
Coastal Community Empowerment Through the Development of Crab Substitute Ekado in Pangkep Regency South Sulawesi

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Abstract

This community service activity aimed to empower coastal women in Pangkep Regency, South Sulawesi, through the production of *ekado* with blue swimming crab (*Portunus pelagicus*) meat substitution as a value-added fishery product. The program was conducted using an extension approach combined with direct demonstration, covering raw material selection, processing techniques based on the cold chain system, packaging, and simple cost analysis. The activity involved fishermen's wives and young women in Talaka Village, Marang District. Evaluation results showed that participants demonstrated a high level of technical competence, with 92% categorized as highly appropriate in applying the processing procedures. Participants also reported strong satisfaction with the training method and expressed interest in continued assistance. This program effectively enhanced participants' skills, increased awareness of nutritional improvement, and provided potential opportunities to generate additional household income through the commercialization of processed crab-based products.

Keywords: Blue Swimming Crab, Coastal Community Empowerment, *Ekado*, Value-Added Fishery Products, Women Participation.

Introduction

The Indonesian government has recently introduced the *Free Nutritious Meal Program (Program Makan Bergizi Gratis)*, which aims to improve community nutrition status, particularly among children and vulnerable groups, while simultaneously supporting local food-based economic development. The success of this program requires the availability of nutritious, safe, and affordable food products derived from local resources, especially those with high protein content from the fisheries sector.

Pangkep Regency, South Sulawesi, is one of the coastal areas with significant capture fisheries potential, including blue swimming crab (*Portunus pelagicus*). Despite this abundance, most crab catches are sold directly to collectors and exported as raw or minimally processed products, resulting in limited value addition at the household level. At the same time, fishermen's

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families, particularly women, have not been optimally involved in processing fishery products that could support household income and local food supply chains.

The Free Nutritious Meal Program creates opportunities for coastal communities to contribute to the provision of protein-rich foods through the development of diversified processed fishery products. Women in fishermen's households play a strategic role in food preparation and processing; therefore, strengthening their skills and knowledge is essential. This community service program focused on the production of *ekado* with blue swimming crab meat substitution as a value-added, nutritious, and potentially marketable food product that can support the implementation of the Free Nutritious Meal Program. The program aimed to enhance participants' technical skills, increase awareness of balanced nutrition, and create alternative income opportunities through the commercialization of locally based fishery products.

Materials and methods

Time and Location

This community service-based study was conducted on 2 October 2025 in Talaka Village, Marang District, Pangkep Regency, South Sulawesi, Indonesia. The activity was organized by the Fisheries Capture Study Program, Politeknik Pertanian Negeri Pangkep, and implemented through direct field practice while applying COVID-19 health protocols.

Community Service Design

The community service activities used a descriptive participatory design combined with a practical experimental approach. The activity aimed to evaluate the effectiveness of training on the production of *ekado* with blue swimming crab (*Portunus pelagicus*) meat substitution as a value-added fishery product. The research focused on skill acquisition, procedural compliance, and participant response following hands-on training and demonstration.

Participants

The participants were fishermen's wives and young women living in coastal areas of Talaka Village. Participant selection was conducted purposively through coordination with village officials and local fishermen groups. A total of 20 participants were involved and actively participated throughout all stages of

the activity, including material delivery, demonstration, and independent practice.

Materials and Equipment

The main raw materials used were blue swimming crab meat and fish meat as the primary protein sources. Supporting ingredients included wheat flour, tapioca flour, eggs, garlic, shallots, pepper, salt, sugar, and food-grade seasonings. Dumpling wrappers were used as the outer casing of the *ekado*. Ice was used to maintain the cold chain system during processing.

Equipment utilized during the activity included knives, cutting boards, mixing bowls, food processors, digital scales, steamers, plastic gloves, packaging materials, and freezers for frozen storage. All equipment was cleaned and sanitized before use to ensure hygiene and food safety.

Experimental Procedure

The activity was carried out in several stages. Initially, participants were provided with extension materials related to the nutritional value of fish and crab, hygienic processing principles, application of the cold chain system, packaging techniques, simple production cost calculation, and marketing strategies. This was followed by a direct demonstration of *ekado* production conducted by the instructors.

The production process included selection and preparation of raw materials, mincing of crab and fish meat, formulation of the dough using a standardized composition, wrapping the mixture with dumpling wrappers, and steaming. Emphasis was placed on maintaining low temperatures during handling to preserve product quality. After steaming, the products were cooled and packaged as frozen products to extend shelf life and enhance economic value.

After the demonstration, participants practiced the entire production process independently under instructor supervision. Each participant followed the same formulation and processing steps to ensure consistency across practices.

Treatments and Replication

The treatment applied in this study was training in the processing of *ekado* using blue swimming crab meat substitution. Replication was conducted across all participants, with each participant performing the complete production procedure. Five evaluation parameters were observed: (1) selection of raw materials, (2) selection of additional ingredients, (3) accuracy of ingredient

composition, (4) implementation of cold chain–based processing procedures, and (5) quality of the final product.

Data Collection

Data were collected through direct observation and structured evaluation sheets. Participant responses regarding ease of processing, effectiveness of the training method, and expectations for future activities were collected using questionnaires at the end of the activity.

Data Analysis

Data were analyzed using descriptive statistical methods. Observational results were expressed as percentages and classified into three categories: highly appropriate, moderately appropriate, and not appropriate. Questionnaire responses were also summarized in percentage form and presented in tables and figures to describe participant perceptions and satisfaction levels. Inferential statistical analysis was not applied, as the study aimed to describe outcomes of a community empowerment program rather than to test statistical hypotheses.

