



Diversifying Chili Products and Managing Business For Harvest Season Solutions: International Collaboration for Community Service

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Abstract: This community service program aims to enhance farmers' understanding and skills about various processed chili products, labeling and packaging technologies, and financial management. The program's approach is counseling, incorporating theories related to the diversification of processed chili commodities, branding, and packaging types alongside financial management procedures. The training progressed with the production of chili-based commodities, including chili syrup, chili candy, chili blocks, and chili chips. Training on labeling and packing, in addition to financial management techniques. The evaluation instrument used was a pre-test and post-test questionnaire to assess changes in participants' knowledge. The data were analyzed using descriptive statistics, focusing on mean and percentage score improvements. The results of this community service project indicate that Partner's knowledge in processed chili products escalated from 45% to 95%, partners' skill in processing diverse chili products advanced from 40% to 90%, the ability to understand and design labels and food packaging enhanced from 35% to 85%, and understanding and abilities in financial management rose from 45% to 80%.


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Introduction

The agricultural sector plays an important role in creating a large number of jobs compared to other sectors in the Indonesian economy. This makes the agricultural sector influential on the economy in Indonesia (Nadziroh, 2020). Chilies (*Capsicum annum* L.) are a strategic commodity of the Indonesian Ministry of Agriculture. This means the commodity has high economic value, contributing significantly to the national economy (Iswari, 2022). Chilies are a seasonal commodity; during the main harvest, the selling price can be very cheap, and during the harvest time, the selling price is very expensive. The high fluctuation in selling prices causes chili commodities to become one of the commodities contributing to inflation (Nugrahapsari & Arsanti, 2019; Fahriani et al., 2023). Red chili (*Capsicum annum* L.) is a horticultural crop that has a high economic value. Chili is a promising commodity for farmers because it has economic value, is an industrial raw material, can be a seasoning, has the opportunity to export, and can also provide employment opportunities (Jasmin et al., 2020).



The supply of chili in the market is abundant, especially during the main harvest, causing the selling price of chili to be very cheap. Chili is easily damaged, shrinks, and expands quickly. Most farmers do not dare to take the risk of achieving a chili harvest that takes too long. In addition, farmers' knowledge and skills in post-harvest processing of chili are still limited, so farmers prefer to sell all their chilies, which ultimately causes an oversupply of chili in the market (Tamam et al., 2015). One of the problems with chili is its easily damaged and short-lasting nature. Fresh chili stored at room temperature has a short shelf life of 3-5 days. Fresh chili stored below 10° C can only last 7-10 days. Therefore, post-harvest handling activities are very important in maintaining the condition of chili prices in the market to remain stable and extend the shelf life of chili products (Tamam et al., 2015). Through food diversification initiated by the government, this can be an opportunity to develop chili into various types of processed products so that its selling value increases and it can be in demand by all levels of society. Processed products made from chili can be marketed through marketplaces or online, which will reach customers widely. A marketplace is generally defined as an intermediary for sellers and buyers to meet in transaction activities via digital platforms (Lestari et al., 2021).

One of the groups that has the potential to act as an initiator in the community is the farmer group at the hamlet level. Human resource development can be done by empowering groups at the hamlet level to improve the members' skills, creativity, and innovation. According to Setiyoko et al. (2023), community empowerment is not only used solely for basic needs but also as an effort to find new alternatives for local economic growth. A productive business organization, Pasekan Lor, Yogyakarta, which has chili farmer group members of approximately 20 active members, is one of the productive business groups that manages approximately 1 hectare of chili land. In general, they sell their chilies in fresh form to traditional markets and have not diversified their products. The chili farmers don't have an understanding or ability in various processed chili products, labeling and packaging technologies, and financial management.

Attractive packaging is crucial for enhancing the value of the chili product. Persuasive and distinctive packaging is crucial for promoting any new product introduced to the market. This packaging may have a novel appearance, style, materials, and design, or be adapted from prior packaging. Packaging serves several tasks, including safeguarding product quality, enhancing product durability, facilitating transmission of product and brand information to customers, assisting the distribution process from producers to consumers, enabling mass manufacturing, and stimulating consumer interest. They are acquiring or utilizing the thing till the conclusive choice to acquire or use it (Kusumawati et al., 2022; Setiyoko et al., 2023). Furthermore, Tokiman et al. (2019) explained that effective packaging is crucial as it serves not only to contain and safeguard the contents but also acts as a medium to attract and inform consumers about the goods within. Food packaging may prolong the shelf life of products by inhibiting degradation, preserving the advantages of processing, and maintaining or enhancing the quality and safety of food.

