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Strengthening The Downstream of Robusta Coffee Products in Gunungjaya Village, Salem Sub-District, Brebes District

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Abstract

Gunung Jaya Village, Salem District, there is a Joint Business Group (KUB) "Lulumpang". Previously, the Lulumpang KUB in Gunung Jaya Village, Salem Subdistrict, Brebes Regency carried out the process of peeling cherry coffee manually using mortar and pestle. This process is time-consuming and labor-intensive, resulting in many broken beans. In addition, stripping the dry skin is also still with lumpang-alu, of course this is very time consuming and hampers the production process. "Lulumpang" also does not have an adequate drying room and drying equipment, so if there is an abundance of harvest, they are overwhelmed. Based on some of the problems faced by KUB Lulumpang as a partner, the pengabdi will handle through 3 stages of service that will be carried out in 3 years, namely year 1 focusing on cultivation and post-harvest technology. In this first year, the service program has been carried out in the form of handling post-harvest technology through training and grants of wet skin peeling tools, namely pulper. In the 2nd year, this service focuses on increasing the production and quality of raosted beans. After the General Soedirman University service team conducted counseling and workshops, the roasted bean production capacity increased 5X and group members increasingly understood the importance of quality control and procedures for saving failed products.

***Keywords**: Coffee, Roasted Bean, Value added, Quality Control*

1. INTRODUCTION

Coffee is still one of the most important plantation commodities in the national economy. In 2015 the total value of plantation exports reached US$ 23.933 billion or equivalent to Rp. 311.138 trillion (assuming 1 US$ = Rp.13,000). Meanwhile, the value of coffee exports alone in 2015 was US$ 1.197 billion despite imports amounting to US$ 31.5 billion (Directorate General of Plantation, 2017).

The coffee agribusiness in Brebes Regency has increased rapidly in recent years. Based on the coffee-producing subdistricts in Brebes, it appears in Table 1 as follows:

Table. 1 Coffee Producing Sub-districts in Brebes Regency 2015 - 2017

No	Sub-Districts	Crop Area (Ha)			Crop Production (Tons)		
		2015	2016	2017	2015	2016	2017
1	Salem	920.25	920.00	957.00	42.55	185.00	471.00
2	Bantar Kawung	25.00	25.00	25.00	13.50	13.50	15.25
3	Paguyangan	4.06	4.50	27.52	3.11	1.80	3.00
4	Sirampog	4.38	4.38	4.38	2.45	1.35	6.35
	Total	953.69	953.88	1.013,9	61,61	201.65	495.6

Source: Brebes in figures 2016-2018 (processed)

Based on Table 1. there was a fairly high increase in production, and this coffee production was dominated by Salem sub-district. One of the factors causing this condition is the change in

plant maintenance patterns so that productivity rises. Salem is a sub-district in Brebes Regency, Central Java, located at the southwestern tip of Brebes Regency. This sub-district is an area surrounded by mountains and also has a lot of potential for coffee plantations.

The condition of coffee plants in Salem Subdistrict that have been in production is generally in the form of old plants inherited from ancestors that are not well maintained, but recently in some places young coffee plants have begun to be planted and connected with superior types/clones. Salem Subdistrict has the highest coffee crop area and production compared to other subdistricts in Brebes Regency as shown in Table 1. Despite having enormous potential, it is ironic that the plantation potential has not been managed optimally and has not contributed to farmers' income as expected. The low income from the plantation sector is possible because most farmers sell low-quality cherry and green bean coffee. This is due to a lack of knowledge about plant cultivation and post-harvest handling of coffee. The coffee produced is sold still in the form of green beans to several collectors from outside the area such as Temanggung, Wonosobo and others at a price of less than Rp 21,000 per kg and less than Rp 5,000/kg for cherry coffee.

