

Empowerment of PKK mothers through seaweed-based culinary diversification training in the Coastal Area of Salemo Island

Alimuddin Sa'ban Miru^{1*}, Faizal Amir¹, Darmawang¹, Siti Hadijah¹, Bakhrani A. Rauf¹

^a Universitas Negeri Makassar, South Sulawesi, Indonesia

^b Universitas Muslim Indonesia, South Sulawesi, Indonesia

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ABSTRACT

This community service activity aimed to increase the added value and economic independence of coastal communities through training in diversifying seaweed-based culinary products. The program was implemented on Salemo Island, Mattiro Bambang Village, Pangkajene and Islands Regency, involving the Independent PKK Mothers Group and the Reski Bersama Seaweed Fishermen Group as partner communities. A participatory approach was applied to ensure active involvement of participants throughout the program, including socialization, technical training in culinary processing, production assistance, and evaluation of outcomes. The training focused on developing innovative seaweed-based food products, such as seaweed meatballs, seaweed nuggets, seaweed barongko, and doi-doi chips made from a seaweed mixture. The results demonstrated a significant improvement in participants' skills, with approximately 85% of participants able to independently produce processed seaweed products after the training. Product diversification successfully increased the economic value of seaweed, transforming it from a raw material into value-added culinary products with an average selling price of IDR 15,000 per package. In addition to economic benefits, the activity strengthened women's participation in the productive economy and facilitated the formation of community-level group-based culinary businesses. The findings indicate that seaweed-based culinary diversification training is an effective strategy for enhancing creativity, increasing household income, and promoting economic independence among coastal communities. Furthermore, this program presents strong potential for replication in other archipelagic and coastal regions with similar socio-economic and resource characteristics.

Keywords: Community empowerment; Culinary diversification; Economic independence; Seaweed.



*Corresponding Author:

Alimuddin Sa'ban Miru, Universitas Negeri Makassar, South Sulawesi, Indonesia

Email: alimuddin.smiru@unm.ac.id



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INTRODUCTION

Indonesia is recognized as one of the world's largest producers of seaweed, contributing substantially to the global supply chain and playing a strategic role in the international marine commodities market (Busthanul et al., 2024). Beyond its role as a raw material for industrial exports, seaweed has considerable potential to be developed into high-value functional food products. Its rich content of dietary fiber, essential minerals, vitamins, and diverse bioactive compounds positions seaweed as a promising ingredient for the development of nutritious, health-oriented, and sustainable food products (Cordeiro & van Hal, 2022). In the context of growing global demand for functional foods and healthier dietary options, seaweed-based products offer a unique opportunity to combine local resources with innovation-driven value creation (Daga et al., 2023).

Pulau Salemo, located in Mattiro Bombang Village, Liukang Tupabbiring Utara District, Pangkajene and Islands Regency, represents a coastal community with abundant marine resources, particularly seaweed. The majority of the population relies on livelihoods as fishermen and seaweed cultivators, making seaweed production a central component of the local economy (Deogade et al., 2022). Despite relatively high production levels, seaweed utilization on the island remains limited primarily to the sale of raw, unprocessed materials. This practice results in low market prices and minimal economic returns, thereby constraining seaweed's potential to significantly improve household income and community welfare. The absence of local processing and product diversification has led to the underutilization of seaweed's economic value (Department, 2024).

One of the key challenges faced by community partners is the limited knowledge and technical skills required to process seaweed into diversified, value-added food products. This challenge is particularly evident among coastal women's groups, such as members of the Family Welfare Movement (PKK), who traditionally play an important role in household food preparation but have limited exposure to food processing technologies and entrepreneurial practices. In fact, women's involvement in productive economic activities, especially those based on local food processing, is widely acknowledged as a strategic factor in strengthening household economies, improving family nutrition, and enhancing local food security. Empowering women with practical skills and knowledge can therefore create a multiplier effect that benefits not only individual households but also the broader community (FAO, 2022).

In response to these challenges, the Village Fostered Empowerment Program was designed as a targeted intervention to enhance community capacity through skills-based training. The program focuses on culinary diversification using seaweed as the primary raw material, introducing participants to the production of innovative food products, including seaweed-based meatballs, nuggets, traditional barongko, and doi-doi crackers (Kimanga et al., 2025). These products were selected not only for their nutritional potential but also for their cultural relevance, market appeal, and feasibility for small-scale home industries. Through hands-on training sessions, participants are introduced to proper processing techniques, hygiene and food safety standards, simple packaging methods, and basic principles of product innovation.

