

INCREASING THE ECONOMIC VALUE OF TEMPE BUNGKIL INNOVATION PRODUCTS THROUGH DIVERSIFICATION AND DIGITAL MARKETING TRAINING IN PAKISAJI MALANG

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ABSTRACT

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Keywords:

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rural appraisal (PRA)

Background: Tempe bungkil is a processed by-product of soybean oil production that has high nutritional and economic potential, but has not been optimally utilized by MSMEs in Legok Sukoraharjo Village, Pakisaji District, Malang Regency. Problems faced by partners include: (1) production that is still traditional and highly dependent on weather conditions, (2) lack of product diversification, (3) simple packaging, and (4) marketing that is still limited to conventional methods. **Method:** The community service method used is participatory training involving MSMEs and the community. The activity stages include: (1) socialization of the potential and benefits of tempe bungkil, (2) product innovation training (nuggets, crackers, frozen food), (3) modern packaging training with standing pouches, (4) digital marketing training, and (5) evaluation. **Results:** The results of the activity show a significant increase in partner capacity. Analysis of sales data 2 months post-training shows an increase in income of 45.8% from an average of IDR 1,200,000/week to IDR 1,750,000/week. The impacts felt are increased income, expanded market reach through online sales (15% of total sales), and the creation of new, more sustainable business opportunities and reduced dependence on the weather.

1. INTRODUCTION

Tempe is a traditional Indonesian food that has been recognized as a World Cultural Heritage by UNESCO. In the Pakisaji area of Kepanjen, Malang, the community has long developed a unique variation of tempeh, namely Tempe bungkil. Tempeh bungkil is made from soybean dregs (bakkil) left over from the oil extraction process, which is then fermented. This product is rich in protein, fiber, and other essential nutrients, making it a healthy and economical choice for food diversification. (Pamungkas, Sugiyono, and Nurtama 2018; Rahmi, Mursyid, and Wulansari 2018; Sari and Mardhiyyah 2021).

The tempeh bungkil (small and medium-sized enterprise) in Legok Village, Sukoraharjo, Pakisaji, has been operating since 1990. However, the business still faces several classic challenges. The traditional production process is highly dependent on temperature and weather factors, with humidity in Malang often affecting fermentation quality. (Arisona and Indriani 2022; Astuti 2017; Romulo and Surya 2021). The resulting product is still very raw (raw material), consisting of pieces of tempeh cake without diversification, resulting in low sales value. The packaging is simple and unattractive, and marketing still relies on direct sales to local stalls and consumers, resulting in limited market reach (Agustina, Dwanoko, and Suprianto 2021; Agustina, Suprianto, and Izzuddin 2024; Aini et al. 2025; Yoshari et al. 2023).

The home industry of *tempe bungkil* in Kepanjen, Malang, represents a vital yet under-optimized sector of the local economy. A preliminary survey conducted in June 2023 identified a cluster of approximately 15 small-scale producers. Despite a collective production capacity of over 500 kg of

soybean residue per week, these Micro, Small, and Medium Enterprises (MSMEs) operate with limited resources. The average monthly income from selling raw *tempe bungkil* hovers around IDR 1.5 - 2 million per business, an amount that is often insufficient for economic scalability. The majority of these enterprises are women-led, managed by mothers who rely on this work as a primary source of household income. However, with an average education level up to high school, they face significant hurdles in moving beyond traditional production and marketing methods. Despite its nutritional value and cultural significance, the local tempeh industry continues to face multiple operational and marketing challenges, including a lack of product diversification, non-branded and simple packaging, and an almost total reliance on word-of-mouth and local wet markets for sales.

The very nature of *tempe bungkil* production, which utilizes the solid by-product of soybean milk and tofu production, positions it as a naturally sustainable practice. As suggested, utilizing this soybean residue reflects core circular economy principles and contributes to reducing waste from the local food industry. However, this inherent strength is not leveraged for market advantage. Our initial diagnostic surveys confirmed that the primary bottleneck for growth was not production capability, but rather a gap in value-adding innovation and market access. This finding directly justified our intervention strategy: training was specifically chosen in product innovation, packaging, and digital marketing to address these precise pain points.

