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Enhancing the Added Value of Catfish through the Production and Development of Catfish Nuggets as an Alternative Food Product in Duwet Village, Tumpang District, Malang Regency

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ABSTRACT

This Community Service Program (PkM) aims to enhance the added value of catfish by processing it into nuggets as an alternative food product in Duwet Village, Tumpang District, Malang Regency. The main problems faced by the community partners include low innovation in fish processing, limited access to technology, and high unemployment among the productive age group. The activities were carried out through a series of stages including socialization, entrepreneurship training, production practice, provision of production equipment, and continuous mentoring. Evaluation methods were conducted before, during, and after the activities using interviews and questionnaires. The results of the program show that the community's skills have significantly improved, catfish nuggets were successfully developed with more hygienic and marketable quality, and entrepreneurial motivation emerged among participants. This program has a positive impact on community economic empowerment, creates new business opportunities, and supports the diversification of food products based on local potential.

Keywords: Economic Empowerment, Entrepreneurship, Food Diversification

1. Introduction

Freshwater fisheries play an important role in supporting food security and the economy of rural communities. One of the most popular and widely cultivated commodities is catfish (*Clarias sp.*), because it is easy to cultivate, has a short harvest period, and is high in protein (Primawestri et al., 2023). However, most of the catfish produced is sold fresh at low prices, so the added value obtained by the community is very limited.

Duwet Village, Tumpang District, Malang Regency is one of the areas with abundant catfish production. However, the local community still faces obstacles in processing, packaging, and marketing catfish-based products. Low technical skills and lack of entrepreneurial knowledge are the main causes of limited food product innovation at the village level.

Through community service activities carried out by the Malang State Polytechnic, training and assistance were provided on processing catfish into catfish nuggets—a modern food product that is highly nutritious, easily accepted by consumers, and has the potential to become a new business icon in Duwet

Village. This activity is expected to become a model of effective collaboration between universities and communities in developing a local economy based on fishery resources.

2. Literature Review

Catfish is high in protein and essential amino acids, and low in fat, making it an ideal raw material for processing into highly nutritious foods (Listyarini et al., 2018). According to Esteves et al. (2021), fish-based processed products have a longer shelf life than fresh fish, especially when combined with vacuum packaging and freezing processes.

Nuggets themselves are a food diversification product with semi-cooked characteristics that can be fried or frozen. Afrisanti (2010) in Sinta et al. (2019) states that fish nuggets are high in protein, easy to process, and have great potential in the fast food market.

In addition to food processing, strengthening community entrepreneurship is also important to ensure the sustainability of the program. (Mardikanto & Soebiato, 2017) emphasize that community empowerment through innovation based on local potential can create sustainable economic impacts when accompanied by skills transfer and managerial assistance.

In the context of small business development, SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis is an effective approach to understanding the strategic position of a business and formulating realistic development steps (Warcito & Saleh, 2016).

3. Methodology

This Community Service Program will be implemented over eight months, from March to October 2025, in Duwet Village, Tumpang District. The target audience for this program is productive-aged individuals who are interested in developing catfish processing businesses. The program is designed to improve the technical, managerial, and entrepreneurial skills of the community in managing fishery products into high-value processed goods. The implementation method consists of the following stages:

3.1. Socialization and Problem Identification

This stage is carried out through meetings at the Duwet Village Hall to introduce the objectives of the activity and identify the community's potential and problems related to catfish processing. Through discussions and field observations, an overview of the main obstacles faced by partners, such as limited technical knowledge and production facilities, is obtained.

3.2. Entrepreneurship Training

This activity focused on providing material on business strategies, small business management, and food product marketing techniques. The training aimed to build community understanding of sustainable business management and increase the competitiveness of local products.

3.3. Production Practice

This stage includes hands-on activities covering the preparation of raw materials, making catfish nugget dough, steaming, cutting, frying, and packaging the products. Through this stage, participants acquire practical technical skills in accordance with food safety standards.

3.4. Production Equipment Grants

In order to support business sustainability, the community service team provided grants in the form of production equipment such as steamers, aluminum baking pans, and cutting boards. This assistance is expected to improve the efficiency and quality of the product processing.

3.5. Sustainable Assistance

The community service team provides intensive assistance to participants in conducting production trials, including providing input related to product formulation, quality control, and packaging techniques so that the production results have a higher selling value.

3.6. Activity Evaluation

Evaluations are conducted in three stages—before, during, and after the implementation of activities—to assess improvements in technical skills, entrepreneurial attitudes, and the sustainability of community businesses after receiving training and assistance.

Through these stages, the program is expected to increase the capacity of the Duwet Village community in the fields of entrepreneurship and fishery product processing, as well as encourage the formation of independent business units based on catfish nugget products.

