



Sustainable Economic Development through Capture Fisheries Downstreaming in Bone Regency

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Abstract

This study examines the downstreaming strategies of capture fisheries products and their contribution to sustainable coastal economic development in Bone Regency, central Indonesia. Downstreaming is recognized as a critical approach to increasing value addition, diversifying income sources, and strengthening coastal communities' welfare. A qualitative case study design was employed, involving 20 informants comprising fishermen, fish processing MSMEs, cooperatives, and local government officials. Data were collected through in-depth interviews, participatory observation, and policy documents review, and analyzed thematically using Miles and Huberman's framework. The findings reveal six key aspects of downstreaming. First, post-harvest processing practices such as salted fish, fish flakes, crackers, and seaweed-based nuggets have significantly enhanced product value and reduced waste. Second, cooperatives and village-owned enterprises (BUMDes) act as aggregators and provide inclusive access to capital and markets. Third, infrastructure limitations, regulatory barriers, and low business literacy constrain market expansion. Fourth, downstreaming generates new opportunities for women and youth to engage in value chain and digital promotion. Fifth, multi-stakeholder synergy collaboration remains partial but has potential for formal institutionalization. Overall, the study underscores the need for integrated policies, institutional strengthening, and sustainable assistance to achieve inclusive, competitive, and environmentally friendly downstreaming of capture fisheries.

Keywords: Downstreaming; Capture Fisheries; Sustainable Economy; Cooperatives; Bone Regency

Abstrak

Penelitian ini menganalisis strategi hilirisasi produk perikanan tangkap dan kontribusinya terhadap pembangunan ekonomi pesisir berkelanjutan di Kabupaten Bone, kawasan tengah Indonesia. Hilirisasi dipandang sebagai pendekatan strategis untuk meningkatkan nilai tambah, mendiversifikasi sumber pendapatan, dan memperkuat kesejahteraan masyarakat pesisir. Penelitian menggunakan metode kualitatif dengan desain studi kasus, melibatkan 20 informan (nelayan, pelaku UMKM pengolahan ikan, koperasi, dan pejabat pemerintah daerah). Data dikumpulkan melalui wawancara mendalam, observasi partisipatif, serta telaah dokumen kebijakan, kemudian dianalisis secara tematik dengan kerangka Miles dan Huberman. Hasil penelitian mengungkap enam aspek utama hilirisasi. Pertama, praktik pengolahan pascapanen seperti ikan asin, abon, kerupuk, dan nugget berbasis rumput laut [berhasil meningkatkan nilai jual sekaligus mengurangi limbah]. Kedua, koperasi dan BUMDes berperan sebagai agregator produk dan penyedia akses modal serta pasar yang inklusif. Ketiga, keterbatasan infrastruktur, hambatan regulasi, dan rendahnya literasi bisnis membatasi perluasan pasar. Keempat, hilirisasi menciptakan peluang baru bagi perempuan dan pemuda dalam rantai nilai serta promosi digital. Kelima, kolaborasi multiaktor masih parsial tetapi berpotensi diperkuat melalui kelembagaan formal. Secara keseluruhan, penelitian ini menegaskan pentingnya integrasi kebijakan, penguatan kelembagaan lokal, dan pendampingan berkelanjutan untuk mewujudkan hilirisasi perikanan tangkap yang inklusif, berdaya saing, dan ramah lingkungan.

Kata Kunci: Hilirisasi; Perikanan Tangkap; Ekonomi Berkelanjutan; Koperasi; Kabupaten Bone.

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INTRODUCTION

Indonesia has enormous blue economy potential, particularly from the capture fisheries sector, yet this potential remains underutilized for improving the livelihoods of coastal communities (Rijal, 2023; Yusuf et al., 2024). Data from the Ministry of Marine Affairs and Fisheries in 2023 indicates that approximately 70% of the catch in the central region of Indonesia is still sold in fresh form or through simple processing, resulting in limited value addition and minimal impact on fishermen's income (Efani et al., 2024). As part of this region, Bone Regency possesses abundant marine fish resources with annual catch production reaching tens of thousands of tons, along with supporting facilities such as fish landing ports, ice plants, and cold storage (Carda, 2022; Putri, 2021; Sambolangi, 2022). However, the integration of these resources into advanced value chains remains weak, leaving downstreaming opportunities largely untapped.