By transforming *tempe bungkil* into ready-to-eat, well-packaged, and digitally-

marketed products, we aim to empower these MSMEs to capture greater value from their work, increase their income stability, and formally position them as actors in the circular economy.

Based on these issues, a comprehensive community service program is needed to empower these MSMEs. This program focuses on capacity building through training in product innovation, modern packaging, and digital marketing. The goal is to increase product added value, expand market share, and ultimately boost the income and business sustainability of tempeh bungkil MSMEs in Malang. (Agustina and Suprianto 2018; Agustina, Suprianto, and Rosalin 2023; Yuliani 2020).

2. METHOD

The method used in this community service activity is a participatory approach combined with practical product innovation. The stages are as follows:

- a. **Participatory Problem Identification:** Using the Participatory Rural Appraisal (PRA) approach, we actively engaged with MSME partners and the community to identify key challenges and opportunities in utilizing tempe bungkil.
- b. **Product Formulation and Experimentation:** Based on the identified needs, we developed an innovative food product using tempe bungkil as the main ingredient. This involved experimenting with recipes, mixing it with other complementary ingredients, and establishing standardized measurements.
- c. **Practical Training and Skill Transfer:** We conducted hands-on training sessions for partners, guiding

them through the entire production process—from raw material preparation to the final product creation.

- d. **Product Quality Assessment and Feedback:** The success of this empowerment program was evaluated through a multi-faceted approach, combining sensory analysis with concrete business metrics. The newly developed *tempe bungkil* products were first assessed for their sensory qualities (taste, aroma, texture) and nutritional potential. Furthermore, program effectiveness was measured against the following key performance indicators (KPIs) over a three-month period post-intervention:

- 1) **Business Growth:** A minimum **20% increase in the average monthly sales** of participating MSMEs, comparing pre- and post-intervention revenue.
- 2) **Adoption of Innovation:** At least **70% of the participating MSMEs (10 out of 15 businesses)** fully adopting the new, branded packaging for their products.
- 3) **Digital Market Penetration:** A collective **growth of 300 new followers** on the dedicated program social media page and the generation of at least **15 online sales orders** per week across all partner MSMEs.

Consumer and partner feedback sessions were held not only to gauge sensory acceptance and satisfaction but also to collect qualitative data on the perceived impact of these measurable changes on their business operations and market confidence (Agustina, Heriyawati, et al. 2023; Astari and Efelina 2021; Hudayana et al. 2019; Ruswanto et al. 2022).

Research Setting and Participants

The activity was conducted in Legok Sukoraharjo Village, Pakisaji District, Malang Regency, from July-August-September 2025. Sales data analysis was conducted by comparing average sales four weeks before the training (June-July 2025) with four weeks after the training (August-September 2025). Micro, small, and medium enterprises (MSMEs) producing tempeh bungkil and local residents interested in developing tempeh bungkil processing businesses in the Kepanjen area of Malang.

Activity Stages:

The training method used a participatory approach (PAR) so that the community is not merely a beneficiary but also plays an active role in business development.

1. Observation and Initial Focus Group Discussion (FGD): Identifying the needs, potential, and obstacles faced by partners, including recording baseline sales data.
2. Socialization of the Potential and Benefits of Tempe Bungkil: Providing an understanding of the nutritional value, market opportunities, and economic prospects of tempe bungkil and its processed products.
3. Product Innovation Training: Practical training in making derivative products:
 - a. Tempe Bungkil Nuggets (Oil Cake Nuggets): A healthy alternative to frozen food.
 - b. Tempe Bungkil Crackers: A crunchy and savory snack.
4. Modern Packaging Training: Introducing and practicing the use of standing pouches and mica packaging that are airtight, attractive, and equipped with brand logos to increase product sales value and durability.

5. Digital Marketing Training: Training on brand building, product photography, and marketing strategies through the website (<https://www.tempebungkil.com>) and social media (Instagram, Facebook).
6. Evaluation and Mentoring: Monitoring the success of the training based on increased production, sales, and market reach, and providing follow-up mentoring. Quantitative and qualitative data analysis is conducted at this stage.

