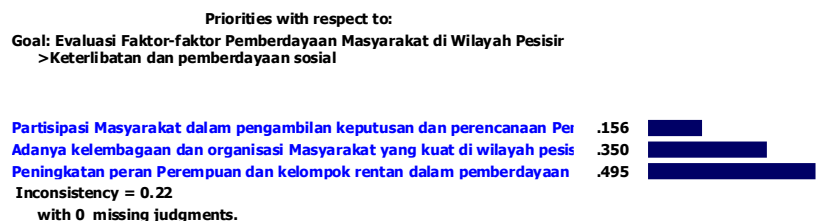
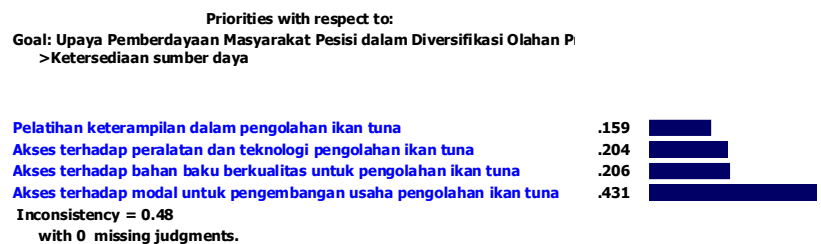


Figure 12. Alternative Strategies Viewed from the Aspect of Social Involvement and Empowerment

In the evaluation of community empowerment factors in coastal areas, there are three important priority points, namely aspects of social involvement and community empowerment. First of all, the main focus in this aspect is to increase the role of women and vulnerable groups in efforts to empower coastal communities. In the assessment scale, this has a weight of 0.495 or 49.5 percent. In this aspect, strong community institutions and organizations in coastal areas are important points that weigh 0.350 or 35 percent in this group. Then, in the evaluation of community empowerment factors in coastal areas, community participation in decision-making and development planning in coastal areas is the third priority. The main focus is on community involvement and social empowerment in coastal areas.

Increasing the role of women and vulnerable groups is a crucial step in achieving gender equality and social justice. It is important to recognize that every individual in society must be given equal opportunities to pay attention to women and vulnerable groups. This will create a higher level of social inclusion. In ensuring community inclusion, it is very important to ensure that no opinion or neglected needs. Empowerment and access to resources are essential.

Model Name: Upaya Pemberdayaan Masyarakat Pesisir dalam Diversifikasi Olahan Produk Ikan Tuna



In coastal communities, women often play important roles in various aspects, especially in managing households and fishing. To strengthen their role in empowerment, we must recognize and leverage existing local leadership. Mobilizing the power of women and vulnerable groups will also have a positive impact on the economic potential of the community. With micro-enterprises, they have the potential to be economic drivers that can improve the quality of life of families and communities through additional income.

CONCLUSIONS

Based on the results of the analysis, the conclusion of this study is that from the four aspects assessed in the efforts to develop the Coastal Community Empowerment sector for tuna product diversification in Bone Bolango Regency, the priority order is the aspect of coaching and education, conservation and sustainability, infrastructure and market access and availability of resources. For the coaching aspect in efforts to empower coastal communities through diversification of processed tuna products, there are four alternative aspects that are the main focus. The main priority is access to capital to develop a tuna processing business with a weight of 0.431 or 43.1 percent. In this case, the groups consider access to quality raw materials for tuna processing with a weight of 0.206 or 20.6 percent to be the second priority. Furthermore, the aspect of access to tuna processing equipment and technology

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with a weight of 0.204 or 20.4 percent is also a focus. Finally, skills training in tuna processing with a weight of 0.159 or 15.9 percent is also needed.

In the priority of access to capital for the development of processing businesses, tuna should be given top priority because it has the highest weight of 0.431 or 43.1 percent. The Importance of Capital in Encouraging Diversification of Tuna Processed Products in Coastal Communities If coastal business actors have sufficient capital, they can invest in the development of facilities and infrastructure to improve tuna processing, expand their business, and increase production. In achieving empowerment goals, the main priority is access to capital.

Some recommendations and suggestions that need to be considered by the Government and the people of Bone Bolango Regency in efforts to develop coastal community empowerment for tuna fish product diversification in Bone Bolango Regency include:

The Bone Bolango Regency Government must continue to increase the budget for the development of Coastal Community Empowerment for Tuna Product Diversification. The sustainability of government spending in the Coastal Community Empowerment sector for Tuna Product Diversification also needs to be maintained to support the development of the Coastal Community Empowerment sector for Tuna Product Diversification in Bone Bolango Regency in the long term so that it is more efficient and competitive.