This condition results in a shortage of high-value processed products despite increasing domestic and global demand for ready-to-consume and environmentally friendly fishery products (Hackshaw et al., 2016; Ninan, 2018; Samarajeewa, 2024). Previous studies have focused on technical aspects of fisheries, such as fish stock conservation or optimization of fishing gear (Bastardie et al., 2022; Bradley et al., 2019; Eigaard et al., 2014; Hilborn et al., 2020; Lorenzen, 2008). In contrast, studies exploring community-based downstreaming that integrates social, economic, and institutional dimensions remain scarce, particularly in central Indonesia (Arifin, 2025; Gani & Handayani, 2024; Juhro & Ridwan, 2021; Khoiriyah, 2024; Nengsih et al., 2020). However, incorporating these aspects is crucial for achieving sustainable economic development that targets increased value addition, empowers local communities, and strengthens coastal institutional capacity (Franco & Tracey, 2019; Handoko et al., 2023).

This study responds to the urgent need to formulate downstreaming strategies that are not merely technical, but socio-economic practices involving fishermen, MSMEs, cooperatives, and local governments. It aligns with the framework of community-based fisheries value chain development, which emphasizes optimizing local resources, community empowerment, and sustainable fisheries governance. The novelty of this study lies in integrating local dynamics—including traditional knowledge, institutional capacity, and market barriers—into a replicable downstreaming model for other coastal regions. Thus, this study not only contributes empirically to the literature on downstreaming and the blue economy but also offering practical policy recommendations for inclusive and sustainable fisheries industrialization in Indonesia.

RESEARCH METHODS

This study uses a qualitative approach with a case study design (Yin, 2018) to examine the dynamics of downstreaming in capture fisheries and its socio-economic implications for sustainable coastal development. The qualitative approach was chosen because it allows for in-depth exploration of local actors' perceptions, strategies, and challenges within the value chain, covering fishermen, fish processing entrepreneurs, cooperatives, and local policymakers.

The research was purposively selected in Bone Regency, given its high intensity of capture fisheries activities, the availability of post-harvest facilities, and emerging initiatives for value-added processing. Bone hosts a Fish Landing Base, several small-to-medium fish processing units, and a fishing community experimenting with diversified products such as smoked fish, flakes, and crackers.

Informants were selected using purposive sampling to ensure the representation of various relevant stakeholders. A total of 20 informants were involved, consisting of 8 active fishermen, 5 MSME actors in catch processing, three representatives of cooperatives or fishermen's groups, and four local government officials in charge of marine and fisheries affairs.

Data collection was carried out through three main complementary techniques. First, semi-structured in-depth interviews were used to explore local actors' perspectives, experiences, and strategies in developing fisheries products downstream. The interview guide was developed based on the value chain framework and the concept of sustainable blue economy, making it flexible yet focused on issues of competitiveness, value addition, and socio-economic impacts. Second, participatory observation was conducted at fish auction sites, fish processing units, and local markets to document post-harvest practices, production processes, distribution, and interactions among actors along the value chain. Third, the document review included regional fisheries policies, production statistics, downstreaming program reports, and relevant fishermen's cooperative archives to enrich the analysis and validate field information.

The collected data were analyzed using Miles and Huberman's (2019) thematic analysis model, which includes data reduction, data presentation, and iterative conclusion drawing. Coding focused on identifying themes such as post-harvest strategies, institutional roles, infrastructure barriers, and socio-economic impacts. The validity of the findings is ensured through triangulation of sources and methods by comparing the results of interviews, observations, and official documents. In addition, member checking is conducted with several key informants to ensure the accuracy of data interpretation. This study also pays attention to ethical aspects, including informant consent and respondent confidentiality, so the entire process follows the principles of ethical and responsible social research.

