

# Community Empowerment of Catfish Farming Groups through Processed Product Diversification to Increase Product Value in Balangnipa Village

**Makmur<sup>1</sup>, Muh. Amar<sup>2</sup>, Sofyang<sup>3</sup>, Mochamad.Nurdin<sup>4</sup>, Nurfadillah<sup>5</sup>, Sitti Fatimah<sup>6</sup>**

<sup>1</sup>Agribusiness Study Program, Universitas Muhammadiyah Sinjai, Sinjai Regency, Indonesia

<sup>23456</sup>Program Studi Administrasi Publik, Universitas Muhammadiyah Sinjai, Sinjai Regency, Indonesia

\*Corresponding author: [makmur.onti@gmail.com](mailto:makmur.onti@gmail.com)

*makmurmakmur*

**Abstract:** Catfish farming represents a strategic community-based economic activity due to its relatively low production cost, high nutritional value, and adaptability to limited land through tarpaulin pond systems. However, many small-scale catfish farming groups remain constrained by limited technical knowledge, weak market access, and the absence of value-added product diversification. This community empowerment program aimed to enhance the capacity of the Bululasiai Catfish Farming Group in Balangnipa Village, Sinjai Regency, through integrated interventions focusing on cultivation improvement, processed product diversification, packaging, marketing, and business legality. The methodology employed participatory approaches, including field surveys, focus group discussions, training sessions, and continuous mentoring to identify key challenges and local potential. The program outcomes demonstrate a significant improvement in participants' knowledge and skills related to sustainable catfish cultivation, processed product development such as catfish sticks and nuggets, and attractive packaging techniques. Furthermore, the initiative facilitated greater awareness of market-oriented production and compliance with business legality requirements, including Business Identification Numbers (NIB) and halal certification processes. The diversification of processed catfish products contributed to increased product value and expanded income opportunities for group members and their households. Overall, the program generated positive economic and social impacts, strengthened local entrepreneurial capacity, and provided a replicable model for empowering small-scale aquaculture communities through value-added processing and integrated market-oriented strategies.

**Keywords :** Catfish Farming; Community Empowerment; Product Diversification; Value Addition

## 1. Introduction

Aquaculture has become one of the most important sectors contributing to food security, economic development, and livelihood sustainability in many developing countries. As capture fisheries face increasing pressure due to overexploitation, climate change, and environmental degradation, aquaculture provides a viable alternative to meet the growing demand for animal protein. Among various freshwater aquaculture commodities, catfish (*Clarias gariepinus*) has emerged as a strategic species due to its rapid growth rate, high survival ability, adaptability to low-oxygen environments, and relatively low production costs. These characteristics make catfish farming particularly suitable for small-scale and household-based aquaculture systems, especially in rural and peri-urban areas. In Indonesia, catfish farming plays a significant role in supporting local economies and fulfilling domestic fish consumption needs. The increasing population growth and rising awareness of the nutritional benefits of fish have led to a steady increase in catfish demand across regions. Catfish is widely consumed due to its affordable price, high protein content, and rich micronutrient composition, including essential amino acids, vitamins, and minerals. Moreover, catfish farming can be conducted using simple technology, such as tarpaulin ponds, which allows farmers with limited land and capital to participate in aquaculture activities. Despite this potential, many small-scale catfish farmers remain trapped in low-income cycles due to limited technical capacity, weak market access, and reliance on selling raw fish without value addition.

One of the main challenges faced by small-scale aquaculture communities is the lack of product diversification and innovation. Most catfish farmers focus solely on the production and sale of fresh fish, which exposes them to price fluctuations, middlemen dependency, and narrow profit margins. Selling

unprocessed catfish often results in lower economic returns, particularly during periods of oversupply. In contrast, value-added processing and product diversification—such as producing catfish-based snacks, nuggets, or ready-to-cook products—offer opportunities to enhance product value, extend shelf life, and reach broader consumer markets. Previous studies have shown that diversification of fishery products can significantly increase household income, strengthen resilience, and improve market competitiveness of small-scale producers. Community empowerment has increasingly been recognized as an effective approach to addressing structural challenges in rural economic development. Empowerment emphasizes participatory processes that enhance community knowledge, skills, confidence, and control over economic resources. In the context of aquaculture, community empowerment involves capacity building in cultivation techniques, processing skills, marketing strategies, and institutional strengthening. Through empowerment-oriented interventions, communities are not only positioned as beneficiaries but also as active agents of development. This approach aligns with sustainable development principles, which emphasize inclusive growth, local participation, and long-term economic resilience.

