

POST-FLOOD ECONOMIC RECOVERY THROUGH PACKAGING INNOVATION AND PRODUCT DIVERSIFICATION INTO SHRIMP PASTE POWDER IN KWALA GEBANG VILLAGE

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Abstract

Kwala Gebang Village in Langkat Regency is a coastal community whose livelihood strongly depends on the capture fishery of rebon shrimp, the main raw material for a traditional shrimp paste (terasi) that has been produced through natural fermentation across generations, including by the Kelompok Tani Hutan (KTH) Kuala Indah. A flood disaster that struck the village at the outset of the program disrupted the production, distribution, and income of the partner group, prompting the International Community Service Collaboration Program between the Faculty of Vocational Studies, Universitas Sumatera Utara (USU) and Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang, Malaysia, to focus on post-flood economic recovery through three main solutions: strengthening business management, improving packaging quality using a vacuum sealer and official labeling, and product diversification through the development of shrimp paste powder. This study employs a Participatory Action Research (PAR) approach, covering situation analysis, training module development, procurement of production equipment, hands-on training, and mentoring. As of the 80% fund-disbursement stage, the program has completed initial coordination and needs mapping, training module preparation, procurement of most supporting materials and equipment, and part of the training and mentoring activities for KTH Kuala Indah members. The results show improvement in hygienic packaging standards, the emergence of a new value-added product in powdered form, and strengthened financial management capacity among the partner group. The program is expected to support post-flood economic recovery while contributing to the achievement of the Sustainable Development Goals (SDGs 1, 8, 9, 12, 14, and 17).

Keywords: *Community Empowerment; Packaging Innovation; Post-Flood Economic Recovery; Product Diversification; Shrimp Paste*

INTRODUCTION

Indonesia's extensive coastline provides substantial capture-fishery potential that sustains the livelihoods of numerous coastal communities, particularly in the small-scale fisheries sector (Kementerian Kelautan dan Perikanan Republik Indonesia, 2022). Optimal utilization of this potential requires not only sustainable harvesting practices but also downstream processing that increases the economic value of fishery products for coastal households (Kementerian Kelautan dan Perikanan Republik Indonesia, 2021). Within this context, traditional processed products such as shrimp paste (terasi) represent an important entry point for strengthening the economic resilience of fishing communities, provided that production, packaging, and marketing practices are continuously improved.

Kwala Gebang Village, with a population of 1,601 people, is located in the eastern coastal region of North Sumatra, in Gebang District, Langkat Regency (Badan Pusat Statistik Kabupaten Langkat, 2023). Its proximity to the sea has made the community highly dependent on the fishery sector, particularly the catch of rebon shrimp, which serves as the principal raw material for a distinctive terasi produced through pure fermentation without any additional ingredients. Production is managed by individual households as well as community business groups, one of which is Kelompok Tani Hutan (KTH) Kuala Indah, the primary partner of this community service program. Most KTH members are rebon-

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shrimp fishers who rely on traditional fishing gear (siring-siring) installed at river estuaries, with the harvest season generally lasting around six months per year, from July to December. A flood disaster that struck the region at the beginning of the program's implementation severely disrupted the community's economic activities: production facilities were damaged, distribution channels were obstructed, and purchasing power declined, collectively slowing the local economy of fishing households and terasi processors. This condition forms the primary rationale for a post-flood economic recovery program directed at strengthening financial management, improving packaging quality, and diversifying terasi products. Based on the initial identification, KTH Kuala Indah faces several persistent constraints: financial records that are not yet systematically maintained; packaging that remains simple, without proper pressing or strong labeling, resulting in reduced hygiene, limited market appeal, and vulnerability to being claimed as a product from other regions; and product diversification that is still confined to conventional molded terasi, without development toward ready-to-use or higher value-added packaged forms such as shrimp paste powder.

To address these challenges, the program brings together the Faculty of Vocational Studies, USU, and UiTM Cawangan Pulau Pinang, Malaysia, whose institutional cooperation has been in place since 6 December 2021. The involvement of this international partner provides technical support in the form of a digital financial recording application for the partner group, while simultaneously introducing the potential of Kwala Gebang Village to an international audience. Beyond its direct economic benefits, the program is designed to contribute to the achievement of the Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), SDG 12 (Responsible Consumption and Production), SDG 14 (Life Below Water), and SDG 17 (Partnerships for the Goals), in line with national commitments toward sustainable development (Kementerian PPN/Bappenas, 2020; Republik Indonesia, 2017; United Nations, 2015). This article reports the progress of the community service program up to the stage of 80% fund disbursement, describing the activities that have been implemented, the outputs achieved, and the strategic challenges that remain to be resolved toward the completion of the program.