4. Results and Discussion

4.1. Results

The Community Service (PkM) activity entitled “Increasing the Added Value of Catfish through the Production and Development of Catfish Nuggets as an Alternative Food Product” was carried out by a team of lecturers from the Malang State Polytechnic in Duwet Village, Tumpang District, Malang Regency. This program lasted for eight months and involved the local community, most of whom were catfish farmers and housewives who were interested in developing a food processing business.

The activity began with a preparation and coordination stage with the Duwet Village Government. At this stage, the community service team conducted a field survey to identify the potential, problems, and needs of the community. The results of the identification showed that the community had great potential in catfish farming, but did not yet master the techniques for processing the harvest into value-added products. In addition, limited equipment and a lack of business management skills were the main obstacles to business development. These findings formed the basis for the development of a training program aimed at improving the technical skills and entrepreneurial knowledge of the community.



Figure 1. Coordination With The Duwet Village Government

The next stage was technical training on catfish nugget processing, which was held at the Duwet Village Hall on September 21, 2025. This activity was attended by catfish farmers, housewives, and young villagers who wanted to develop small businesses. The training began with an explanation of the importance of diversifying fishery products, the nutritional value of catfish, and the market opportunities for processed freshwater fish products. After the theoretical session, participants were given hands-on training on the catfish nugget production process, starting from ingredient preparation, catfish meat grinding, mixing spices and binding ingredients, molding, steaming, cutting, breaded, frying, to product packaging.



Figure 2. Explanation of the Selection of Quality Materials by the PKM Team

The practical activities were carried out in groups so that all participants could actively participate in each stage. Participants learned techniques for maintaining the cleanliness of ingredients and equipment, the correct measurement of ingredients, and processing procedures to produce consistent texture and taste. After several trials, the participants were able to produce catfish nuggets with the right taste and attractive appearance. The products were then packaged in transparent plastic with simple labels to introduce the identity of local products from Duwet Village.



Figure 3. Training on Making Catfish Nuggets



Figure 4. Enthusiasm of Training Participants

To support the sustainability of the program, the PkM team provided production equipment grants to partner community groups. The equipment provided included steamers, baking pans, cutting boards, and hygiene supplies such as gloves, aprons, and masks. This assistance was intended to enable the production process to be carried out more quickly, hygienically, and efficiently. After the equipment was handed over, the community conducted independent production simulations to ensure that all stages could be carried out properly using the facilities provided.



Figure 5. Some of the equipment grants to training participants

As a measure to strengthen product identity, the team encouraged participants to develop labeled packaging with the name “Duwet Polinema Catfish Nugget” as a local brand that reflects the characteristics of the village. This effort is expected to strengthen the product's image and attract the interest of local and regional markets. All training and mentoring activities were documented in the form of photos and videos as evidence of the implementation of activities and material for scientific publication.

Overall, the activities ran smoothly and received full support from the village government and local community. Community participation was very high, as seen from their active involvement in each training session and production practice. Participants demonstrated increased knowledge, skills, and motivation to develop businesses based on local potential. This program not only improved the technical capabilities of the community but also fostered a spirit of entrepreneurship and community cooperation, which are important foundations for sustainable economic development in Duwet Village.

4.2. Evaluation of Community Service Activities

The Community Service Program (PkM) was carried out in Duwet Village, Tumpang District, Malang Regency, with a focus on increasing the added value of catfish through training in production and development of catfish nuggets as an alternative food product. This program involved the local community, most of whom work as catfish farmers and housewives.

The implementation of the activity began with a coordination and community needs identification stage. Based on the initial survey results, it was found that the community had great potential in catfish production, but lacked the skills to process the harvest into high-value products. This condition is similar to that found by Afrisanti (2010) in Sinta et al. (2019), who stated that the low added value of freshwater fish at the farmer level was due to a lack of innovation in processing and minimal technical skills among the community.

The next stage was technical training on making catfish nuggets, which was held at the Duwet Village Hall on September 21, 2025. Participants consisted of catfish farmers, housewives, and young villagers interested in developing small businesses. The training began with an explanation of the importance of diversifying fishery products and the nutritional value of catfish. Catfish is known as a high-protein source with low fat content and complete essential amino acids (Listyarini et al., 2018). These advantages make it a potential raw material for modern food products such as nuggets, which have a longer shelf life and high nutritional value (Esteves et al., 2021).