Financial management is needed to find out the extent of the group's business development related to profit and loss and statements of financial position, such as assets, debts, and capital. Profit and loss reports are needed to determine the income earned and costs incurred. From the profit/loss reports, it can be seen that the profit or loss obtained by the group, so that later it can be used for decision making. In addition, by having good financial management, the group is able to allocate its funds properly. Allocation of funds can be prioritized for productive things or generating income, such as being allocated to increase



production and land expansion. Besides, the funds must also be allocated for reserve funds used for urgent/emergency activities. Financial management in a group is necessary to account for the group's finances to members (Wulandari et al., 2023)

Based on the situation analysis above, the community service team of Mercuru Buana University Yogyakarta, Indonesia, in collaboration with Universiti Technology MARA (UiTM) Cawangan, Negeri Sembilan, Malaysia. The specific goals of this program are to enhance farmers' understanding and skills about various processed chili products, labeling and packaging technologies, and financial management.

Method

The International joint community service program was conducted over a period of six months, from January to June 2025, encompassing the stages (program planning, implementation, monitoring, and evaluation) at the residence of the Chairman of chili farmers in Pasekan Lor, Yogyakarta. The phases of the community service program consist of: analysis of partner issues; establishing solutions for partner issues; conducting training on the diversification of various chili products (chili syrup, chili candy, chili blocks, and chili chips); hybrid training and counselling on different types of labels and packaging techniques; counselling and practicing financial management; distribution of production equipment support; monitoring and evaluating programs. The employed approach is illustrated in Figure 1.

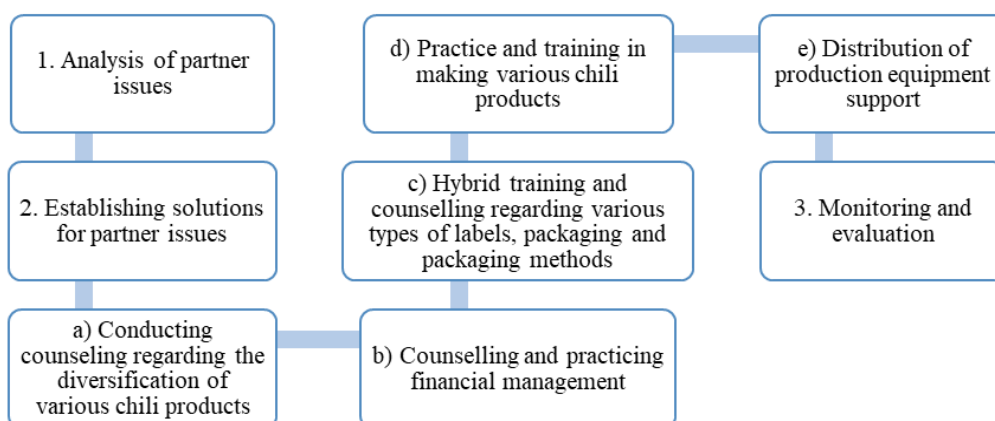


Figure 1. Phases of implementing community service activities

1) Analysis of partner issues

The initial step of scenario analysis is a comprehensive process that encompasses several critical components. The process starts with systematic data collection, encompassing the gathering of relevant data and systematically documenting various characteristics. This information offers the foundation for further inquiry. In addition to data collection, a crucial element of the process is engaging in constructive dialogues with the group's Chairperson. These meetings have two objectives: to offer a comprehensive understanding of the organization's issues. To guarantee a systematic and informed strategy for addressing the challenges encountered by partners, the investigation seeks to elucidate the current issues addressing the most critical topics by exchanging perspectives during these interactions.

2) Establishing solutions for partner issues

Proposed resolutions to these issues include the following:



- a) Providing counselling and practicing on the diversification of various kinds of chili commodities. Counseling and practice were provided to members of the Pasekan Lor chili farmers in Yogyakarta to enhance their understanding of processing chili into various products, including chili syrup, chili candy, chili blocks, and chili chips. It aims to enhance partners' expertise in manufacturing diverse chili-based commodities with increased market value.
 - b) Engagement in the practice and training of producing diverse chili products. During this session, three students and two laboratory technicians served as facilitators. Partners are categorized into four groups, each consisting of five people. The initial group prepared chili syrup, the second group crafted chili candy, the third group produced chili blocks, and the last group created chili chips. This group division seeks to enhance training efficiency to ensure it remains manageable. Subsequently, group members may pose inquiries to one another and engage in inter-group practice on the processing of their particular commodities. By employing this strategy, every group member will acquire the competencies necessary to handle all products being practiced.
 - c) Hybrid education about various kinds of labels, packaging, and packaging techniques. This tutorial describes the important role of packaging and labeling in the marketing of food commodities.
 - d) Counselling and practicing financial management, by giving guidance and hands-on training for the partners to help them effectively manage their finances. This includes: understanding basic financial concepts (income, expenses, profit, and loss), teaching budgeting skills to plan and control monthly or seasonal expenses, and promoting the importance of saving and reinvesting profits.
 - e) Distribution of production equipment support. The team provided assistance with the equipment required for the self-supporting manufacturing of various processed chili products. The equipment distributed to partners consists of a mixer, a spinner machine, a pair of candy moulders, and chili block moulders.
- 3) Monitoring and evaluation**

