## Introduction Of Post-Harvest Processing Tehcnology To Increase Production Capacity And Quality Of Coffee Processed By Uph Sekar Rindu, Dampit, Malang Regency.

*Wenny Bekti Sunarharum[1*], Sudarminto Setyo Yuwono[1], Erni Sofia Murtini[1], Kiki Fibrianto[1], Elok Waziiroh[1], Eka Shinta Wulandari[1], Laila Yum Wahibah[1]*
[1]Faculty of Agricultural Technology
Universitas Brawijaya

[*]Coresponding author :
wbsunarharum@ub.ac.id

## ABSTRACT

*Besides coffee productivity, the most prominent problem in the coffee production is related to the consistency of quality. Since coffee is an important livelihood of the coffee farmers and related industries, the quality and production problem should be adequately addressed. It has an influence to socio-economic factors including people's welfare, especially coffee farmers' welfare. This community service program is specifically aimed to resolved coffee quality and productivity problems encountered by Sridonoretno coffee processing and producing unit in UPH Sekar Rindu. The approach in addressing those problems includes four steps. First step is the community empowerment through training on coffee quality and introduction on selective picking/harvesting method. Secondly, writing and documenting standard operating procedures for harvesting, for some common coffee post harvest processing methods as well as an appropriate storage procedure that could be applied by the community. Thirdly, the introduction of machinery including coffee huller and scale to improve coffee productivity. The last effort is to perform certification and grading of the quality of Sridonoretno green coffee beans.*

## INTRODUCTION

Coffee is a popular beverage consumed worldwide and has been cultivated in several countries in the world. Two main species of coffee are Coffea Arabica, commonly known as Arabica and Coffea robusta or Robusta coffee [4]. Coffee is a unique and very complex commodity where the quality is influenced by numerous factors from the farm to cup [9]. These factors might include geographical origin [3], climate [6], elevation of planting sites and temperatures [2], shade [5] as well as nutrients or fertilizers [8].

The International Coffee Organization [7] has reported the fluctuation of coffee imports and exports in the current year. Indonesia remains the fourth biggest coffee exporters in the world after Brazil, Vietnam and Colombia [7]. In Indonesia, coffee is widely produced in Java, Sumatra, Papua and Sulawesi. Several well-known local coffee includes coffee Java, Sumatra Sidikalang, Sumatra Lintong, Mandheling Sumatra, Aceh Gayo, Wamena Papua, Sulawesi Toraja, Bali Kintamani, Flores Bajawa and mostly they are from Arabica species [1].

In the last decade, coffee become more popular in Indonesia including in Malang, a city located in East Java. The increase in domestic demand had triggered the development of local coffee originated from Malang such as from Southern part of Malang. Two well-known coffee

from this area are Amstirdam coffee and Sridonoretno coffee, which are Robusta species. Amstirdam coffee is originated from Ampel Gading, Sumber Manjing, Tirtoyudo and Dampit; as well as Sridonoretno coffee, which is specifically produced by local coffee farmers in Sri Mulyo, Sukodono and Batu Retno, Dampit, Malang Regency.

Market demand for Malang coffee including Sridonoretno Dampit coffee is continually increasing. However, the productivity and consistency of coffee quality remains problematic.

The problem of quality and production capacity of coffee (green coffee beans) should be appropriately addressed. It has an influence to socio-economic factors including people's welfare, especially coffee farmers' welfare. Therefore, this community service program was specifically aimed to resolved coffee quality and productivity problems encountered by Sridonoretno coffee processing and producing unit in UPH Sekar Rindu, Sukodono Village, Dampit, Malang Regency through community empowerment.

Specifically, the objectives of this program were as below:

1. To overcome problem of processing and producing of Sridonoretno coffee at UPH Sekar Rindu.
2. To provide solutions and recommendations in order to maintain and improve the quality of Sridonoretno coffee.
3. To assist the quality certification of Sridonoretno coffee.

## MATERIALS AND METHODS

Since local coffee were mainly produced and processed by small-holder farmers, they are the target or partner of this program. Particularly, the community empowerment was targeting farmers belongs to UPH Sekar Rindu farmers group, from Sukodono Village, Dampit Sub-district, Malang Regency, who involved in the production of Sridonoretno coffee. The activities were carried out in the farmers location as well as at Universitas Brawijaya, Malang from June to November 2017.

