AIJSED | This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License
Vol. 6 No. 02 (2026)

Andalasian International Journal of Social and Entrepreneurial Development (AIJSED)

ISSN: 2808-6732 (Online)

Available at: http://aijsed.lppm.unand.ac.id/index.php/aijsed

DOI: https://doi.org/10.25077/aijsed.6.02.26-32.2026

Article

Enhancing Coffee Farmers' Knowledge of Robusta Bean Quality through "Bean-to-Cup" Training in Nagari Simpang Utara, Pasaman Regency

Daimon Syukri[1]*, Matlal Fajri Alif[2], Risa Meutia Fiana[3], Yusti Atika[2], Diah Ayu Natasya[1], Muhammad Sulthan[1]

[1]Department of Food and Agricultural Product Technology, Universitas Andalas, Padang, Indonesia
[2]Department of Chemistry, Universitas Andalas, Padang, Indonesia
[3]Department of Agricultural Industry Technology, Universitas Andalas, Padang, Indonesia

Article Information

Received : 2026-07-21
Revised : 2026-08-15
Accepted : 2026-09-28
Published: 2026-10-21

Keywords

Bean to cup, Coffee, Community Service, Robusta, Training

* Corresponding Author

dsyukri@ae.unand.ac.id

Abstract

Robusta coffee is a leading commodity of Pasaman Regency, West Sumatra, yet the quality of coffee beans produced by farmers remains low due to harvesting and postharvest handling practices that do not yet meet standards. This community service activity aimed to improve farmers' knowledge of coffee bean quality through Bean to Cup training conducted on 5-7 July 2026 in Nagari Simpang Utara, Simpang Alahan Mati District. The implementation methods included lectures, demonstrations, hands-on practice, discussion, and evaluation using a questionnaire administered to seven participants across eight knowledge indicators. Data were analyzed descriptively based on the percentage of correct answers. The evaluation results showed that participants' knowledge level reached 92.86% (52 of 56 correct answers), classified as excellent. All participants understood the importance of selective harvesting, fruit ripeness, fermentation, and drying before storage, while knowledge of green bean moisture content before storage still needed strengthening (71.4%). The training proved effective in improving farmers' knowledge and has the potential to support improvements in the quality, added value, and competitiveness of robusta coffee in Nagari Simpang Utara.

INTRODUCTION

Coffee is a leading plantation commodity in Indonesia that plays an important role as a source of foreign exchange, employment, and farmer income. Among the two main cultivated species, robusta coffee (Coffea canephora) dominates national production due to its high adaptability, good productivity, and lower cultivation costs compared to arabica coffee. Rising domestic coffee consumption and market demand for quality coffee open up great opportunities for farmers, but these opportunities can only be seized if the quality of the coffee beans meets industry standards, which require consistency in both physical quality and flavor (Widyasari, 2023).

Pasaman Regency, particularly Nagari Simpang Utara, is one of the robusta coffee production centers in West Sumatra, where most residents depend on the coffee plantation sector. Field observations show that farmers still face obstacles such as simultaneous harvesting without regard to fruit ripeness, suboptimal sorting, fermentation and drying techniques that do not yet meet standards, and storage at moisture levels that do not meet requirements. This condition causes inconsistent coffee quality and low selling prices.

The quality of coffee beans is determined by a series of processes from harvesting to storage, including the application of Good Handling Practices (GHP) principles. One parameter that is often overlooked is the moisture content of the beans before storage; moisture content above 12.5% risks triggering mold growth and even the formation of mycotoxins that reduce the physical quality and food safety of the coffee. Successful implementation of these quality standards depends heavily on farmers' level of knowledge, since knowledge determines a person's ability to accept and apply technological innovation.

One approach considered effective for improving farmers' capacity is practice-based training, or learning by doing. In this approach, participants not only receive material theoretically but also gain direct experience through demonstration and practice, so that understanding of the material becomes deeper and longer-lasting. Various community service activities based on training and direct mentoring carried out among coffee farmer groups in various regions have been shown to significantly improve farmers' knowledge, technical skills, and economic capacity (Sembiring et al., 2023; Sugiarto et al., 2025; Teniro & Zainudin, 2022). This approach is relevant for application to the robusta coffee farming community in Nagari Simpang Utara, who have so far relied more on knowledge passed down through generations rather than the application of measurable quality standards.