FINDINGS

Downstreaming strategies for capture fisheries products implemented in coastal areas

Post-harvest processing practices

Downstreaming strategies for capturing fisheries' products in the coastal areas of Bone Regency are realized mainly through increasingly varied and value-added post-harvest processing practices. Communities that previously only sold fish in fresh condition are now developing various processed products such as salted fish, fish flakes, fish crackers, and nuggets made from a mixture of seaweed. These efforts extend the shelf life of products and double their selling price compared to fresh fish in local markets. These changes are driven by training from relevant government agencies, youth group initiatives, and simple innovations utilizing assistive technologies such as solar dryers and vacuum packaging machines. Creativity in using fish fillets or heads as byproducts, such as crackers and fish flour, also serves as a solution to reduce waste while expanding income sources for fishing families. This is evident from the following statements from informants:

"In the past, fish was only sold fresh, but now we make salted fish and shredded fish for longer storage. The price has also doubled." (Fish processing MSME actor)

"We use solar dryers provided by the agency. In the past, it was difficult to dry fish during the rainy season, but now it is faster." (Head of a fish processing group)

"Young people here are trying to make fish nuggets using seaweed as a mixture. The market is quite good, especially for schools." (Local youth entrepreneur)

"The products are now vacuum-packed so they can be shipped to Makassar without spoiling quickly." (MSME Actor)

"We started making fish crackers from leftover fillets to avoid waste." (Housewife and cooperative member)

"Fishermen usually bring home small fish to make dried fish. It is additional income for the family." (Fishermen community leader)

*"There was once an assistance program to make fish meal for animal feed from fish heads."
(Local facilitator)*

Interpreting these findings indicates a structural transformation in the capture fisheries value chain at the community level. Post-harvest-based downstreaming extends the catch's economic life and strengthens fishing households' economic resilience through product diversification. This approach also addresses the issue of fish waste, which has long been an environmental problem in fish landing centers. Simple technologies such as solar dryers and vacuum machines signify the adoption of contextually appropriate innovations—low-cost yet high-impact technologies. Additionally, youth involvement in creating innovative products like seaweed-based nuggets indicates the regeneration of business actors and the infusion of fresh ideas into the fish processing industry. This reflects a paradigm shift among coastal communities from traditional extractive practices to value-added and sustainable resource management.

Involvement of Cooperatives and Village-Owned Enterprises

The downstreaming strategy for capture fisheries products in the coastal areas of Bone Regency is also supported by the critical role of fishermen's cooperatives and village-owned enterprises (BUMDes) as local economic institutions. Cooperatives act as a link between household-scale producers and broader markets, both at the sub-district and district levels. Through cooperatives, members' processed products are collected and marketed collectively, and their prices are negotiated to be fairer for fishermen. On the other hand, BUMDes contribute by providing interest-free loans to support business capital and facilitating access to fisheries product exhibitions as platforms for promotion and networking. Although BUMDes' support remains limited in capital and capacity, its presence is sufficient to help initiate simple processing businesses and motivate the community to participate in the post-harvest value chain. The following informants illustrate this situation:

"Our cooperative collects processed products from members and then sells them to the subdistrict market." (Head of the Tonra fishermen's cooperative)

"BUMDes helps us borrow capital without interest to buy packaging equipment." (Small business owner)

"We coordinate with BUMDes to participate in a fishery product exhibition in Bone." (Community leader)

"The cooperative also negotiates prices with collectors to be fairer to fishermen." (Cooperative member)

"BUMDes assistance is still limited, but it is enough to start a simple processing business." (MSME actor)

The interpretation of these findings indicates that cooperatives and BUMDes play a strategic role in strengthening the local economic structure during the downstreaming process. Cooperatives act as product aggregators and price protectors for members, reducing fishermen's dependence on single collectors who often unilaterally determine prices. BUMDes, despite the small scale of their interventions, have opened access to inclusive capital and expanded the exposure of local products through exhibitions or new market networks. The combination of their functions provides an important foundation for developing a more organized and sustainable capture fisheries value chain, while demonstrating the potential of community-based governance models that can be replicated in other coastal areas.

