

# A Multidisciplinary Approach to Empowering Coastal Women's Groups: Packaging Innovation, Product Shelf Life, and Nutritional Information for Seafood Products

Nurul Chamidah<sup>1</sup>, Tri Budi Prasetyo<sup>2</sup>, Rizki Budhi Suhara<sup>3</sup>, Ari Yulistianingsih<sup>4</sup>, Daduk Merdika Mansur<sup>5</sup>, Wildan Hafiah Nabil<sup>6</sup>

<sup>1,6</sup>Department of Communication Science, Faculty of Social and Political Sciences, Universitas Muhammadiyah Cirebon, Cirebon, Indonesia. Email: [nurul.chamidah@umc.ac.id](mailto:nurul.chamidah@umc.ac.id)<sup>1</sup>

<sup>2</sup>Department of Industrial Engineering, Faculty of Engineering, Universitas Muhammadiyah Cirebon, Cirebon, Indonesia. Email: [tri.budi@umc.ac.id](mailto:tri.budi@umc.ac.id)<sup>2</sup>

<sup>3</sup>Department of Communication Science, Faculty of Social and Political Sciences, Universitas Muhammadiyah Cirebon, Cirebon, Indonesia. Email: [rizki.budhi@umc.ac.id](mailto:rizki.budhi@umc.ac.id)<sup>3</sup>

<sup>4</sup>Department of Nutrition, Faculty of Health, Universitas Muhammadiyah Cirebon, Cirebon, Indonesia. Email: [ari\\_yulistianingsih@umc.ac.id](mailto:ari_yulistianingsih@umc.ac.id)<sup>4</sup>

<sup>5</sup>Department of Hospitality, Faculty of Management, Universitas Telkom, Bandung, Indonesia. Email: [dadukmansur@telkomuniversity.ac.id](mailto:dadukmansur@telkomuniversity.ac.id)<sup>5</sup>

## ARTICLE HISTORY

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## ABSTRACT

This community service program aimed to develop innovative packaging for seafood products as an effort to increase the added value, shelf life, and marketing potential of Ambulu Village's flagship products in Losari District, Cirebon Regency. The program partners were Family Welfare Empowerment (PKK) cadres who manage Kafe Jukung, a culinary business unit that offers various seafood dishes and still depends on the availability of fresh ingredients from local fishers' catches. The activity was conducted over six months, from June to November 2025, through several stages: preliminary observation, product development by an interdisciplinary team, packaging design, product shelf-life testing, nutritional content analysis, training in packaging techniques, and sustainability evaluation. The results show that three main dishes—blekutak masak hitam, sweet-and-sour shrimp, and smoked sembilang fish mangut—were successfully developed into ready-to-eat products with innovative packaging that is informative, hygienic, and visually attractive. Shelf-life testing showed that the products remained suitable for consumption after sterilization, storage, and reheating. Nutritional analysis showed that all three products met the criteria for low-fat claims. Training and mentoring improved the PKK cadres' skills in standardized packaging processes, enabling them to perform the procedures independently.

**Keywords:** Community Service, Seafood Cuisine, Packaging Innovation, Ambulu PKK.

## I. Introduction

Coastal areas have extensive fishery-resource potential. In general, however, communities living in coastal regions still face living conditions that are not fully prosperous. The low income levels of fishers and fish farmers are not commensurate with the current potential of fisheries and with the competitive nature of



fishing compared with other business activities (Abdullah et al., 2022). A similar condition is found among coastal women's groups in Ambulu Village, Losari District, Cirebon Regency. Based on field observations, the economic activities of PKK cadres in this village focus on processing fishers' catches and pond-cultivation products into seafood dishes served buffet-style or by pre-order. Ambulu Village is one of the coastal villages in Cirebon Regency. Approximately 59% of its area consists of fishponds or aquaculture ponds, so a large portion of the community depends on fishing and pond farming for their livelihoods (Pratama, 2024). A comparable phenomenon was also found in a study of fish-processing businesses managed by women in Depok, Bantul Regency. Although Indonesia has extensive coastal potential, the economic condition of communities in these regions remains relatively underdeveloped. Women fish-processing entrepreneurs also face several constraints, including limited access to technology, markets, and capital (Sari et al., 2024).

