ABDIMAS: Jurnal Pengabdian Masyarakat Universitas Merdeka Malang
Vol.10(3) August 2025, 627-640
p-ISSN: 2721-138X e-ISSN: 2548-7159
http://jurnal.unmer.ac.id/index.php/jpkm

LPPM
UNMER
MALANG

Strengthening communities' capacity through fish crackers processing technology in Konang Village, Lamongan

Abdul Aziz Jaziri[1], Awang Tri Satria[2], Rahmi Nurdiani[3], Jaka Suryatama[4]

1Department of Fishery Product Technology, Faculty of Fisheries and Marine Science, 2Department of Animal Husbandry, Faculty of Animal Science, 3Bioseafood Reseach Group, Faculty of Fisheries and Marine Science, 4School of Postgraduate Studies, Universitas Brawijaya
Jl. MT. Haryono No.169, Ketawanggede, Malang, East Java, 65145, Indonesia

ARTICLE INFO:

Received: 2025-04-11
Revised: 2025-05-12
Accepted: 2025-07-04
Published: 2025-08-30

Keywords:

Blue economy, Empowering communities, Fish product, Technology adoption

ABSTRACT

Community empowerment plays an important role in strengthening local economic resilience, particularly in coastal areas where fisheries are the main livelihood. In Konang Village, Lamongan, abundant aquaculture production, especially milkfish and tilapia, often faces declining prices during peak harvest seasons, leading to economic vulnerability. To address this issue, a Community Partnership Program (PKM) was implemented with the objective of enhancing the capacity of the Pertiwi Sukses Bersama community group through fish cracker processing technology. The program applied a participatory and collaborative approach, consisting of five stages: socialization, training and capacity building, technology application, mentoring and evaluation, and sustainability planning. Training modules included fish cracker production, food safety and legality (Business Identification Number/NIB, PIRT, and halal certification), as well as digital marketing using e-commerce platforms. The results showed significant improvement in participants' knowledge and skills, reflected in post-test scores that increased from 44 to 82 on average. The group successfully acquired an NIB, initiated the process of halal and PIRT certification, and practiced digital marketing strategies. In addition, the community product was branded as "Kerupuk Ikan Bengawan" to strengthen identity and competitiveness. These achievements demonstrate that structured empowerment programs can foster sustainable fisheries-based enterprises, support the blue economy, and contribute to rural economic resilience.

How to cite: Jaziri, A. A., Satria, A. T., Nurdiani, R., & Suryatama, J. (2025). Strengthening communities' capacity through fish crackers processing technology in Konang Village, Lamongan. Abdimas: Jurnal Pengabdian Masyarakat Universitas Merdeka Malang, 10(3), 627-640. https://doi.org/10.26905/abdimas.v10i3.16197

1. INTRODUCTION

Community group (POKMAS), Pertiwi Sukses Bersama, was established on 30 December 2024 in Konang, Glagah, Lamongan as a direct outcome of a training programme on fish-based product diversification. The group comprises 10 core members, predominantly the wives of local fish farmers, who are actively engaged in utilising aquaculture resources such as milkfish (Chanos chanos) and tilapia (Oreochromis niloticus). Geographically, Konang Village is strategically located 21.3 km from the Lamongan Regency administrative centre and adjacent to the Bengawan Solo River, conditions that favour aquaculture development. The creation of POKMAS represents the community's effort to transform abundant raw materials into value-added products, with fish crackers identified as a potential

✉ Corresponding Author: **Abdul Aziz Jaziri**: Tel. +62 341 571260 | E-mail: azizjaziri@ub.ac.id

commodity. The establishment of community-based organisations is recognised as an effective strategy to enhance local economic resilience, particularly in rural and coastal settings where livelihoods depend heavily on fisheries resources (Ghazali et al., 2021; Melina et al., 2021).

Despite this potential, POKMAS continues to encounter several challenges that constrain its growth. Chief among these is the limited access to Appropriate Technology (AT) for efficient fish cracker production. The absence of standardised processing equipment, insufficient mastery of food safety practices, and inadequate documentation of production outputs have been identified as major bottlenecks. These findings are consistent with a preliminary survey conducted by the community service team and corroborated by previous research on rural fish-processing groups, which emphasises structural barriers in developing competitive value-added products (Silaban et al., 2024). Such constraints limit the group's ability to maintain consistent quality, achieve compliance with market standards, and expand production capacity.

To address these challenges, the community service team implemented targeted interventions based on AT solutions. The interventions focused on three key aspects: (1) The introduction of appropriate processing technology to improve product quality and efficiency; (2) Mentoring related to business legality to ensure compliance with regulatory frameworks and facilitate formal market access; and (3) The provision of training in digital marketing to strengthen competitiveness and expand consumer reach. This integrated approach was designed not only to resolve the immediate technical and managerial problems of POKMAS but also to enhance the long-term sustainability of its economic activities (Hadinata et al., 2023).

The relevance of these interventions is strongly supported by empirical evidence. Previous studies have demonstrated that the adoption of simple yet efficient processing technologies, the acquisition of legal business status, and the utilisation of digital marketing strategies significantly enhance the productivity and profitability of community-based enterprises (Melina et al., 2021; Rachmawati et al., 2023). Aligning the interventions with such evidence strengthens the expectation of measurable outcomes, including increased production capacity, expanded market access, and improved household incomes (Musdar et al., 2023).

Accordingly, the objective of this community service programme is to strengthen the institutional and entrepreneurial capacity of POKMAS Pertiwi Sukses Bersama through the application of AT in processing, legal compliance, and digital marketing. Ultimately, this initiative aims to improve the welfare and economic resilience of fish-farming households in Konang Village and contribute to the broader goal of sustainable rural development.