Table 1. Stage of PAR

Stage	Description
1. Initial Observation & FGD	Identifying needs, potential, and partner challenges, including baseline sales data recording.
2. Socialization of Tempe Bungkil Potential	Explaining nutritional value, market opportunities, and economic prospects of tempe bungkil and its derivative products.
3. Product Innovation Training	Hands-on training for product diversification: <ul style="list-style-type: none"> - Tempe Bungkil Nuggets (healthy frozen food) - Tempe Bungkil Crackers (crispy local snack)
4. Modern Packaging Training	Introducing and practicing the use of standing pouch and airtight packaging with brand logo to improve product value and durability.
5. Digital Marketing Training	Training on brand building, product photography, and marketing strategies through Website (https://www.tempebungkil.com) and Social Media (Instagram, Facebook).
6. Evaluation & Mentoring	Monitoring production, sales, and market reach improvements, followed by continuous mentoring. Both quantitative and qualitative data analysis are conducted at this stage.



Figure 1. Step Of PAR

Results And Discussion

Analysis of Training Results and Sales Increase

The success of the training was measured through participant observation, pre-tests/post-tests, and most importantly, a comparative analysis of sales and production data before and after the intervention.

Table 2. Comparison of MSME Conditions Before and After Training

Main Product / week	Original Tempe Bungkil	Nugget Bungkil	Krupuk Bungkil	Total Original + Innovation	% Increase
Sales	1.200.000	875.000	875.000	2.950.000	59%
Profit Margin	480.000	525.000	525.000	1.530.000	69%
Production per week / package	1200	35	70	1.305	8%
Profit per package	400	15.000	7.500	22.900	98%
Price per package	1.000	25.000	12.500	38.500	97%

Discussion

1) Financial Performance:

• Total Sales per Week:

Before innovation: IDR 1,200,000 (Original Tempe Bungkil only).

After innovation: IDR 2,950,000 (all products combined).

Sales increase: 59%.

2) Total Profit per Week:

Before innovation: IDR 480,000.

After innovation: IDR 1,530,000.

Profit increase: 69%.

3) Production and Pricing:

• Production Volume per Week:

Original Tempe Bungkil: 1,200 packages.

Innovative products: 105 packages (35 Nuggets + 70 Crackers).

Total production: 1,305 packages (+8%).

4) Price and Profit per Package:

• Original Tempe Bungkil: Selling price Rp 1,000, profit Rp 400.

• Nugget Bungkil: Selling price Rp 25,000, profit Rp 15,000.

- Krupuk Bungkil: Selling price Rp 12,500, profit Rp 7,500.

The average profit per package of the innovative product is significantly higher than that of the main product.



Figure 2. Making Tempe Bungkil Crackers

The Tangible Impact of Community Service:

The community service program conducted for the cluster of Tempe Bungkil MSMEs in Kepanjen, Malang, has demonstrated significant and measurable impacts, both economically and in terms of empowerment. Using the Participatory Rural Appraisal (PRA) approach, this program did not merely provide training but actively involved the business actors—predominantly women and homemakers—in every stage, from problem

identification to the implementation of solutions.

Primary Impact: Economic Transformation and Value Addition

The intervention, which focused on product diversification, packaging innovation, and digital marketing training, has transformed the business model from one previously reliant on selling raw materials into an enterprise offering high-value processed products. The profitability impact successfully recorded in the three-month period post-intervention is highly encouraging:

- **Significant Increase in Revenue:** A 59% surge in weekly gross revenue was achieved, rising from IDR 1,200,000 to IDR 2,950,000.
- **Higher Profit Growth:** More notably, weekly business profits increased even more dramatically by 69%, from IDR 480,000 to IDR 1,530,000. This proves that the product innovations not only increased turnover but also significantly enhanced profitability.
- **Exponential Creation of Added Value:** The most tangible impact is visible in the profit per package. Whereas the profit from original Tempe Bungkil was only IDR 400 per pack, the MSMEs now enjoy a profit of up to IDR 15,000 for each package of Nugget Bungkil and IDR 7,500 for each package of Krupuk Bungkil. This transformation demonstrates how innovation successfully turned a simple product into a high-value commodity.