The main problems faced by coastal women's groups in Cirebon Regency are not limited to production aspects, but also involve serving systems and product packaging that do not yet support food durability or wider distribution. This situation limits business development. One of the key challenges faced by micro, small, and medium enterprises (MSMEs) is the limited use of digital technology and the low quality of product packaging; as a result, marketing remains limited and reaches only local consumers. This can hinder MSMEs' potential to grow and expand their markets (Sabriyanti et al., 2025). In addition, research on coastal women's empowerment shows that, without technical training and mentoring, women's groups tend to function only as production implementers without significant improvement in economic capacity (Misrina et al., 2022).

Various studies show that coastal-community empowerment, particularly among women's groups, can be carried out through the diversification of seafood products, the improvement of processing skills, and packaging innovations that increase selling value. Packaging innovation is a priority issue that can be developed by optimizing local potential through community empowerment, increasing awareness of packaging through surveys of packaging-importance levels, developing appropriate technology, and expanding marketing networks to improve product competitiveness (Badri et al., 2022). Other research using interactive training approaches shows that innovation-based fishery-product processing not only increases community knowledge and skills, but also creates opportunities for income diversification (Guspiandra et al., 2024). In addition, the number of partners with product names or brands and labels increased from 30% to 100%, and 90% of partners had repackaged their products (Yuliana et al., 2022). However, most previous community-service practices have focused on product processing or digital marketing, while interventions emphasizing packaging innovation based on local identity as a strategy to strengthen the economy of coastal women's groups remain limited.

Based on these conditions, this community service program aimed to develop packaging innovations for seafood products in order to improve product durability, economic added value, and the local identity of Ambulu Village. In addition to producing packaging designs that are informative and representative, the program also aimed to increase the knowledge and skills of Ambulu Village PKK cadres in food-service management, packaging techniques, preservation processes, and product sterilization. The main output of the program was a ready-to-eat seafood-product packaging prototype that highlights Cirebon's local identity, nutritional-value information, and the profile of the PKK group as part of a community-branding strategy. This is consistent with other research showing that local-product development through product innovation and digital marketing not only increases the economic value of products, but also promotes local entrepreneurship (Ompusunggu et al., 2025).

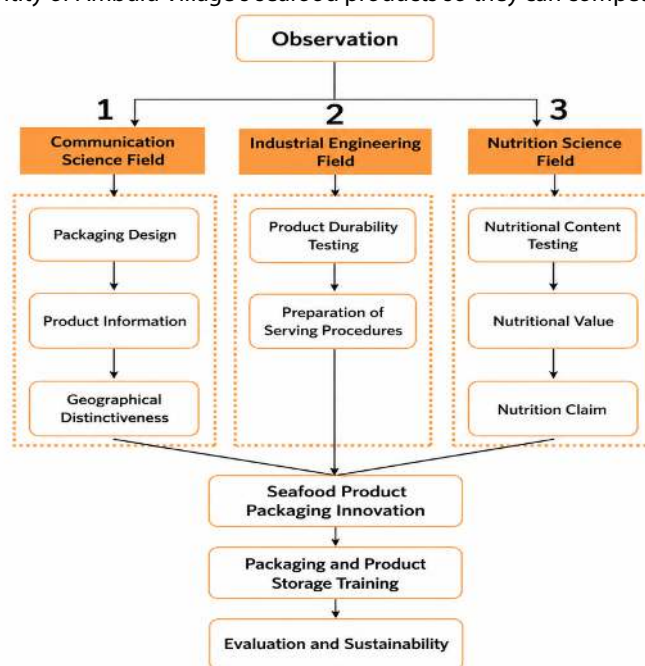
## II. Research Method

This community service activity used a product-development design with a focus on creating packaging innovations for seafood products produced by the partner group. The partners were women affiliated with the PKK cadres of Ambulu Village, Losari District, Cirebon Regency, who have been active in processing and marketing seafood products as one of the village's leading potentials. The entire series of activities was carried out at Galeri Ambulu, which functions as a marketing center for the village's flagship

products, a meeting place for cadres, and the location of Kafe Jukung, which serves various local specialty dishes. The community service program lasted six months, from June to November 2025. The implementation stages began with observation as an initial step to obtain a comprehensive overview of the partners' conditions. The observation was conducted by the lecturer team to identify the types of products produced, the initial forms of packaging used, and the marketing strategies already in place. The results of the observation were used as the basis for designing packaging innovations that matched the product characteristics and partner needs.