2. METHODS

Program Design

The design of the Community Partnership Program (PKM) was formulated using a participatory and collaborative approach to ensure inclusivity and accountability (Figure 1). The program was conducted in Konang Village, Glagah Sub-district, Lamongan Regency, East Java, with 10 core members of Pertiwi Sukses Bersama serving as direct beneficiaries. The facilities and equipment employed in the implementation included an automatic dough mixer, a rehydrator and spinner machine, five fish cracker cutters, and a continuous sealer machine. The introduction of these tools was intended to enhance production

efficiency, ensure product uniformity, and improve competitiveness. Furthermore, the program design incorporated training and mentoring on business legality, with an emphasis on obtaining Home Industry Food Production (PIRT) licenses, halal certification, and Business Identification Numbers (NIB), thereby facilitating regulatory compliance and access to broader markets. Digital marketing strategies were also prioritised to enable participants to effectively utilise platforms such as Shopee, TikTok, and Instagram for product promotion and sales expansion. Collectively, this design concept integrated three critical components, appropriate processing technology, business legalisation, and digital marketing, aimed at strengthening the entrepreneurial capacity of the partner group (Rahmat & Mirnawati, 2020).

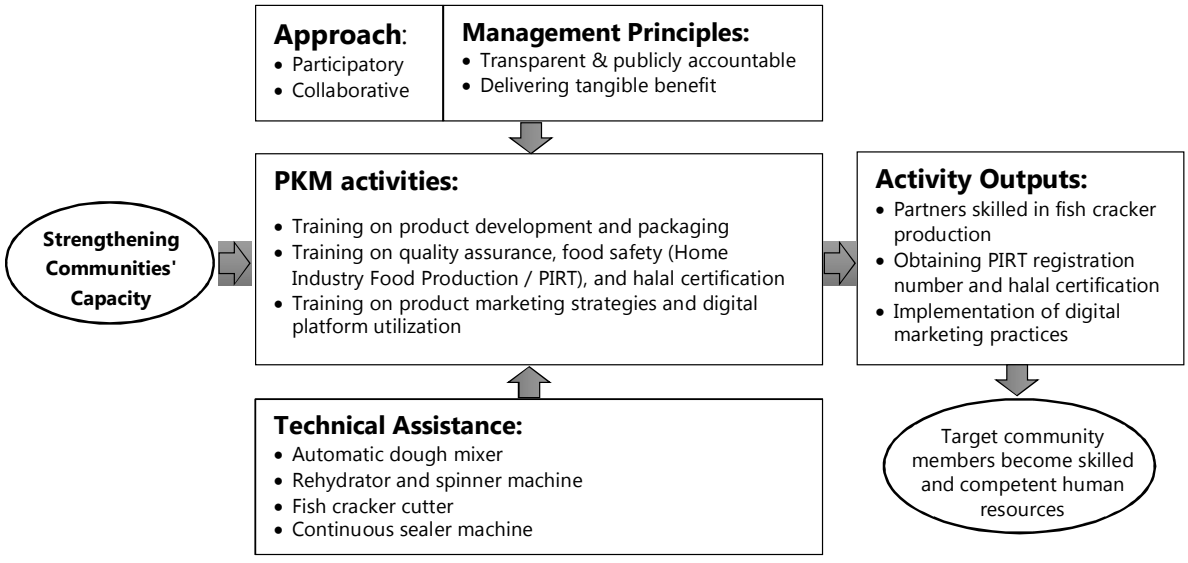

Figure 1. Problem-solving approach model

Program Implementation Methods

Program implementation relied on three core methods. First, technical training and workshops were delivered to transfer knowledge in fish cracker production technology, quality assurance, food safety, and digital marketing practices. Second, mentoring and continuous technical assistance were provided to ensure partners could proficiently operate the introduced machines, meet licensing requirements (PIRT, NIB, and halal certificates), and establish sustainable digital marketing platforms. Third, program evaluation was undertaken using quantitative indicators, including pre-test and post-test assessments during training, sensory evaluation of fish crackers, the increase in production output (kilograms per production cycle), the adoption rate of digital platforms for marketing, and the percentage increase in sales revenue. These indicators ensured that evaluation focused on measurable and objective outcomes rather than qualitative impressions (Handayani et al., 2022).

Schedule and Stages of Implementation

The implementation process was structured into six sequential stages (Table 1) to ensure systematic execution and replicability.

Table 1. Training schedule of PKM activities

Session	Activities	Objectives	Time
1	- Introduction of the implementing group - Introduction to fish cracker products	- To familiarize participants with the implementing group - To introduce various types of fish cracker products	April 2025
2	- Introduction to Business Identification Number (NIB) - Introduction to Home Industry Food Production Commitment Fulfillment Certificate (SPP-IRT) - Education on handling and processing fishery products	- To obtain NIB through the Online Single Submission (OSS) system - To obtain the Home Industry Food Production Commitment Fulfillment Certificate (SPP-IRT) - To provide knowledge on post-harvest handling and diversification of fish products (fish crackers)	July 2025
3	- Explanation of halal "self-declare" certification for home industry - Step-by-step procedures for halal "self-declare" certification - Differentiation between certified and uncertified halal products	- To provide knowledge of the application process for halal "self-declare" certification - To obtain halal "self-declare" certification for fish cracker products - To recognize the benefits of halal logos on food products -	August 2025
4	- Explanation of digital marketing (e-commerce) - Introduction to platforms for digital marketing (Shopee, TikTok, Instagram) - Explanation of strategies and stages in digital marketing	- To provide an overview of digital marketing (e-commerce) - To introduce platforms commonly used for product marketing (Shopee, TikTok, Instagram) - To develop strategies and stages for marketing fish crackers through digital platforms	August 2025
5	- Practical demonstration of fish cracker production - Explanation of modules and production stages - Explanation of raw material preparation for fish cracker production	- To practice fish cracker production techniques - To understand the procedures of fish cracker production - To identify necessary raw materials for fish cracker production -	August 2025
6	- Introduction to fish cracker product packaging - Introduction to continuous sealer machine	- To provide knowledge of proper fish cracker packaging techniques - To provide understanding of continuous sealer operation for fish cracker packaging	September 2025