Another critical aspect influencing the success of small-scale aquaculture enterprises is compliance with business legality and quality assurance standards. In many developing regions, informal business practices dominate the aquaculture sector, limiting access to formal markets, government support programs, and financial institutions. The absence of business identification numbers, halal certification, and standardized packaging reduces consumer trust and constrains market expansion. Legalization and certification processes are therefore essential to enhance product credibility, market penetration, and long-term business sustainability. However, limited awareness and technical assistance often hinder small-scale farmers from fulfilling these requirements. Balangnipa Village, located in Sinjai Regency, South Sulawesi, represents a typical example of a community with significant aquaculture potential but limited value-added utilization. The Bululasiai Catfish Farming Group (Pokdakan Bululasiai) consists of small-scale farmers who primarily engage in catfish cultivation as a secondary source of income. Although the group possesses adequate production capacity and basic cultivation experience, several constraints persist, including limited technical knowledge, dependence on a single marketing channel, absence of processed product diversification, and lack of attractive packaging and formal business legality. These challenges restrict the group's ability to maximize economic benefits and expand its market reach.

Previous studies on catfish farming in Indonesia have largely focused on technical cultivation aspects, feed efficiency, and production performance. While these studies provide valuable insights into improving productivity, fewer studies emphasize integrated community empowerment models that combine cultivation improvement, processed product diversification, packaging innovation, marketing strategies, and legal compliance. Moreover, research on community-based aquaculture empowerment often highlights economic outcomes without sufficiently addressing the role of value-added processing and institutional strengthening as key drivers of sustainable income growth. This gap indicates the need for practical, participatory, and integrated empowerment initiatives that address both production and post-harvest dimensions. This community service program was designed to address these challenges through a comprehensive empowerment approach targeting the Bululasiai Catfish Farming Group. The program integrates capacity building in sustainable catfish cultivation, training in processed product diversification (such as catfish sticks and nuggets), packaging and branding development, marketing orientation, and assistance in obtaining business legality, including Business Identification Numbers (NIB) and halal certification. By adopting a participatory methodology, the program ensures that local knowledge, needs, and potential are actively incorporated into the intervention design and implementation.

The significance of this program lies not only in its practical contribution to improving the economic welfare of catfish farming communities but also in its academic contribution to the literature on community empowerment and small-scale aquaculture development. The program demonstrates how integrated value-added strategies can transform traditional aquaculture practices into more market-oriented and sustainable enterprises. Furthermore, it provides empirical evidence that empowerment-based interventions can enhance entrepreneurial capacity, increase product value, and strengthen local economic resilience. Therefore, this article aims to analyze the implementation and outcomes of the empowerment program for the Bululasiai Catfish Farming Group in Balangnipa Village. Specifically, it seeks to (1) examine the effectiveness of capacity-building activities in improving farmers' knowledge and skills, (2) evaluate the impact of processed product diversification on product value and income opportunities, and (3) assess the role of packaging, marketing, and business legality in supporting sustainable community-based aquaculture enterprises. The findings of this study are expected to contribute to the development of replicable empowerment models for small-scale aquaculture communities in Indonesia and other developing countries with similar socio-economic characteristics.

## 2. Research Methodology

### Research Design

This study employed a community-based participatory research (CBPR) approach integrated with a descriptive qualitative method. The approach was selected to ensure active involvement of community members throughout the empowerment process, from problem identification to implementation and evaluation. CBPR is widely applied in community empowerment studies as it emphasizes collaboration, local participation, and sustainability of program outcomes. The research design focused on assessing the effectiveness of empowerment interventions in improving knowledge, skills, product diversification, and economic value among catfish farming groups.