The overarching objective of this program is to improve the skills and creativity of coastal communities in processing local resources, thereby increasing the added value of seaweed and diversifying household income sources. By transforming seaweed from a low-value raw commodity into attractive, nutritious food products, the program seeks to enhance the economic resilience of coastal households. Furthermore, the initiative promotes local food-based entrepreneurship, encourages sustainable use of marine resources, and supports the development of a community-based economy rooted in local potential. In the long term, such empowerment efforts are expected to strengthen social

capital, reduce economic vulnerability, and contribute to sustainable development in Pulau Salemo and similar coastal regions across Indonesia.

METHOD of IMPLEMENTATION

The implementation of the Village Fostered Empowerment Program was conducted using a participatory, collaborative approach, ensuring the active involvement of community partners throughout the entire process. The method was structured into five sequential stages, as outlined below, to achieve sustainable capacity building and effective knowledge transfer among beneficiaries.

Program Preparation and Needs Assessment

The initial stage focused on preparatory activities, including coordination with village authorities, community leaders, and partner groups. A needs assessment was conducted through informal interviews and field observations to identify existing conditions, challenges, and local potential related to seaweed utilization. This stage aimed to map community needs, determine appropriate training materials, and ensure that the program design was aligned with local socio-economic contexts and available resources.

Program Socialization

Socialization activities were carried out to introduce the objectives, scope, benefits, and implementation plan of the program to the target groups, namely the seaweed farmer group and the women's PKK group. This stage served to build mutual understanding, strengthen community commitment, and encourage active participation. Open discussions were facilitated to gather feedback and expectations from participants, thereby fostering a sense of ownership and shared responsibility for the program's success.

Technical Training on Seaweed-Based Culinary Processing

The third stage involved hands-on technical training focused on diversifying seaweed-based culinary products. Participants were trained directly in the preparation and processing of seaweed into value-added food products, including seaweed meatballs, nuggets, barongko, and doi-doi crackers. Training materials covered raw material preparation, processing techniques, hygiene and sanitation practices, and simple packaging methods. This practical approach enabled participants to acquire applicable skills and enhance their confidence in producing food products independently.

Production Assistance and Mentoring

Following the training sessions, continuous assistance and mentoring were provided during the initial production phase. The implementation team accompanied participants to ensure proper application of processing techniques, consistency in product quality, and adherence to food safety standards. This stage was critical in reinforcing skills, addressing technical difficulties, and encouraging participants to refine their products through practice and innovation. Mentoring also supported the development of group-based production activities as a foundation for small-scale entrepreneurship.

Monitoring and Evaluation

The final stage consisted of monitoring and evaluation to assess the program's effectiveness. Evaluation methods included direct observation of participant performance, group discussions, and assessment of product quality and production outcomes. Feedback from participants was collected to identify strengths, challenges, and areas for improvement. The results of this stage were used to assess skill improvement, participant engagement, and potential economic impact, and to formulate recommendations for program sustainability and possible replication in other coastal communities.

RESULT

The implementation of the seaweed-based culinary diversification training program in Pulau Salemo produced tangible outcomes in including product development, capacity building, and economic improvements among community partners. The results demonstrate that participatory training combined

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with hands-on practice effectively enhanced both technical skills and economic engagement, particularly among women in coastal households.

Development of Seaweed-Based Culinary Products

As a direct result of the training activities, four main seaweed-based culinary products were successfully developed, namely seaweed meatballs, seaweed nuggets, seaweed barongko (a traditional dessert), and seaweed-based doi-doi crackers. These products were selected based on their cultural acceptability, nutritional potential, ease of production, and market feasibility. Participants were able to integrate seaweed into familiar food products without compromising taste or texture, thereby increasing consumer acceptance. The diversification process demonstrated that seaweed can be utilized not only as an industrial raw material but also as a functional food ingredient suitable for daily consumption.

Improvement of Participants' Skills and Participation

Evaluation results indicated a significant improvement in participants' technical skills following the training program. Approximately 85% of participants were able to independently produce seaweed-based food products after completing the training sessions. Participants demonstrated improved understanding of raw material preparation, processing techniques, hygiene standards, and simple packaging methods. Moreover, several participants began experimenting with variations in flavor and product form, indicating increased creativity and confidence in food processing. The active involvement of PKK women's groups highlights the strengthening of women's roles in productive economic activities at the household level.