The closing phase involves evaluation and monitoring. This stage concludes following the counseling, training, and support procedure for independence production. Assessment is conducted throughout the beginning and ending of the activity. The evaluation instrument used was a pre-test and post-test questionnaire to assess changes in participants' knowledge. The data were analyzed using descriptive statistics, focusing on mean and percentage score improvements. The monitoring and evaluation program aimed to assess the effectiveness of the service program in enhancing partners' knowledge, abilities, and awareness about the diversification of chili product processing, as well as education on labelling, packing, and financial management. Additionally, monitoring is beneficial for offering consultations on commodities, pricing, equipment, and digital promotion of the products.

Result and Discussion

Counseling and practice of diversifying chili products

Partners received counseling to enhance their understanding of processing chili commodities, including chili syrup, chili candy, chili blocks, and chili chips. This education program enables partners to enhance their knowledge in manufacturing diverse chili commodities, which have higher selling prices than unprocessed chili. The program ended



with a question-and-answer session, following which participants may inquire about aspects of processed chili products that need further clarification. After completion of the counseling activities, the focus moved to the practice of processing chili commodities, including chili syrup, chili candy, chili blocks, and chili chips. The team got assistance from three students and two technicians acting as facilitators. Figure 2 illustrates the discussion activities related to the diversity of processed chili products. The products that are derived from the training are shown in Figure 3.



Figure 2. Counseling regarding the diversification of processed chili commodities



Figure 3. Chili products

Hybrid counseling and training regarding labels and packaging

During this counseling session, participants received an explanation on the significance of packaging and labeling in the marketing of food commodities. Packaging serves not only to safeguard the commodities but also plays a crucial part in persuading people to purchase them (Kusumawati et al., 2022). The packaging of a product serves as a way to interact between producers and customers (Indrihastuti et al., 2019; Prasetyo et al., 2023). Packaging is essential for market competitiveness. It serves as a communication instrument, delivering crucial information on the food, including nutritional value, ingredients, and expiration dates. Packaging design, sustainability, and eco-friendliness significantly impact customer decisions, as purchasers increasingly favor products that resonate with their environmental principles (Rusu et al., 2024). The label serves as the product's identification despite the presence of different products in the same market. Government Regulation Number 69 of 1999 mandates the inclusion of labels on food packaging. Nonetheless, Micro, Small, and Medium Enterprise (MSMEs) corporations prioritize their product marketing tactics while neglecting ancillary considerations such as labelling (Prasetyo et al., 2023). Effective packaging, coupled with informative labeling, may significantly contribute to the execution of marketing goals and foster feelings of consumer happiness and loyalty. Packaging using informational labels can enhance the market value of a product (Liu et al., 2025). Every participant was given an opportunity for active participation. After counseling, the team conducted a question-and-answer session to assess the participants' comprehension of community service activities, which might serve as

informative knowledge on a marketable product. The outcomes of the community service implementation indicated that the extension participants reacted well and appeared content. Participants have demonstrated their ability to identify shortcomings in their existing commodities. The hybrid training on food labeling and packaging is presented in Figure 4.



Figure 4. The hybrid training on food labeling and packaging

Counselling and practicing financial management

The team also provided training on financial administration, specifically inventory books and group cash books. Inventory books are used to record the types of inventory owned by the group, their quantities, and the sources of the inventory, the dates of acquisition, inventory codes, and the condition of the inventory. With inventory books, group members can collectively monitor the inventory they own. The volunteer team also explained how to compile cash books. The cash book is used to track the group's cash inflows and outflows, ensuring that cash flow is properly monitored. The cash book is organized using a five-column format, consisting of Date, Description, Debit, Credit, and Balance. The Debit column is used to record the amount of cash received, while the Credit column is used to record the amount of cash disbursed. The Balance column shows the cash balance after any additions or deductions. Every business venture requires good business financial management. Financial record-keeping is mandatory for both small and large businesses. The Pengabdi team emphasizes the importance of financial recording. Financial recording is necessary to measure financial performance and determine whether it is in line with targets. Methods to keep the company's cash flow under control include managing finances effectively. Financial management means that business owners must be able to plan, organize, direct, and control financial activities (Wulandari et al., 2023). The income report is used to determine the profits or losses earned by the group. A profit occurs when income exceeds expenses, and vice versa. The group must also be aware of its financial position as reflected in the balance sheet, where the total assets must be equal to the total liabilities and equity owned by the group. Financial management education and training activities are shown in Figure 5.