3. RESULTS AND DISCUSSION

Results

The implementation of community service programs, such as the PKM activities in Konang Village, was systematically structured into several phases, including socialization, training and capacity building, technology application and product development, monitoring and evaluation, and sustainability planning. A structured approach of this kind is essential for gradually strengthening the capacity of community groups, as exemplified by Pertiwi Sukses Bersama.

Socialization

The socialization stage was conducted to identify existing problems faced by the community group and to discuss potential solutions in a participatory manner. This activity was carried out both offline (face-to-face) and online through Zoom meetings with the Pertiwi Sukses Bersama community group in March 2025 (Figure 2). During this session, coordination was also established regarding the overall schedule and implementation of the PKM program. Insights from prior PKM programs have shown that this participatory approach enhances the clarity of shared goals and facilitates the identification of relevant training needs, which are critical to effective implementation.

The outcomes of the socialization included a shared understanding of the program objectives and the identification of specific training materials required by the community group. The training modules were finalized to cover six major topics: (1) Technical training on fish cracker production; (2) Introduction to fish cracker production equipment; (3) Training on the preparation of a Business Identification Number (NIB); (4) Training on the preparation of documents for the Home Industry Food Production Commitment Fulfillment Certificate (SPP-IRT); (5) Training on the preparation of halal self-declare certification documents; and (6) Training on digital marketing (e-commerce).

The participatory approach in this phase facilitated not only the mapping of problems and needs but also strengthened the group's sense of ownership of the program. Similar approaches have been reported as effective in community empowerment initiatives, where early-stage socialization and participatory dialogue were found to enhance mutual trust, alignment of expectations, and readiness for subsequent stages of implementation (Rahmat & Mirnawati, 2020; Sari et al., 2019).

Figure 2. Socialization process: (a) Offline (face-to-face) meeting; (b) Online meeting

Training and Capacity Building

The training and capacity-building activities for the Pertiwi Sukses Bersama community group were conducted in August 2025 in Konang Village, Lamongan. The training schedule is presented in Table 2. A total of 10 members participated in this activity, most of whom were wives of local fish farmers. The training was designed to enhance both technical and managerial competencies and was delivered offline through a combination of methods, including presentations, interactive discussions, and hands-on demonstrations (Figure 3), eflecting contemporary approaches widely recognized as effective in community education and skills development (Zamayla et al., 2024).

To assess the effectiveness of the training, all participants were required to complete a pre-test prior to the delivery of the training materials. This evaluation aimed to measure their baseline knowledge and understanding of the topics. Following the training sessions, participants were given a post-test with

similar question items to determine the extent of knowledge acquisition. The pre-test results indicated that most participants scored an average of 44 out of 100 across ten questions, which means that participants were able to answer fewer than half of the questions correctly. These findings suggest that the majority of participants had limited prior knowledge of the training content.

Figure 3. Knowledge transfer process: (a) Introduction to NIB & SPP-IRT; (b) Introduction to digital marketing; (c) Introduction to halal certification