### Study Area and Participants

The study was conducted in Balangnipa Village, Sinjai Utara District, Sinjai Regency, South Sulawesi, Indonesia. The research subjects consisted of members of the Bululasiai Catfish Farming Group (Pokdakan Bululasiai), which includes 10 active members engaged in small-scale catfish cultivation as a supplementary livelihood. In addition to group members, participants also involved housewives of group members and students from Universitas Muhammadiyah Sinjai who supported training and facilitation activities. The selection of the research location was based on the presence of significant aquaculture potential, existing institutional structure (Pokdakan), and identified challenges related to limited product diversification, marketing constraints, and absence of business legality.

### Data Collection Techniques

Data were collected using multiple techniques to ensure data triangulation and validity:

#### 1. Field Observation

Direct observations were conducted to assess existing cultivation practices, pond management systems, harvesting processes, and post-harvest handling. Observations also focused on production facilities, processing tools, and packaging practices before and after the intervention.

#### 2. Semi-Structured Interviews

Interviews were conducted with Pokdakan members to identify key problems, needs, and expectations related to catfish cultivation, processing, and marketing. Interviews also explored participants' prior knowledge, experience, and perceived constraints in business development.

#### 3. Focus Group Discussions (FGDs)

FGDs were carried out to facilitate participatory problem identification and collective decision-making regarding empowerment strategies. Discussions emphasized potential diversification products, marketing opportunities, and legal compliance requirements.

#### 4. Documentation

Documentation included photographs of training activities, processing stages, packaging outcomes, and administrative records related to business legality (e.g., Business Identification Number/NIB).

### Empowerment Program Stages

The empowerment program was implemented through several structured stages:

#### 1. Needs Assessment and Program Planning

An initial survey and FGDs were conducted to map local potential and identify key challenges faced by the farming group. Based on these findings, an integrated empowerment program was designed, focusing on cultivation improvement, product diversification, packaging innovation, marketing orientation, and business legality assistance.

#### 2. Capacity Building and Training

Training activities included:

- Technical training on sustainable catfish cultivation practices
- Processing training on value-added products such as catfish sticks and catfish nuggets
- Packaging and labeling training to improve product aesthetics and market appeal
- Marketing orientation using local networks and social media platforms

#### 3. Business Legality Assistance

Assistance was provided to facilitate the issuance of Business Identification Numbers (NIB) and to support the halal certification process. This stage aimed to enhance market access, consumer trust, and long-term business sustainability.

#### 4. Monitoring and Evaluation

Monitoring was conducted throughout program implementation to assess participation levels, skill acquisition, and product development progress. Evaluation focused on changes in participants' knowledge, skills, and perceived economic benefits resulting from the program.

### Data Analysis

Data analysis was conducted using qualitative descriptive analysis. Interview transcripts, observation notes, and FGD results were systematically categorized and interpreted to identify patterns of change before and after program implementation. The analysis emphasized improvements in technical capacity, diversification practices, packaging quality, and business awareness. Findings were then compared with relevant literature on community empowerment and small-scale aquaculture development to strengthen analytical rigor.

### Ethical Considerations

Ethical principles were upheld throughout the study. Participation was voluntary, and informed consent was obtained from all participants. The research prioritized transparency, mutual respect, and community benefit. All collected data were used solely for academic and empowerment purposes.

## 3. Results and Discussion

### 3.1 Implementation of the Community Empowerment Program

The community empowerment program was initiated following a preliminary field survey and participatory discussions with members of Pokdakan Bululasiai in Balangnipa Village. The initial assessment revealed that catfish farming activities were predominantly limited to cultivation and direct

sale of fresh fish, with minimal value addition. Economic benefits were therefore constrained by fluctuating market prices, limited buyer networks, and the absence of processed products that could extend shelf life and increase profit margins.