The solutions offered to resolve the problems was through community empowerment program on coffee post-harvest processing technology as detailed below:

1. Training on coffee quality and introduction on selective picking/harvesting method.
2. Writing and documenting standard operating procedures for harvesting, for some common coffee post harvest processing methods as well as an appropriate storage procedure that could be applied by the community.
3. The introduction of machinery including coffee huller and scale to improve coffee productivity.
4. Performed certification and grading of the quality of Sridonoretno green coffee beans.

## RESULTS AND DISCUSSION

### *Situation based on survey results*

Sukodono Village is located in Dampit sub-district, Malang Regency, East Java province (Figure 1). Based on the primary data of Central Bureau of Statistics of Malang Regency (2014), the altitude of Sukodono village is 550-725 m.a.s.l with a mountainous contour. This village has 5 *dukuh* (or smaller village) with a total area of 1.861 Ha. The area is an agricultural land that consist of paddy fields (26 Ha) and dry land (1835 Ha). Total population is about 10,579 people (2,631 households). The majority of Sukodono villagers (2,673 people) work as farmers / coffee farmers (generally Robusta coffee) and this number exceeds those of other villages in Dampit sub-district.

*Introduction Of Post-Harvest Processing Tehcnology To Increase Production Capacity
And Quality Of Coffee Processed By Uph Sekar Rindu, Dampit, Malang Regency.*

767

*Figure 1. Location of Sukodono Village and UPH Sekar Rindu*

Sukodono Village is one of three villages joined in the Sridonoretno cooperative area, which has some Processing Unit of Products (UPH) of coffee. UPH is in charge of assessing, controlling, and monitoring the process of coffee processing by farmers until ready to be deposited to Sridonoretno cooperation for further marketing and distribution. One of the UPH that has the potential to be developed in Sukodono Village is UPH Sekar Rindu. UPH Sekar Rindu is located in Dusun Kampung Teh, RT 19 / RW 02, Sukodono Village, Dampit District, Malang Regency. As shown in Figure 1.

The UPH centered at the residence of UPH Chairman (Mr. Siadi) comprises about 35 coffee farmers from at least 180 farmers recorded in Sukodono Village. The number of workers in coffee plantations under the auspices of UPH Sekar Rindu ranges from 70 - 100 people.

At each harvesting season, the coffee production can reach 6 quintals to 1.5 tons. However, the productivity and consistency of the quality of the coffee for specialty coffee is still a problem. Harvesting coffee green cherries and not mature enough cherries were found to cause poor coffee quality and low price. At one harvest season, losses due to this harvest can reach 1 quintal.

**Training and counseling on processing and quality of coffee**

The extension activities and trainings on the processing and quality of coffee were conducted further. This activity was followed by the farmers of UPH Sekar Rindu. The training materials include "selective picking of red cherries" harvesting methods and appropriate coffee post-harvest handling and processing methods.

Selective picking is the process of harvesting fresh coffee (cherries) when the fruit is completely red (ripe). This condition had been previously reported to result in optimal flavor formation in the Arabica coffee cherries (fruit). Not only in Arabica, Robusta coffee which is harvested on this stage also produced flavorful coffee, certainly with more quality.

In reality, there were only a small percentage of farmers in the area of UPH Sekar Rindu who were aware of the importance of quality coffee production and willing to join the farmer group. Most of the reasons are socio-economical factors such as obstacles from their own families who get used to do strip picking or not following selective harvesting method which is time consuming, as well as the need of quick cashflow. However, red picking approach was found to be able to increase Robusta coffee price in the marketplace. Therefore, counseling for farmers about the coffee quality is needed so that farmers who have joined in the community with the recommended method will be loyal and

able to maintain and to improve the quality of coffee.

Beside harvesting, training and counseling were conducted on post-harvest handling and processing methods. The materials include various coffee processing techniques (natural methods, honey, semi-wet and wet) and factors that should be considered during coffee handling and processing.

### Development of standard operating procedures (SOP)

The abovementioned activities lead This activity leads to the development of standard operating procedures (SOP) for each post-harvest processing methods, as well as for storage. At the moment, there is no documented SOP available and therefore not all farmers or coffee production staff can produce coffee with similarly high quality. The SOP was well documented and distributed to the community for guidance that could be useful for farmers or people involved in coffee production.

