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Empowering Smallholder Dairy Farmers through Product Diversification: A Sustainable Value-Addition Strategy in Pasuruan

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A B S T R A C T

The Sidomuncul II dairy cattle farmers group in Pasuruan faces the challenge of low fresh milk selling prices due to market fluctuations and limited access to processing facilities. This condition reduces the added value received and, consequently, affects farmers' welfare. This community service activity aims to empower farmers by diversifying fresh milk products into mozzarella cheese and yoghurt, thereby increasing added value. The method used is Participatory Rural Appraisal (PRA), which emphasizes active participation of partners in the process of problem identification, needs analysis, and solution formulation. The stages of activities include the socialization of business feasibility and marketing of processed milk products, technical training in mozzarella cheese and yoghurt production, mentoring, and production monitoring. The results show that farmers can produce both products with good quality standards and improve their skills in processing and packaging. In addition, farmers are increasingly aware of the importance of product innovation for maintaining business sustainability. This activity also opens new marketing opportunities through local and digital networks, thereby contributing to increased farmers' income.

Contribution to Sustainable Development Goals (SDGs):
SDG 1: No Poverty
SDG 8: Decent Work and Economic Growth
SDG 12: Responsible consumption and production

1. INTRODUCTION

1.1. Research Background

Dairy farming is an important subsector in Indonesia's agricultural development. In addition to providing nutrition for the community, particularly animal protein and calcium, dairy farming also contributes to employment and rural economic growth. However, this enormous potential has not been optimally utilized. According to the Ministry of Agriculture, national milk production is only around 824,300 tons, far lower than the national demand of 4 million tons per year [7]. As a result, Indonesia still relies on imports to meet more than 70% of its milk needs [3] This situation is ironic, considering that many regions in Indonesia are actually dairy cattle centers, one of which is Kota Pasuruan in East Java.

During the 2021-2023 period, dairy cow milk production in Pasuruan and Boyolali showed quite varied trends. In Pasuruan in particular, dairy cow milk production experienced a significant increase from 2021 to 2022. According to the latest data from the Kota Pasuruan Agriculture Office in 2024, milk production reached 97 litres. The largest milk production was in Tutur, Lekok, and Puspo Districts. However, despite this potential, dairy farming in Pasuruan still faces various challenges that hinder the competitiveness of dairy products in the global and domestic markets (Figure 1).

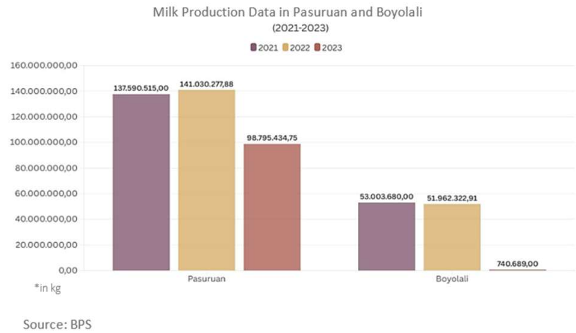

Figure 1. Milk Production Data in Pasuruan and Boyolali

Generally, local dairy farmers face the classic problem of low fresh milk prices. At the farmer level, the price is only around IDR 5,000-6,000 per litre. This price is not commensurate with production costs, especially feed and labor costs, which continue to increase. As a result, farmers' profit margins are getting thinner, and many are only surviving to cover their daily living expenses. In addition, milk consumption in Indonesia remains low at around 16 litres per capita/year [3]. This figure lags far behind Malaysia (50 litres per capita/year) and Thailand (35 litres per capita/year).

This low consumption is not only due to people's purchasing power but also to the limited variety of dairy products available in the local market. Consumers tend to be more interested in products that are varied, practical, distinctive in taste, and with a longer shelf life. Current consumption trends show a significant increase in dairy-based processed products, particularly yogurt and mozzarella cheese. In India and Europe, value-added dairy products have been shown to increase the competitiveness of small farmers amid low milk prices [5]. Yoghurt is popular for its health benefits as a probiotic [19], while mozzarella is gaining popularity as the bakery, restaurant, and fast-food industries expand [6].