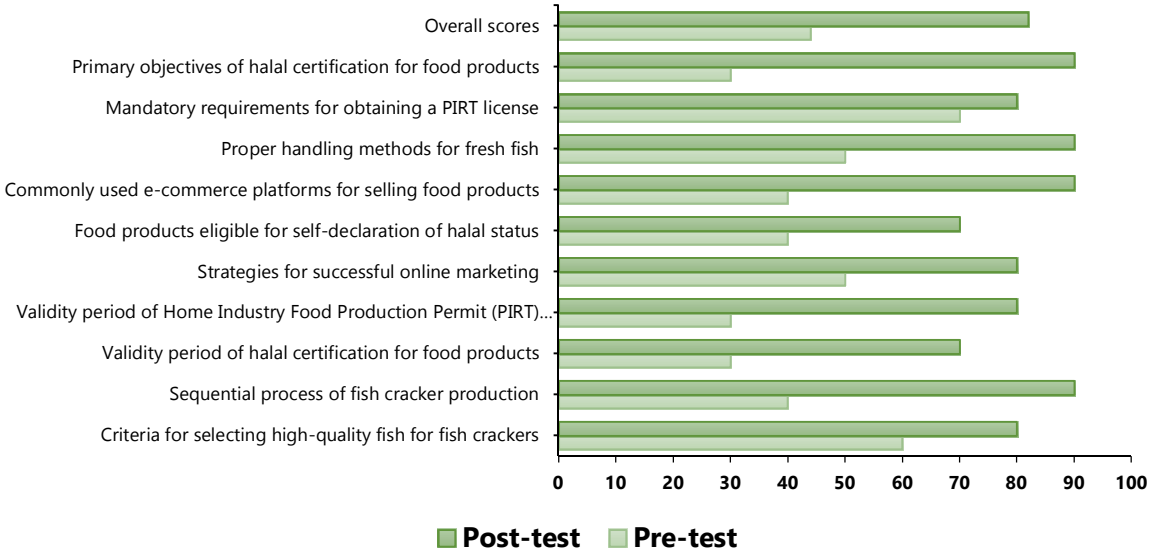

Figure 4. Pre-test and post-test scores during training

Conversely, the post-test results revealed a significant improvement in participants' understanding. On average, participants achieved a score of 82 out of 100, demonstrating that nearly all questions were answered correctly. This improvement indicates effective knowledge transfer during the training sessions and highlights the participants' increased comprehension of the presented material (Figure 4). The results further confirm that the training program had a positive impact on building the knowledge base of the community group. Such outcomes are consistent with findings from previous studies, which reported that structured training and participatory learning approaches significantly enhance community capacity and entrepreneurial readiness in fisheries-based enterprises. Chanthuch et al. (2023), for example, emphasize that knowledge transfer depends heavily on participants' capacity, which must be developed through targeted training. Similarly, Gilmer et al. (2021) highlight the importance

of focused capacity-building programs in fostering resilience and enabling communities to mobilize resources more effectively.

In summary, the implementation of training and capacity-building activities not only increased participants' technical knowledge and practical skills but also empowered them to play a more active role in managing fish-based product development. These findings reinforce the importance of tailored training modules as a key strategy for improving human resource capacity in community-based programs, thereby contributing to sustainable rural and fisheries development (Gilmer et al., 2021; Zamayla et al., 2024).

Fish Cracker Production Practice

The subsequent stage of the program involved a demonstration of fish cracker production. The practice used a mixture of several tropical marine fish species commonly found along the northern coastal areas of Lamongan, namely pike conger (Congresox talabon), lizardfish (Saurida tumbil), and barracuda (Sphyraena barracuda). These species are considered economically important due to their relatively affordable prices, as they are typically used in the surimi production. In addition, those fishe are characterized by tender flesh and whiter flesh color, making them suitable as raw materials for fish-based products with high consumer acceptability (Fan et al., 2024).

The formulation of the fish crackers combined fish meat (6 kg), tapioca flour (15 kg), garlic (750 g), yeast (3 pieces), salt (400 g), sugar (3 tablespoons), and mineral water (6 L), all of which play a role in defining the textural integrity and flavor profile of the final product. During the training, participants were directly involved in hands-on practice at every stage of the production process, including raw material preparation, mixing, molding, boiling, drying, and frying (Figure 5). This participatory approach was critical in enhancing technical competence and ensuring that participants gained the skills required to replicate the production process independently (Sharma et al., 2022; Sufiat et al., 2022). Nutritional analysis of the final product indicated that 100 g of fish crackers contained approximately 15 percent protein and 200 kcal of energy. These results highlight that such value-added processing can improve the nutritional profile of commonly available fish species, thereby contributing to food security and dietary diversification in local communities (Baishak et al., 2020).

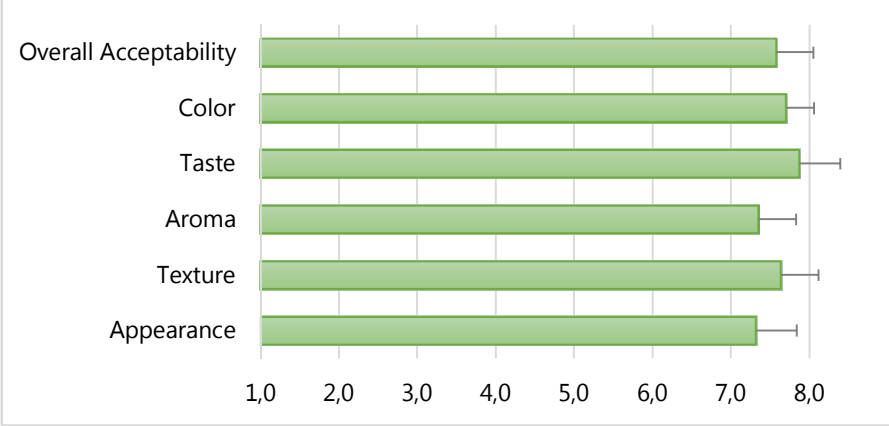

Figure 5. Fish cracker production process

In addition, the integration of modern processing techniques, such as the use of pre-ground garlic to enhance flavor and automatic dough mixers to improve homogenization, was shown to optimize efficiency and improve the overall product quality (Adam et al., 2022). Equally important, the implementation of food quality and safety measures, demonstrated by nutritional labeling on the packaging, enhances product transparency, consumer trust, and overall marketability (He et al., 2022).

Taken together, the structured training program combined with systematic production practices not only facilitated effective knowledge transfer but also emphasized the strategic use of locally abundant tropical marine fish species to support community-based food innovation. This integration of practical training with scientific knowledge in fish processing demonstrates the potential of community empowerment initiatives to foster value-added product development, strengthen local food industries, and advance socio-economic resilience in coastal regions.

Mentoring and Evaluation

The mentoring and evaluation stages of the community partnership program for the Pertiwi Sukses Bersama community group play a pivotal role in fostering sustainable practices and ensuring operational independence in fish cracker production. Mentoring activities covered a wide range of aspects, including technical guidance on production processes, marketing strategies using digital platforms, and assistance in fulfilling legal requirements such as obtaining certifications. This comprehensive support framework is consistent with previous findings, which emphasize that collaborative partnerships and continuous capacity building are essential for the sustainability and effectiveness of community-based initiatives (Shaibi et al., 2015).

