



## Original Article

### Tilapia Processing Innovation for Sustainable Development by Islamic Boarding School in Kambitin Village, Tabalong Regency, South Kalimantan Province

Flora Devica<sup>1</sup>, Edi Wiraguna<sup>2✉</sup>, Tri Budiarto<sup>3</sup>, M Iqbal Nurulhaq<sup>4</sup>

<sup>1,2,3,4</sup> College of Vocational Studies, IPB University.

Correspondence Author: ediwiraguna@apps.ipb.ac.id✉

#### Abstract:

This study explores the integration of Islamic education with practical training in fishery management at Al Islam Agricultural Technology Islamic Boarding School, focusing on tilapia cultivation in South Kalimantan, Indonesia. Despite challenges in post-harvest management leading to limited sales of raw tilapia, innovative training initiatives aim to extend product shelf life and enhance market value. A community service program evaluated from September to December 2023 assessed the sustainability of tilapia processing training among students (*santri*), emphasizing skills development in product innovation and hygiene practices. The program, utilizing various tools and materials, successfully introduced processed fish products such as shredded meat, nuggets, tofu meatballs, and baby tilapia crispy, garnering high participant satisfaction (79.91%) and affirming potential for sustainable fishery practices.

**Keywords:** Fishery Management; Tilapia Cultivation; Product Innovation

#### Introduction

Al Islam Agricultural Technology Islamic Boarding School, located in Kambitin Village, Tanjung Subdistrict, Tabalong Regency, South Kalimantan Province, is dedicated to providing Islamic religious education while also fostering the development of students' potential. The students, known as *santri*, are trained for service programs as working groups (*pokja*) within the boarding school, with a focus on managing business units. One promising business unit is in freshwater fishery, specifically the cultivation of tilapia. Tilapia is a widely cultivated freshwater fish in Indonesia, known for its essential nutrients, including protein, carbohydrates, fats, calcium, phosphorus, and iron ([Dadiono & Aminin 2021](#)).

Based on field observation data, several issues were identified within the fishery business unit, which is now in its third cycle, with a total of 14,000 fish stocked, including



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9,000 Thai tilapia and 5,000 superior tilapia. One of the main challenges in post-harvest management is the suboptimal handling of tilapia, leading to limited sales primarily to the boarding school kitchen for student consumption. Consequently, the fish are sold raw without innovative processing methods. Effective innovation should focus on creating products with extended shelf life. Proper fish processing is crucial, as unprocessed fish spoil quickly due to bacterial activity and chemical changes. Addressing these challenges requires efforts to provide training for students (*santri*) on creating innovations in transforming fresh fish into processed products. Emphasis should be placed on proper packaging techniques, maintaining hygiene, and ensuring long shelf life to create high-value products. Training activities can positively impact participants by enhancing their knowledge, skills, and fostering new innovations (Devica et al. 2023). The purpose of the community service is to evaluate the sustainability of tilapia processing training and evaluate the effectiveness of the training on processing products derived from tilapia fish commodities.

## Methods

### Place and time of implementation

The community service is held at Al Islam Agricultural Technology Islamic Boarding School in Kambitin Village, Tanjung Subdistrict, Tabalong Regency, South Kalimantan Province. Running from September to December 2023, the three-month program targets the students (*santri*) of the boarding school.

### Tools and Materials

The tools used in the community service include a projector, laptop, writing materials, sound system, camera, mobile phone, stove, frying pan, spatula, chopper, basin, tray, digital scale, baking tray, gloves, knife, and steamer. The materials used include tilapia fish, garlic, shallots, coriander, galangal, brown sugar, turmeric, bay leaves, citrus leaves, salt, cooking oil, and various other flavor enhancers.

### Implementation method

The implementation of community service is carried out gradually, covering socialization, training, and direct practice. In the socialization phase, students are informed about the purpose of the program. The community service held on November 12, 2023, introduces various processed fish products and familiarizes participants with the necessary tools and materials for product manufacturing. During the practical sessions, the facilitator explains each step of product creation, ensuring compliance with quality processing standards. The processed products include shredded meat, nuggets, tofu meatballs, and baby tilapia crispy.