Challenges and opportunities in improving welfare through capture fisheries downstreaming

Infrastructure and Market Access Challenges

The most fundamental challenge in downstreaming capture fisheries products in Bone Regency is the limited infrastructure and market access. Processed fish products are still distributed locally up to the regency level, while opportunities to access modern markets or exports have not been optimally utilized. Obstacles arise from a lack of supporting facilities such as cold storage in villages, the distance of ice plants from fish landing sites, and high transportation costs. On the other hand, processed products do not yet have distribution permits and certification, which are prerequisites for entering modern retail markets or digital platforms. Price uncertainty is also an obstacle, as fishermen do not have long-term price contracts and are therefore highly vulnerable to market fluctuations. The following informants revealed this information:

"Our market is still limited to here and the district, even though we could get higher prices if we could export." (Fish floss MSME actor)

"We often lose money when fish prices drop suddenly, as we don't have fixed price contracts." (Fisherman leader)

"There is an ice factory, but it is far from our village, so transportation costs increase." (Cooperative member)

"We don't know how to enter the online marketplace, so we are still focused on selling to collectors." (Young fish processor)

"Our products do not have distribution permits, so it is difficult to enter supermarkets." (Female entrepreneur)

Interpretation of these findings shows that physical limitations and regulatory barriers slow down the downstreaming process. Processed products struggle to meet modern markets' quality standards and supply continuity without adequate supporting infrastructure. These obstacles also directly impact business operators' profit margins due to additional transportation and storage costs. This condition emphasizes the importance of policies integrating post-harvest infrastructure development, product certification facilitation, and access to digital markets as key strategies for sustainable downstreaming.

Human Resource Capacity and Business Literacy

In addition to infrastructure issues, low human resource capacity and business literacy are significant challenges in the downstreaming process. Although coastal communities possess technical skills in fish processing, most lack understanding of business management, profit and loss calculations, and marketing strategies. Training programs conducted by the government or NGOs are often short-term, insufficient for building long-term capacity. Additionally, there is a generational gap where young people are more familiar with social media and digital technology but are not fully engaged in family businesses. Low awareness of the importance of business legality and export standards also makes it difficult for local products to compete in broader markets. The following quotes illustrate this:

"We can process fish, but we don't understand how to calculate business profits and losses." (Housewife fish processor)

"Training is often only provided once, and after that, we are confused when technical issues arise." (MSME operator)

"Young people are more familiar with social media, but not all are involved in downstream processing." (Youth leader)

"We need assistance to obtain halal certification and PIRT permits." (Small business owner)

*"Many still view processed food production as a side job, not a primary source of income."
(Coastal community leader)*

"Knowledge about export quality standards is still minimal." (Fishermen group leader)

"We don't have a cooperative that specifically trains in digital marketing." (NGO facilitator)

The interpretation of this sub-theme shows that weak business literacy and human resource capacity are key obstacles to developing the value chain of the captured fisheries. Limited managerial understanding prevents fish processing businesses from expanding into other businesses, while opportunities for digital marketing have not been fully utilized. These challenges underscore the need for long-term assistance focused on strengthening entrepreneurial capacity, digital marketing training, and sustainable mentoring so that coastal communities can compete in modern markets and maximize the added value of their products.

Downstreaming Opportunities for Welfare

Downstreaming of capture fisheries products in Bone District increases the added value of catches and opens new opportunities for improving the welfare of coastal communities. This transformation is evident in the changing roles of fishing families, particularly the involvement of women and youth, and the diversification of previously unavailable jobs. Women who previously only helped at home are now actively processing products such as fish crackers, while youth are involved in digital promotion through social media to expand the market. Downstreaming also creates new jobs at various stages, from processing, packaging, to product distribution, so that fishermen's household income is no longer entirely dependent on the fishing season. These changes are evident in the following statements from informants:

*"I used to just help my husband at home, but now I make fish crackers for my income."
(Housewife)*