Grand View Research reports that in Indonesia's ready-to-eat frozen cheese market, mozzarella is the largest segment and the one experiencing the fastest growth, mainly due to increased consumption of pizza and fast food [2]. This condition indicates a significant market opportunity for farmers if they diversify their dairy products. Desa Kemiri, Kec. Puspo, Kota Pasuruan, is one of the dairy cow centres, with a population of more than 17,000 heads. However, most of the milk produced is still sold in its fresh form through cooperatives, with no added value from processing. As a result, farmers' bargaining position is very weak. They are only suppliers of raw materials, while the processing industry enjoys greater profits.

The gap between the low price of fresh milk and the high demand for processed products shows the need for innovative strategies for farmers.

1.2. Literature Review

Research in agribusiness shows that product diversification and innovation strategies can increase the resilience of small businesses. Agroindustrial MSMEs must understand the importance of adapting to strengthen their competitiveness [13]. In addition to production, marketing is also crucial. Research confirms that digital marketing and branding for MSMEs are effective in increasing income for small and medium-sized businesses. The importance of food safety and the application of simple technology so that local processed products can be accepted by a broader market [8].

Milk processing training successfully improved farmers' skills and motivation in developing milk processing businesses [18]. Research in Bangelan Village, Malang, shows that processing milk into yoghurt can yield a profit of around IDR 9,793 per unit, which is much higher than the profit from selling fresh milk [2]. Similarly, a study at KPBS Pangalengan confirms that mozzarella cheese and yoghurt provide significant added value to dairy farmers' household incomes [12]. It is noted that yoghurt consumption in Indonesia continues to increase, along with public awareness of healthy lifestyles [10].

Some of the foundations of this research served as the basis for community service activities focused on diversifying dairy products into yoghurt and mozzarella cheese. One relevant solution is product diversification through training and assistance in processing milk into products with higher selling value. This community service also addresses the issues of low fresh milk prices and farmers' weak bargaining position by formulating solutions through dairy product diversification, including training in yoghurt and mozzarella cheese production. These two products were selected based on technical and market considerations. From a technical standpoint, the processes for making yoghurt and mozzarella are relatively simple, can be done with household equipment, and do not require large investments. This allows farmers to immediately practice it independently, without relying on large-scale industries [9].

The primary outcome is to improve farmers' ability to process fresh milk into high-quality products, such as yoghurt and mozzarella cheese. This is important because improving milk processing skills can directly impact the motivation and independence of livestock groups. In addition to improving skills, this activity aims to develop prototypes of processed products from local milk [8]. Such products have been proven to extend shelf life while increasing consumer appeal [9]. From an economic perspective, this diversification is expected to increase the added value of milk by two to three times compared to the sale of fresh milk.

1.3. Research Objective

This community service activity aims to empower farmers by diversifying fresh milk products into mozzarella cheese and yogurt as a strategy to increase added value.

2. MATERIALS AND METHODS

Participatory Action Research (PAR) is one of the most popular social research models in community service activities, especially in universities. This is because the principles of PAR are highly relevant to the three pillars of higher education, namely education and teaching, research, and community service [16]. PAR is often described as research that involves the community as its research subjects. The purpose of the PAR method is to make improvements [11]. In this Program Kemitraan Masyarakat (PKM), the community service team used the Participatory Action Research method as a reference in preparing an activity implementation plan, with the problem identification and need analysis stages conducted together with partners. This was followed by solution planning and by conducting counselling, demonstrations, and practices on processing milk into mozzarella

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cheese and yoghurt. The final stage was mentoring and evaluation.

The community service activity was carried out at the residence of the Head of the Sidomuncul II Farmer Group in Desa Kemiri, Kec. Puspo, Kota Pasuruan, is one of the dairy cow centers. Problem identification and solution planning through FGDs were conducted in February-March, followed by socialisation and counselling on June 21, 2025, and the implementation of processing and packaging practices on June 26-28, 2025. The activity partner was the Sidomuncul II Farmers Group, which had only been selling fresh milk through a cooperative. There were 30 participants in the activity, including livestock group members and housewives who had been helping with the milking process. In addition to the farmers, the activity was attended by the head of the farmer group, who accompanied them daily. The presence of these parties showed broad support for efforts to increase farmer capacity through milk product diversification.