Table 1. Statements related to program implementation and its impact on the sustainability of product processing

| No | Statement                                                        |
|----|------------------------------------------------------------------|
| 1  | Sustainable in the long term                                     |
| 2  | Easily obtainable materials                                      |
| 3  | Requires guidance                                                |
| 4  | Easy product creation                                            |
| 5  | Product provides benefits                                        |
| 6  | Product brings new innovations to the students ( <i>santri</i> ) |

|    |                                       |
|----|---------------------------------------|
| 7  | Recommending the product to consumers |
| 8  | Introducing the product               |
| 9  | Marketing the product                 |
| 10 | Assisted in product creation          |

To evaluate the impact of the community service, a questionnaire is administered to all participants. The questionnaire contains 10 statements (Table 1) related to program implementation and its impact on the sustainability of product processing to 30 participants. Participants rate their agreement on a 4-point scale: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The results for each variable are analyzed using a Likert scale and interpreted according to Table 2 ([Wiraguna et al. 2024](#)).

$$P \text{ (Perception Interpretation)} = \frac{\text{Total Survey Result Scores}}{\text{Total Highest Scores} \times 100\%} \times 100\%$$

Table 2. Interpretation of participant socialization perception scores

| No | Value      | Category  |
|----|------------|-----------|
| 1  | 0% - 24%   | Verry Low |
| 2  | 25% - 49%  | Low       |
| 3  | 50% - 74%  | Medium    |
| 4  | 75% - 100% | High      |

## Results

### The Community Service Focuses on Processing Fishery Products

The community service was held in the Hall of Al Islam Agricultural Technology Islamic Boarding School. Training sessions took place on October 5 and November 12, 2023. The program commenced with opening remarks from the school's leadership and representatives from CSR Adaro, followed by presentations and demonstrations on processing fishery products. The processed items included shredded meat, nuggets, tofu meatballs, and baby tilapia crispy. Materials used for production included tilapia fillet, tapioca flour, wheat flour, breadcrumbs, tofu, garlic, shallots, coriander, galangal, brown sugar, turmeric, bay leaves, citrus leaves, salt, flavor enhancers, and cooking oil. The production steps were as follows (Figure 1): 2) Gather and prepare all necessary tools and material; 2) Clean and fillet the tilapia; 3) Steam the tilapia and finely chop it using a chopper; 4) Grind spices such as shallots, garlic, turmeric, and other flavour enhancers; 5) Heat a small amount of oil and sauté the ground spices until fragrant; 6) To make shredded fish (*abon*), mix the steamed and chopped tilapia with the sautéed spices, stirring until dry; 7) To make nuggets, skip steaming the tilapia. Grind the fish, mix it with spices, add tapioca flour and wheat flour, shape into nuggets, and coat with breadcrumbs. To make tofu meatballs, grind the tilapia, mix with spices, shape to match the size of tofu, and steam. Then, deep-fry both products until golden brown; 8) To make baby tilapia crispy, coat tilapia fry with wheat flour and tapioca flour, and deep-fry until crispy.



Figure 1. Practice of making processed products (a) shredded fish (b) tofu meatballs (c) baby tilapia crispy (d) nugget.

Products of community service are categorized as *abon* for long-term storage, and nuggets, tofu meatballs, and baby tilapia crispy for short-term storage. Post-production, these items are packaged in standing pouches and plastic film to maintain quality and hygiene standards (Figure 2).