"The shredded fish business allows me to pay for my children's schooling without having to wait for the fishing season." (MSME actor)

*"Young people now don't just go fishing, but also create promotional content for fish products."
(Youth leader)*

*"Downstreaming has created new jobs, from processing and packaging to distribution."
(Cooperative facilitator)*

"Our income has almost doubled since we started selling processed products instead of fresh fish." (Fisherman and processor)

The findings indicate that downstreaming has a multiplier effect on the well-being of coastal communities. Product diversification and new economic activities enhance family financial independence, strengthen economic resilience during lean seasons, and open up inclusive participation opportunities for women and youth. Downstreaming creates a more sustainable business ecosystem by integrating production processes, digital marketing, and local distribution into a single value chain. These findings underscore that downstreaming is not only an economic strategy but also a social empowerment tool that can improve the competitiveness of coastal communities while strengthening social cohesion through cross-generational and gender involvement.

Role and Synergy of Stakeholders

The role and synergy of stakeholders are key factors in supporting the downstreaming of capture fisheries products in Bone District. The research findings indicate that various parties, such as the fisheries department, village government, cooperatives, and local communities, have different but complementary contributions. The fisheries department provides production facilities and technical training. At the same time, the village government facilitates basic infrastructure such as production spaces that meet health standards. Cooperatives bridge

producers and markets, including organizing community participation in district-level exhibitions to expand marketing networks. However, there are gaps in the marketing stage, which still depend on individual and business group initiatives and inconsistent cooperation with local marketplaces. This situation is reflected in the following informants' views:

"The agency provided drying equipment and training on how to use it." (Salted fish business operator)

"The village government helps facilitate clean production spaces so that health standards are met." (Community leader)

"We are often invited to district-level fishery product exhibitions." (Cooperative chairperson)

"The government helps with initial capital, but marketing is still our initiative." (MSME actor)

"There is cooperation with local marketplaces, but it is not yet running regularly." (Community leader)

Interpretation of these findings indicates that the downstreaming of capture fisheries products has triggered the emergence of cross-actor collaboration patterns, although the synergies formed are still partial. The role of the government is dominant in the initial stages in the form of equipment assistance and training, while strengthening market networks and business sustainability still relies on local capacity and community initiatives. This collaboration can potentially develop into a more structured ecosystem if sustainable programs are integrated, including alignment of support between local governments, villages, cooperatives, and the private sector. Moving forward, more formal coordination mechanisms among actors are needed to ensure that downstreaming efforts do not stop at the distribution of assistance but continue toward the development of a competitive and inclusive fisheries value chain.

DISCUSSION

The findings of this study highlight the dynamics of downstreaming of capture fishery products in Bone District as a sustainable economic development strategy that integrates social, economic, and institutional dimensions. Downstreaming in this context is not merely a technical post-harvest process to enhance the value of fish products, but also reflects structural changes in coastal community governance involving multi-actor roles, social innovation, and adaptation to modern market challenges. This discussion will outline the research findings within the framework of the value chain theory, sustainable blue economy, and community-based approaches, and link them to previous studies in Indonesia and the international context.

Transformation of Post-Harvest Practices: A Paradigm Shift from Extractive to Value-Added

Diverse and value-added post-harvest processing practices are central findings of this research. Communities that previously relied on selling fresh fish now produce salted fish, fish flakes, fish crackers, and seaweed-based nuggets. This transformation not only extends product shelf life but also doubles selling prices. This supports Bastardie et al.'s (2022) argument that seafood product diversification plays a vital role in increasing the income of small-scale fishermen while reducing their vulnerability to fluctuations in fresh fish prices. This change is also in line with the blue economy concept, which emphasizes optimizing marine resources while maintaining ecological sustainability (Khoiriyah, 2024; Rijal, 2023). Simple technologies such as solar dryers and vacuum packaging demonstrate the adoption of low-cost but high-impact innovations, as Samarajeewa (2024) noted in their study on seafood processing in Sulawesi. The involvement of young people in product innovation, such as seaweed nuggets, demonstrates the regeneration of entrepreneurs and confirms the importance of the younger generation's creativity in renewing the local value chain (Juhro & Ridwan, 2021).