### Problems of post-harvest processing of coffee

Based on the survey results, the main problem in the processing field encountered is the absence of huller (dry grinder) for dried coffee and scales to weigh the coffee cherries from farmers who deposited to UPH. So far, the smallholders farmers used to rent the machine and therefore adding the production cost which is quite expensive. The increase in those cost will disadvantage farmers considering the price of Robusta (green bean) is quite cheap, at round Rp. 29.000,00 per kilogram for the red picking category and Rp. 25.000,00 per kilogram for mixed category (mixture of green, orange, semi red). Processing coffee using proper machines that could be shared (used) by all farmers in the UPH farmers group will be very beneficial to speed up the process and increase productivity. Therefore the introduction of hulling technology, procurement of huller machine capacity of 50 kg / hour (Figure 2) along with the scales were made.



**Figure 2. Coffee huller**

### Coffee quality certification

As the last effort of this program, coffee certification was performed. In this activity, green coffee beans produced by the farmers, which is Sridonoretno coffee were graded based on an Indonesian National Standard (SNI 01-2907-2008) for green coffee beans. The quality assessment was conducted at the Indonesian Coffee and Cocoa Research Institute (ICCRI). The green coffee beans tested were coffee processed by different post-harvesting methods i.e. honey, semi wet and wet. The results showed that Sridonoretno green coffee beans were of high grade (grade 1).

### CONCLUSIONS

This community service program to empower coffee farmers in UPH Sekar Rindu, Sukodono Village, Dampit Sub-district, Malang Regency may solve coffee production and quality problems. It is also expected to aid in the marketing strategy of Sridonoretno coffee in the near future since it may increase the credibility of Sridonoretno coffee. In turn, hopefully it may contribute to increase community's welfare, particularly those whose their livelihoods depends on coffee commodity.

*Introduction Of Post-Harvest Processing Tehcnology To Increase Production Capacity And Quality Of Coffee Processed By Uph Sekar Rindu, Dampit, Malang Regency.*

769

## REFERENCES

[1] *Anonymous, 2012. The diverse coffees of Indonesia. http://www.sca-indo.org/diverse-coffees-indonesia/ SCAINDO (19 April).*

[2] *Bertrand, B.; Vaast, P.; Alpizar, E.; Etienne, H.; Davrieux, F.; Charmetant, P. 2006. Comparison of bean biochemical composition and beverage quality of Arabica hybrids involving Sudanese-Ethiopian origins with traditional varieties at various elevations in Central America. Tree Physiology, 26, 1239-1248.*

[3] *Bhumiratana, N., Adhikari, K., & Chambers, E. (2011). Evolution of sensory aroma attributes from coffee beans to brewed coffee. LWT - Food Science and Technology, 44(10), 2185–2192, http://dx.doi.org/10.1016/j.lwt.2011.07.001.*

[4] *Bicho, N. C., Leitão, A. E., Ramalho, J. C., de Alvarenga, N. B., & Lidon, F. C. (2013). Impact of roasting time on the sensory profile of Arabica and Robusta coffee. Ecology of Food and Nutrition, 52(2), 163–177, http://dx.doi.org/10.1080/03670244.2012.706061.*

[5] *Bosselmann, A. S., Dons, K., Oberthur, T., Olsen, C. S., Ræbild, A., & Usma, H. (2009). The influence of shade trees on coffee quality in small holder coffee agroforestry systems in Southern Colombia. Agriculture, Ecosystems & Environment, 129(1–3), 253–260, http://dx.doi.org/10.1016/j.agee.2008.09.004.*

[6] *Costa Freitas, A. M., & Mosca, A. I. (1999). Coffee geographic origin — An aid to coffee differentiation. Food Research International, 32(8), 565–573, http://dx.doi.org/10.1016/s0963-9969(99)00132-5.*

[7] *ICO. 2017. Trade Statistics. Available: http://www.ico.org/trade_statistics.asp [Accessed 28 November 2017].*

[8] *Poltronieri, Y., Martinez, H. E., & Cecon, P. R. (2011). Effect of zinc and its form of supply on production and quality of coffee beans. Journal of the Science of Food and Agriculture, 91(13), 2431–2436, http://dx.doi.org/10.1002/jsfa.4483.*

[9] *Sunarharum, W. B., Williams, D. J. & Smyth, H. E. 2014. Complexity of coffee flavor: A compositional and sensory perspective. Food Research International, 62, 315-325. Wasserman, G. 1992. Coffee. In Kirk-Othmer Encyclopedia Of Chemical Technology, 4 ed.; Kirk-Othmer, Ed. John Wiley & Sons, Inc.; Vol. 6.*

*Introduction Of Post-Harvest Processing Tehcnology To Increase Production Capacity And Quality Of Coffee Processed By Uph Sekar Rindu, Dampit, Malang Regency.*

770