

## Tofu Product Diversification through Community Empowerment: Enhancing MSME Economic Value in Labuhan Ratu I Village, East Lampung

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### ABSTRACT

This community-based empowerment program was conducted in Labuhan Ratu I Village, East Lampung, to enhance the economic value of tofu products through diversification for micro, small, and medium enterprises (MSME). The main problem identified was the limited product innovation of Barokah Tofu MSME and the underutilization of tofu waste, which posed environmental concerns. This study aimed to evaluate the effectiveness of participatory training on diversifying tofu products in improving community capacity and economic opportunities. The program used a participatory action approach involving 28 participants, comprising MSME actors and PKK (Pemberdayaan dan Kesejahteraan Keluarga) women. The activities included socialization, hands-on production training, and mentoring in packaging and simple digital marketing. Program effectiveness was measured using pre-test and post-test evaluations. The results showed a significant increase in participants' knowledge, from 16% prior understanding to 100% post-training comprehension. The diversified product demonstrated improved shelf life and higher market potential compared to fresh tofu. Economically, the program increased value-added opportunities while socially strengthening women's entrepreneurial roles. Environmentally, tofu waste utilization supports sustainable production practices. These findings indicate that participatory food diversification training can serve as an effective community empowerment model to enhance rural MSME competitiveness and sustainability.

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## INTRODUCTION

The Indonesian economy is influenced by several factors, one of which is MSMEs that are able to absorb labor and utilize local resources optimally (Sabillah et al., 2023). Labuhan Ratu I Village, Way Jepara District, East Lampung Regency has various developing MSMEs, one of which is Tahu Barokah MSME. This MSME has been family-run since 2021 with a production capacity of 12-20 kg per day. The main products are white tofu and fried tofu, but until now, the business is still limited to conventional practices, so the selling price is still relatively low. In addition to limitations in product innovation, this SME faces another problem, namely, solid tofu waste that has not been optimally utilized. This waste will pollute the environment if it is not properly processed and utilized. Therefore, innovation is needed that not only increases the economic value of the product but also reduces the environmental impact through the utilization of waste.

Food product diversification is an important strategy for improving the competitiveness of MSMEs. Other processed products, such as tofu crackers, have good market prospects because they are easily accepted by consumers, have a longer shelf life, and have higher economic value than fresh tofu. This innovation is expected to open up new business opportunities, expand market networks, and increase the income of rural communities (Putri et al., 2022).

To support this innovation, students participating in the Sumatra Institute of Technology's Thematic Community Service Program (KKN) carried out community service activities in the form of socialization, training, and assistance in the tofu cracker production process. These activities involved PKK mothers and MSME actors in the village with the aim of improving skills, encouraging creativity, and strengthening local economic independence.

Through these activities, it is hoped that the community involved will not only acquire technical skills in processing tofu waste into tofu crackers but also be able to manage small businesses more optimally by improving product quality, packaging, and utilizing digital markets. These activities and innovations are expected to have a positive impact on the economy, society, and environment and serve as a model for community empowerment based on local potential that can be replicated in other areas.

Food product diversification is closely related to value-added theory, which emphasizes the transformation of raw products into higher economic value commodities to improve rural income (Porter, 1985). In rural MSME contexts, diversification not only enhances competitiveness but also reduces dependency on single-product markets.

From an empowerment perspective, community capacity building plays a crucial role in strengthening local entrepreneurship. Empowerment-based interventions enable communities to develop technical skills, managerial competence, and collective economic initiatives (Zimmerman, 2000). Furthermore, the circular economy approach highlights the importance of waste valorization in promoting sustainable rural industries. The utilization of tofu pulp into value-added food products reflects a zero-waste principle and sustainable resource management (Ellen MacArthur Foundation, 2013).

Despite various studies discussing MSME development and food diversification, limited research integrates economic improvement, women's empowerment, and environmental sustainability within a single participatory intervention model. Therefore, this study aims to evaluate the effectiveness of participatory training on diversifying tofu products in enhancing community capacity, economic value, and environmental sustainability in Labuhan Ratu I village.

## METHOD

**Research Design.** This study employed a participatory action research (PAR) approach combined with a community-based intervention design.

**Participants.** The program involved 28 participants, consisting of Barokah Tofu MSME actors and PKK women in Labuhan Ratu I Village.