Implicitly, downstreaming strategies not only increase economic profits but also contribute to the reduction of fish waste. For example, processing fish heads into animal feed flour reflects the application of circular economy principles in coastal communities (Ninan, 2018). This indicates that even under resource-constrained conditions, coastal communities can innovate to create new value that supports ecological and socio-economic sustainability.

The Role of Cooperatives and Village-Owned Enterprises: Local Institutional Pillars in Downstreaming

Cooperatives and village-owned enterprises (BUMDes) connect household-scale producers with broader markets. Cooperatives serve as product aggregators and determine fairer prices, while BUMDes provide access to inclusive capital and facilitate participation in product exhibitions. These findings align with Andania et al.'s (2025) and Dwiyanti's (2022) research, which emphasizes the importance of local institutions in strengthening fishermen's bargaining power against intermediaries and modern markets.

The existence of cooperatives in the Bone context also demonstrates the potential of collective marketing to reduce transaction costs and strengthen distribution networks for processed products (Dwiyanti & Al Syahrin, 2018). Meanwhile, despite their limited scale, BUMDes serve as an initial catalyst for downstreaming, particularly through interest-free loans and the provision of basic facilities. The limited capacity of BUMDes, such as insufficient capital and ongoing technical support, underscores the need to integrate local and central government programs to strengthen the role of these local institutions. The community-based fisheries management (CBFM) model, which emphasizes fisher participation and strengthening local institutions, can be adapted to ensure the sustainability of downstreaming programs (Hackshaw et al., 2016).

Infrastructure and Market Access Challenges: Structural Gaps in the Value Chain

One of the main obstacles to downstreaming is the limited basic infrastructure, such as cold storage, ice plants, and efficient distribution facilities. Processed products are challenging to meet modern market quality standards without adequate logistical support. Other obstacles include limited distribution permits and certification, which hinder access to supermarkets and exports. These findings are consistent with a study by Ismail & Marhati (2024), which noted that infrastructure gaps constitute a significant barrier to implementing a circular economy in developing countries. Price uncertainty and the absence of long-term contracts exacerbate fishermen's vulnerability to market fluctuations. A study by Bradley et al. (2019) highlights a similar phenomenon: long-term contracts with buyers are key to fishermen's income stability. In the context of Bone, the absence of such contractual mechanisms leaves fishermen dependent on mediators and vulnerable to unilateral pricing practices.

To address this gap, integrative policies are needed that link post-harvest infrastructure development, product legality facilitation, and access to digital marketplaces. This approach can draw on the success of the fishery cluster model, where the government, cooperatives, and the private sector collaborate to build shared facilities to meet export standards (Bastardie et al., 2022; Eigaard et al., 2014).

Human Resource Capacity and Business Literacy: Crucial Non-Technical Barriers

Low business literacy is a significant challenge in the downstreaming process. Although technical skills in fish processing are adequate, most business actors do not understand financial management, market analysis, or marketing strategies. This causes fish processing businesses to

be often considered a side job rather than a primary source of livelihood. This finding reinforces the research by Dwiyanti et al. (2024), which found that a lack of sustainability literacy in the SME sector hinders the transition to sustainable business.

Generational gaps are also evident; young people have an advantage in utilizing social media for product promotion, but their involvement is not optimal. A study by Efani et al. (2024) shows that younger generations are more interested in working for businesses with social and environmental sustainability values, so this potential needs to be maximized through intergenerational mentoring programs. Sustainable mentoring is required, not just short-term training. A participatory capacity-building model that actively involves the community in designing the training curriculum can be a solution to ensure that skills are truly internalized (Sahid et al., 2020; Sahid & Hazan, 2024).