Bean to Cup training is a learning method that introduces the entire stages of coffee processing, from fruit selection, postharvest processing, roasting, grinding, to brewing. Through this approach, participants can understand the relationship between each processing stage and the final quality of the coffee produced, while also building awareness that coffee quality is not merely the result of a single stage but an accumulation of the entire handling chain from the farm to the cup. This community service program, carried out by the Universitas Andalas Community Service Team (Tim PKM), aims to analyze farmers' level of knowledge of coffee bean quality after participating in the training, as a basis for developing a follow-up mentoring strategy.

EXPERIMENTAL SECTION

Location, Time, and Target of the Activity

The activity was carried out on 5-6 July 2026 in Nagari Simpang Utara, Simpang Alahan Mati District, Pasaman Regency, as part of the Universitas Andalas Community Service Program. The target participants were seven active farmers who were members of the local robusta coffee farmer group, who had cultivation experience and a commitment to developing their coffee business, so that they were expected to become agents for disseminating information to other farmers.

Implementation Stages

a. Preparation. Coordination with the village government and farmer group, identification of partner needs, preparation of materials, and preparation of equipment (coffee roaster, grinder, moisture analyzer, digital scale, brewing equipment) and coffee bean materials harvested by the community.

b. Extension/Lecture. Delivery of interactive material covering robusta coffee characteristics, coffee bean quality factors, selective harvesting, sorting, identification of defective beans, fermentation, washing, drying, moisture content standards, green bean storage, and the basics of roasting, accompanied by active discussion of field problems.

c. Demonstration. Resource persons directly demonstrated the stages of sorting, pulping, fermentation, washing, drying, and moisture content measurement, through to roasting using a 500-gram capacity machine, accompanied by an explanation of the scientific basis of each stage.

d. Practice. Participants directly tried selecting ripe (red) cherries, sorting, operating the pulping machine, observing fermentation, measuring moisture content, roasting, grinding, and brewing coffee with guidance from the team.

e. Evaluation. Conducted at the end of the activity using a questionnaire containing eight statements regarding fruit ripeness, harvesting technique, sugar content of red cherries, the function of shade trees, sorting, identification of defective beans, post-pulping drying, and green bean moisture content before storage. Each answer was classified as correct or incorrect according to the answer key.

RESULT AND DISCUSSION

The activity took place over three days using a participatory approach that combined lectures, demonstrations, hands-on practice, and discussion. This approach was chosen because it can increase participant engagement in the learning process, so that the knowledge gained is not only theoretical but can also be applied directly in daily cultivation and coffee processing activities.



Figure 1. Workshop Materials

The first day focused on delivering basic material on the importance of coffee bean quality, the factors affecting quality, and the basic principles of coffee processing. The material presented emphasized that coffee quality is determined not only by variety or environmental conditions but also by every stage from harvesting to storage. Participants were also introduced to the overall Bean to Cup concept, an approach that explains the relationship between cultivation, postharvest processing, roasting, grinding, and coffee serving in relation to the final product quality.

The second day focused on demonstration and hands-on practice of coffee processing. Participants practiced fruit sorting, pulping, fermentation, washing, drying, moisture content measurement using a moisture analyzer, and roasting using a roasting machine. The hands-on approach gave participants the opportunity to understand each stage more deeply while comparing it with the techniques they had been using in the field.



Figure 2. Coffee Bean Sorting



Figure 3. Roasting Practice



Figure 4. Roasted Coffee

The third day was filled with coffee brewing practice, discussion of the obstacles faced by farmers in coffee processing, and a knowledge evaluation using a questionnaire. The discussion was lively, allowing participants to share their experiences in cultivation and coffee processing. Several participants revealed that they had never measured moisture content before storage and still mixed fruits with different ripeness levels at harvest, indicating that the training provided new insights that participants had not previously had.