Based on these findings, the empowerment intervention was designed to address four interrelated dimensions: (1) improvement of catfish farming knowledge, (2) development of value-added processed products, (3) enhancement of packaging and marketing strategies, and (4) facilitation of business legality. The implementation phase involved active participation from catfish farmers, their household members—particularly women—and students from Universitas Muhammadiyah Sinjai as facilitators. The empowerment activities were conducted through structured training sessions, hands-on demonstrations, and continuous mentoring. This participatory approach ensured that local knowledge was respected while new technical skills were gradually introduced. The high level of attendance and engagement during training sessions indicates strong community acceptance and perceived relevance of the program.



*Figure 1. Training Activities on Catfish Processing and Group Participation*

The training sessions fostered a learning environment that encouraged discussion, experimentation, and peer learning. Participants were not only passive recipients of information but were actively involved in decision-making processes related to product selection, processing techniques, and packaging designs.

### 3.2 Enhancement of Knowledge and Skills in Catfish Cultivation

One of the primary outcomes of the empowerment program was a measurable improvement in participants' knowledge and technical skills related to catfish cultivation. Prior to the intervention, farming practices were largely based on trial-and-error methods, with limited understanding of optimal feeding schedules, water quality management, and sorting techniques. Through targeted counseling and interactive discussions, participants gained a clearer understanding of best practices in catfish farming, including pond management, feed efficiency, and harvesting techniques. Improved technical knowledge contributed to better fish growth performance and reduced mortality rates, although the study primarily focused on empowerment outcomes rather than biological productivity indicators. The findings align with previous studies emphasizing that knowledge transfer and capacity building are critical determinants of success in small-scale aquaculture systems. Enhanced technical competence not only improves production outcomes but also increases farmers' confidence in managing their enterprises more professionally.

### 3.3 Product Diversification as a Strategy for Value Addition

A key result of the program was the successful introduction of processed catfish products, particularly catfish sticks and catfish nuggets. Prior to the intervention, none of the group members had experience in processing catfish into value-added products. The diversification training therefore represented a significant shift from traditional production-oriented practices to a market-oriented business approach. The processing workshops focused on simple, affordable techniques suitable for household-scale production. Participants learned about raw material preparation, seasoning formulation, frying techniques, and hygiene standards. These activities were especially well received by women participants, who recognized the potential of processed products as home-based income-generating activities.

Product diversification contributed to several tangible benefits. First, processed catfish products offered higher selling prices compared to fresh fish. Second, these products had longer shelf lives, enabling flexible marketing strategies. Third, diversification reduced dependence on a single market channel, thereby lowering economic vulnerability.



Figure 2. Processed Catfish Products: Sticks and Nuggets

These results support the argument that value addition through processing plays a crucial role in strengthening rural livelihoods. Similar findings have been reported in community-based agro-processing initiatives, where diversification significantly improves household income and resilience.

### 3.4 Packaging Innovation and Market Appeal

Packaging was identified as a critical factor influencing consumer perception and product competitiveness. Prior to the program, catfish products were sold without standardized packaging, limiting their appeal and market reach. Through packaging training sessions, participants were introduced to basic principles of attractive and functional packaging, including labeling, branding, and portion sizing. Participants experimented with various packaging materials and designs, ultimately selecting options that balanced cost efficiency and aesthetic appeal. The introduction of labeled packaging enhanced product visibility and conveyed a sense of professionalism, which is essential for penetrating broader markets.



*Figure 3. Packaging Design and Labeling of Processed Catfish Products*

Improved packaging also facilitated pricing differentiation, allowing producers to position their products as premium snacks rather than raw commodities. This finding underscores the importance of packaging innovation as a non-technical yet highly impactful component of community-based enterprise development.

### 3.5 Business Legality and Institutional Strengthening

Another significant outcome of the empowerment program was increased awareness and partial fulfillment of business legality requirements. Many participants were previously unfamiliar with the importance of formal business registration and halal certification. The mentoring sessions provided step-by-step guidance on obtaining a Business Identification Number (NIB) and understanding the process of halal certification.

Although the halal certification process was still ongoing at the time of reporting, the issuance of NIB represented a major milestone. Legal recognition enhances credibility, facilitates access to government support programs, and opens opportunities for collaboration with formal market actors. From an institutional perspective, the empowerment program strengthened Pokdakan Bululasiai as a collective entity. Group members demonstrated improved coordination, shared responsibilities, and a stronger sense of ownership over their joint economic activities.

