Vol 7 No 4, Desember 2023
ABDI DOSEN
Jurnal Pengabdian Pada Masyarakat
pISSN: 2614-6509
eISSN: 2620-5156

INCREASING KNOWLEDGE OF COFFEE FARMERS IN THE COOPERATIVE "KETAKASI" ABOUT USE SMART ECO ROASTING MACHINE THROUGH TRAINING

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Abstract
Roasted coffee is an Indonesian export product and the Ketakasi Cooperative is one of the coffee exporters and a tourist destination. In its development, the Ketakasi Cooperative needs a machine that can facilitate the roasting process and has a small capacity for profiling and educational tourism. The solution offered is the use of a Smart Eco Roasting Machine. The method for implementing this service is competency development in the form of training and mentoring at the Ketakasi Cooperative which includes three stages of activities, namely the preparation stage, implementation stage, and evaluation stage. Based on the overall evaluation results, there was an increase in the understanding of coffee farmers and cooperative administrators about the roasting process. Training participants are interested in using the Smart Eco Roasting Machine.
Keywords: Green Bean Roasting Machine, Ketakasi Cooperative, Smart Eco Roasting Machine

INTRODUCTION

Coffee is one of the plantation commodities that plays an important role in economic activities in Indonesia. Coffee is also one of Indonesia's export commodities which is quite important as a foreign exchange earner besides oil and gas. Apart from increasingly open export opportunities, the domestic coffee market is still quite large. Coffee production from 2019 to 2021 tends to increase. In 2019 coffee production was 752.51 thousand tons, increasing to 762.38 thousand tons in 2020 or an increase of 1.31 percent. In 2021 coffee production will increase to 786.19 thousand tons or an increase of 3.12 percent (BPS, 2021).

Most of Indonesia's coffee production is exported abroad and the rest is marketed domestically. Indonesian coffee exports reach five continents, namely Asia, Africa, Australia, America and Europe with the main share in Europe. In 2021, the top five importing countries for Indonesian coffee are the United States, Egypt, Spain, Malaysia and Japan. The three largest coffee export volumes in 2021 are Arabica WIB/robusta OIB, not roasted, not decaffeinated (HS 0901111000) at 97.17 percent, Coffee oth than Arabica WIB/robusta OIB, not roasted, not decaffeinated (HS 0901119000) at 2 .12 percent, Coffee,

Submitted: July-2023 Received: November-2023 Available Online: December-2023

roasted, not decaffeinated, ground (HS 0901212000) at 0.45 percent, and others at 0.26 percent (BPS, 2021).

Roasted coffee, which is an Indonesian export product, is the result of roasting green beans. According to (Sudantha et al., 2019) roasting is the process of removing water from green beans, drying and developing green beans, reducing their weight and providing aroma. When coffee is cooked there is a chemical reaction that accompanies it so that the character of the green beans (coffee beans) changes. The longer coffee beans are cooked, the more the chemicals change their characteristics. When coffee beans go through the roasting process, the coffee beans turn brown. Therefore, if the coffee beans are darker in color, it means the roasting process takes longer.

Manually roasting industrial coffee beans takes a relatively long time, namely around 2 hours in the process, so a lot of energy is needed to stir the coffee beans and causes the person carrying out the process to get tired easily if done on a large scale and will affect the quality of the roasted coffee. This makes manual coffee bean roasters less efficient (Yani, 2018).

One of the reasons for the low quality of coffee beans processed by farmers is that the use of a frying pan as a roasting medium is considered less effective due to the uneven heat of the pan and the absence of temperature control in manual roasting. As a result, excessive heat occurs which causes the heat distribution in the coffee beans to be uneven and the coffee beans turn black more quickly (Maulana, 2016).

IMPLEMENTATION METHOD

The model of this service activity is training and assistance in making roasted coffee using the Smart Eco Roasting Machine. Mentoring is a model of community service activities carried out for outreach activities accompanied by coaching and targeting activities. The method that will be used in this activity is training in making roasted coffee using a Smart Eco Roasting Machine at the Ketakasi Cooperative, Sidomulyo Village, Silo District, Jember Regency, including three stages of activities, namely the preparation stage, implementation stage and evaluation stage.