A particular focus was placed on digital marketing through platforms such as Shopee (https://id.shp.ee/CLtFcot), and Instagram (@pkm_desa_konang). This reflects the increasing importance of e-commerce as a critical strategy for small-scale enterprises, especially in rural areas where traditional market access is limited. Digital marketing not only improves product visibility but also expands consumer reach, thereby strengthening business sustainability. Prior studies have highlighted that adopting digital platforms significantly contributes to community engagement and economic empowerment (Kepper et al., 2024). Moreover, obtaining certifications such as the Business Identification Number (NIB), PIRT, and halal certification constitutes an important step toward operational legitimacy, consumer trust, and expanded market access. Research further suggests that certifications enhance consumer confidence and improve the competitiveness of artisanal and small-scale food products (Tabak et al., 2016). The Pertiwi Sukses Bersama community group successfully obtained an NIB (No. 1508250217855), while the application processes for halal certification and the PIRT certificate (P-IRT 2023524011138-30).

The evaluation process was designed to be systematic, focusing on training delivery, technical production procedures, and product feasibility testing through sensory analysis (Figure 6). Results from sensory evaluations, covering appearance, texture, aroma, color, taste, and overall acceptability, demonstrated that the fish crackers achieved high acceptability scores, indicating that the combination of raw materials and production methods was carried out effectively and in accordance with good manufacturing practices. These outcomes underscore the value of integrating consumer feedback into quality assurance processes, as also supported by prior studies emphasizing the role of consumer insights in enhancing product quality and market performance (Rosewarne et al., 2021).

In conclusion, the mentoring and evaluation components of this PKM program represent critical pillars for ensuring the sustainability and scalability of community enterprises. By combining traditional

skill-building with digital marketing strategies and rigorous product quality assessment, the program not only strengthens entrepreneurial capacity but also aligns with contemporary models of rural economic development. Such integrated approaches have been identified as effective pathways for building resilient community-based businesses in the fisheries sector (Durgaprasad & Prasad, 2023).

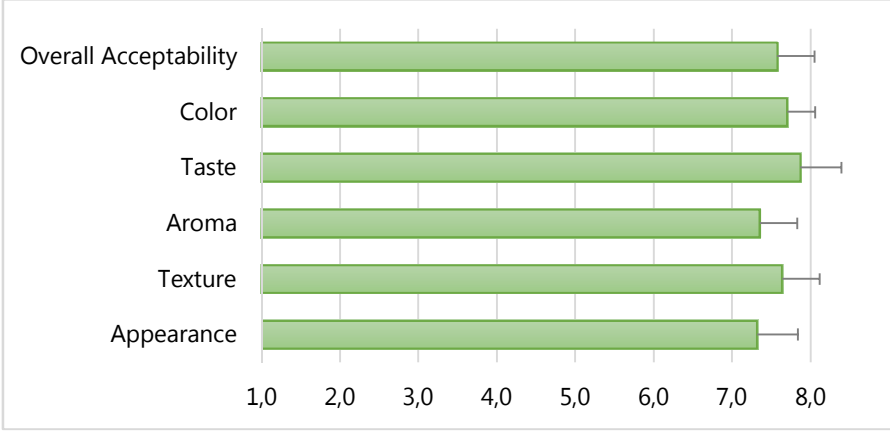

Figure 6. Bar graph showing results of 9 -point hedonic scale sensory evaluation of the fish cracker

Sustainability and Exit Strategy

The final stage of the community service program emphasized ensuring the sustainability of the Pertiwi Sukses Bersama community group in managing fish cracker production. To strengthen continuity, reflective discussions and knowledge-sharing sessions were conducted between PKM facilitators and the community, which culminated in a structured follow-up plan (Figure 7). This plan established key commitments, including the formal branding of the product as "Kerupuk Ikan Bengawan." Branding initiatives of this kind are essential for long-term sustainability, as they foster community ownership, strengthen group identity, and acknowledge collective contributions (Shifa et al., 2023).

The formalization of these commitments was reinforced through the signing of an agreement concerning the utilization of program outputs, ensuring that community welfare remained the primary focus. This effort aligns with the principles of the blue economy, which advocate for sustainable marine resource utilization to enhance social and economic well-being (Wanta & Gunawan, 2021). Additionally, the preparation of a draft patent application for the fish cracker formulation highlighted the group's commitment to innovation and product standardization. Protecting intellectual property in this way not only safeguards unique local products but also reinforces the entrepreneurial spirit and capacity for innovation within community-based enterprises (Ujianti et al., 2024).

To expand visibility and promote knowledge-sharing, dissemination strategies were designed to target mass media, scientific conferences, and peer-reviewed journals. These communication efforts are expected to amplify the achievements of the PKM in Konang Village and create a transferable model for other communities involved in local product development. Prior research emphasizes that dissemination and knowledge-sharing are critical for strengthening branding, showcasing successful technology adoption, and providing replicable practices for broader community empowerment (Rianawati et al., 2024; Siswanto & Rosdaniah, 2023).

Figure 7. Dicussion between PKM's facilitators and Pertiwi Sukses Bersama community group: (a) Discussion process; and (b) Follow up process

Overall, the PKM program resulted in significant improvements in the capacity of the Pertiwi Sukses Bersama community group. The successful application of fish cracker production technology not only demonstrated the practical implementation of the blue economy but also showcased the sustainable utilization of aquatic resources for local economic empowerment. These achievements resonate with Indonesia's Asta Cita presidential agenda, which underscores the responsible use of marine resources to strengthen community-based economic resilience (Oktaviani et al., 2024). Ultimately, the program contributed to positive community transformation by empowering local members to independently sustain their fish-based enterprise, thereby supporting the broader objectives of sustainable development and resilience in rural economies.