In 2019 the processing of coffee from green beans to roasted beans and ground coffee began to be carried out in Gunung Jaya Village, Salem District, which was driven by a young man from Gunung Jaya Village named Imam, processing coffee in a Joint Business Group called "Lulumpang" which already has a simple production house with 1 wet skin peeling machine, a grant from the first year of Research-Based PKM. The "Lulumpang" production house because it does not have a modern roasting or roasting, must do roasting only with pottery / manual wok. In addition, dry skin peeling is also still done with lumpang-alu, of course this is very time consuming and hampers the production process. In addition, "Lulumpang" also does not have an adequate drying room and drying equipment, so if there is an abundant harvest, they are overwhelmed. "Lulumpang" can usually pack 100 to 150 packs of ground coffee with a net weight of 100 grams in a day. For the general public, the ground coffee is sold at a price of Rp. 20,000. But if sold to resellers, the price is tagged at Rp. 15,000. Resellers who have joined, who come from the villages of Wanoja and Bentar.

Based on the situation analysis and the results of discussions between partners and the LPPM UNSOED Community Service team, the problems faced by partners are:

(1) Problems of Coffee Cultivation
- Farmers have not implemented Good Agriculture Practices (GAP)-based farming or cultivation methods. Farmers do not understand that coffee plant stems must be pruned for the growth of new branches and ease of harvesting.
- At harvest time, many farmers practice harvesting until the end, including unripe green fruit.

(2) Post-harvest Process Issues
- There are no trained personnel who understand good post-harvest processes. So that in this village the process is only by natural methods, even though there are many other types of processes such as: fullwash, honey, etc.
- Does not yet have an adequate drying room
- Do not yet have a coffee dryer. Currently, each dryer uses a very traditional tool and takes a long time to complete.

(3) Problems with production aspects/coffee processing techniques
- Do not have adequate roasting equipment. Roasting is still done with earthen pottery and manually with a very small capacity. The capacity of coffee bean roasting equipment is currently only household scale (very low).
- Do not have a dry coffee peeler. Tools are still simple and traditional

(4) Management aspect issues
- There is no record of raw materials, processes and products, so process traceability is unknown.

- Institutionalization is not organized. All activities are focused on the head of the farmer group and his son.
- Partners' knowledge of business administration and management is low.

(5) Process and Downstream Product Issues

- There are no SMEs or entrepreneurs who are engaged in the downstream processing of coffee products
- There is no community competence or expertise regarding the processing of downstream coffee products
- There is no equipment that supports the downstream coffee process

Based on the problems mentioned above, the Research-Based PKM team provides solutions to the problems as follows:

Year 1 (Focus on cultivation and post-harvest technology)

1. *Increased capacity of hulling dried coffee beans into green bean*
2. Improved farmer skills in good agricultural practices (GAP = Good Agriculture Practices), especially pruning and harvesting
3. Improved management and process administration skills

Year 2 (Focus on increasing raosted coffee production)

1. Increased production capacity of household-grade roasted coffee to small or medium industrial scale
2. Handling of low quality products
3. Improved quality control of raw materials, in-process control and finished good quality

Year 3 (Focus on Competitiveness and Business Sustainability)

1. Improving the quality of coffee product packing
2. Increased knowledge and skills in making coffee-derived products and expanded marketing access
3. Improved drying efficiency

Currently, the research-based community service team at Jenderal Soedirman University provides solutions to problems in year 2, namely focusing on increasing roasted coffee production.

2. METHOD

The following are the steps for implementing Research-Based PKM, Gunung Jaya Village, Salem District in Brebes Regency

- **Preparation:**
  - Coordination of LPPM Unsoed's Research-Based PKM team.
  - Division of tasks between members
- **Activity Planning**
  - Selection and determination of the procurement of tools and materials needed for dedication
  - Selection of the type of training, which is agreed to address the priority problems to be addressed
  - Determination of experts and resources needed (resource persons) in training / counseling activities to be carried out
  - Determination of procurement of tools and materials
  - Determination of activity schedule
  - Selection and determination of the procurement of tools and materials needed for the service

- Selection of the type of training, which is agreed to address the priority problems to be addressed
- Determination of experts and resources needed (resource persons) in training / counseling activities to be carried out
- Determination of procurement of tools and materials
- Determination of activity schedule

