

**TECHNOLOGICAL NEEDS AND POST-HARVEST
INNOVATIONS FOR THE DANGGIT (*SIGANUS
CANALICULATUS*) INDUSTRY IN BARANGAY PLARIDEL,
PALOMPON, LEYTE**

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Abstract

The danggit (*Siganus canaliculatus*) industry in Barangay Plaridel, Palompon, Leyte faces persistent technological and operational challenges that constrain its growth and sustainability. Data collected through structured interviews with 50 fisherfolk and processors revealed that weather dependence is a critical limitation, as traditional sun-drying methods are frequently disrupted during the rainy season. Waste management also emerged as a pressing issue, with 96% of respondents citing concerns over by-product accumulation and 86% reporting improper disposal practices. Economic constraints were evident, with 80% identifying low selling prices and 72% noting the absence of efficient deboning technologies that could reduce occupational risks associated with traditional splitting. All respondents (100%) reported reliance on manual fish cutting and sun-drying using bamboo and polyethylene trays. To overcome these challenges, the study recommends the introduction of weather-resilient drying systems, mechanized deboning technologies, improved packaging methods, waste valorization strategies, and targeted capacity-building programs. These interventions are projected to enhance productivity, promote worker safety, and support the long-term sustainability of the danggit industry.

Keyword: Technology Needs Assessment, Danggit Industry, Post-Harvest Technology, Fish Processing

Background of the Study

The danggit (*Siganus canaliculatus*), also called the white-spotted rabbitfish, is the key to the coastal economies in Barangay Plaridel, Palompon, Leyte. This local industry is established in the community's traditions, providing livelihood opportunities to many families engaged in fishing, drying of the product. Dried danggit (buwad) known for its salty taste and crunchy, is a known product in Palompon, Leyte and even in international markets. However, like many other fisheries-based industries, the danggit sector in Barangay Plaridel faces several challenges and opportunities that shape its sustainability and development.

The danggit (*Siganus canaliculatus*) also called the white-spotted rabbitfish, is key to the coastal economies of the Philippines in Barangay Plaridel, Palompon, Leyte. This local business in the community's fishing traditions giving many families a way to make a living through fishing, drying, and selling the product. Dried danggit is a preferred product known

for its crunchy texture and tasty flavor which it popular in local and even it reached to a foreign markets. Yet, like many other fishing-based industries, the danggit trade in Barangay Plaridel faces several hurdles and chances that affect its ability to last and grow.

The influence of climate change on marine ecosystems is one of the challenges confronting the industry. Rising sea temperatures, unpredictable weather patterns, and coastal pollution have negatively affected fish populations, leading to fluctuating catches and potential declines in supply (Tiejun Zhang, et. al 2024). Additionally, the used of ‘bugsok’ or cone-shaped stick is a pressing concern as some local fishermen employ these fishing practices that threaten or destroys the coral reef in the coastal area of Brgy. Plaridel, Palompon, Leyte. The depletion of natural resources could significantly affect the industry, particularly if conservation measures are not effectively enforced.

Throughout the conducted observation and Technology Needs Assessment conducted some of the issues were observed. Many small-scale fish processors in Barangay Plaridel rely on traditional sun-drying methods, which are susceptible to contamination due to exposure to dust, insects, and fluctuating weather conditions and the volume of danggit waste was thrown in coastal area. Without proper investment in modern drying facilities, recycling technology and adherence to food safety standards, the industry may struggle to compete in a more demanding global market.

Despite these challenges, the danggit industry in Barangay Plaridel also presents promising opportunities for growth and sustainability. One of the key initiatives supporting the industry is the "Bantay Danggit" ordinance, which enforces a closed fishing season from February to April to allow the species to reproduce and maintain stable population levels. This regulation, coupled with community-based conservation efforts, provides a framework for ensuring the long-term sustainability of the danggit industry while supporting local fisherfolk.

Furthermore, value addition and modernization in processing techniques could open new market opportunities for danggit products. By implementing Good Manufacturing Practices (GMP) and adopting more hygienic drying technologies, converting waste danggit into a new product, local producers can enhance product quality, extend shelf life, and meet international food safety standards. Compliance with GMP not only protects consumer health but also builds trust and confidence in the food industry (Terio V, et.al 2017). This transition could make Barangay Plaridel’s dried danggit more competitive and zero waste, increasing income opportunities for small-scale producers.