The product-development process was then carried out in parallel by an interdisciplinary team. The communication science team was responsible for designing the new outer packaging, focusing on the visual appearance of the front and back of the package, including the product name, product imagery, product advantages, and other relevant supporting information to strengthen the identity of the seafood products. At the same time, the industrial engineering team conducted a series of product-durability tests to ensure that the designed packaging could maintain product quality during storage and reheating. Testing was conducted by packaging the products using the new packaging design, storing them for a certain period, and reheating them to assess changes in structure and product durability. Meanwhile, the nutrition team analyzed the products' nutritional content to determine nutritional values per serving and possible nutrition claims to include on the packaging label. These three parallel processes produced seafood-product packaging innovations with aesthetic value, durability, and complete nutritional information.

After the packaging design was completed and tested, the activity continued with mentoring through training on packaging and storage techniques for the partners. This mentoring aimed to ensure that the partners were able to apply proper, hygienic, and standardized packaging techniques, including how to use the packaging equipment and storage techniques that support extended product shelf life. The final stage of the activity consisted of evaluation and the formulation of program sustainability. Evaluation was conducted to measure the effectiveness of the activity through observation of the packaged products, the partners' ability to apply packaging techniques, and feedback on the program benefits. In addition, the team prepared a sustainability plan through marketing assistance, provision of print-ready designs, and strengthening the identity of Ambulu Village's seafood products so they can compete in a wider market.



**Figure 1. Flow of the activity implementation method**

### III. Results and Discussion

The implementation of the community service program, which focused on packaging innovation for seafood products in Ambulu Village, produced several important findings that became the basis for product development. The process included preliminary observation, product development by an interdisciplinary team, packaging-innovation design, training and mentoring for PKK cadres, and an initial evaluation of program sustainability. Each stage demonstrated an increase in partner capacity while producing product innovations that are ready to be further developed as part of Ambulu's distinctive culinary identity.

#### 3.1. Observation

The preliminary observation showed that one of the main business units managed by the PKK group is Kafe Jukung, located in Galeri Ambulu. The cafe serves a variety of coastal seafood dishes, such as sweet-and-sour shrimp, grilled milkfish, smoked sembilang fish, blekutak, and grilled squid. Food is served buffet-style or in bancakan packages at a very affordable price, approximately IDR 20,000 per portion. However, this culinary production activity remains highly dependent on the availability of fresh ingredients from fishers' catches or local aquaculture harvests. During the lean fishing season, the availability of key ingredients such as milkfish, shrimp, or blekutak becomes limited, making it difficult to serve a consistent menu variety. The PKK cadres choose not to use frozen raw materials from modern markets because of concerns about declining quality and the potential presence of harmful preservatives. This cautious attitude reflects a commitment to food safety, but it also results in operational limitations, restricted menu availability, and dependence on a reservation system. Food menus can only be served based on prior orders and are not always available every day. This condition highlights the need for innovation in the form of ready-to-eat food that can be enjoyed anytime and anywhere, does not depend on the season, and has potential as a distinctive Ambulu souvenir product. Based on this analysis, three flagship products were selected for development: blekutak masak hitam, sweet-and-sour shrimp, and smoked sembilang fish mangut.

#### 3.2. Focus Group Discussion (FGD)

A focus group discussion (FGD) was carried out as an initial stage and served as a participatory dialogue forum with the community to identify the partners' problems, needs, and potential. The FGD involved an interdisciplinary lecturer team and Ambulu Village PKK cadres who manage the Kafe Jukung seafood business. The discussion was conducted openly and interactively, with participants sitting in a circle to create an equal atmosphere and encourage the active participation of all members.