Economic Impact and Added Value

The diversification of seaweed into processed culinary products resulted in a notable increase in product value. While raw seaweed is typically sold at relatively low prices, the processed products were marketed at an average price of IDR 15,000 per package. This value addition contributed to an estimated increase in household income of approximately 25–30% per harvest season among participating households that allocated part of their seaweed production for processing. Furthermore, the activity facilitated the formation of a small group-based culinary business unit, indicating the initial development of a sustainable community-based enterprise. Overall, these results confirm that seaweed-based culinary diversification training is efficacious in improving community skills, increasing product value, and enhancing economic resilience in coastal areas. The outcomes suggest strong potential for replication in other island and coastal communities with similar resource characteristics and socio-economic conditions.

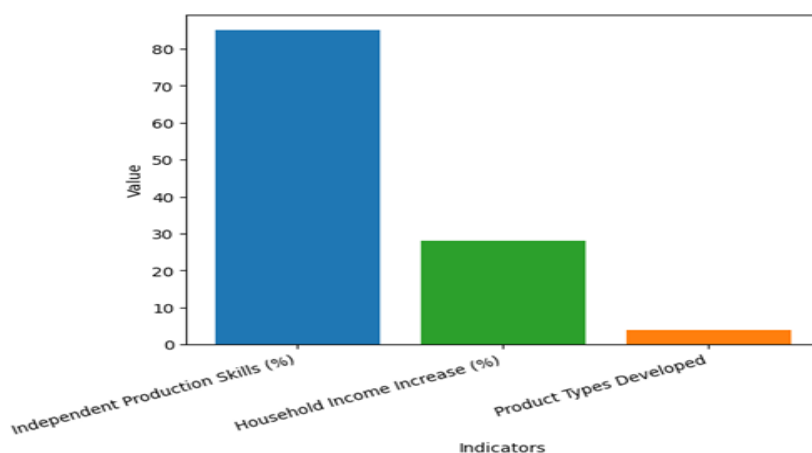


Figure 1. Bar chart illustrating the main outcomes of the seaweed-based culinary diversification program, including improvements in participants' production skills, increased household income, and the number of developed products.

The bar chart illustrates the key outcomes of the seaweed-based culinary diversification program implemented in Pulau Salemo. The first indicator shows that 85% of participants achieved independent production skills, indicating that the training was highly effective in transferring practical knowledge and technical competencies. This high percentage reflects the success of the hands-on, participatory approach, which enabled participants, particularly members of the PKK women's group, to apply processing techniques without continuous external assistance confidently.

The second indicator demonstrates an average household income increase of approximately 28%. This finding confirms that processing seaweed into value-added culinary products significantly improves its economic value compared to selling raw seaweed. The income growth suggests that even small-scale home-based processing can contribute meaningfully to household economic resilience. It supports the role of culinary diversification as a viable livelihood strategy in coastal communities. The third indicator shows the development of four distinct seaweed-based food products, reflecting the program's success in promoting product diversification and innovation. The variety of products, ranging from ready-to-eat foods to snack items, enhances market flexibility and reduces economic risk by preventing dependence on a single product. This diversification also increases the potential for broader market acceptance and long-term business sustainability. Overall, the graphical results indicate that the program effectively improved technical capacity, increased economic returns, and stimulated local food innovation. These outcomes demonstrate that seaweed-based culinary diversification is a practical and scalable approach to strengthening community-based economies and empowering coastal women by sustainably utilizing local marine resources.

DISCUSSION

The results of the seaweed-based culinary diversification program in Pulau Salemo demonstrate that community empowerment initiatives grounded in local resource utilization can generate meaningful social and economic impacts. The discussion of these findings highlights the effectiveness of participatory training approaches, the strategic role of women in coastal economic development, and the importance of value addition in improving household income and local resilience.

One of the most significant outcomes of the program was the high proportion (85%) of participants who were able to produce seaweed-based food products independently after the training. This finding indicates that the hands-on, practice-oriented training method was successful in transferring technical skills to community members. Practical demonstrations, direct involvement in food processing, and continuous mentoring enabled participants to overcome initial limitations in knowledge and confidence. Similar studies have emphasized that participatory and experiential learning approaches are more effective than purely theoretical methods in community-based food processing programs, particularly in rural and coastal settings where formal education levels may vary (Knorr & Augustin, 2025).