LITERATURE REVIEW

Terasi (shrimp paste) is a traditional Indonesian condiment produced through the fermentation of small shrimp such as rebon, typically without chemical additives, resulting in a distinctive aroma and flavor that are widely used in everyday cooking. As a fishery-based product, its quality is highly dependent on the freshness of raw materials, hygienic handling, and appropriate post-harvest processing. Improving product quality and food safety standards is therefore a key entry point for increasing the competitiveness of small-scale fishery-based enterprises. Packaging technology plays a strategic role in determining the marketability of processed fishery products. The use of a vacuum sealer removes air from the packaging, thereby extending shelf life, maintaining hygiene, and reducing the risk of microbial contamination, while official product labeling strengthens brand identity and protects the product from being misappropriated or claimed as originating from another region. Proper labeling and packaging are also essential prerequisites for entering modern retail channels and reaching markets beyond the local area. Product diversification is widely regarded as an effective strategy for increasing the added value and competitiveness of micro, small, and medium enterprises (MSMEs) based on local potential (Sari & Putra, 2021). In the case of terasi, diversification into powdered form offers practical advantages: ease of use, a longer shelf life, and simpler distribution compared to the conventional molded product, positioning it as a ready-to-use functional condiment suitable for wider and more distant markets.

Beyond product-level innovation, the long-term sustainability of a community enterprise depends on sound business management practices, including systematic financial recording, cash-flow and profit-loss reporting, and brand-value development through tools such as the Business Model Canvas (Yunus, 2019). Strengthening these managerial capacities enables community groups to manage their business more professionally and to sustain the benefits of technical training beyond the life of the assistance program. Finally, community empowerment following a natural disaster can be understood as part of a broader economic-recovery framework that combines livelihood restoration with resilience-building measures. Programs designed around the principles of the Sustainable Development Goals (SDGs) — encompassing poverty reduction, decent work, responsible production and consumption, and sustainable use of marine resources — provide a coherent reference for structuring post-disaster community assistance that is both immediately responsive and oriented toward long-term sustainability (Kementerian PPN/Bappenas, 2020; United Nations, 2015).

METHOD

This community service program adopts a Participatory Action Research (PAR) approach, in which the implementation team and the partner group jointly identify problems, design solutions, and evaluate outcomes throughout the program cycle. The activity is centered in Kwala Gebang Village, Gebang District, Langkat Regency, North Sumatra, in partnership with Kelompok Tani Hutan (KTH) Kuala Indah, together with the international partner Universiti Teknologi MARA (UiTM), Cawangan Pulau Pinang, Malaysia. The implementation team consists of five members with multidisciplinary expertise, including human resource and business management, information technology, and food-related fields, targeting active participation of KTH Kuala Indah members, most of whom are rebon-shrimp fishers and household-scale terasi producers. Three strategic solutions were designed to address the partners' problems: (1) business-management training and mentoring, covering the introduction of the Business Model Canvas, brand-value enhancement, and preparation of profit-loss and cash-flow reports; (2) improvement of product packaging quality, through the procurement and use of a vacuum sealer, the design of an official product label distinctive to Kwala Gebang Village, molded and labeled terasi products, and the application of hygienic and attractive packaging standards; and (3) product diversification and innovation, through the development of shrimp paste powder, the provision of a drying appliance, and the design of practical packaging suited to markets outside the region.

The implementation procedure is organized into several stages: (1) initial coordination and needs mapping with KTH Kuala Indah, conducted on 29 July 2026; (2) preparation of training modules on digital financial management, packaging (vacuum sealing and labeling), and shrimp paste powder diversification; (3) procurement of supporting materials and equipment, including a vacuum/food sealer machine, digital scale, food processor, terasi molds, bottle and standing-pouch packaging, product labels, and a heat gun; (4) hands-on training and demonstration of vacuum sealing and label design, held on 6 August 2026; (5) trial production of shrimp paste powder through drying, grinding, sieving, and packaging; (6) digital marketing training; (7) mentoring and periodic monitoring of the application of training results; (8) partner participation in an MSME product exhibition; and (9) final evaluation and preparation of the completion report. Data were collected through participatory observation, in-depth interviews, questionnaires, and photographic and video documentation, complemented by Focus Group Discussions (FGD) to assess the effectiveness of the training and mentoring activities. Data were analyzed descriptively and qualitatively to evaluate the progress of the empowerment model up to the current reporting stage.