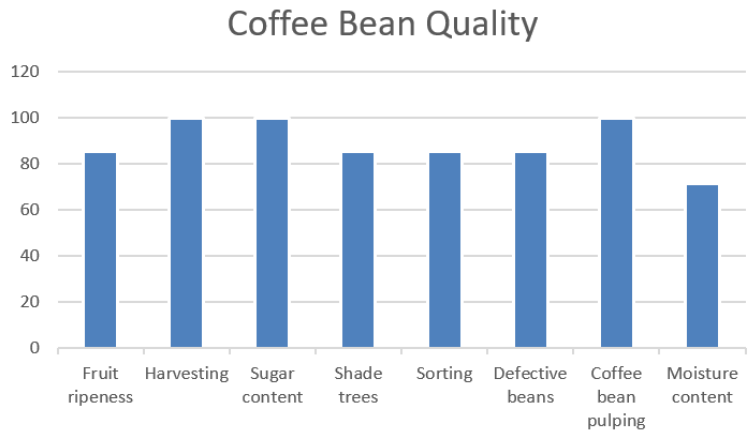


Figure 5. Graph of Coffee Bean Quality Knowledge

Effect of Fruit Ripeness on Coffee Bean Quality. A total of 85.7% of participants understood that the ripeness level of coffee cherries is one of the main factors determining coffee bean quality. Coffee cherries harvested at optimal ripeness, i.e., bright red in color, contain higher sugar content and aroma-precursor compounds compared to fruit that is still green or overripe, thereby supporting a better fermentation process and contributing to the formation of a more complex coffee flavor (Widyasari, 2023; Abubakar et al., 2022). There was still one participant who gave a less accurate answer, indicating that understanding of this indicator still needs to be strengthened through field mentoring, given that harvesting in everyday practice is often done simultaneously to save labor.

Selective Harvesting. All participants (100%) understood that selectively harvesting red cherries produces better coffee quality compared to mixed harvesting. Red cherries have an optimal physiological ripeness so that the fermentation process proceeds better and produces a more complex flavor, while green cherries contain lower sugar content and have the potential to produce an astringent taste. Participants' success in understanding this material indicates that the training has changed perceptions regarding the importance of harvesting based on fruit ripeness rather than solely on harvesting time efficiency.

Sugar Content of Red Cherries. All participants also understood that red coffee cherries have optimal sugar content to support the fermentation process. This knowledge is important because sugar is the main substrate for microorganisms during fermentation, and optimal fermentation will produce various aroma-forming compounds that affect the coffee's flavor character. Understanding of this aspect is expected to encourage farmers to pay more attention to the quality of raw materials before entering the processing stage.

Effect of Shade Trees. A total of 85.7% of participants knew that shade trees play a role in influencing coffee bean quality. Shade functions to regulate light intensity, maintain soil moisture, reduce plant stress, and slow down fruit ripening so that the development of flavor-forming compounds proceeds more optimally (Evizal et al., 2012). The presence of participants who did not yet understand the function of shade trees indicates that this cultivation aspect still needs attention in the next mentoring activity.

The Importance of Fruit Sorting. A total of 85.7% of participants understood that sorting fruit before the pulping process is an important stage in maintaining coffee quality. Sorting aims to separate damaged, pest-attacked, or unripe fruit so that only quality fruit is processed further. Good sorting practice will produce more uniform physical quality of coffee beans and reduce the number of defective beans, which directly affects the increase in coffee selling price (Teniro & Zainudin, 2022).

Identification of Defective Beans (Coffee Defects). Most participants (85.7%) understood that coffee beans with holes caused by pest attacks are classified as defective beans. This knowledge is important because the presence of defective beans can reduce the physical quality and flavor of the coffee. In coffee trading, the number of defects is one of the main parameters in determining coffee quality according to national and international standards, so farmers' ability to identify defective beans is an important competency for improving product competitiveness.

Postharvest Drying. All participants (100%) understood that coffee beans resulting from pulping cannot be stored immediately and must be dried first. Drying aims to reduce moisture content so that microorganism activity can be suppressed and bean quality is maintained during storage. This result shows that the hands-on material using a moisture analyzer had a positive impact on participants' understanding of the importance of drying.

Green Bean Moisture Content. The indicator with the lowest achievement was green bean moisture content before storage, at 71.4%, with two less accurate answers. Before the training, moisture content was generally only estimated based on the texture or sound of the bean when bitten, even though moisture content above 12.5% has been shown to increase the risk of mold growth and accelerate the decline in sensory quality and food safety of coffee beans during storage. Based on research by Wicaksono (2018), the moisture equilibrium point for coffee must be less than 12%, so coffee with high moisture content tends to have a higher level of damage.

The high percentage of correct answers (92.86%) indicates that the learning by doing approach is more effective than the conventional lecture method, in line with adult learning theory, which emphasizes the importance of real experience, as also shown by the improvement in farmers' knowledge in similar coffee postharvest mentoring activities that combined training, demonstration, and hands-on practice (Sembiring et al., 2023; Sugiarto et al., 2025). The training also changed participants' perspective, which previously assumed that coffee quality was determined only by the roasting process, into an understanding that quality is the result of a series of processes from fruit selection to roasting.

