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Technology-based Intervention Framework for Barangay Plaridel, Palompon, Leyte

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Abstract

Brgy. Plaridel in Palompon, Leyte relies heavily on danggit (rabbitfish) production, yet faces challenges in weather-dependent drying, limited product innovation, and unmanaged waste. This study developed a technology-based intervention framework to address these issues using a quantitative design with surveys and focus group discussions among local processors and marketers. Results revealed that 90% of respondents identified sudden rainfall as the main drying challenge, while 84% reported spoilage-related income losses. Producers showed strong interest in product diversification, with 70% favoring packaged danggit snacks and 60% gourmet condiments. Waste disposal remains a concern, as 56% admitted to indiscriminate practices, though most respondents expressed openness to waste-to-value solutions. Descriptive statistics indicated high awareness (M = 3.8) and very high willingness to adopt new technologies (M = 4.2). The proposed framework integrating weather-resilient dryers, food innovations, and waste management offers a scalable, sustainable solution to enhance product quality, income, and community resilience.

Keywords: Danggit; Technology-Based Intervention; Fisheries; Sustainability

1. Introduction

Brgy. Plaridel in Palompon, Leyte, is a coastal community where small-scale fisheries, particularly the production of dried danggit (rabbitfish), are vital to local livelihood and food security. Despite its economic importance, the traditional sun-drying method used for processing danggit is highly dependent on favorable weather conditions, making it susceptible to sudden rainfall, contamination, and inconsistent product quality. This vulnerability often leads to income losses and market rejection of poorly dried products (Food and Agriculture Organization [FAO], 2020).

There is, therefore, an urgent need to introduce a weather-resilient dryer that leverages solar or hybrid drying technologies. Studies have demonstrated that solar tunnel dryer offers a promising solution for reducing postharvest losses and preserving the nutritional quality of fruits and vegetables in the region. This innovative technology can contribute to food security and sustainable agricultural practices in developing communities. (Ujunwa, Nworie, Agbo, Otah, Famuyibo, Brown, & Ugo, 2024). Implementing such technologies in Brgy. Plaridel can help stabilize income and improve product quality for local fisherfolk.

Additionally, the local fishery economy suffers from a lack of value-added processing. Most danggit is sold as a basic dried product, limiting profit margins and access to broader markets. Food product innovations such as converting dried fish into packaged snacks, gourmet condiments, or fortified food items can increase product value and diversify income sources. This aligns with national strategies promoting agri-fishery value chain development and local enterprise growth (Department of Agriculture-Bureau of Agricultural Research [DA-BAR], 2020).

Another critical concern is the waste generated from fish processing. Left unmanaged, waste contributes to environmental degradation and public health risks. The development of a waste danggit processor, which converts by-

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products into fish meal, organic fertilizer, or biodegradable materials, supports a circular economy approach and enhances resource efficiency (Ghaly et al., 2013; Department of Science and Technology - Industrial Technology Development Institute [DOST-ITDI], 2021).

The integration of these innovations into a comprehensive tech-based intervention framework—encompassing drying technology, food product development, and waste management—can provide a sustainable, scalable solution tailored to Brgy. Plaridel. This study, therefore, seeks to contribute to sustainable fisheries development, resilience building, and technological empowerment in rural coastal settings. Moreover, it aligns with the Philippine government's digital transformation and inclusive growth agenda (National Economic and Development Authority [NEDA], 2022).

1.1. Objectives of the Study

The main objectives of this study were to develop a technology-based intervention framework in Brgy. Plaridel, Palompon, Leyte. Specifically, the study sought to address the following research questions

- What were the current challenges faced by danggit producers in Brgy. Plaridel in terms of drying practices, product innovation, and waste management?
- How could a weather-resilient dryer be designed and integrated to improve drying efficiency and product quality?
- What food product innovations could be developed to increase market value and income for local producers?
- How could waste from danggit processing be sustainably managed or converted into value-added by-products?

2. Methodology

2.1. Research Design

This study employed a quantitative approach design, and evaluated a tech-based intervention framework for danggit industry in Brgy. Plaridel, Palompon, Leyte. This approach sought to identify current challenges related to weather-vulnerable drying methods, market limitations, and waste management practices. The insights from this phase guided the development of appropriate technological interventions

A structured survey questionnaire was administered to all respondents involved in fish processing and marketing in Barangay Plaridel. This provided quantitative data on productivity rates, economic losses due to weather disruptions, current drying durations, product pricing, and waste disposal practices. The results helped quantify the scope of the problem and established baseline data for intervention design.