- **Activity Implementation**
  - **a.** Related to technical and production aspects
    The implementation of programs related to technical and production aspects is mainly solved through the procurement of tools, introduction of new tools, grants of tools, and transfer of appropriate technology. The steps to be taken are as follows: (1) Calculate the existing capacity against average needs. (2) Inventory the existing equipment needed (3) Procure and purchase the required material equipment (4) Conduct training / introduction to the use of new equipment. (5) Hand over equipment grants to partners.
  - **b. Related to HR Competence and Quality**
    The implementation of programs related to the competence and quality of human resources is mainly through training and workshops. The steps to be taken are as follows: (1) Analyzing and inventorying training and workshop needs (2) Preparing training program planning, workshops and organizational improvement (3) Preparing mentors and experts in accordance with their fields (4) Preparing training schedules (5) Implementing training programs and improvements needed (6) Submitting softcopy and hardcopy of training materials/guidelines. (7) Assisting the program and assisting in the necessary improvements, (8) Evaluating program activities.

4. Mentoring, Monitoring and Evaluation of Training Performance
After the program is completed, according to the plan, partners are expected to utilize the equipment and training. During this period, the PKM team provided assistance by attending the partner's place in months N + 1 and N + 2. The effectiveness of the program can be measured through the target output indicators that have been set.

5. Partner Participation and Contribution
In the implementation of this PKM program, KUB Lulumpang as a partner, apart from being the object of the program is also the subject, the KUB Lulumpang group is the real business actor. Partners act as participants and actively participate in training and counseling activities. In this PKM activity, partners will also contribute in the form of accurate information, a place to conduct counseling and training activities and workshops.

3. RESULT AND DISCUSSION

The implementation of Research-based community service activities carried out in Gunungn Jaya Village, Salem District, Brebes Regency was carried out in July 25, 2023. Some of the training, counseling and workshops that have been carried out include:

1. Increasing the production capacity of household-grade roasted coffee to an industrial scale.

The training materials presented included material about coffee roasting, important processes that determine coffee character and roasting evaluation to increase industrial scale. Roasting Coffee is cooking coffee, basically roasting is the process of removing water in coffee, drying and developing the beans, reducing their weight, giving aroma to the coffee. When coffee is cooked there is an accompanying chemical reaction that changes the character of the coffee beans. The longer the beans are cooked, the more the chemicals change their characteristics. When coffee is roasted, it turns brown in color.

Therefore, if the coffee beans are darker in color, it means they have been roasted longer. However, roasting coffee beans is not as simple as putting them in a roaster and then roasting them. Coffee beans will actually produce different coffee when roasted at different temperatures even if the end result is the same color, because coffee roasting is an art. Roasting is therefore one of the most important processes that will affect the quality of the aroma and flavor of the coffee. Even in percentage terms, the roasting process has an influence of up to 30% in the contribution of aroma and flavor.

Figure 1. *Handover of Roasting Machine Grant*

2. Improved quality control of raw materials

The material presented included coffee cultivation, and post-harvest processing. After the training, the activity was continued with assistance on how the implementation of standard guidelines could be applied in the field, then compiled a guidebook on post-harvest processing, so that the quality of products produced from cultivation could improve.

Improving product quality is done by increasing knowledge about cultivation, some of the training activity materials include:

a. Seeding

with seeds (Generative) specifically for Robusta coffee:

- Beds are given a roof as shade
- Before the coffee seeds are sown, the sand media must be watered, no need to fertilize it
- Seeds are planted 0.5 cm deep, 2x5 cm apart.
- Planted seeds are sprinkled with pieces of weeds/straw (conventional), or tightly covered (new method, if more than 10 thousand seeds are sown)
- Every day the beds are watered, and after reaching the seedling stage, the seedlings are immediately transplanted to polybag media.