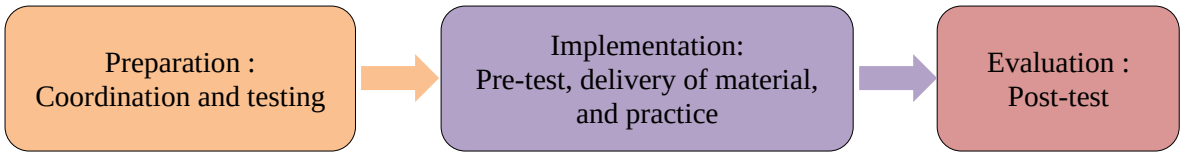

Figure 1. Stages of service activities

RESULTS AND DISCUSSION

Smart Eco Roasting Machine is a roasting machine (roasting coffee beans) designed to produce quality roasted coffee with efficient heating capabilities using an automatic infrared burner. This machine is also equipped with various features, including a digital thermometer and roast coffee cooler, which can help in controlling and monitoring the roasting process

accurately. An Arduino data logger is also used to record data during the roasting process, allowing better monitoring and control. This machine also has efficient electrical power with a consumption of around 210W.

Service activities at the Ketakasi Cooperative began with coordination with the Ketakasi Cooperative Manager, Mr. Yusron. This is done to ensure the number of participants and technical activities. In this coordination, it is agreed that the activities that will be carried out in general along with the time plan for the activities. The atmosphere during coordination is shown in Figure 2.

Figure 2. Coordination atmosphere

Before the Smart Eco Roasting Machine was socialized to users, the team carried out a series of tests to ensure the roasting machine functioned as expected. The team collects data at each stage of roasting to check the accuracy and consistency of the process.

This service activity takes the form of competency development in the form of mentoring 19 members of the Ketakasi Cooperative, namely administrators and coffee farmers. The material was delivered by the user, namely Mr. Teguh from Rangkum Coffee and a Mechanical Engineering lecturer. The content of the material includes sorting before the roasting process, density or density or mass of green beans, types of roasting, roasting process and sorting after the roasting process.

During the activity, participants were given a pre-test to determine their level of understanding of the roasting process. As many as 36.8% of Ketakasi Cooperative members do not understand the roasting process. So far, the Ketakasi Cooperative has never tried different types or levels of roasted coffee, while market demand varies.

To produce roasted coffee according to demand, testing or profiling is required, so it is necessary to use a small-capacity roasting machine, namely the Smart Eco Roasting Machine. Apart from that, to increase the number of tourist visits to the Ketakasi Cooperative, the Smart Eco Roasting Machine can be an attraction, because it allows tourists to try the roasting process themselves according to their wishes.

Delivery of material is carried out using various methods and media. The methods used are lecture, question and answer, discussion and practice. Meanwhile, the media used includes PowerPoint, images and the Smart Eco Roasting Machine. This aims to support and increase the absorption of material by cooperative members. The atmosphere when delivering the

material can be seen in Figure 3.