### 3.6 Socio-Economic Impacts and Community Perceptions

The socio-economic impacts of the empowerment activities were evident in both tangible and intangible dimensions. Economically, participants reported increased income potential due to higher product prices and diversified revenue streams. Socially, the program fostered stronger group cohesion and enhanced the role of women in household economic decision-making. Positive community responses indicate that the program addressed real needs and leveraged existing local potential. Participants expressed satisfaction with the practical nature of the training and emphasized the relevance of processing and marketing skills in improving their livelihoods. The empowerment process also contributed to increased self-efficacy among participants. Confidence in managing production, processing, and marketing activities is a critical indicator of sustainable empowerment.

### 3.7 Discussion: Integrating Empowerment, Value Addition, and Sustainability

The findings of this study demonstrate that community empowerment in small-scale aquaculture is most effective when technical, economic, and institutional dimensions are addressed simultaneously. The integration of cultivation training, product diversification, packaging innovation, and business legality created a comprehensive empowerment framework. Consistent with empowerment theory, the program emphasized participation, capacity building, and local ownership. The success of processed catfish products highlights the strategic importance of value addition in rural development contexts, where raw commodity markets often offer limited returns. Moreover, the involvement of women and students enhanced the inclusivity and sustainability of the program. Women's participation in processing activities expanded household income opportunities, while student involvement strengthened knowledge transfer and community-academic collaboration. Despite its positive outcomes, the program also faced limitations, including limited production scale and dependence on local markets. Future initiatives should therefore focus on scaling up production, strengthening marketing networks, and establishing partnerships with government and private sector actors.

### 3.8 Implications for Community-Based Aquaculture Development

The results of this study provide practical insights for policymakers, development practitioners, and academic institutions. Community-based aquaculture empowerment programs should prioritize value-added processing, market orientation, and legal compliance to maximize economic impact. The Balangnipa experience demonstrates that even small-scale interventions can generate meaningful change when grounded in local potential and participatory approaches. Replication of similar models in other rural communities may contribute to broader goals of inclusive economic development and food system sustainability.

## 4. Conclusion

### 4.1 Summary of Findings

This study confirms that community empowerment through catfish farming development and product diversification plays a significant role in increasing the economic value of local aquaculture

products in Balangnipa Village. The empowerment program successfully addressed fundamental challenges faced by the catfish farming group, including limited technical capacity, lack of product innovation, weak market orientation, and absence of formal business legality. Through structured training and participatory engagement, members of Pokdakan Bululasiai demonstrated improved understanding of sustainable cultivation practices, post-harvest processing, and entrepreneurial strategies.

#### 4.2 Practical Implications

The findings of this study provide important practical implications for community-based economic development programs. Product diversification, particularly through processed catfish products, proved effective in enhancing product value, extending shelf life, and reducing market price volatility. The introduction of improved packaging, branding, and legality compliance contributed to greater market readiness and consumer trust. These results indicate that integrated empowerment interventions can serve as a practical model for strengthening small-scale aquaculture enterprises in rural and semi-urban areas.

#### 4.3 Program Limitations

Despite its positive outcomes, this study has several limitations. The empowerment program was implemented within a relatively short timeframe and involved a limited number of participants, which may affect the generalizability of the findings. In addition, the assessment of program impact relied primarily on qualitative indicators, such as participant perceptions and observed behavioral changes, without comprehensive quantitative measurements of income growth or production efficiency. These limitations highlight the need for longer-term and more data-driven evaluations.

#### 4.4 Recommendations for Future Development

Based on the study findings and identified limitations, future empowerment initiatives should prioritize sustained mentoring, institutional strengthening, and market expansion strategies. The integration of digital marketing platforms and partnerships with local stakeholders is recommended to enhance product competitiveness. Furthermore, future research should incorporate quantitative impact indicators and comparative approaches across different regions to strengthen empirical evidence and support broader policy formulation. With continuous support and collaborative governance, community-based aquaculture empowerment programs have strong potential to contribute to inclusive and sustainable local economic development.

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