Vegetative (Clonal) Seeding

- By making rooted cuttings seedlings
- By making connections with nematode-resistant, drought-resistant and well-rooted rootstocks, BP 308

b. Land preparation and shade planting

Mixed plant shade

- *Fruit trees: mango, jackfruit, orange, clove, ballada eggplant*

- *Vegetables: Chili, tomato, corn, boncis beans, (planted until coffee is 2 years old)*

Permanent shade

- Lamtoro (Leucaena), Gliricidae, Dadap
- Woody trees: Sengon, suren, mahogany planted only at the edge of the garden boundary

c. Fertilization
   - fertilizer is applied twice a year, at the beginning and end of the rainy season
   - ertilizer is placed/sprinkled around the coffee trunk, at a distance of 30-50 cm from the trunk.
   - before fertilizing the grass around the trunk is cleaned first, after sowing, the fertilizer is covered with soil.
   - Fertilizer dosage is determined based on soil or leaf analysis. If there is no soil/leaf analysis, a provisional dose can be used.

d. Harvest
   - harvesting is done by red picking
   - sorting in the field
   - weighing and shipping to the factory
   - storing coffee in the receiving tub and coffee is ready for processing

3. Improvement of in-process control of product quality

The materials presented included coffee quality measurement and post-harvest processes. In general, the post-harvest coffee process is divided into two methods, namely wet and dry methods. Included in the wet method are the full washed and semi washed methods. Meanwhile, the dry method coffee post-harvest process includes honey and natural process.

Value-added is the difference between output costs and input values (Feifi, et al., 2010). The value-added analysis stage has variables in the form of production output, raw materials (inputs), labor, raw material prices and product prices, labor wages, and the number of other inputs used. Value-added analysis uses the Hayami method, resulting in added value received in each element. The advantage of this method is that it is easy to understand and use, and provides complete information for actors, investors and workers.

4. Product quality improvement (finish good green coffee and ground coffee)

The material presented included the quality of the final product and ground coffee desired by customers, therefore a guidebook for measuring the quality of good ground coffee was prepared.

Coffee is a type of beverage that comes from processing coffee beans that have been roasted and ground into coffee powder. This drink is famous for its properties in resisting drowsiness, especially for those of us who like to stay up late, besides that coffee also has other effects that are good and bad for health. The most widely used types of coffee are arabica and robusta, each coffee bean has its own flavor from its respective region of origin.

When coffee beans are ground into coffee powder, they are converted into small particles, drastically releasing aroma and some other compounds. Initially the flavor- and aroma-forming compounds are bound in seed form, and when ground into coffee grounds, these good compounds are exposed to the air.

Figure 2. *Community Service Workshop*

Based on the results of the implementation of activities, the priorities for handling year 2 that have been carried out by the research-based community service team are as follows.

Table 2. Handling Priority

Handling Priority	Solution Offered	Achievement Indicator	Solution Achievement
Increased green bean roasting capacity from household scale to industrial scale	• Procurement of roasting equipment with a capacity of 5 kg/batch • Tools donated by KUB "Lulumpang" as partner	• The existence of 1 roasting tool with a capacity of 5 kg/batch • Capacity increases at least 5 x fold	• A roasting machine with a capacity of 5kg/batch has been purchased. • Production capacity of KUB Lulumpak increased by 5X
Salvage of failed and low quality products	• Quality control training • Failed product rescue training • Making action plan for product failure	• lActors understand about test pass, reprocess and reject products • There is a rescue procedure (action plan) if there is a failed product	• Group members have understood the quality control of their products • Group members understand the procedure for salvaging failed products
Improved quality control of raw materials, in process control and finished good quality	• Quality control training of raw materials, work-in-process and final products	• Members have an awareness of the importance of quality raw material • There is training for at least 70 percent of group members	• Group members have understood the importance of product quality • Training participants are 80 percent of the group members

4. CONCLUSION

Based on the results of the activities and observations made, it can be concluded that the research-based community service activities are as follows: (1) Increasing the production capacity of household class roasted coffee to a small or medium industrial scale (2) The method used is counseling and training by experts on saving failed and low quality products (3) Training and counseling on quality control of raw materials, products in process and final products

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