



BUILDING ECONOMIC INDEPENDENCE IN SRIDADI VILLAGE, SIRAMPOG DISTRICT, BREBES REGENCY THROUGH PRIMARY AND SECONDARY INNOVATION OF ARABICA COFFEE PRODUCTS

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Abstract. Sridadi Village in Sirampog District, Brebes Regency, faces the challenge of poverty, despite its extraordinary potential from its 118.47 hectares of smallholder Arabica coffee plantations. To optimize this potential, two productive economic partners have been established: the Berkah Abadi Farmers Group, which focuses on cultivation, and the Sirampog Estate Coffee Joint Business Unit, which focuses on coffee processing. These business units previously struggled to efficiently process downstream products due to a lack of post-harvest technology, such as conventional roasters with a capacity of only 1/2 kg/batch and small grinders with a capacity of 1 kg/batch. To address this, the Village Empowerment Team (PDB) from Peradaban University and Universitas Jenderal Soedirman, funded by the DPPM, carried out community service activities in its second year (2025). The goal is to build village economic independence through a series of interventions, including workshops, training, and appropriate technology grants, namely a 5 kg/batch roasting machine and a 10 kg/batch grinder. The results of this program have shown a very positive impact. Production capacity increased by 5-10 times for grinding and roasting processes, and farmer knowledge increased by 4.40% (from 77.3% to 81.7%). This program has proven effective in empowering communities by optimizing local Arabica coffee resources.

Keywords: Economic Independence, sridadi village, arabica coffee, primary innovation, secondary innovation.

1. Introduction

Brebes Regency is one of the regions in Central Java that faces the challenge of extreme poverty, where in 2022, the percentage of poor people reached 16.05% of the total population (1). This condition is exacerbated by the dominance of poor households from the agricultural sector, casual workers, and low levels of education (2). Nevertheless, Brebes has significant natural resource potential, with coffee being one of the region's three leading products alongside salted eggs and shallots (3). In particular, the Sirampog District, with an altitude of over 1,000 meters above sea level, is an ideal and dominant location for producing Arabica coffee (4).

The village of Sridadi in Sirampog District, despite being classified as a poor village, has tremendous potential for smallholder Arabica coffee cultivation, spread over 118.47 hectares of land. To optimize this asset, two productive economic entities have been formed, namely the



Berkah Abadi Farmer Group, which focuses on cultivation, and the Sirampog Estate Coffee Joint Business Unit, which is engaged in coffee processing. However, the downstreaming of products by the Sirampog Estate Coffee Business Unit is hampered by the lack of adoption of post-harvest technology. The equipment used is still very simple and conventional; the roasting process can only process 1/2 kg/batch, while the grinding process has a capacity of only 1 kg/batch. These technological limitations significantly restrict production capacity, hamper efficiency improvements, and ultimately reduce the potential added value that farmers can enjoy (5) and (6). In fact, through value chain analysis, it has been proven that the greatest added value in the coffee agribusiness lies in the processing of green beans and roasting (7).

Seeing this urgency, the Village Empowerment Team (PDB) from Peradaban University and Universitas Jenderal Soedirman carried out community service activities funded by DPPM. This program is highly relevant to the village priorities outlined in the 2020–2025 Sridadi Village Development Plan (RPJMDes), which includes support for capital investment through training in coffee downstream business unit management and facilitation of the promotion of superior products.

Therefore, this community service activity has the main objective of building the foundation for the economic independence of Sridadi Village through primary and secondary innovation of Arabica coffee products. The specific objectives of this intervention are 1) to increase production capacity and efficiency in coffee downstream processing through grants for modern appropriate technology tools, and 2) to improve the knowledge, skills, and competence of partner human resources (HR) in the technical aspects of cultivation, business management, and product quality control. It is hoped that this program will optimize the potential of Arabica coffee, reduce poverty, and support Sridadi Village in becoming a coffee-based tourist destination.

2. Methods

This study applied a Participatory Action Research (PAR) approach emphasizing community empowerment through local potential development, particularly Arabica coffee. The research was conducted in Sridadi Village, Sirampog District, Brebes Regency, Central Java, a highland area suitable for Arabica cultivation. The main partners were the Berkah Abadi Coffee Farmers Group (cultivation) and the Sirampog Estate Coffee Unit (processing and marketing).

The implementation consisted of five stages: preparation, socialization, training, technology application, and evaluation. During preparation, coordination and Focus Group Discussions (FGDs) were held to identify partners' needs and design action plans. The training phase focused on enhancing partners' capacity through Good Agricultural Practices (GAP) for farmers and Good Manufacturing Practices (GMP) for processors.

Technology implementation included introducing roasters, grinders, moisture testers, and digital scales to improve efficiency and product quality. Continuous mentoring ensured the proper use of equipment and application of modern coffee processing techniques. Program success was evaluated using the Plan–Do–Check–Action (PDCA) cycle by measuring partners' improvements in knowledge, skills, productivity, and product value-added. Data were collected through observation, interviews, documentation, and pre-test and post-test questionnaires, and analyzed using descriptive qualitative and simple quantitative methods.