Figure 2. Tilapia Processed Products

Evaluation of the community service

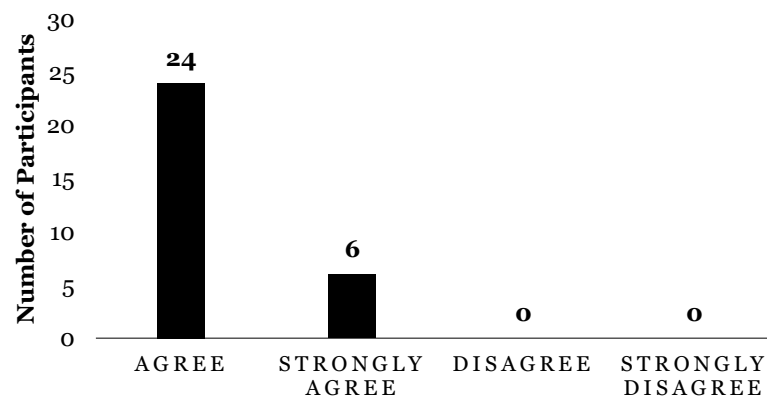
The questionnaire responses reflect the views of socialization participants on product sustainability (Sugiyono 2019). According to Table 3, calculations show that a majority of respondents strongly agree with the survey statements. Specifically, the total scores indicate 241 respondents agreeing and 59 strongly agreeing, with no respondents indicating disagreement, out of a total possible score of 300 points.

| Table 3. Perception of Product Processing Sustainability Calculation |           |    |   |   |    |       |
|----------------------------------------------------------------------|-----------|----|---|---|----|-------|
| No                                                                   | Statement | SD | D | A | SA | Total |

|       |                                                                  |     |    |     |
|-------|------------------------------------------------------------------|-----|----|-----|
| 1     | Sustainable in the long term                                     | 29  | 1  | 30  |
| 2     | Easily obtainable materials                                      | 24  | 6  | 30  |
| 3     | Requires guidance                                                | 23  | 7  | 30  |
| 4     | Easy product creation                                            | 27  | 3  | 30  |
| 5     | Product provides benefits                                        | 20  | 10 | 30  |
| 6     | Product brings new innovations to the students ( <i>santri</i> ) | 22  | 8  | 30  |
| 7     | Recommending the product to consumers                            | 27  | 3  | 30  |
| 8     | Introducing the product                                          | 22  | 8  | 30  |
| 9     | Marketing the product                                            | 24  | 6  | 30  |
| 10    | Assisted in product creation                                     | 23  | 7  | 30  |
| Total |                                                                  | 241 | 59 | 300 |

Note: The question criteria in the survey are adapted from [Wiraguna et al. \(2024\)](#) Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

The average perception of participants in the community service regarding the sustainability of product processing indicates that 24 participants agreed, 6 participants strongly agreed, 0 participants disagreed, and 0 participants strongly disagreed, out of a total of 30 respondents. The survey results are shown in Figure 3.



Graphic 1. Perception of participants in the socialization

According to Table 4, the perception of participants regarding the sustainability of product processing yields a percentage of 71.91%. This score falls within the high satisfaction criteria based on the intervals, indicating that participants in the activity are highly satisfied with the socialization program. These findings highlight the potential for sustainability in product processing as revealed by the survey results, similar to findings in the study by [Virianita R et al. \(2020\)](#).

Table 4. Total answer of participants

| Criteria | Calculation Results |
|----------|---------------------|
|----------|---------------------|

|                                          |   |        |
|------------------------------------------|---|--------|
| Number of Answers from Respondents       | : | 300    |
| Number of Respondents Who Answered       | : | 30     |
| Number of Highest Scores on the survey   | : | 241    |
| Lowest Total Score on the survey         | : | 59     |
| Computation of perceptual interpretation | : | 79.91% |

### Conclusion

Al Islam Agricultural Technology Islamic Boarding School in Kambitin Village, Tanjung Subdistrict, Tabalong Regency, South Kalimantan Province, stands out for its dual focus on Islamic religious education and the development of entrepreneurial skills among its students, known as *santri*. The school's freshwater fishery business unit, specializing in tilapia cultivation, reflects its commitment to practical education and sustainable development. Despite challenges in post-harvest management and limited sales, efforts to innovate and train students in fish processing have shown promising results. The community service program conducted from September to December 2023 successfully evaluated the sustainability of tilapia processing training, achieving a high participant satisfaction rate of 71.91%. This underscores the program's effectiveness in promoting sustainable practices and fostering innovation, positioning the school as a leader in integrating education with practical skills development and community empowerment.

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