Figure 5. Financial management education and training activities

Distribution of production equipment support

The service team provided the equipment necessary for the independent manufacturing of diverse processed chili commodities. The equipment transferred to partners includes a mixer, a spinner machine, a pair of candy moulders, and chili block moulders. The leader of the community service team transferred this equipment to the head of the partner's group. Following the equipment handover, the team offered support in utilizing the equipment. Partners receive instruction on utilizing the provided equipment for independent manufacturing. Figure 6 illustrates the distribution of manufacturing equipment assistance.



Figure 6. The distribution of manufacturing equipment assistance.

Monitoring and evaluation

The evaluation was conducted to evaluate the impact of the community service programs in enhancing the knowledge, skills, and awareness of partners, including understanding diversification of chili-based products, skills in producing chili-based products, knowledge of label packaging, and knowledge of financial management. Participants expressed interest in producing chilli-based products. They may utilize the chillies cultivated in their land. Additionally, the elevated selling prices of chilli-based products stimulate participants to enhance their family's economic condition. Upon completion of this activity, participants are expected to have the skill in producing high-quality chilli-based products and enhance their own potential to produce good-quality products. This assessment indicates that the service activities have effectively enhanced the participants' knowledge and abilities about the diversification of chilli-based processing products, food labeling and packaging, and financial management. Figure 7 displays the evaluation results of various service activities.

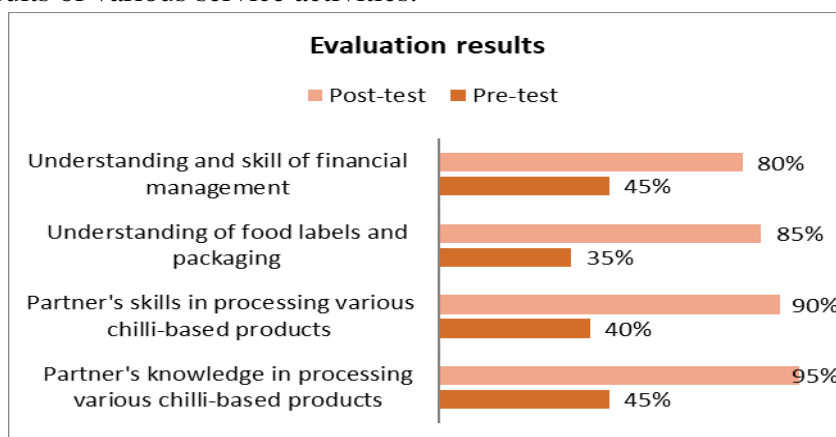


Figure 7. Evaluation results

From Figure 7, it can be seen that partner's knowledge in processed chili products escalated from 45% to 95%, partners' skill in processing diverse chili products advanced from 40% to



90%, the ability to understand and design labels and food packaging enhanced from 35% to 85%, and understanding and abilities in financial management rose from 45% to 80%. The results of the evaluation indicate that the community service programs have effectively enhanced participants' knowledge, abilities, as well as understanding of the diversification of chili-based commodities, food labeling and packaging, and financial management. This outcome demonstrates that the community service program has effectively provided advantages and enabled the community to establish enterprises for processed chili-based commodities.

Follow-up actions will include regular monitoring through periodic visits or virtual meetings with participants, distribution of simplified educational materials, and the formation of a local peer-support group. Additionally, collaboration with local institutions will be established to continue promoting and supervising the implementation of knowledge and practices gained from the program to ensure long-term sustainability.

Conclusion

The results of this community service project indicate that partner's knowledge in processed chili products escalated from 45% to 95%, partners' skill in processing diverse chili products advanced from 40% to 90%, the ability to understand and design labels and food packaging enhanced from 35% to 85%, and understanding and abilities in financial management rose from 45% to 80%. The results show a strong contribution to partner empowerment, with significant improvements in product processing, packaging, and financial skills. This supports their readiness for small-scale entrepreneurship and enhances community economic sustainability.

Recommendation

Partners need to be experienced in the intensive use of digital marketing for selling and promoting products. It is essential to enhance understanding of the procedures and methods for gaining a PIRT certificate. It is recommended that the Agriculture Service provide training in digital marketing and facilitate access to the home industry food production permit certification to support product commercialization and ensure long-term sustainability.

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