The method for this community service activity was also based on the PKM team's research roadmap. The main focus of this activity was diversifying processed dairy products and strengthening digital marketing to achieve economic sustainability for farmers. In the initial stage, research and community service [1] played an important role in strengthening institutions by forming farmer groups (gapoktan) and improving the farmer marketing system (Figure 2),

Furthermore, the research results enriched the approach by adding aspects of digital branding and entrepreneurship. Training designed from this research enables farmers to build a stronger, more professional product image across various digital platforms, including Instagram, Facebook, and e-commerce sites such as Shopee and Tokopedia. In addition, strengthening the entrepreneurial spirit and applying the concept of sustainable economy are also introduced as strategies to build a dairy business that not only survives but also grows competitively. Another important contribution emphasises food safety and the improvement of processed product quality. This is continued in the research, which encourages the diversification of dairy-based products, such as the development of flour and jam from local ingredients [1].

This series of studies provides a strong foundation for the PKM team in designing the development of processed dairy products, such as yoghurt, local cheese, and other value-added products with broad market potential. Strengthening packaging and branding strategies is also an important part of penetrating domestic and international markets. Overall, this roadmap supports the team's grand vision to improve the economic sustainability of dairy farmers in Pasuruan through product innovation and digitalisation of marketing.

3. RESULT AND DISCUSSION

The community service activity was carried out in Desa Kemiri, Kec. Puspo, Kota Pasuruan, to improve farmers' skills in processing fresh milk into value-added products such as yoghurt and mozzarella cheese. This activity was attended by 30 dairy farmers from the Sidomuncul II Farmer Group.

The activity was carried out in three stages, namely material delivery, demonstration, and hands-on practice. In the material delivery stage, participants gained an understanding of the weaknesses of fresh milk, which has a short shelf life and fluctuating prices. States that the shelf life of fresh milk is only about 6-8 hours at room temperature without refrigeration, so farmers often incur losses due to distribution constraints and the risk of contamination. In fact, by applying technologies such as pasteurisation, fermentation, and processing to produce value-added products such as yoghurt, milk caramel candy, and ice cream, the selling value can be increased significantly [1].

Figure 2. Presentation of Material on the Importance of Product Diversification

To measure the activity's effectiveness, the implementation team used pretest and posttest instruments. Before the In the socialisation session, participants were asked to complete a questionnaire that measured their understanding of product diversification, marketing strategies, and basic business analysis.

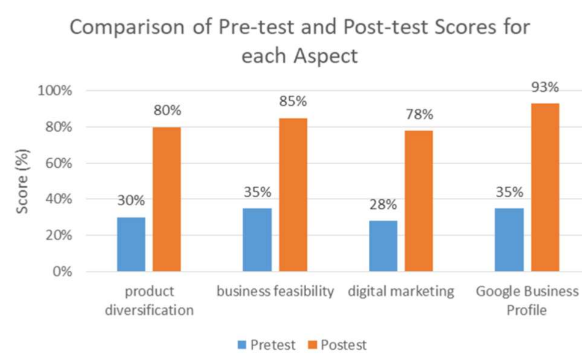

Figure 3. Graph comparing partners' understanding before and after the activity

Based on the evaluation results shown in Figure 3, there was a significant increase in the aspects of product diversification and business feasibility analysis following the activity. The pretest score for product diversification was only 30%, but it increased sharply to 80% in the post-test, indicating that participants understood and mastered the concept of milk product diversification as a strategy to increase added value. Meanwhile, in terms of business feasibility, the initial score of 35% jumped to 85% after the training, indicating that participants were not only able to design a variety of processed milk products, but also had the skills to assess the financial feasibility, market prospects, and sustainability of the businesses they developed. This indicates that the training activities successfully increased participants' knowledge and skills in developing dairy-based businesses through a more innovative, business-oriented approach.

During the demonstration and practice of yoghurt making, participants were taught to pasteurise milk at 85°C for 30 minutes, cool it to 43°C, add a lactic acid bacteria starter, and ferment it for 6–8 hours.

Figure 4. Demonstration of cheese and yogurt making practices

The practice results showed that most participants successfully produced yoghurt with a thick texture, a fresh taste, and a distinctive aroma. This knowledge aligns with Shekhar's (2024) study, which confirms that controlling fermentation factors—especially temperature, pH, acidity, and starter culture quality—is key to producing high-quality yoghurt. In addition, several participants made simple innovations by adding local fruits, in line with research [9] which states that consumer preference-based innovations can increase product competitiveness.

During the mozzarella cheese-making practice, participants learned the stages of heating milk, adding coagulants (rennet), forming curds, boiling, and stretching the dough. The evaluation results showed varying levels of success among the groups, particularly during the dough-stretching stage. However, the majority of the groups succeeded in producing mozzarella with good elasticity and the ability to melt when heated, in accordance with general product standards. These findings support research findings that small-scale cheese production can be carried out using simple technology without compromising quality [17].