Results

Implementation of Community Service Activities

The community service program was successfully conducted on 2 October 2025 in Talaka Village, Marang District, Pangkep Regency, South Sulawesi. The activity was carried out through collaboration between the implementation team from the Fisheries Capture Study Program, Politeknik Pertanian Negeri Pangkep, and the local coastal community. The target participants were fishermen's wives and young women living in coastal areas.

The program was implemented using an extension-based approach combined with direct demonstrations. The activity began with the delivery of educational materials related to the nutritional benefits of fish and blue swimming crab (*Portunus pelagicus*), hygienic food processing, application of the cold chain system, packaging techniques, simple cost analysis, and marketing strategies. This was followed by hands-on demonstrations of *ekado* production with blue swimming crab meat substitution, in which participants actively observed and later practiced the process independently.

Participation and Engagement

Participant involvement during the activity was very high. All participants attended the entire session and actively participated in discussions and practical sessions. Participants showed enthusiasm, asked questions, and demonstrated a strong interest in learning new processing skills. The interactive extension method encouraged active learning and facilitated better understanding of the material delivered.

The participatory approach enabled participants to directly apply the knowledge and skills acquired during the activity. This method was effective in building participant confidence, particularly during the independent practice of *ekado* production.

Evaluation of Technical Skill

Evaluation of participants' technical skills was conducted through direct observation using structured evaluation criteria. Five aspects were assessed: (1) selection of raw materials, (2) selection of additional ingredients, (3) accuracy of ingredient composition, (4) implementation of processing procedures based on the cold chain system, and (5) quality of the final product.

The evaluation results showed that 92% of participants were categorized as "highly appropriate" in performing the *ekado* production process, while 8% were categorized as "moderately appropriate." No participants were categorized as "not appropriate." The highest level of conformity was observed in the implementation of cold chain-based processing procedures and the quality of the final product, where all participants achieved the "highly appropriate" category.

Product Outcomes

The *ekado* products produced during the activity met the expected quality standards in terms of shape, texture, and appearance. The substitution of blue swimming crab meat contributed to enhanced nutritional value and improved product taste. Participants successfully applied freezing techniques to produce frozen *ekado*, which has a longer shelf life and higher economic value compared to fresh products.

The uniformity of the final products indicated that participants were able to follow standardized processing steps effectively. This outcome demonstrates the feasibility of introducing value-added fishery products at the household level using locally available resources.

Perspectives and Expectations for Follow-up Activities

Participant feedback indicated that the majority of participants perceived the *ekado* production process as easy to perform, even though it was their first experience. Participants expressed high satisfaction with the extension methods used, particularly the combination of lectures and direct demonstrations.

All participants expressed interest in continued mentoring and follow-up activities, including the formation of small-scale production groups to support household income generation. This response indicates strong community acceptance and the potential sustainability of the community service program.

Community Empowerment Potential

The results of this community service activity demonstrate its potential to support household income improvement and nutritional enhancement among coastal communities. By empowering women through skill development in processing value-added fishery products, the program contributes to strengthening household resilience and supports broader initiatives such as the Free Nutritious Meal Program through the provision of nutritious, locally based food products.

Discussion

The results of the activity show that training in *ekado* processing with blue swimming crab meat substitution can be understood and applied well by coastal communities, even though most participants did not have any previous experience. The high level of compliance in the implementation of the production stages reflects the effectiveness of the extension method, which integrates material delivery with hands-on practice (Zen Munawar et al., 2023). The participatory learning approach is known to be able to improve technical understanding while building participants' confidence in adopting new applied skills (Nurhaida et al., 2023; Syamsuddin et al., 2022).

The consistent application of cold chain processing principles by all participants demonstrates an increased awareness of food quality and safety aspects. Temperature control during the handling of raw materials up to the post-processing stage plays an important role in maintaining product quality and preventing nutritional loss (Vinnikova et al., 2019). Hygienic and standardized processing practices are key factors in producing safe processed food products that are suitable for development at the household and small business levels (Jongwanich, 2009).

In terms of product, the uniformity of *ekado* quality reflects the participants' ability to follow the established formulation and procedures. Substituting crab meat not only increases the protein content but also improves the sensory characteristics of the product, making it more appealing. In addition, the application of freezing techniques provides added value through extended shelf life and increased distribution flexibility, which ultimately opens up new economic opportunities for fishing households based on local resources (Tsironi et al., 2015).

The positive response of participants to the ease of the production process and their interest in further assistance indicate the program's potential for sustainability. The involvement of women in the processing of value-added fishery products plays a strategic role in strengthening the economic and nutritional security of families. In a broader context, the development of processed foods based on local fishery products has the potential to support the provision of nutritious food while promoting the strengthening of coastal communities' food systems in a sustainable manner (Erlyn et al., 2023).

Conclusions

The community service program on the production of *ekado* with blue swimming crab (*Portunus pelagicus*) meat substitution was successfully implemented in Talaka Village, Marang District, Pangkep Regency. The activity achieved full participant attendance and active involvement throughout all stages of implementation. Descriptive evaluation results showed that 92% of participants demonstrated a highly appropriate level of procedural compliance, while the remaining 8% were categorized as moderately appropriate. All participants successfully applied cold chain-based processing procedures and produced frozen *ekado* products that met the predetermined quality criteria.

The program effectively enhanced participants' technical skills in processing value-added fishery products and increased their capacity to utilize locally available blue swimming crab resources. In addition, participant responses indicated a high level of satisfaction with the extension methods used and strong interest in continued mentoring. Overall, the activity demonstrates the feasibility of empowering coastal women through skill-based community service programs to support household food security, nutritional improvement, and potential income generation.

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