**Figure 2. FGD with the community and policy stakeholders**

The FGD discussed various aspects of culinary-business management, including dependence on seasonal raw materials, limited product innovation, and constraints in packaging and marketing. The discussion results showed that the partners have good product-processing skills, but still need assistance in developing ready-to-eat products, standardizing packaging, and strengthening product visual identity. The findings from the FGD became the basis for formulating the packaging-innovation design, selecting the flagship products to be developed, and preparing training and mentoring stages that matched the partners' needs.

### 3.3. Product Development

The product-development stage was carried out in parallel by an interdisciplinary lecturer team involving the fields of communication, industrial engineering, and nutrition.

#### a. Packaging Design

The communication science team focused on designing the outer packaging, including the front and back panels. The packaging innovation consisted of three package types for the three flagship products: blekutak masak hitam, sweet-and-sour shrimp, and smoked sembilang fish mangut.



**Figure 3. Frozen-food packaging design**

The packaging design used two dominant base colors: black and red. Black was selected to convey an elegant, modern, and premium impression, while red was used to emphasize the identity of flavorful and richly spiced coastal cuisine. The color combination, strong food visuals, and complete product information make the packaging more competitive and ready to compete as a souvenir food product.



**Figure 4. Product-development process from the communication science perspective**

#### b. Packaging and Product-Durability Trials

The industrial engineering team then conducted product-durability testing. This activity was carried out in the Industrial Engineering Laboratory of the Faculty of Engineering, Universitas Muhammadiyah Cirebon. Each product was weighed according to the specified portion, followed by a sterilization process through boiling in water at 100°C for 10 seconds. The products were then stored in a freezer for two weeks as a simulation of storage durability. After the storage period, the products were heated in a microwave for five to ten minutes to test changes in structure, texture, and taste quality. This testing ensured that the products remained suitable for consumption after storage and reheating.



**Figure 5. Product testing and packaging trial**

#### c. Measurement of Product Nutritional Value

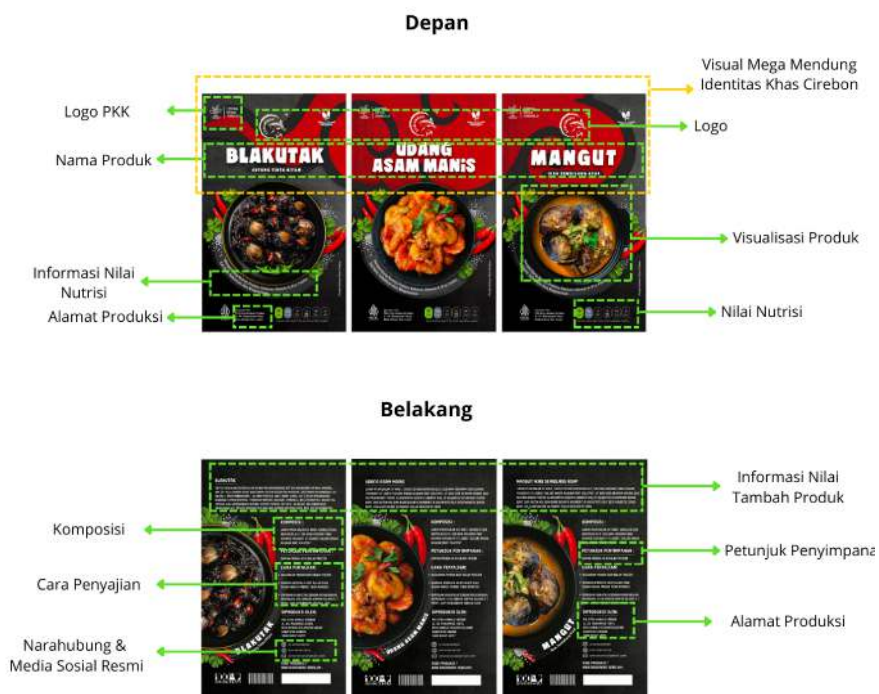
The nutrition team analyzed the nutritional content in the Nutrition Laboratory of the Faculty of Health, Universitas Muhammadiyah Cirebon. The analysis included energy content, macronutrients, and other nutritional characteristics needed for food labeling. The results showed that all three seafood products met the criteria for low-fat claims, which can be stated on the packaging as added value to attract consumers who consider health aspects in their purchasing decisions.