In order to support the empowerment of coastal communities to diversify tuna products in Bone Bolango Regency, related agencies need to coordinate more intensively with the Gorontalo Provincial Government in terms of developing tourism areas which will ultimately lead to increasing the utilization of diversified tuna products managed by the Coastal Community of Bone Bolango Regency.

The government must be able to collaborate with banks to support the empowerment of coastal communities to diversify tuna fish products so that the coastal community empowerment business to diversify tuna fish products can become a sustainable business that does not only depend on support from the central government.

The results of the analysis carried out in mapping out strategies that need to be considered by the Bone Bolango Regency government are related to budget support for coaching and education for the community regarding the diversification of tuna fish processing that needs to be increased, not limited to the budget for training but also for the conservation and sustainability of tuna fish production in coastal areas, equal distribution of infrastructure and market access and the availability of supporting resources.

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REFERENCES

- 1) Anand, S., Enayati, M., Raj, D., Montresor, A., & Ramesh, M.V. (2024). Internet over the ocean: A smart IoT-enabled digital ecosystem for empowering coastal fisher communities. *Technology in Society*, 79(February 2023), 102686. <https://doi.org/10.1016/j.techsoc.2024.102686>
- 2) Andriamahefazafy, M., & Kull, CA (2019). Materializing the blue economy: Tuna fisheries and the theory of access in the Western Indian Ocean. *Journal of Political Ecology*, 26(1), 403–424. <https://doi.org/10.2458/v26i1.23040>
- 3) Bi, J. (2024). Aquatic Food Products: Processing Technology and Quality Control. *Foods*, 13(17), 2806. <https://doi.org/10.3390/foods13172806>
- 4) Fajriah, Isamu, KT, Mustafa, A., & Arami, H. (2021). Strategy for the development of local fisheries product processing in coastal areas of North Konawe Regency. *IOP Conference Series: Earth and Environmental Science*, 674(1). <https://doi.org/10.1088/1755-1315/674/1/012031>
- 5) Hakim, HMZ, Nopiana, M., & Latuconsina, H. (2022). Strategy for development of fishery products processing industry in Rembang Regency, Indonesia. *AAFL Bioflux*, 15(5), 2292–2298.
- 6) Halim, A., Wiryawan, B., Loneragan, NR, Hordyk, A., Sondita, MFA, White, AT, Koeshendrajana, S., Ruchimat, T., Pomeroy, RS, & Yuni, C. (2019). Developing a functional definition of small-scale fisheries in support of marine capture fisheries management in Indonesia. *Marine Policy*, 100(November), 238–248. <https://doi.org/10.1016/j.marpol.2018.11.044>
- 7) Holvoet, K., & Allison, E. H. (2008). Livelihood diversification in coastal and inland fishing communities: misconceptions, evidence and implications for fisheries management. *Interpretation A Journal Of Bible And Theology*, 1–39.
- 8) Khoirunnisa, EI (2024). The Role of Non-Governmental Organizations in Empowerment to Improve Community Welfare in Indonesia. *Proceedings of the International Conference on Learning Communities*, 1(1), 2859–2864.
- 9) Nicolosi, A., Di Gregorio, D., Arena, G., Laganà, V.R., & Privitera, D. (2021). Small-scale coastal fisheries in the midst of adaptation and diversification: Insights from Southern Italy. *Sustainability (Switzerland)*, 13(13), 1–27. <https://doi.org/10.3390/su13137393>

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- 10) Phillipson, J., Salmi, P., Linke, S., Svets, K., & Budzich-Tabor, U. (2024). Fisheries local action groups, small-scale fisheries and territorial development. *Sociologia Ruralis*, 64(3), 399–414. <https://doi.org/10.1111/soru.12478>
- 11) Pomeroy, R., Arango, C., Lomboy, C.G., & Box, S. (2020). Financial inclusion to build economic resilience in small-scale fisheries. *Marine Policy*, 118(September 2019), 103982. <https://doi.org/10.1016/j.marpol.2020.103982>
- 12) Wiyono, ES, Yamada, S., Tanaka, E., Arimoto, T., & Kitakado, T. (2006). Dynamics of fishing gear allocation by fishers in small-scale coastal fisheries of Pelabuhanratu Bay, Indonesia. *Fisheries Management and Ecology*, 13(3), 185–195. <https://doi.org/10.1111/j.1365-2400.2006.00493>.



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