**Instruments.** A structured knowledge-based questionnaire was used for pre-test and post-test evaluation. The instrument consisted of 10 questions related to production techniques, packaging, and basic marketing strategies.

**Procedure.** The intervention consisted of three stages: (1) socialization on product diversification and market potential; (2) hands-on training in tofu cracker production; and (3) mentoring on packaging and simple digital marketing strategies.

**Data Analysis.** Data were analyzed using descriptive statistics by comparing pre-test and post-test percentage scores to assess knowledge improvement.



**FIGURE 1.** Socialization activities on tofu product diversification for MSME actors and PKK women

The next stage is the practice of making tofu crackers, where participants are trained in everything from preparing the raw materials, mixing the dough, steaming, cooling, slicing thinly, drying, to packaging the product. Training participants are also guided to practice frying crackers directly as a product trial. Each participant is allowed to try it directly to understand the technique and be able to overcome technical obstacles that arise during the production process. After the practice, further assistance is provided to ensure that the skills can be applied consistently in the field. The mentoring includes product quality monitoring, taste and texture evaluation, product packaging innovation, and simple social media-based marketing strategies. To measure the effectiveness of the activities, pre-tests and post-tests are conducted with participants before and after the activities. The evaluation results will be analyzed descriptively to assess the extent of the community's understanding and skill development after participating in the program.

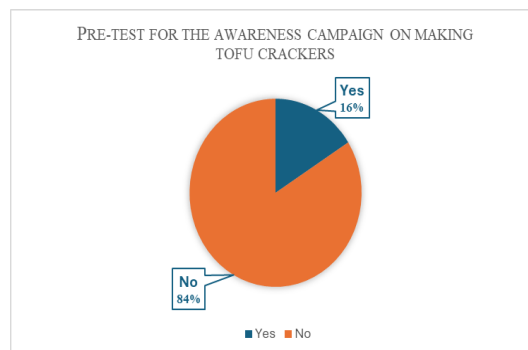


**FIGURE 2.** Equipment used during the practical activity of making tofu crackers

In addition to socialization, training, and mentoring, this activity also targets program sustainability plans. The plans include advanced training on digital marketing, business financial management, and strategies for distributing the products produced. The village authorities and the MSME office are expected to support the processing of business legalities, such as PIRT permits and halal certification so that the products processed by the community are more trusted by consumers. Thus, the methods applied are not only focused on training in making tofu crackers, but also pay attention to the sustainability of community businesses.

## RESULTS AND DISCUSSION

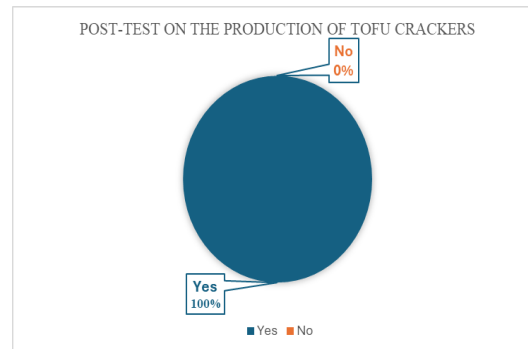
The results of the community service activities carried out show a significant increase in the knowledge, understanding, and skills of the people of Labuhan Ratu I Village regarding the processing of diversified tofu products. Based on the pre-test results conducted before the activities were carried out, the majority of participants, consisting of MSME actors and PKK women, did not understand the process of making tofu crackers. The pre-test data showed that 84% of participants did not know the process of making tofu crackers, and only 16% understood the basic techniques. This condition shows that the community's initial knowledge of tofu product diversification is still very low.



**FIGURE 3.** Results of the pre-test on the socialization of tofu cracker production before coaching

After the socialization and training activities, the post-test results showed that all (100%) participants were able to understand and practice making tofu crackers. The increase from 16% of participants to 100% proves that interactive socialization and training methods are effective in improving the

community's skills in processing tofu into products with higher value. The enthusiasm of the participants was evident from the seriousness they showed in following each stage of the activity, their willingness to try processing the dough independently, and their active questions regarding packaging techniques and product marketing strategies.



**FIGURE 4.** Results of the post-test on socialization of tofu cracker production after training

The tofu crackers produced are of fairly good quality. They are crispy, savory, and of course have a much longer shelf life than fresh tofu. The products are packaged in simple airtight plastic packaging with labels containing basic information such as product name, ingredients, and expiration date. Although still very simple, this packaging technique has attracted the attention of the local community, as evidenced by requests from residents of other villages who are interested in purchasing the products made during the training.