Survey questionnaire was distributed using purposive sampling to all respondents actively engaged in *danggit* processing. The survey was administered in person and was translated into local dialects or Bisaya

3. Results and Discussions

3.1. Challenges in Traditional Drying Practices

The results show that the majority of respondents (90%) identified sudden rainfall as the most pressing challenge, confirming the vulnerability of traditional sun-drying to weather conditions. High levels of contamination (80%) and spoilage losses (84%) further indicate the need for a weather-resilient dryer that ensures product safety and consistency.

Table 1 Challenges in Traditional Drying Practices

Challenge	Frequency (f)	Percentage (%)
Sudden rainfall/weather disruptions	45	90%
Contamination (dust, insects, animals)	40	80%
Inconsistent drying time & quality	38	76%
Limited drying space	30	60%
Loss of income due to spoilage	42	84%

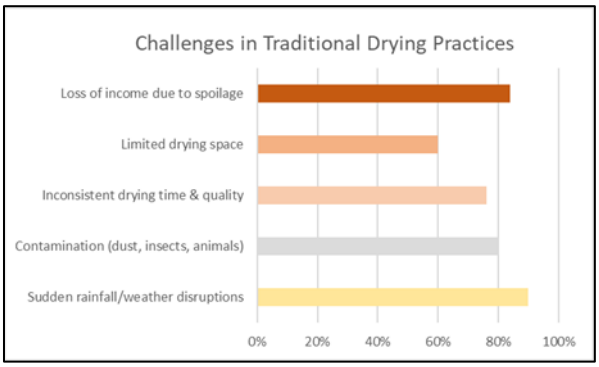

Figure 1 Challenges in Traditional Drying Practices

3.2. Interest in Food Product Innovations

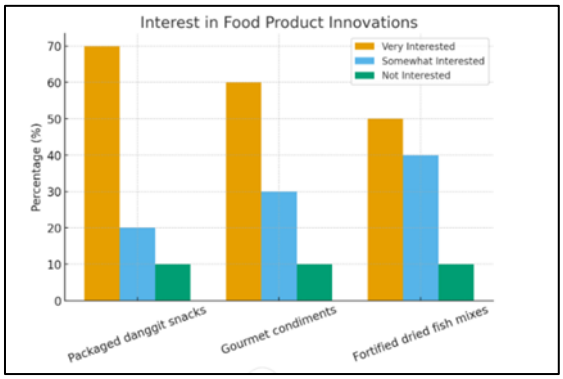

Figure 2 Interest in Food Product Innovations

Most producers showed high enthusiasm for packaged danggit snacks (70%) and gourmet condiments (60%), highlighting a willingness to diversify products. This suggests strong potential for value-added innovations that can raise market competitiveness and income.

Table 2 Interest in Food Product Innovations

Proposed Product	Very Interested (%)	Somewhat Interested (%)	Not Interested (%)
Packaged danggit snacks	70%	20%	10%
Gourmet condiments (sauces)	60%	30%	10%
Fortified dried fish mixes	50%	40%	10%

3.3. Waste Management Practices and Perceptions

Over half (56%) of the respondents reported indiscriminate waste disposal, which poses environmental and health risks. Only 14% were already engaged in waste valorization (fertilizer/fishmeal). This supports the integration of a waste-to-value system in the intervention framework.

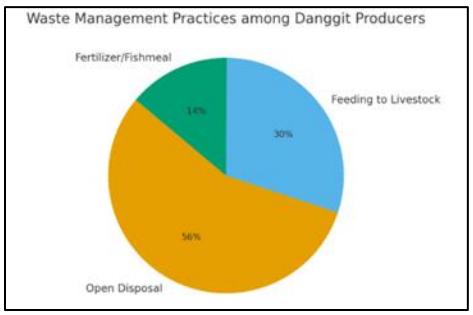

Figure 3 Waste Management Practices among Danggit Producers

3.4. Readiness to Adopt Tech-Based Framework

Table 3 Readiness to Adopt Tech-Based Framework

Category	Mean (M)	Standard Deviation (SD)	Interpretation
Awareness of technology	3.8	0.6	High
Willingness to adopt	4.2	0.5	Very High
Perceived economic benefits	4.3	0.4	Very High
Perceived environmental impact	4	0.5	High

The descriptive statistics reveal a strong willingness to adopt new technologies (M = 4.2, SD = 0.5) and recognition of economic benefits (M = 4.3, SD = 0.4). This indicates favorable conditions for implementing the proposed framework, provided adequate training and community involvement are ensured.

4. Conclusion

The study shows that danggit producers in Brgy. Plaridel continue to struggle with drying methods, limited product innovations, and waste disposal issues. By introducing a tech-based intervention framework that includes weather-resilient dryers, new product ideas, and sustainable waste processing, the community can improve product quality, earn more income, and protect the environment. The success of this effort depends on the active involvement of the community, support from institutions, and the ability to expand the framework, ensuring lasting livelihoods and sustainable fisheries for the future.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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