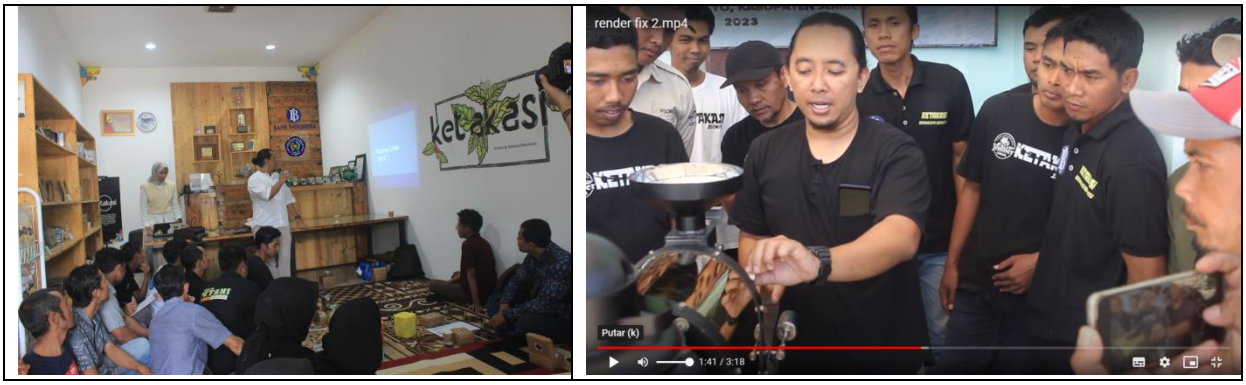

Figure 3. Atmosphere of material delivery

After delivering the material, the next stage is evaluation. Evaluation is carried out to measure the level of absorption of material by participants or cooperative members. The evaluation technique applied is by giving post-test questions to participants. The post-test results obtained are then compared with the pre-test results taken before delivering the material. From this evaluation stage, it is known that there has been an increase in the understanding of coffee farmers and cooperative administrators regarding the roasting process (Figure 4).

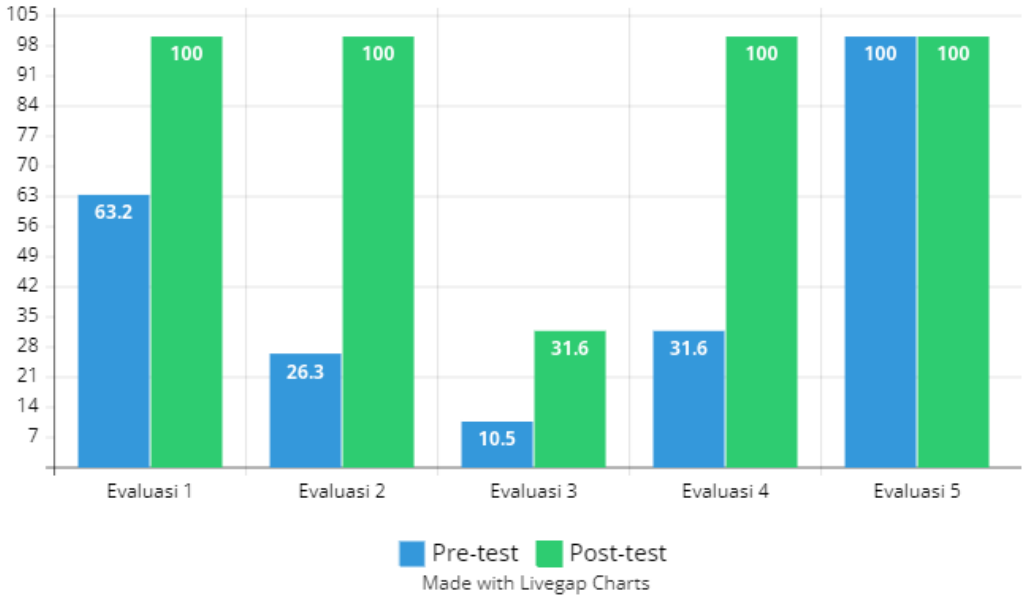

Figure 4. Increase in the percentage of training participants' answers using the Smart Eco Roasting Machine

The first evaluation showed an increase in knowledge and understanding of coffee farmers and cooperative administrators regarding the roasting process by 36.8%. Initially around 63.2% knew, but after training it became 100%. The second evaluation also showed an increase in skills in the roasting process by 73.7%. Before the training, only 26.3% had ever

carried out the roasting process. The third evaluation regarding the criteria for determining roasting type was still known by 10.5% of participants at first, after training there was an increase of 21.1%. The fourth evaluation relates to the type of roast that is commonly sold because it allows cooperatives to enter the roasted coffee market. As many as 31.6% already knew and this increased to 100% after training. The fifth evaluation found consistent answers that participants wanted to use modern machines when roasting green beans. The Smart Eco Roasting Machine is considered to suit their needs because before the Smart Eco Roasting Machine was introduced there was already a discussion about the needs of the Ketakasi Cooperative.

CONCLUSION

Competency development activities in the form of training and mentoring at the Ketakasi Cooperative include three activity stages, namely the preparation stage, implementation stage and evaluation stage. Based on the overall evaluation results, there was an increase in the understanding of coffee farmers and cooperative administrators regarding the roasting process. Training participants are interested in using the Smart Eco Roasting Machine.

Acknowledgments

We would like to thank the Directorate General of Higher Education, Research and Technology, Ministry of Education, Culture, Research and Technology for funding assistance for the 2023 Kedaireka Matching Fund Batch 2 Program.

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