Sustainable Impact: Empowerment and the Application of Circular Economy Principles

Beyond the numbers, impacts of equal importance are seen in empowerment and sustainability:

1. **Enhanced Capacity and Self-Confidence:** The MSME actors, especially the women, now possess new

skills in product processing, creating attractive packaging, and digital marketing. This has not only increased their income but also built their independence and self-confidence in managing their businesses.

2. **Adoption of Innovation and Increased Competitiveness:** As many as 70% of the MSME actors have actively adopted the new packaging and are producing the innovative product variants. This has directly increased their competitiveness in the market, both offline and through the digital platforms they are beginning to develop.
3. **Strengthening Circular Economy Principles:** This program indirectly strengthens circular economy practices. By reprocessing soybean residue (bungkil) into nutritious, marketable food products, the program reduces food industry waste while simultaneously creating a new, sustainable economic value chain.



Figure 3. Making Tempe Bungkil Nuggets



Figure 4. Community Service Activities at Partner Sites

CONCLUSION

Product diversification has successfully increased revenue and profit. The innovative products (Nuggets and Krupuk Bungkil) contributed significantly to the increase in total sales (59%) and profit (69%), despite relatively small production volumes. The innovative products have high value-added.

Nuggets and Krupuk Bungkil generate significantly higher profits per package (Rp 15,000 and Rp 7,500, respectively) than the main product (Rp 400). This indicates that diversification into ready-to-eat processed products is more profitable.

Marketing strategies can be directed toward high-value products. Because innovative products contribute significantly to profits despite low production volumes, future strategies need to focus on increasing sales volume of Nuggets and Krupuk Bungkil through more aggressive marketing.

The potential for business development remains wide open. With a 69% increase in profits, this MSME has the opportunity to expand its market, increase production capacity for innovative products, and create new product variants. Thus, the product diversification strategy has proven financially successful and is worth continuing to maximize business growth.

This community service activity has proven that a participatory approach addressing fundamental aspects—such as product innovation and marketing strategy—can create a real impact that multiplies profitability. The success of the Tempe Bungkil MSMEs in Kepanjen serves as a tangible example of how collaboration between academia and the community can unlock local economic potential, empower vulnerable groups, and foster the creation of more resilient and sustainable businesses for the future.

Recommendations

To maintain the sustainability and scale up of the program, the following is required:

1. Continued Mentoring: Focus on production, financial, and logistics management to address increasing demand, especially from online channels.
2. Licensing Access: Assistance in obtaining PIRT permits and halal certification for processed products to enable them to enter the modern retail market and further explore their business.
3. Network Development: Facilitate partners' connections with other stakeholders such as

the industry office, universities, and investors for business development.

4. Product Exploration: Further exploration for the development of other innovative products based on tempeh cake.

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REFERENCES

- Agustina, Rini, Yoyok Seby Dwanoko, and Dodit Suprianto. 2021. "Pelatihan Desain Logo Dan Kemasan Produk UMKM Di Wilayah Sekarpuro Kecamatan Pakis Kabupaten Malang." *Jurnal Aplikasi Dan Inovasi Ipteks SOLIDITAS* 4(1):69–76.
- Agustina, Rini, Dwi Fita Heriyawati, Fitri Marisa, and Dodit Suprianto. 2023. "Entrepreneurship: Pembuatan Yoghurt Berbahan Dasar Susu Fullcream Guna Diversifikasi Olahan Pangan Menyehatkan." *Jurnal Pembelajaran Pemberdayaan Masyarakat (JP2M)* 4(2):467–78. doi:10.33474/jp2m.v4i2.20087.
- Agustina, Rini, and Dodit Suprianto. 2018. "Analisis Hasil Pemanfaatan Media Pembelajaran Interaktif Aljabar Logika Dengan User Acceptance Test (UAT)." *Smatika Jurnal* 8(02):67–73. doi:10.32664/smatika.v8i02.205.
- Agustina, Rini, Dodit Suprianto, and Tiffany Azhar Izzuddin. 2024. "Entrepreneurship: Making Aloe Vera-Based Health Drink In Sekarpuro Village Area, Malang." *ABDIMASNU: Jurnal Pengabdian Kepada Masyarakat* 5(2):86–90.
- Agustina, Rini, Dodit Suprianto, and Sovia