In the practice of making catfish nuggets, participants learned the stages from grinding catfish meat, mixing spices and binding ingredients, molding, steaming, cutting, coating with breadcrumbs, to frying and packaging. Repeated trials showed an improvement in participants' skills in measuring ingredients and maintaining hygiene during the production process. The resulting products had a firm texture, balanced savory taste, and attractive appearance, in line with the findings of Tumion & Hastuti (2017), who found that the sensory characteristics of catfish nuggets were greatly influenced by the proportion of additives and processing techniques.

In addition to technical training, participants also underwent entrepreneurship and small business management training. Participants were equipped with an understanding of business planning, production cost calculations, pricing, and marketing strategies. According to Mardikanto & Soebiato (2017), community empowerment activities must be accompanied by increased managerial capacity so that the results of training can continue to be productive economic activities. In this context, the community of Duwet Village began to understand the importance of financial record keeping, cost efficiency, and the use of social media as a means of promoting local products.

4.3. Discussion

To support business sustainability, the PkM team provided grants for production equipment such as steamers, baking pans, cutting boards, thinwall containers, and hygiene equipment. The use of this equipment increased production time efficiency and maintained product quality. These findings support the research by Esteves et al. (2021), which states that the use of modern processing technology and equipment can extend the shelf life of fish products and increase production process efficiency.

From a social perspective, this activity strengthened collaboration between universities, village governments, and communities. Active community participation during the activity fostered a sense of ownership of the program and strengthened social solidarity. This is in line with the results of community service reported by Sari et al. (2021), that catfish processing training can increase community confidence, cooperation, and creativity in creating superior local products.

To understand the strategic position of the catfish nugget business in Duwet Village, a SWOT analysis was conducted to describe the strengths, weaknesses, opportunities, and threats of the business. The results of the SWOT analysis can be seen in the table.

Table 6. SWOT Analysis of Catfish Nugget Business

Aspect	Analysis
Strengths	Abundant availability of catfish raw materials in Duwet Village. Catfish nuggets are high in protein and have good nutritional value. The production process is relatively simple and can be done with basic equipment. Improved community skills in local fish-based food processing techniques.
Weaknesses	Participants' initial knowledge of ingredient formulation and food quality standards is still limited. Limited supporting facilities such as vacuum sealers and freezers. Product shelf life is limited without frozen storage. The community's digital marketing capabilities are still low.
Opportunities	Market demand for fish protein-based ready-to-eat foods is increasing. Government support for fishery product processing and MSME empowerment. Potential for developing the local brand "Nugget Lele Duwet" as a leading village product. Opportunities to expand marketing through social media and e-commerce.
Threats	Competition with commercial nugget products that already have big brands. Fluctuations in catfish feed prices that affect production costs. Risk of product quality decline if storage is not done properly. Limited labor that can cause inconsistency in production.

The main strengths lie in the abundant availability of local raw materials, support from educational institutions, and the taste of the product that is accepted by consumers. These conditions strengthen the

competitiveness of local products, as stated by Warcito & Saleh (2016) that internal strengths in the form of resource potential and institutional support can be the main driving factors in the success of local food micro-businesses.

The weaknesses that still exist include small production capacity, limited managerial experience, and the absence of distribution permits. However, the opportunities for business expansion are enormous, given the increasing trend of practical and healthy food consumption in society (Listyarini et al., 2018). Government program support and easy access to digital marketing also present significant opportunities to expand the product market.

Potential threats include competition with large-scale commercial products and fluctuations in raw material prices and energy costs. To overcome this, development strategies need to be directed at strengthening the identity of local brands, increasing production capacity, and implementing food safety standards so that the catfish nuggets from Duwet Village have sustainable competitiveness.

Overall, this PkM activity shows that a participatory and direct assistance approach is an effective method for improving the technical and entrepreneurial skills of rural communities. The results of the activity are in line with the theory of community empowerment, which emphasizes the active involvement of the community in every stage of the development process (Mardikanto & Soebiato, 2017). This program has succeeded in encouraging the creation of local product innovations, strengthening household economies, and creating small business models based on the potential of fishery resources.

5. Conclusion

The community service program in Duwet Village has successfully improved the community's ability to process catfish into value-added products in the form of *catfish nuggets*. Through training and mentoring, the community has been able to apply hygienic and efficient production techniques, as well as understand the basics of entrepreneurship and product packaging. This activity has also strengthened cooperation between universities, village governments, and communities in developing local potential. Analysis results indicate that the catfish nugget business has good prospects due to the availability of raw materials, market opportunities, and community enthusiasm. However, production capacity, business legality, and marketing strategies still need to be strengthened.

For the sustainability of the program, it is recommended that there be further training related to processing technology and digital marketing, distribution permits and halal certification, as well as the development of packaging and the local brand "Duwet Polinema Catfish Nugget". Collaboration with business partners and village institutions is also important to expand the marketing network and maintain business continuity.

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