Improved knowledge of coffee bean quality has economic implications, since high-quality coffee has a better selling price, in line with the results of community service showing that optimizing coffee bean processing can genuinely increase farmer income (Teniro & Zainudin, 2022). The training introduced the concept of added value to participants, who had previously generally only sold dried beans without paying attention to quality. Mastery of small-scale roasting machines also opens up opportunities for product diversification into roasted coffee or ground coffee, as has been proven among other farmer groups that succeeded in increasing production capacity and sales volume through similar postharvest innovation (Sugiarto et al., 2025), and has the potential to reduce postharvest losses caused by drying or storage errors.

Some obstacles encountered included participants' limited experience in using modern equipment such as moisture analyzers and roasting machines, the number of practice tools not yet proportional to the number of participants, and the challenge of changing farmers' habits in the field, which are still influenced by labor availability and economic conditions. Similar obstacles have also been reported in other smallholder coffee farm mentoring activities, which emphasize the importance of continuity of mentoring so that the adoption of cultivation and postharvest techniques can be realized consistently (Suhartoyo et al., 2020). Therefore, the next community service program needs to be directed toward the technology implementation stage, preparation of harvest and postharvest SOPs, quality control training, strengthening of farmer group institutions, and sustainable collaboration between the village government, universities, and coffee business actors.

CONCLUSION

The *Bean to Cup* training program effectively improved farmers' knowledge of coffee bean quality, achieving a 92.86% learning outcome. The combination of lectures, demonstrations, and hands-on practices enabled participants to understand key quality improvement processes, including selective harvesting, fruit maturity, sorting, fermentation, and post-harvest drying. However, knowledge regarding the standard moisture content of green beans still requires further strengthening through continuous assistance. This practical-based training approach can serve as a model for developing coffee farmers' capacity to produce higher-quality and more valuable coffee products.

ACKNOWLEDGEMENTS

This work was supported by LPPM Universitas Andalas with scheme "Program Kemitraan Masyarakat Membantu Usaha Berkembang (PKM-MUB) Batch I" under Grant Number 5/UN16.19/PM.03.03/PKM-MUB/2026

REFERENCES

Abubakar, Y., Hasni, D., & Wati, S. A. (2022). Analisis kualitas buah merah kopi arabika gayo dan korelasinya dengan kualitas biji pada ketinggian berbeda. *Jurnal Tanaman Industri dan Penyegar*, 9(1), 1-14.

Adam, F., Agustina, R., & Fadhil, R. (2022). Pengujian cita rasa kopi arabika dengan metode cupping test. *Jurnal Ilmiah Mahasiswa Pertanian*, 7(1), 517-521.

Evizal, R., Tohari, Prijambada, I. D., & Widada, J. (2012). Peranan pohon pelindung dalam menentukan produktivitas kopi. *Jurnal Agrotropika*, 17(1), 19-23.

Sembiring, A. C., Sitanggang, D.L., & Purnasari, N. (2023). Pemberdayaan Petani Kopi Karo melalui Pengolahan Pasca Panen. *Jurnal Mitra Prima*, 5(2).

Sugiarto, T., Sutisna, U., Hidayati, N., Warso, & Nurhidayat, A. (2025). Peningkatan kapasitas dan nilai tambah kopi robusta melalui inovasi pascapanen Kelompok Tani Trisno Maju di Talagening Purbalingga. *Jurnal BUDIMAS*, 7(3), 1-12.

Suhartoyo, H., Saputra, H. E., & Salamah, U. (2020). Upaya peningkatan produktifitas kebun kopi rakyat system agroforestry di Kelurahan Ujan Mas Atas, Kabupaten Kepahiang, Provinsi Bengkulu. *Prosiding Seminar Nasional Pengabdian Kepada Masyarakat 2020*, 60-70.

Teniro, A., & Zainudin, Z. (2022). Optimalisasi pengolahan biji kopi dalam upaya peningkatan pendapatan petani. *Jurnal Pengabdian Pada Masyarakat Indonesia*, 1(3), 24-28.

Wicaksono, P. E. (2018). Penentuan Kadar Kandungan Air Pada Biji Kopi Arabika Dengan Teknik Laser Induced Breakdown Spectroscopy (LIBS) (Undergraduate Thesis, Institut Teknologi Sepuluh Nopember). *Institut Teknologi Sepuluh Nopember Repository*.

Widyasari. (2023). Pengaruh ukuran biji kopi robusta pada kualitas citarasa kopi. *Jurnal Agro Industri Perkebunan*, 11(1), 1-14.

© Daimon Syukri, Matlal Fajri Alif, Risa Meutia Fiana, Yusti Atika, Diah Ayu Natasya, and Muhammad Sulthan (2026)