Discussion

The PKM program implemented in Konang Village highlights the importance of adopting a structured, phased approach in community-based empowerment. The integration of socialization, training and capacity building, technology application, mentoring, and sustainability planning proved effective in strengthening the technical and entrepreneurial capacities of the Pertiwi Sukses Bersama community group. Similar approaches have been emphasized in previous studies, where phased capacity-building ensured more sustainable outcomes and reduced dependency among local communities (Sari et al., 2019).

The socialization stage played a foundational role in aligning expectations and building trust. Through participatory dialogue, the program successfully identified community needs and co-developed training modules, covering technical and managerial content such as fish cracker production, certification requirements, and digital marketing. Participatory methods are consistently associated with enhanced ownership and long-term impact in community interventions (Rahmat & Mirnawati, 2020). The use of both offline and online platforms further demonstrated adaptability and inclusivity, aligning with emerging evidence that hybrid engagement models increase participation (Azmi et al., 2024).

The training and capacity-building phase demonstrated a significant knowledge transfer, as evidenced by the sharp improvement between pre-test (average 40/100) and post-test (85/100) scores. This reflects the effectiveness of experiential learning methods, combining presentations, discussions, and hands-on practice. Previous research underscores that adult learning in community settings is most effective when practical exercises complement theoretical inputs (Chanthuch et al., 2023). Importantly, the integration of regulatory and marketing topics ensured that training addressed systemic barriers often faced by rural enterprises, echoing similar findings in community-based SME development (Gilmer et al., 2021).

The production practice demonstrated the strategic use of locally available fish species such as pike conger, lizardfish, and barracuda. These species, often underutilized, were transformed into value-added products with high nutritional content (15 percent protein per 100 g). Such utilization reflects blue economy principles, where sustainable resource use supports food security and economic empowerment (Hussain et al., 2017; Mahadiansar et al., 2023). The incorporation of appropriate technologies, such as dough mixers and nutritional labeling, further strengthened efficiency, transparency, and consumer trust, consistent with research highlighting the role of technology transfer in enhancing product competitiveness (Adam et al., 2022; He et al., 2022).

Mentoring and evaluation provided continuity, ensuring that knowledge gained during training was translated into practice. Tangible outcomes included the successful acquisition of a Business Identification Number (NIB) and progress toward halal and PIRT certification. Certifications are vital for small enterprises, as they directly affect consumer trust and market access (Tabak et al., 2016). Additionally, digital marketing training using platforms such as Shopee, TikTok, and Instagram aligned with broader trends in e-commerce adoption, which has been shown to increase the resilience and sustainability of rural SMEs (Kepper et al., 2024). Sensory evaluations, where fish crackers scored highly on appearance, taste, and aroma, validated the effectiveness of the production process and highlighted consumer acceptance, echoing prior studies that link product quality with market success (Rosewarne et al., 2021).

Finally, the sustainability and exit strategy phase underscored the community's growing independence. Branding the product as Kerupuk Ikan Bengawan and preparing a draft patent application demonstrated strategic steps toward innovation and long-term market positioning. Branding and intellectual property rights are increasingly recognized as vital tools for sustaining community enterprises and strengthening competitiveness in artisanal food systems (Shifa et al., 2023; Ujianti et al., 2024). The dissemination of program outcomes through mass media, conferences, and journals not only amplified achievements but also positioned the initiative as a transferable model for other coastal communities (Rianawati et al., 2024; Siswanto & Rosdaniah, 2023).

Overall, the Konang Village PKM program illustrates how integrated approaches that combine participatory planning, tailored training, technology adoption, and systematic mentoring can strengthen rural communities while advancing blue economy principles. By aligning with Indonesia's Asta Cita agenda on sustainable marine resource utilization, the program demonstrates that small community groups can contribute significantly to local economic resilience and sustainable development.

4. CONCLUSION AND RECOMMENDATIONS

The Community Partnership Program (PKM) in Konang, Glagah, Lamongan with community group Pertiwi Sukses Bersama demonstrated the relevance between program objectives and tangible outcomes. Quantitative indicators confirm significant achievements: (1) Knowledge and skills improved substantially, with participants' average scores increasing from 44/100 in the pre-test to 82/100 in the post-test, showing a 86 percent knowledge improvement; (2) The application of appropriate technology (AT) resulted in a real increase in production capacity, with fish cracker output rising, accompanied by improved product quality verified through sensory evaluations (appearance, texture, aroma, taste, and overall acceptability scores averaging above 8 on a 9-point hedonic scale); (3) Legal business documents were successfully obtained, including the issuance of a Business Identification Number (NIB: No. 1508250217855) and progress on halal certification and PIRT certificate (P-IRT 2023524011138-30); and (4) Digital marketing practices were implemented using platforms such as Shopee, TikTok, and

Instagram, resulting in measurable online sales and expanded consumer reach. These results highlight that the program's objectives, enhancing knowledge, strengthening technology adoption, securing legality, and advancing digital marketing, were achieved and aligned with indicators of improved productivity, compliance, and market access.