3. Results And Discussion

The findings of this community empowerment program demonstrate that the integration of capacity building, appropriate technology adoption, and participatory assistance successfully improved the productivity and economic independence of Arabica coffee farmers in Sridadi



Village. In relation to the research objectives, the program achieved its main targets by strengthening partner competencies, improving post-harvest management, increasing production efficiency, and enhancing the value-added of local coffee products. The increase in knowledge scores from 77.3% to 81.7% indicates that training and mentoring activities effectively improved participants technical understanding and managerial awareness regarding coffee cultivation and processing. In addition, studies on community-based empowerment programs highlighted that participatory mentoring and technical training contribute significantly to increasing local entrepreneurial capacity and economic resilience in rural areas. Therefore, the results of this study further strengthen the argument that combining technological support with community participation can accelerate sustainable rural economic development.

The improvement in production performance can also be explained by the implementation of appropriate technology. The introduction of roasting machines, grinders, moisture meters, and digital scales enabled partners to standardize production processes, minimize post-harvest losses, and maintain product consistency. These improvements contributed directly to higher production capacity and better product quality. The significant increase in value-added products was primarily driven by the transition from selling raw green beans to producing roasted coffee products with various roast profiles that possess higher market value.

These findings are consistent with previous studies emphasizing that technology adoption and human resource development are important determinants of MSME competitiveness and supply chain efficiency. Prior research explained that the use of appropriate technology in coffee processing improves operational efficiency, product standardization, and market competitiveness (8). In addition, studies on community-based empowerment programs highlighted that participatory mentoring and technical training contribute significantly to increasing local entrepreneurial capacity and economic resilience in rural areas. Therefore, the results of this study further strengthen the argument that combining technological support with community participation can accelerate sustainable rural economic development.

Several factors may explain the positive outcomes observed in this program. First, the active involvement of community members throughout the implementation process created a strong sense of ownership and commitment toward program sustainability. Second, the training activities were directly aligned with the practical needs of the partners, making the transfer of knowledge more effective and easier to implement in daily operations. Third, the availability of modern processing equipment reduced production limitations previously experienced by farmers and enabled them to improve both efficiency and product quality simultaneously.

From a theoretical perspective, these findings support the Dynamic Capability Theory, which emphasizes that organizations and communities must continuously adapt, integrate knowledge, and reconfigure resources to survive in dynamic business environments. The successful adoption of technology and knowledge transfer among coffee farmers demonstrates the importance of adaptive capability in improving MSME performance and competitiveness.

Practically, this program provides evidence that integrated empowerment models combining training, mentoring, and technological assistance can become an effective strategy for developing rural MSMEs, particularly in the agricultural and coffee sectors. From a policy perspective, the findings suggest that government institutions and development agencies should strengthen support for rural MSMEs through sustainable training programs, technology grants, and collaborative partnerships to enhance local economic independence and regional competitiveness.

Overall, the program successfully strengthened the digital and technology-based coffee supply chain ecosystem in Sridadi Village. The Participatory Action Research (PAR) approach proved effective in encouraging community participation, increasing collective awareness, and fostering sustainable economic empowerment based on local potential.

Table 1. Results of Community Service Activities

No.	Outer Group	Target Status	Information
1	Description Increasing partner empowerment levels: Production Aspects	Achieved	Farmer group members are now able to produce roasted coffee beans with various roast profiles, rather than just selling green beans as before. After receiving roasting equipment, partners can now produce roasted coffee beans from selected, sorted beans. This opens up new market opportunities and significantly increases the selling value of their products.
2	Technical/equipment upgrades	Achieved	1) A roasting machine has been donated. Partners have experienced significant improvements. Previously, the coffee roasting process was only done manually with a capacity of 1/2 kg/batch. Now, with this new technology, production capacity has increased to 5 kg/batch. 2) A grinder has been donated. The grinding process has also improved, from initially only being able to produce 1 kg/batch, to a tenfold increase with the introduction of appropriate technology, a 10 kg/batch grinder. 3) A moisture meter has been donated to ensure the coffee beans are in optimal condition before roasting, preventing production failures. 4) A digital scale has been donated. Digital scales are more widely used due to their more accurate and precise measurements.
3	Quality Management Improvement: Raw material quality, process control and final product	Achieved	Members of the business group participated in training on the quality of raw materials, in-process products, and finished products. Previously, management's understanding/knowledge was only 77.3%, but after the training, this increased to 81.7%, a 4.40% increase.
4	Improving Knowledge of Cultivation and Post-Harvest Processing	Achieved	Members of the business group participated in training on processing cherry coffee into green bean products using the full-washed, semi-washed, whiney, and honey methods. After pre- and post-tests, their understanding increased by 4.40%.

Referring to Table 1, the results of community service activities under the assisted village empowerment scheme are as follows:

3.1 Improvement of Partner Capacity

The evaluation results indicated a substantial increase in both technical and managerial competencies among partners after the training and mentoring sessions. The Good Agricultural Practices (GAP) training improved farmer's understanding of standardized cultivation techniques—from planting and maintenance to harvesting and post-harvest handling—while Good Manufacturing Practices (GMP) training enhanced their ability to manage production hygiene, processing efficiency, and product consistency. Pre-test and post-test assessments showed an improvement in knowledge from 77.3% to 81.7%, reflecting a positive shift in technical awareness and skill application across the coffee supply chain.