After the practical training and demonstration on making mozzarella cheese and yoghurt drinks, the activity continued with the product packaging process, using 250 ml bottles for yoghurt and vacuum-sealed plastic for 250 grams of mozzarella cheese. This packaging process not only maintains product quality, hygiene, and shelf life, but also increases sales value by adding visual identity through labels and the “SIMOORA” trademark. The presence of labels with attractive, informative designs is expected to convey a professional image, strengthen branding, and increase consumer appeal for diversified fresh milk products produced by farmer groups.

From an economic perspective, simulation calculations show that the selling price of yoghurt is around IDR 10,000 per 250 ml bottle, while mozzarella is IDR 45,000 per 250 grams. These values are much higher than those of fresh milk, which is priced at Rp5,000–6,000 per litre at the farmer level. This means that dairy product diversification can increase selling value by 2 to 3 times. This reinforces confirms that dairy product diversification has a significant impact on improving the income of farming households [14].

Figure 5. (a) Demonstration of packaging with partners (b) Mozzarella cheese and yoghurt packaging with SIMOORA labels

The results of the joint reflection with the participants showed high enthusiasm to continue the milk processing business as a group. The participants also realized the importance of institutional support and long-term assistance for the business to be sustainable. The success of small livestock-based business development is greatly influenced by institutional factors, collaboration, and program sustainability [18]. Thus, this activity has succeeded in equipping farmers with technical skills, economic understanding, and entrepreneurial motivation. Diversifying fresh milk into yoghurt and mozzarella cheese has proven an effective strategy for increasing added value, expanding market opportunities, and strengthening farmers' bargaining power at the local level.

4. CONCLUSION

The PKM community service activity in Sidomuncul II Farmer Group, Desa Kemiri, Kec. Puspo, Kota Pasuruan, shows that diversifying fresh milk into processed products such as yoghurt and mozzarella cheese can be a real solution to the low selling price of milk at the farmer level. Through a participatory approach that included counselling, demonstrations, and hands-on practice, participants acquired new technical skills and motivation to develop milk-processing businesses. The training results showed that farmers could produce high-quality products with greater economic value than fresh milk. The involvement of members also provided important support for the program's sustainability.

This activity not only improves individual skills but also fosters collective awareness among farmers about the importance of business innovation. The expected long-term impact is the formation of small dairy processing businesses, which can expand markets, increase income, and strengthen farmers' bargaining position. Thus, this service contributes to the achievement of sustainable development goals, particularly food security and local economic growth.

REFERENCE

[1] Anifiatiningrum, Solikin, N., Yuniati, E., Linawati, Ariana, M., & Ramadhani, C. F. (2024). Pelatihan Teknik Pascapanen Dan Penyimpanan Susu Segar Peternak Sapi Perah “Sumber Mulyo” Desa Jugo, Kecamatan Mojo, Kabupaten Kediri. Jurnal Pengabdian Kepada Masyarakat - UKK, 48–54.

[2] Ardiansyah, R., Utami, H. D., & Nugroho, B. A. (2021). Value Added Analysis of Milk Process Products in Wonosari District, Malang Regency. Jurnal Ekonomi Pertanian Dan Agribisnis (JEPA), 5(1), 204–211.

 https://doi.org/10.29165/ajarcde.v9i3.864

[3] FAO. (2022). Dairy Market. Dairy Market Review: Overview of Global Dairy Market and Policy Developments in 2021, 1–5. Retrieved from https://www.fao.org/3/cc1189en/cc1189en.pdf

[4] Grand View Research. (2022). Indonesia Individual Quick Frozen Cheese Market Size & Outlook.

[5] Hemme, T., & Otte, J. (2010). Pro-Poor Livestock Policy Initiative Status and Prospects for Smallholder Milk Production A Global Perspective. In the Food and Agriculture Organization of the United Nations.

[6] Intelligence, M. (2023). Mozzarella Cheese Market Size & Share Analysis - Growth Trends & Forecasts (2025 - 2030) Source: https://www.mordorintelligence.com/industry-reports/mozzarella-cheese-market?utm_source.