Brgy. Plaridel, Palompon, Leyte is known as danggit industry with many families unto fishing, drying, and selling danggit as their source of income. However, the industry remains to traditional methods, which significantly limit its growth potential. This study is conducted in response to the growing need to assess the current challenges and technological requirements of local danggit producers.

Initial interviews with local fisherfolk and processors revealed pressing issues such as Lack of cold storage facilities, leading to spoilage and income loss during peak harvests and some of

the responses during interview that they sell it in a lower price. Inconsistent drying techniques affected by unpredictable weather conditions, resulting in poor product quality.

Limited access to updated fishing equipment and post-harvest technology, which hampers efficiency and output. According to data from the Municipal Agriculture Office of Palompon (2023), approximately 60% of coastal households in Brgy. Plaridel are engaged in danggit-related activities. And yet no access to any form of mechanized or improved equipment. Furthermore, annual income from danggit production has shown a 15% decline over the past 5 years, largely due to post-harvest losses and market competition.

Given these realities, the study aims to identify the root causes of these issues and explore appropriate technological interventions such as solar drying systems, vacuum packaging, and other technology processor. This research is not only timely but essential, as it seeks to empower a marginalized yet economically significant sector of the community. Additionally, the findings can be used to attract funding, training programs that will be conducted through extension activities by the Palompon Institute of Technology.

Conceptual Framework

The Process Flow of this study (figure 1) each representing a sequential phase in the research and technology development process. The research starts with identifying key challenges in the industry including economic factors (costs, market competition, financial constraints), Technological factors (existing technology, and available advancements). Then, the next step involves assessing what the industry requires to overcome the identified challenges. It includes research on industry demands and technological gaps.

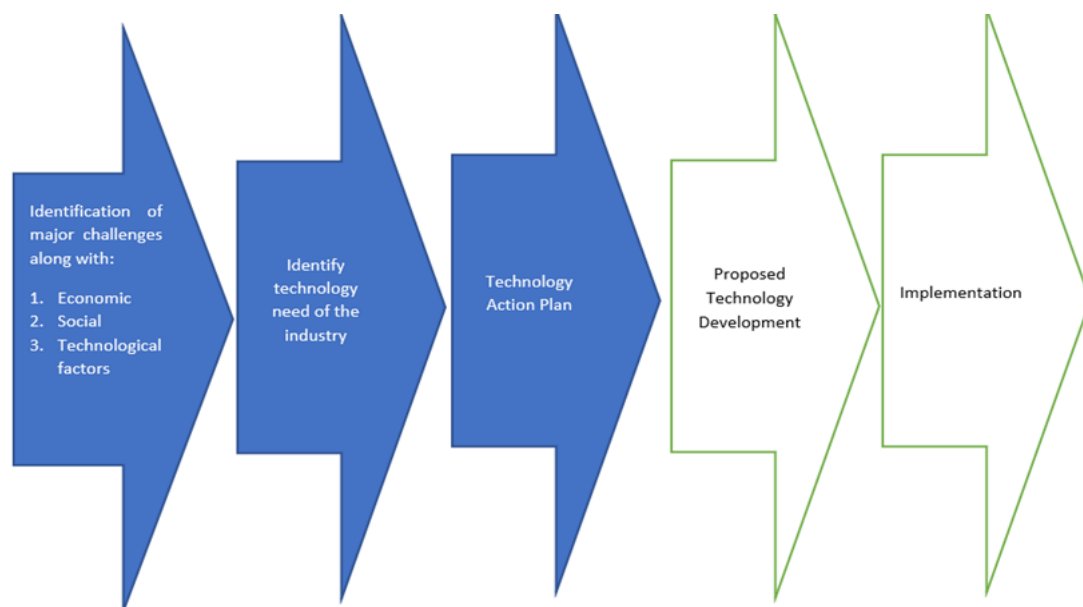


Figure 1. The Process Flow of Research Study

A concrete strategy will be developed to address the technological needs. This could involve setting objectives, defining methodologies, and establishing roadmaps for technology adoption and Proposals may involve R&D, prototyping, or feasibility studies for future technology development and innovations.

Objectives of the Study

This study aimed to assess the technological needs of the danggit industry in Barangay Plaridel, Palompon, Leyte. In particular, it sought to identify the major challenges affecting the industry, determine the technological requirements necessary to address these challenges, and recommend technology-driven solutions and innovations that could improve production efficiency and ensure the sustainability of the sector.