The program also faced several limitations, including the relatively short duration of mentoring, limited access to advanced processing equipment, and the dependency on internet connectivity for digital marketing. Based on these constraints, the following recommendations are proposed for future community service initiatives: (1) Extended mentoring duration: Future programs should allocate more time for intensive mentoring and monitoring to ensure that skills and technologies are fully adopted and institutionalised within the community group; (2) Upgrading technology facilities: Providing additional or more advanced equipment (e.g., larger capacity mixers, automatic cutters, mechanical deboner) is recommended to support scalability and further efficiency in production; (3) Strengthening digital infrastructure: Collaboration with local government and service providers is necessary to improve internet connectivity and access to digital tools in rural areas, thereby enhancing the sustainability of e-commerce practices; (4) Capacity building in financial management: Training should be expanded to include bookkeeping, financial literacy, and cost–benefit analysis to strengthen business resilience and independence.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to the Ministry of Higher Education, Science, and Technology (Kemdiktisaintek) for the financial support provided under the Community Partnership Program (PKM), Grant No. 00560.9/UN10.4051/BLKSI/2025. The authors also wish to thank the Directorate of Research and Community Service (DRPM), Universitas Brawijaya, for facilitating the fund disbursement and supporting the implementation of this program. Also, special appreciation is also extended to the student team (Muhamad Asrizal Fatahillah, Luqmanul Mushoddaq, Eva Maulidia Zuhra, and Sheinia Indhy Aurellia) for their valuable assistance in both technical preparation and field activities, which significantly contributed to the success of the PKM implementation.

REFERENCES

Adam, Y., Jar-Elnbi, F., & Hasan, A. (2022). The characteristics of cracker fish and beef products processed under Sudanese conditions. *Journal of Food Sciences, 3*(1), 21–31. https://doi.org/10.47941/jfs.1100

Azmi, N., Yuliana, L., & Perkasa, D. H. (2024). Strategi digital marketing untuk UMKM fashion dan aksesoris wanita. *SUBSERVE: Community Service and Empowerment Journal*, *2*(2), 130-137. https://doi.org/10.36728/scsej.v2i2.38

Baishak, N., Islam, M., Moazzem, M., Ahmad, I., & Zzaman, W. (2020). Quality evaluation of nutritious fish crackers developed from three carp fish species. *Asian Food Science Journal, 17*(1), 15–23. https://doi.org/10.9734/afsj/2020/v17i130182

Chanthuch, T., Ngounhort, H., & Sou, V. (2023). The key impacts of student satisfaction with job opportunity in technical and vocational education and training (TVET), Cambodia. *European Journal of Business and Management, 15*(17), 28–36. https://doi.org/10.7176/ejbm/15-17-04

Durgaprasad, A., & Prasad, C. (2023). Modeling challenges for building technological capacities to achieve sustainability in the food industry. *Foresight and STI Governance, 17*(3), 45–55. https://doi.org/10.17323/2500-2597.2023.3.45.55

Fan, X., Geng, W., Li, M., Wu, Z., Li, Y., Yu, S., … Zhao, Q. (2024). Performance and protein conformation of thermally treated silver carp (Hypophthalmichthys molitrix) and scallop (Argopecten irradians) blended gels. *Journal of the Science of Food and Agriculture, 104*(13), 7797–7808. https://doi.org/10.1002/jsfa.13608

Ghazali, M., Rabbani, R., Sari, M., Rohman, M., Nasiruddin, M., Suherman, S., & Nurhayati, N. (2021). Pelatihan pengolahan kerupuk ikan di Desa Ekas Buana Kecamatan Jerowaru Kabupaten Lombok Timur. *Jurnal Pengabdian Magister Pendidikan IPA, 4*(2), 52–58. https://doi.org/10.29303/jpmpi.v4i2.683

Gilmer, T., Center, K., Casteel, D., Choi, K., Innes-Gomberg, D., & Lansing, A. (2021). Developing trauma-resilient communities through community capacity-building. *BMC Public Health, 21*(1), 1713. https://doi.org/10.1186/s12889-021-11723-7

Hadinata, F., Rahayu, S., Adijaya, M., & Utami, P. (2023). Pemberdayaan kelompok dasa wisma dalam pengembangan produk olahan berbasis ikan di Desa Sambora Kecamatan Toho Kabupaten Mempawah. *Jurnal Pengabdian Kepada Masyarakat Nusantara, 4*(4), 4627–4635. https://doi.org/10.55338/jpkmn.v4i4.2226

Handayani, F., Tasabaramo, I., Maretik, M., Joesidawati, M., Fadiana, M., Mpia, L., & Aldi, R. (2023). Pelatihan pembuatan kerupuk ikan bagi kelompok nelayan Teri Jaya Desa Toari Kabupaten Kolaka. *Jurnal Pengabdian Multidisiplin, 3*(3), 125–131. https://doi.org/10.51214/00202303699000

He, X., Lv, Y., Li, X., Yi, S., Zhao, H., Li, J., … Xu, Y. (2022). Improvement of gelation properties of silver carp surimi through ultrasound-assisted water bath heating. *Ultrasonics Sonochemistry, 83*, 105942. https://doi.org/10.1016/j.ultsonch.2022.105942

Hussain, M., Failler, P., Karim, A., & Alam, M. (2017). Major opportunities of blue economy development in Bangladesh. *Journal of the Indian Ocean Region, 14*(1), 88–99. https://doi.org/10.1080/19480881.2017.1368250

Kepper, M., Stamatakis, K., Deitch, A., Terhaar, A., Gates, E., Cole, G., & Eyler, A. (2024). Sustainability planning for a community network to increase participation in evidence-based lifestyle change programs: A mixed-methods approach. *International Journal of Environmental Research and Public Health, 21*(4), 463. https://doi.org/10.3390/ijerph21040463

Mahadiansar, M., Alfiandri, A., & Marliani, M. (2023). PESTEL analysis of blue economy development policy in Indonesia. *BIO Web of Conferences, 70*, 05005. https://doi.org/10.1051/bioconf/20237005005

Melina, S., Sobariah, S., & Yuniarti, T. (2021). Peningkatan pengetahuan, sikap, dan keterampilan melalui pelatihan dan pendampingan usaha olahan kerupuk ikan tongkol pada kelompok istri nelayan di Kecamatan Simeulue Timur, Kabupaten Simeulue, Provinsi Aceh. *Pelagicus, 2*(3), 127–135. https://doi.org/10.15578/plgc.v2i3.10298