[7] Kementrian Pertanian. (2023). Statistik Peternakan dan Kesehatan Hewan 2023. 2, 1–253. Retrieved from https://satudata.pertanian.go.id/assets/docs/publikasi/Buku_Statistik_2023_ISSN.pdf

[8] Kesuma, R. F., Rahmadianto, S. A., & Yuniati, Y. (2020). Peningkatan Pemahaman Mengenai Keamanan Pangan bagi Masyarakat Desa Tegalweru. JAPI (Jurnal Akses Pengabdian Indonesia), 5(1), 18–21. https://doi.org/10.33366/japi.v5i1.1267

[9] Krisnaningsih, A. T. N., & Setiyaningsih, W. (2018). IbM KELOMPOK PETERNAK SAPI PERAH DI DESA KEMIRI KECAMATAN JABUNG KABUPATEN MALANG. Jurnal Pengabdian Masyarakat Universitas Merdeka Malang, 3(1). https://doi.org/10.26905/abdimas.v3i1.2249

[10] Noer, R. L., Prihananto, P., Ninglasari, S. Y., & Made, N. G. (2024). The Motivation of Healthy Product Consumption: A Bibliometric Study. International Journal of Academic Research in Business and Social Sciences, 14(6), 1290–1303.

[11] Putri, R. A., & Sembiring, S. B. (2021). Implementasi Aplikasi Desktop Publishing untuk Desain Flyer dan Kartu Nama dengan Metode Participatory Action Research (PAR). Jurnal IPTEK Bagi Masyarakat, 1(1), 1–7.

[12] Ramadhani, F., Santoso, S. I., & Sumarsono, D. (2019). Analisis Nilai Tambah Komoditi Produk Olahan Susu di Koperasi Peternakan Bandung Selatan (KPBS), Kecamatan Pangalengan, Kabupaten Bandung. Jurnal Ekonomi Pertanian Dan Agribisnis, 3(4), 738–750. https://doi.org/10.21776/ub.jepa.2019.003.04.9

[13] Ramadhani, M., Yuswita, E., Riana, F. D., Sosial, J., Pertanian, E., Pertanian, F., & Brawijaya, U. (2023). Analisis Ketahanan Pelaku Usaha Pada Kafe Di Kota Malang Saat Pandemi Covid-19 Analysis of Entrepreneurial Resilience At Cafes in Malang City During the Covid-19 Pandemic. 7(1), 389–404. Retrieved from https://doi.org/10.21776/ub.jepa.2023.007.01.34

[14] Rusdiana, S., Praharani, L., Ishak, A. B. L., & Talib, C. (2021). Peningkatan Nilai Ekonomi Peternak Melalui Diversifikasi Usaha Sapi Perah (IMPROVEMENT OF FARMERS ECONOMIC VALUE THROUGH DIVERSIFICATION OF DAIRY COW BUSINESS). Jurnal Veteriner, 22(36), 583–598. https://doi.org/10.19087/jveteriner.2021.22.4.593

[15] Shekhar, C. (2024). Influence of production processes on assessment of safety and quality of fermented milk. In The Microbiology, Pathogenesis and Zoonosis of Milk Borne Diseases (pp. 95–114).

[16] Siswadi, & Syaifuddin, A. (2024). Penelitian Tindakan Partisipatif Metode Par (Partisipatory Action Research) Tantangan Dan Peluang Dalam Pemberdayaan Komunitas. Jurnal Institut Pesantren Sunan Drajat (INSUD)Lamongan, 19(02), 111–125. Retrieved from https://doi.org/10.55352/uq

[17] Suryaningrat, I. B., Novita, E., & Kasanah, U. (2020). Cleaner Production Practices in Agroindustry: A Case of Small Scale Cheese Factory in Indonesia. International Journal on Food, Agriculture and Natural Resources, 1(1), 19–23. https://doi.org/10.46676/ij-fanres.v1i1.5

[18] Widadie, F., Setyowati, S., Handayani, S. M., & Sundari, M. T. (2021). Pelatihan Pembuatan Yoghurt Pada Kelompok Ternak Di Desa Kemiri Kecamatan Mojosongo Boyolali. SEMAR (Jurnal Ilmu Pengetahuan, Teknologi, Dan Seni Bagi Masyarakat), 10(1), 29. https://doi.org/10.20961/semar.v10i1.45874

[19] Widyastuti, Y., Febrisiantosa, A., & Tidona, F. (2021). Health-Promoting Properties of Lactobacilli in Fermented Dairy Products. Frontiers in Microbiology, 12(May), 1–8. https://doi.org/10.3389/fmicb.2021.673890