RESULTS AND DISCUSSION

Initial Coordination and Training Module Preparation

The implementation team conducted initial coordination with the chairperson and members of KTH Kuala Indah in Kwala Gebang Village on 29 July 2026. This meeting was aimed at re-mapping the partner group's most urgent training needs following the flood disaster. The results of this coordination became the basis for preparing three training modules: digital financial management, packaging (vacuum sealing and labeling), and shrimp paste powder diversification.



Figure 1. Traditional Shrimp Paste (Terasi) Production Activity by Members of KTH Kuala Indah

Procurement of Materials and Supporting Equipment

In line with the approved budget plan, the implementation team has procured most of the consumable materials and supporting equipment for the program, including a food/vacuum sealer machine, a digital scale, a food processor, terasi molds, bottle and standing-pouch packaging, product labels, and a heat gun used to seal bottle packaging and plastic seals.



Figure 2. Handover of Production Equipment and Vacuum-Sealing

Development of the Shrimp Paste Powder Product

Together with KTH Kuala Indah members, the implementation team carried out trials for developing the diversified shrimp paste powder product, covering drying, grinding, sieving, and bottle packaging. The main challenge encountered was the drying process, which required several days to complete under natural sun-drying; to address this constraint, the team decided to provide a grant of a food dehydrator to shorten drying time and ensure more consistent product quality.



Figure 3. Training of Shrimp Paste Powder

Vacuum-Sealing Packaging Training and Label Design

The implementation team carried out training and demonstration on the use of the vacuum sealer machine, together with mentoring on the design of an official brand label distinctive to Kwala Gebang Village's terasi products, aimed at improving product hygiene and market competitiveness. This activity, together with the handover of production equipment, was held on 6 August 2026. The new packaging and labeling design (Figure 4) reflects the local identity of Kwala Gebang, positioning the product as "Terasi Mandiri" and its powdered variant, "Terasi Bubuk," as a practical, savory, and ready-to-use condiment. The inclusion of an ingredient list, net weight, and "use-before" field on the label reflects an initial step toward compliance with modern food-labeling standards, in addition to strengthening consumer trust and brand recognition beyond the local market.

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Figure 4. Packaging Label Design for the Shrimp Paste Powder ("Terasi Bubuk") Product of KTH Kuala Indah

Discussion: Packaging Innovation, Diversification, and Post-Flood Recovery

The findings indicate that packaging innovation and product diversification jointly contribute to strengthening the post-flood economic recovery of KTH Kuala Indah. Vacuum sealing reduces exposure to air and moisture, extending shelf life and improving hygienic quality, while the newly designed official label protects the group's product identity and enhances its appeal for markets beyond the village. These improvements directly respond to the packaging-related constraints identified prior to the program and are consistent with the broader principle that appropriate packaging technology is a prerequisite for small-scale fishery products to compete in wider markets. Diversification into shrimp paste powder adds a ready-to-use, longer-lasting alternative to the conventional molded terasi, in line with the view that product diversification increases the added value and competitiveness of locally based MSMEs (Sari & Putra, 2021). The drying-time constraint encountered during trial production illustrates a common technical bottleneck in small-scale food processing; the team's decision to provide a food dehydrator as a targeted equipment grant demonstrates a responsive, needs-based approach to overcoming production barriers identified directly from the field.

At the same time, business-management strengthening — including the introduction of a digital financial recording system supported by the international partner, UiTM Cawangan Pulau Pinang — addresses the partner group's earlier lack of systematic financial records (Yunus, 2019). This combination of technical and managerial interventions reflects the program's alignment with the Sustainable Development Goals, particularly by supporting decent livelihoods, encouraging responsible production, and reinforcing the international academic partnership between USU and UiTM as part of a wider recovery and innovation ecosystem for the coastal community of Kwala Gebang.

CONCLUSION

The Community Service Program "Post-Flood Economic Recovery by Strengthening Shrimp Paste Enterprises through Packaging Innovation and Diversification into Shrimp Paste Powder in Kwala Gebang," together with the partner group, KTH Kuala Indah, and the international partner, UiTM Cawangan Pulau Pinang, the implementation team has completed initial coordination, procurement of most materials and equipment, and part of the training and mentoring activities in digital financial management, product packaging, and shrimp paste powder diversification. The results achieved so far show positive progress toward the mandatory and additional targeted outputs, although several activities still require follow-up stages before the program concludes. Accelerating the remaining activities, intensifying coordination with the international partner to finalize the cooperation agreement, and providing continued mentoring to KTH Kuala Indah after the program ends are recommended to ensure that the training outcomes are applied independently and sustainably.

Acknowledgment

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