3.2 Application of Appropriate Technology

The introduction of modern tools—such as a 5 kg capacity coffee roaster. The use of roasting machine technology makes it easy for producers to accurately control temperature and time. This precise control is crucial in creating a stable coffee flavor profile, thereby maintaining product quality in line with market standards (9). In an effort to improve the efficiency of the post-harvest process, an electric grinder machine grant was also included. This machine offers a tenfold increase in grinding production capacity, from 1 kg/batch to 10 kg/batch, while ensuring that the size of the coffee powder particles remains uniform (10). This uniformity in size is a major factor contributing to the quality of premium coffee brews [10]. To ensure the quality of raw materials, a moisture meter is also provided. This tool serves to ensure that coffee beans are at the ideal moisture level before roasting, a vital preventive measure to prevent damage or failure during the production process [11]. Given that minimal moisture content in coffee beans correlates positively with longer shelf life (13). This tool is absolutely necessary to maintain coffee bean quality. Furthermore, to support accurate mass measurement, large-capacity digital scales are also provided. The accuracy and precision offered by digital scales make them the primary choice for measuring the quantity of raw materials [13]. Figure 1 below shows the donated equipment.

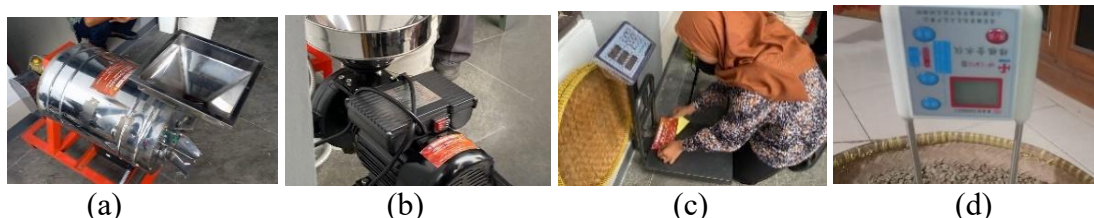


Figure 1. Handover of appropriate technology tools (a) Roasting (b) Grinder (c) Scales (d) Moisture Meter

The use of roasting and grinding machines ensured uniform bean roasting and stable flavor profiles, while the moisture tester helped maintain optimal humidity levels before packaging. These tools enabled consistent production quality and reduced post-harvest losses.

3.3 Productivity and Value-Added Impact

Following the program implementation, partners experienced a notable increase in productivity and product value-added. Average production efficiency rose by approximately 30%, while the value-added of processed Arabica coffee increased by 81.5% compared to pre-intervention levels. This improvement stemmed from enhanced production management, technology utilization, and adherence to quality standards.

These findings are consistent with prior studies (15), which highlight that digital adoption and capacity building significantly enhance supply chain efficiency and competitiveness among micro and small enterprises.

3.4 Socio-Economic Impact

Beyond technical improvements, the program generated broader social and economic benefits. Partners demonstrated increased independence, entrepreneurial motivation, and professionalism in managing their coffee enterprises. The Sridadi Arabica Coffee brand has begun to emerge as a promising local product with strong market potential and sustainable economic value for the community.

3.5 Discussion

Overall, the program effectively strengthened the digital and technology-based coffee supply chain ecosystem in Sridadi Village. The active participation of the community throughout each



implementation stage confirmed the effectiveness of the Participatory Action Research (PAR) approach in enhancing local capacity and collective awareness.

The outcomes also align with the Dynamic Capability Theory, emphasizing that the ability to adapt, learn, and reconfigure resources is a key determinant of performance in a dynamic environment. Thus, the integration of technology, knowledge, and community participation has proven essential for fostering innovation, productivity, and sustainable rural economic development in Arabica coffee production.

4. Conclusion

The Village Empowerment Program (PDB) in Sridadi Village, Sirampog District, has successfully achieved its research objectives by building the foundations for community economic independence through primary and secondary innovations in Arabica coffee products. This success was achieved through a dual intervention strategy that proved to be effective. Quantitatively, grants for appropriate technology tools—including a 5 kg/batch roasting machine and a 10 kg/batch electric grinder—have dramatically increased production capacity by 10 times compared to previous conventional methods. This increase in efficiency, supported by quality control instruments such as moisture meters and digital scales, ensures more uniform and controlled final product quality, which is key to increasing the selling value of coffee. In addition, this program has also succeeded in improving the competence of partner human resources (HR), where technical and managerial training (GAP and GMP) showed an increase in knowledge and skill levels of 4,40% (from 77,3% to 81,7%). Overall, the harmonious integration of modern technology with the strengthening of HR expertise has successfully transformed the Sirampog Estate Coffee Business Unit from an inefficient household-scale operation into a competitive business unit, thereby having a significant positive impact on increasing product added value and supporting the economic independence of Sridadi Village.

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