This community service activity has had a significant economic and social impact. Economically, the diversification of tofu products into tofu crackers has opened up new business opportunities for the people of Labuhan Ratu I Village. This innovative tofu cracker product has a higher selling price than fresh tofu and a longer shelf life, thus opening up opportunities for increased family income. Previously, tofu products were only sold fresh at limited prices, but now the community can sell tofu crackers with higher profit margins. This diversification also provides opportunities for new business development in supporting sectors such as packaging and marketing (Sabillah et al., 2023).

**Economic Value-Added Estimation.** Based on a simple cost-price approximation, fresh tofu production is estimated at IDR 8,000 per kg with an average selling price of IDR 10,000 (approximately 25% margin). After diversification into tofu crackers, the equivalent production cost is estimated at IDR 12,000, while the selling value reaches IDR 18,000-20,000, resulting in an estimated profit margin of 50-60%. This indicates that product diversification can substantially increase value-added potential for rural MSMEs.

**Discussion Linkage to Prior Studies and Theory.** The knowledge increase aligns with empowerment theory emphasizing participatory learning as a driver of self-efficacy and community capacity (Zimmerman, 2000). Similar community-based food diversification programs were reported to strengthen MSME competitiveness and entrepreneurship development (Putri et al., 2022; Sabillah et al., 2023). From a sustainability perspective, tofu waste utilization represents circular economy practice at the village level through waste valorization (Ellen MacArthur Foundation, 2013).

From a social perspective, training involving PKK mothers strengthens the role of women in home-based entrepreneurship. This activity boosts confidence by providing new skills through training that can be used to support the household economy. It also strengthens cooperation and social networks among residents involved in the activity, as they can work together in the production, packaging, and marketing processes. Overall, this activity can foster a spirit of collective entrepreneurship that has the potential to

give rise to joint ventures. Meanwhile, from an environmental perspective, the use of tofu waste as a raw material for crackers contributes to reducing pollution and supports the principle of zero waste. Thus, this activity provides multidimensional benefits: skill enhancement, economic strengthening, social empowerment, and sustainable environmental management (Putri et al., 2022) (Sari & Putri, 2024).

The evaluation of the results of the activities shows that several factors supported the successful implementation of the program, such as high community participation, support from village officials, and the ease of use of simple equipment already owned by villagers. In addition to the success factors, there are still several obstacles that need to be overcome in the implementation of these activities. The drying or sun-drying process, which still relies on sunlight, often causes the drying of crackers to be hampered by weather conditions, making it difficult for the product to dry completely during the rainy season. In addition, some of the participants who took part in the training are not yet accustomed to marketing products through digital platforms such as WhatsApp or Instagram, so they still need further training. Another obstacle encountered is the participants' lack of habit of recording business finances, making it difficult to calculate profits in managing capital.

To overcome the obstacles encountered in the field, a more structured program sustainability plan is needed. Efforts that can be made include providing additional training related to digital marketing, simple financial management, and alternative drying techniques for products using new tools such as electric ovens. In addition, long-term assistance from universities and village governments is needed to ensure that the tofu cracker business can continue to grow. The formation of a joint business group or village cooperative can be a means of collaboration for residents in producing tofu crackers, marketing, and collectively managing this tofu product business. With the formation of synergy between the village community, village government, universities, and related agencies, this tofu cracker production business will not only survive but also has the potential to develop into an independent and sustainable business unit. This shows that community service programs carried out through food product diversification can be an effective empowerment model in improving community welfare.

## CONCLUSION

This study confirms that participatory tofu product diversification training effectively improves knowledge, skills, and value-added economic potential of MSMEs in Labuhan Ratu I Village. The increase in understanding from 16% to 100% demonstrates the success of the intervention model. Policy implications include the need for village-level cooperative formation, local government support for business legality (PIRT and halal certification), and continued digital marketing training to expand market reach. Academically, this study contributes an integrated community-based food diversification empowerment model combining economic, social, and environmental dimensions. However, this study is limited by its small sample size and short intervention duration. Future research should include a comprehensive economic feasibility analysis and digital marketing performance evaluation.

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Finally, the author hopes that the established collaboration can continue in the form of follow-up activities, such as entrepreneurship training, strengthening the capacity of MSME, and digital marketing assistance, so that the benefits of this program can be continuously sustainably felt by the community.

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