Downstreaming Opportunities: Multiplication Effects on Welfare

The downstreaming of capture fisheries products in Bone has created significant opportunities for improving welfare, particularly through diversifying the roles of fishing families. Women who previously played domestic roles are now active as processing entrepreneurs, while young people are initiating digital promotion of products. This diversification of work creates household economic resilience to lean seasons and fish price fluctuations. These findings support the theory of sustainable livelihoods (Lorenzen, 2008), which emphasizes the importance of income diversification in increasing the resilience of rural communities. The involvement of both genders and generations is also in line with the inclusive approach to coastal development, highlighting the importance of women's participation in the fisheries value chain to achieve economic and social equality (Handoko et al., 2023). Furthermore, downstreaming has the potential to create a sustainable local business ecosystem, where the production, distribution, and marketing chains are integrated within the community. This can be the basis for developing community-based blue entrepreneurship that combines local cultural values, ecological sustainability, and economic competitiveness.

Stakeholder Synergy: Collaboration Remains Partial

The multi-actor role—local government, villages, cooperatives, and communities—is key to supporting downstreaming. Assistance with tools, training, and production space facilitation from the government is the initial foundation. However, this synergy is still partial because product marketing and business sustainability largely depend on community initiatives. The collaboration model found in Bone aligns with quadruple helix innovation (Franco & Tracey, 2019; Gani & Handayani, 2024), in which sustainable innovation emerges from the interaction of four leading actors: government, academia, business, and society. However, unlike in urban or large corporate contexts, collaboration in Bone is still informal and requires formal coordination mechanisms such as multi-stakeholder forums to align programs, budgets, and targets. A study by Yusuf et al. (2024) on community-based tourism management shows that the success of cross-actor collaboration is highly dependent on the clarity of roles, benefit sharing, and conflict resolution mechanisms. Similar principles can be applied to strengthening downstreaming in Bone so that it does not rely solely on aid distribution but also builds a competitive and inclusive value chain.

Research Implications

Theoretically, this study expands the literature on downstream fisheries by highlighting the social and institutional dimensions often overlooked in technical-based studies. The integration of value chain, blue economy, and sustainable livelihoods theories shows that downstreaming is an

economic process and a social transformation involving cultural adaptation and multi-actor collaboration.

Practically, the results of this study provide input for policy formulation at the local and national levels. The government must prioritize post-harvest infrastructure development (cold storage, clean production facilities), strengthen local institutional capacity (cooperatives, village-owned enterprises), and develop sustainable mentoring programs to improve business literacy and digital marketing skills. Integration of support across government levels and partnerships with the private sector are crucial to expanding market access, including export markets and e-commerce.

Additionally, this study underscores the importance of gender- and generation-based approaches in downstreaming programs. Empowering women through processing businesses and youth through digital marketing can be effective strategies to enhance the inclusivity and sustainability of programs. If appropriately managed, community-based downstreaming models like those in Bone can be replicated in other coastal areas in Indonesia with similar characteristics.

CONCLUSION

This study reveals that the downstreaming of capture fisheries products in Bone Regency significantly enhances sustainable coastal economic development by shifting practices from fresh fish sales to diversified value-added processing. The process is supported by the involvement of local institutions such as cooperatives and village-owned enterprises (BUMDes), as well as increased participation of women and youth in the post-harvest value chain. These dynamics collectively improve household income, strengthen community resilience, and foster inclusive participation across gender and generations. However, the findings also reveal persistent challenges, including limited infrastructure, regulatory barriers such as permits and certification, and low levels of business and digital literacy. Moreover, stakeholder collaboration remains partial and requires more formal mechanisms to ensure long-term sustainability. Addressing these gaps is essential to transform downstreaming from a short-term aid-driven initiative into a competitive and inclusive local industry.

This research contributes by highlighting the integration of social, economic, and institutional dimensions in fisheries downstreaming, moving beyond purely technical approaches. Yet, its scope is limited to Bone Regency, with qualitative data that do not quantify long-term impacts. Future research should expand to multiple coastal regions, adopt mixed-methods approaches, and investigate consumer preferences, export supply chains, and digital traceability applications. Such efforts will provide a stronger basis for scaling up downstreaming strategies and supporting Indonesia's national agenda for sustainable blue economy development.

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