Methodology

This study employed a descriptive quantitative research design to assess the challenges and technological needs of the danggit (*Siganus canaliculatus*) industry in Barangay Plaridel, Palompon, Leyte. The study was conducted in this coastal barangay, which was chosen because of its strong involvement in the danggit industry and its active engagement in fish processing and aquaculture activities. Data were collected using a structured survey questionnaire, allowing responses to be quantified and analyzed statistically. The respondents consisted of 50 individuals engaged in fishing and fish processing, selected through purposive sampling to ensure that information came from participants with direct experience and involvement in the industry. In addition, two barangay officials were included to provide insights into existing support programs and development plans relevant to the danggit sector. To analyze and interpret the data gathered from the survey, frequency counts and percentages were employed as the primary statistical tools.

Ethical Considerations

Prior to the actual data gathering, the researchers sought permission from the Barangay Captain of Barangay Plaridel, Palompon, Leyte, to conduct the technology needs assessment. Informed consent was obtained from all participants before the administration of the survey. The respondents, consisting of fisherfolk, processors, and barangay officials, were assured that their participation was voluntary and that they could withdraw from the study at any time without penalty. Confidentiality of responses was strictly observed, and no identifying information was disclosed in the reporting of results.

To ensure transparency and ethical conduct, the objectives of the study were clearly explained to the participants, and their consent was secured prior to their participation. Photographs and other forms of documentation were taken only with the explicit permission of the respondents. All data collected were used solely for academic purposes and were treated with the highest level of integrity.

Results and Discussion

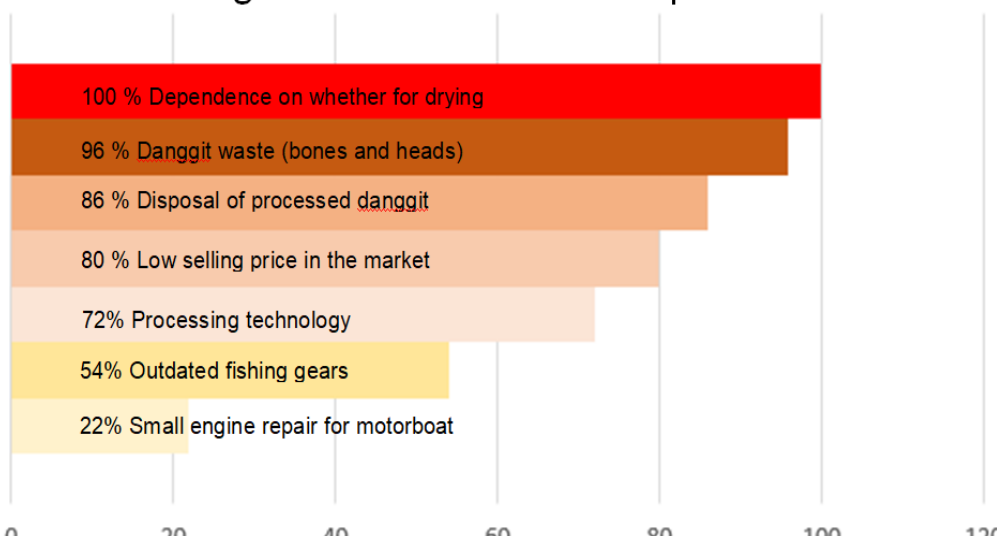
This section presents the findings of the study on the challenges and technological needs of the danggit industry in Barangay Plaridel, Palompon, Leyte, based on the data gathered from survey responses. The results are organized and presented statistically to provide a clear understanding of the current conditions, practices, and needs of the local fisherfolk and processors engaged in danggit production.

The analysis revealed several common challenges faced by the respondents. Weather dependence was reported as a major concern, particularly during rainy days when traditional sun-drying methods are disrupted. Waste management also emerged as a critical issue, with 96% of respondents citing concerns related to danggit by-products and 86% identifying problems with their disposal. In addition, 80% of respondents noted the low selling price of danggit in the market, while 72% highlighted difficulties in processing technology, particularly deboning, which poses risks of cuts and injuries during manual splitting (Figure 1).