Musdar, T., Syamsuryanita, S., & Saswini, A. (2023). Pemanfaatan limbah tulang ikan bandeng menjadi cemilan kerupuk stik tinggi kalsium dan protein sebagai upaya pencegahan stunting. *JMM (Jurnal Masyarakat Mandiri), 7*(5), 5206–5218. https://doi.org/10.31764/jmm.v7i5.17553

Oktaviani, D., Sunardi, S., & Sumiarsa, D. (2024). Carbon stock of mangrove ecosystem and role of blue economy in Pangandaran, West Java. *E3S Web of Conferences, 495*, 02002. https://doi.org/10.1051/e3sconf/202449502002

Rachmawati, R., Novita, R., Erwandi, E., & Iskandar, I. (2023). Pemberdayaan kewirausahaan bidang gizi melalui pelatihan teknologi pengolahan produk hasil perikanan bagi mahasiswa dan alumni gizi Poltekkes Kemenkes Aceh. *Jurnal Pade Pengabdian & Edukasi, 5*(1), 41–48. https://doi.org/10.30867/pade.v5i1.1093

Rahmat, A., & Mirnawati, M. (2020). Model participation action research dalam pemberdayaan masyarakat. *Aksara: Jurnal Ilmu Pendidikan Nonformal, 6*(1), 62–71. https://doi.org/10.37905/aksara.6.1.62-71.2020

Rianawati, A., Darmasetiawan, N., Hadi, F., Oktavianus, J., & Utama, C. (2024). Enhancement of Indonesia's blue economy sector through innovation and competitive advantage based on resource-based view theory. *Problems and Perspectives in Management, 22*(2), 165–181. https://doi.org/10.21511/ppm.22(2).2024.14

Rosewarne, E., Chislett, W., McKenzie, B., Reimers, J., Jolly, K., Corben, K., & Webster, J. (2021). Stakeholder perspectives on the effectiveness of the Victorian salt reduction partnership: A qualitative study. *BMC Nutrition, 7*(1), 14. https://doi.org/10.1186/s40795-021-00414-6

Sari, Y., Farida, I., & Hetika, H. (2019). Model pendampingan UMKM pengolahan hasil laut dengan metode pendekatan pendampingan terintegrasi. *Monex Journal Research Accounting Politeknik Tegal, 8*(1), 293–302. https://doi.org/10.30591/monex.v8i1.1269

Shaibi, G., Konopken, Y., Nagle-Williams, A., McClain, D., Castro, F., & Keller, C. (2015). Diabetes prevention for Latino youth. *Health Promotion Practice, 16*(6), 916–924. https://doi.org/10.1177/1524839915603363

Sharma, S., Majumdar, R., Mehta, N., & Nirmal, N. (2022). Effects of pineapple peel ethanolic extract on the physicochemical and textural properties of surimi prepared from silver carp (Hypophthalmichthys molitrix). *Foods, 11*(20), 3223. https://doi.org/10.3390/foods11203223

Shifa, M., Nasir, M., Ariani, D., & Suhendra, N. (2023). Analysis of the coastal economic potential based on the blue economy concept in realizing village SDGs. *J-Ebis (Jurnal Ekonomi dan Bisnis Islam), 8*(2), 413–430. https://doi.org/10.32505/j-ebis.v8i2.5945

Silaban, B., Leiwakabessy, J., Tupan, J., Lewerissa, S., Nanlohy, E., & Rieuwpassa, F. (2024). Edukasi pengolahan hasil perikanan dalam upaya penguatan pangan berbasis protein di Negeri Tengah Tengah, Maluku Tengah. *Jurnal Abdi Insani, 11*(2), 1737–1746. https://doi.org/10.29303/abdiinsani.v11i2.1575

Siswanto, N., & Rosdaniah, S. (2023). Driving blue economy for sustainable development: A case of stakeholder collaboration platform development. *IOP Conference Series: Earth and Environmental Science, 1198*(1), 012013. https://doi.org/10.1088/1755-1315/1198/1/012013

Sufiat, S., Azmi, U., & Safrida, S. (2022). Evaluation of consumer acceptance and nutritional value from opak crackers with the addition of triggerfish (Canthidermis maculata). In *IOP Conference Series: Earth and Environmental Science, 956*(1), 012013. IOP Publishing.

Tabak, R., Duggan, K., Smith, C., Aisaka, K., Moreland Russell, S., & Brownson, R. (2016). Assessing capacity for sustainability of effective programs and policies in local health departments. *Journal of Public Health Management and Practice, 22*(2), 129–137. https://doi.org/10.1097/PHH.0000000000000254

Ujianti, R., Novita, M., & Burhanuddin, A. (2024). Strengthening the blue economy through marine, coastal resources, and the social environment. *KnE Social Sciences, 9*(6), 15304. https://doi.org/10.18502/kss.v9i6.15304

Wanta, D., & Gunawan, J. (2021). Sustainability blue disclosures: Index development and preliminary implementation. *JRAK: Jurnal Riset Akuntansi Kontemporer*, *13*(2), 97-105. https://doi.org/10.23969/jrak.v13i2.4473

Zamayla, G. M., Catolpos, A. J., Gonzaga, G., & Caingcoy, M. (2024). Impact of capacity-building project on socio-economic well-being of women in Higaonon Community. *Asia Pacific Journal of Social and Behavioral Sciences, 22*(Special Edition), 20-34. https://doi.org/10.57200/apjsbs.v22i0.402