The strong engagement of PKK women's groups further underscores the importance of women's empowerment in local economic development (Lafeuille et al., 2024). Women traditionally play a central role in household food preparation, making them well-positioned to adopt food-processing innovations. By equipping women with technical skills and basic entrepreneurial knowledge, the program contributed not only to income generation but also to enhanced household decision-making capacity. Increased women's participation in productive activities has been widely associated with improved family welfare, better nutrition outcomes, and stronger community cohesion. In this context, the program aligns with broader development goals related to gender equality and inclusive economic growth (Moritz, 2020).

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The observed increase in household income, estimated at approximately 25–30%, highlights the economic significance of value addition through food processing. Selling raw seaweed typically yields low, volatile prices, leaving producers vulnerable to market fluctuations and seasonal demand. By contrast, processed seaweed products such as meatballs, nuggets, barongko, and doi-doi crackers command higher and more stable prices. The average selling price of IDR 15,000 per package reflects a substantial increase in seaweed's economic value and demonstrates the feasibility of small-scale processing as a supplementary livelihood strategy. This finding supports previous research indicating that downstream processing and product diversification are critical components of sustainable coastal economic development (Nakhate & van der Meer, 2024).

Product diversification also plays an important role in reducing economic risk. The development of four distinct seaweed-based products provides flexibility in responding to consumer preferences and market demand (Pangestuti & Kim, 2021). Ready-to-eat products such as nuggets and meatballs cater to daily consumption needs, while snack products like doi-doi crackers offer longer shelf life and broader market reach (Webb et al., 2023). Meanwhile, the adaptation of traditional foods such as barongko using seaweed illustrates how local culinary heritage can be preserved while introducing nutritional and economic innovation. This integration of tradition and innovation enhances community acceptance and increases the likelihood of sustained adoption (Roullier-Gall et al., 2020).

From a nutritional perspective, incorporating seaweed into commonly consumed foods can improve dietary quality. Seaweed is rich in dietary fiber, minerals, and bioactive compounds, making it a suitable ingredient for functional food development (Rusli et al., 2020). Although the program did not conduct laboratory-based nutritional analysis, participants and consumers reported positive acceptance in terms of taste and texture. This suggests that seaweed-based foods can be integrated into daily diets without compromising sensory qualities, which is a critical factor for long-term consumption and market success (Safitri et al., 2021).

The formation of a small group-based culinary business unit further indicates the program's potential for sustainability. Collective production and marketing enable participants to share resources, reduce individual risk, and strengthen bargaining power (Sobuj et al., 2025). Group-based enterprises are particularly relevant in coastal communities, where social ties are intense and collective action is culturally embedded. However, sustaining these enterprises will require continued support in areas such as product standardization, packaging improvement, branding, and access to broader markets (Tahiluddin et al., 2025). Despite its positive outcomes, the program also faces limitations (Suci Dewi et al., 2025). The scale of production remains relatively small, and market reach is currently limited to local and nearby areas. Future initiatives should focus on strengthening post-training support, including business management training, digital marketing, and linkage with cooperatives or local government programs (Swanepoel et al., 2020).

Additionally, further research on consumer acceptance, shelf-life analysis, and nutritional profiling would enhance the scientific and commercial credibility of the products. Overall, the findings confirm that seaweed-based culinary diversification is an effective strategy for empowering coastal communities, increasing household income, and promoting sustainable use of marine resources. The approach demonstrated in Pulau Salemo offers a replicable model for other coastal and island communities facing similar challenges, including low commodity prices and limited value addition. With appropriate institutional support and market integration, such initiatives have the potential to contribute significantly to local economic development and food security.

CONCLUSION

The seaweed-based culinary diversification program implemented in Pulau Salemo successfully enhanced community skills, particularly among PKK women's groups, and increased the economic value of locally produced seaweed. The training enabled participants to independently produce diverse seaweed-based food products, resulting in improved household incomes and the emergence of small-scale, group-based culinary enterprises. These findings indicate that participatory, skills-oriented empowerment programs are effective in strengthening economic resilience and promoting sustainable utilization of coastal resources.

It is recommended that future programs provide ongoing post-training support focused on business management, product standardization, and market expansion. Local government and related institutions should support the development of seaweed-based microenterprises through access to capital, certification, and marketing networks. Additionally, the program model should be replicated in other coastal and island communities to maximize the socio-economic potential of seaweed as a locally available resource.

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