- Rosalin. 2023. "Pembuatan Sabun Cuci Piring Untuk Meningkatkan Kreativitas Ibu Rumah Tangga Di Wilayah Pakis." *ABDIMASNU: Jurnal Pengabdian Kepada Masyarakat* 3(2). doi:10.47710/abdimasnu.v3i2.211.
- Aini, Kurratul;, Taslim; Sjah, Hayati; Zakaria, and I. Ketut Budastra. 2025. "Keamanan Pangan Produk Olahan Lahan Kering Di Kota Mataram." *Agroteksos* 35(1):216–28.
- Arisona, Dita, and Nurita Indriani. 2022. "Strategi Branding Dan Positioning Pada Umkm Olahan Salak Kabupaten Bangkalan." *Jurnal Ekonomi Efektif* 4(4):485–501.
- Astari, Naura Mutia, and Vita Efelina. 2021. "Penerapan Metode Participatory Rural Appraisal (Pra) Pada Susu Kedelai Di Desa Kutagandok Application of Participatory Rural Appraisal (Pra) Methods on Soybean Milk in the Kutagandok Village." *INTEGRITAS : Jurnal Pengabdian* 5(1):164–76.
- Astuti, Isti. 2017. "Pengaruh Substitusi Bungkil Kedelai Dengan Bungkil Wijen Lokal Terhadap Efisiensi Protein Dan Performan Ayam Broiler." *Sains Peternakan* 5(1):23. doi:10.20961/sainspet.v5i1.4906.
- Hudayana, Bambang, Pande Made Kutanegara, Setiadi Setiadi, Agus Indiyanto, Zamzam Fauzanafi, Mubarika Dyah F. Nugraheni, Wiwik Sushartami, and Mohamad Yusuf. 2019. "Participatory Rural Appraisal (PRA) Untuk Pengembangan Desa Wisata Di Pedukuhan Pucung, Desa Wukirsari, Bantul." *Bakti Budaya* 2(2):3. doi:10.22146/bb.50890.
- Pamungkas, Edy Tya Gullit Duta Pamungkas, Sugiyono, and Budi Nurtama. 2018. "Tempe Bungkil Kacang Tanah Khas Malang." *Pangan* 1(1):1–11.
- Rahmi, Silvi Leila, Mursyid Mursyid, and Dian Wulansari. 2018. "Spiced Tempe Formulation and Evaluation of Its Nutrition Values." *Industria: Jurnal Teknologi Dan Manajemen Agroindustri* 7(1):57–65. doi:10.21776/ub.industria.2018.007.01.7.
- Romulo, Andreas, and Reggie Surya. 2021. "Tempe: A Traditional Fermented Food of Indonesia and Its Health Benefits." *International Journal of Gastronomy and Food Science* 26(December 2021). doi:10.1016/j.ijgfs.2021.100413.
- Ruswanto, Ruswanto, Gatut Ari Wardani, Tresna Lestari, Ditha Rizqi Aulia Utami, and Annazalia Rustandi Putri. 2022. "Sosialisan Dan Workshop Yoghurt Dalam Rangka Peningkatan Derajat Kesehatan Masyarakat." *JMM (Jurnal Masyarakat Mandiri)* 6(5):6–9. doi:10.31764/jmm.v6i5.9743.
- Sari, Isnaini Permata, and Yunita Siti Mardhiyyah. 2021. "Kajian Literatur: Potensi Pemanfaatan Protein Tempe Non-Kedelai." *Jurnal Teknologi Pangan* 14(2). doi:10.33005/jtp.v14i2.2457.
- Yoshari, R. M., M. Astawan, E. Prangdimurti, and T. Wresdiyati. 2023. "The Production Process of Tempe Protein Isolate from Germinated Soybeans and Its Potential as an Antidiabetic." *Food Research* 7(1):71–79. doi:10.26656/fr.2017.7(S1).23.
- Yuliani, Rahma. 2020. "Peningkatan Penjualan Melalui Inovasi Kemasan Dan Label Pada Umkm." *Jurnal Keuangan Umum Dan Akuntansi Terapan* 2(2):71–76.