Table 1. Challenges of the fisherfolk and processors

Challenges	Frequency
Dependence on whether for drying	50 (50)
Danggit waste (bones and heads)	48 (50)
Disposal of processed danggit	43 (50)
Low selling price in the market	40 (50)
Processing technology	36 (50)
Outdated fishing gears	27 (50)
Small engine repair for motorboat	11 (50)
Training food processing	-
Food packaging	-

Challenges of the fisherfolk and processors



Existing Practices and Tools Used

Survey findings showed that all fisherfolk relied on manual techniques for cutting and splitting fish, while processors still depended on sun-drying using improvised bamboo and polyethylene trays. Although traditional and low-cost, these practices result in product contamination, inconsistent drying, and increased post-harvest losses. Recent findings reinforce that sun-drying remains the norm among small-scale processing operations despite its documented drawbacks (Hin et al., 2024).

Waste generation is also a pressing concern: heads, bones, and entrails are often improperly disposed of in coastal areas. This is particularly troubling given that the majority of seafood (25–60% of wet weight) can become waste that nonetheless contains proteins, oils, and valuable biocompounds—highlighting a significant opportunity for waste valorization (Zhan et al., 2024).

Technological Needs of the Industry

Respondents were asked to identify the technologies they believed would improve their production practices. Figure 2 illustrates the actual manual cutting of fish during the deboning process, which highlights the labor-intensive and hazardous nature of traditional methods.



Figure 2. Traditional Cutting

Table 2 presents the results of the technology needs assessment. The findings show that the most urgent requirement was solar drying equipment (100%), reflecting the community's vulnerability to weather-dependent drying and the risks of contamination associated with open-air sun drying. Recent studies confirm that modern solar and hybrid dryers can improve product safety, reduce drying time, and enhance efficiency in small-scale fisheries (Russo, 2024).

Vacuum sealing and packaging technologies were the second priority (94%). These innovations are essential for prolonging shelf life, ensuring hygienic storage, and improving the marketability of dried fish. Advances in active and intelligent packaging, including nanotechnology-based solutions, have demonstrated effectiveness in reducing microbial growth and oxidation in seafood products (Jacinto-Valderrama et al., 2023).

The need for mechanized deboning machines was also emphasized (80%), as manual deboning exposes workers to repetitive strain and accidental injuries. Mechanization in small-scale fisheries not only increases processing speed but also ensures uniformity and quality in value-added products (Bera & Mondal, 2022).

Additionally, 70% of respondents identified training in fish processing as a necessary intervention. Training programs focused on Good Manufacturing Practices (GMP), food safety, and product diversification can empower local producers to meet both domestic and international market requirements (FAO, 2022).

Lastly, 58% of respondents expressed the need for technologies to process danggit waste, such as fish heads and bones. At present, these by-products are discarded into coastal areas, causing environmental issues. However, seafood waste valorization into protein hydrolysates, bio-packaging, or edible coatings is a growing innovation that could enhance sustainability and provide alternative income streams (Kharadi et al., 2025).

Table 2. Technology Needs Assessment

Technological Needs	Frequency
Solar drying equipment	50 (50)
Vaccum selling/ packaging	47 (50)
Deboning machine	40 (50)
Fish processing training	35 (50)
Technology processor for danggit waste	29

Conclusion

The study revealed that the danggit (*Siganus canaliculatus*) industry in Barangay Plaridel, Palompon, Leyte remains dependent on traditional practices such as manual deboning and open-air sun-drying, leading to inefficiencies, contamination risks, and post-harvest losses. Based on the data gathered, the industry requires key technological innovations including weather-reliant drying systems, modern packaging, mechanized deboning, waste-processing technologies for value-added products, and relevant training. Addressing these needs is essential to improve production efficiency, sustainability, and competitiveness of the dried danggit industry.

Recommendation

Based on the findings, several actions are recommended to strengthen the danggit industry in Barangay Plaridel, Palompon, Leyte. First, the adoption of solar and hybrid drying systems is necessary to reduce dependence on weather conditions, minimize contamination, and ensure consistent drying quality. The promotion of advanced packaging technologies, such as vacuum sealing and intelligent packaging, is also essential to extend shelf life and increase market competitiveness. To improve processing efficiency and worker safety, mechanized deboning machines suited for small-scale fisheries should be introduced. In addition, continuous training programs focusing on Good Manufacturing Practices (GMP), food safety standards, and value-added fish processing are needed to build local capacity. Developing waste-to-value technologies to convert danggit by-products into useful products such as fish meal, protein hydrolysates, or bio-based packaging will further support sustainability. Finally, stronger policy and institutional support should be pursued through partnerships between local government, cooperatives, and academic institutions to facilitate technology adoption, financial assistance, and extension programs.

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