**Figure 6. Product nutritional-value information**

Package	Serving Information	Nutritional Value and Claim
Blekutak, small package	Serving size: 50 g; 2 servings per package	Calories: 21 kcal; total fat: 1.6 g; protein: 0.4 g; total carbohydrate: 1.5 g; sugar: 0.25 g; salt (sodium): 115 mg. Nutrition claim: low fat.
Blekutak, medium package	Serving size: 50 g; 3 servings per package	Calories: 24 kcal; total fat: 1.7 g; protein: 0.4 g; total carbohydrate: 1.6 g; sugar: 0.25 g; salt (sodium): 128 mg. Nutrition claim: low fat.

### 3.4. Packaging Innovation

The packaging innovation produced three types of packaging for three flagship products: blekutak masak hitam, sweet-and-sour shrimp, and smoked sembilang fish mangut. The outer packaging design covered both the front and back panels.



**Figure 7. Front and back packaging-design information**

The front display of the packaging was designed to highlight product identity and visual appeal. The top section features the Mega Mendung motif as a distinctive Cirebon identity, combined with the PKK logo, product logo, and product name to reinforce the brand and product origin. The center section presents food visualization using original photographs taken directly by the team in order to represent quality, texture, presentation, and authentic visual appeal. It is also complemented by nutritional-value information as an added nutritional benefit. The lower section of the front packaging provides the production address and confirms nutritional information as a form of transparency and nutrition education for consumers, while also clarifying the product's origin.

The back display of the packaging functions as a more complete product-information medium. The top section presents product added-value information that emphasizes the advantages of fresh ingredients and hygienic processing. The middle section contains the ingredient composition, storage instructions, and serving directions to maintain quality and flavor. The lower section of the back packaging includes the production address, contact information, and official social media accounts as tools for communication, promotion, and sustainable product marketing.

### 3.5. Training and Mentoring

The next stage consisted of training and mentoring for PKK cadres on product-packaging techniques. Training began with weighing the products according to standard portion weights before placing them into vacuum plastic packaging. The packaging process was carried out using a sealer, with attention to hygiene aspects, including the use of gloves and sterilization procedures. After the products were tightly sealed, additional sterilization was carried out by immersion in hot water, followed by storage in a freezer. Mentoring was conducted intensively until the PKK cadres were able to perform all packaging stages—from weighing and sealing to sterilization and storage—independently and according to the established standards.



**Figure 8. Documentation of the mentoring process**

### 3.6. Evaluation and Sustainability

The initial evaluation showed that the activity improved the skills of Ambulu PKK cadres in processing and packaging seafood products. Nevertheless, program sustainability still requires further innovation, especially in relation to more comprehensive shelf-life measurement or expiration testing, determining competitive selling prices, and developing marketing strategies capable of expanding market reach. In the future, the packaging and product innovations have strong potential to become a distinctive culinary identity of Ambulu that can be marketed as souvenir foods or ready-to-eat meals with a wider distribution range.

## IV. Conclusion

As an academic writer, crafting a strong and impactful conclusion is a crucial element in the overall structure and effectiveness of a research paper. The conclusion serves as the final opportunity to reiterate the significance of the study, summarize the key findings, and emphasize the larger implications or significance of the research. (Ami et al., 2020). As an academic writer, crafting a strong and impactful conclusion is a crucial element in the overall structure and effectiveness of a research paper. The conclusion serves as the final opportunity to reiterate the significance of the study, summarize the key findings, and emphasize the larger implications or significance of the research. (Ami et al., 2020). As an academic writer, crafting a strong and impactful conclusion is a crucial element in the overall structure and effectiveness of a research paper. The conclusion serves as the final opportunity to reiterate the significance of the study, summarize the key findings, and emphasize the larger implications or significance of the research. (Ami et al., 2020).

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