Farmers’ attitude to standard production method based on Temanggung robusta coffee’s geographical indication

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Abstract. Temanggung Regency is one of the main producers of coffee in Central Java Province. Robusta coffee originating from this area has the potential to become a specialty coffee because it has a distinctive taste character that is indicated because of geographical factor. In an effort to improve competitiveness and protect their coffee, coffee farmers are motivated to produce and do post-harvest based on Geographical Indications (GI) standard. However, only around 170 farmers who implement production methods (on farm); harvest and post-harvest; and processing in accordance with standards. Attitudes are thought to have an important role in the behavior of these farmers. This publication will deliver part of the research results, namely the importance of farmers’ attitudes towards coffee production methods (on farm) that are appropriate to GI. For this reason, this study aims to analyze the attitude of farmers to the standard production methods according to the GI of Temanggung Robusta Coffee. The study was conducted in Kandangan Sub-district where the location of the MPIG-KRT secretariat was located. Respondents were 80 coffee farmers who were taken by simple random sampling. Data was collected by questionnaire, independent interview, observation, and documentation recording. The results showed that 1) the majority (51.25%) of farmers had good attitudes and 45% were very good towards the standards of coffee production methods, 2) There was a significant relationship between the influence of others and farmers’ attitudes toward the standard production methods, but there was no significant relationship between age, formal education, and non-formal education with the attitude of the farmer.

1. Introduction

Coffee is a plantation commodity that has been cultivated traditionally in Indonesia for several centuries. Although coffee is not originated from Indonesia, it supposedly remains to be mainstay commodity as the source of livelihood to millions Indonesian people in the present and in the future [1]. Indonesia is the 3rd coffee producer following Brazil and Vietnam, with export volume of more than 500 thousand tons per year. Coffee commodity is the mainstay plantation commodity with significant contribution to Indonesian economy, as export foreign exchange producer, income source, and farmer welfare, industrial basic material producer, job opportunity creator, and for area expansion [1]. Moreover, export volume of Indonesian Robusta coffee had a good prospect [2].

Temanggung Regency is one of main coffee producing areas in Central Java Province. In 2015, coffee plantation area was reported more than 11,000 ha in width. Out of the width, 8,158.55 ha is Robusta coffee plantation area or with mean productivity of 1.2 ton/ha. The development of Robusta
coffee commodity agribusiness in Temanggung Regency is still opened sufficiently, through whether extensification (area expansion), intensification to improve productivity, or improving the quality and developing the upstream industry. Robusta coffee coming from this area is expected potentially to be specialty product (specialty coffee) as it has typical taste character [1].

In Indonesia (including in Temanggung Regency), coffee plants are mostly smallholder plantations which are still limited in the application of technology both cultivation and post-harvest so that they are not in accordance with the principles of sustainable agriculture. With a sustainable farming system, it will produce coffee production that is quality and environmentally friendly, as well as socio-economically profitable. This system is expected to increase coffee production while providing the lives of farmers, without ignoring the interests of future children and grandchildren [3].

The requirements for environmentally friendly coffee plantations have now become the demands of the global market, especially in European Union countries. Agricultural products are no longer only assessed on the basis of the quality of their products, but are also assessed on the basis of how to produce coffee but also their cultivation such as the use of protective trees, control of plant pests and preservation of natural resources including biodiversity. Therefore, the business world must be prepared to face various requirements that must be met related to the environmental impact of coffee plantations [3]. To improve product competitiveness, farmers in Temanggung District need to follow standards in coffee production, harvesting and post-harvesting, as stated in the Book of Protection for the Geographical Indication of Temanggung Robusta Coffee.

In global market and tighter competition era, Geographical Indication (GI) plays an important role. The advantages of GI protection internationally among others: a) geographical indication can be used as product marketing strategy in both domestic and foreign trades, b) can give added-value to product and improve the producer’s welfare, and c) can improve GI product’s reputation in international trade, [4]. GI also gives certainty to the consumers to consume local product coming from special area using a distinctive producing method [1].

Temanggung Robusta coffee has characteristics of typical, unique, and different product quality indicated with geographical factor. Temanggung Robusta coffee is produced by Robusta coffee tree planted in Temanggung Regency area at 400 m altitude. This region has cold and moist air, with high rainfall (8-month rainy season and 4-month dry season). Daily air temperature in Temanggung Regency ranges between 20-30°C with air humidity > 80%. Land declivity in Robusta planting location largely belongs to category >45% distinctive [1].

Farmers affiliated with Coffee Farmers Group in Temanggung region are cooperating with each other in the attempt of improving their competitiveness and protecting their coffee. Masyarakat Perlindungan Geografis Kopi Robusta Temanggung (MPIG-KRT) has been officially established since 2015 based on Notary Deed and the application for registration approved in 2016. This farmer group’s membership can be filled in only by Coffee Farmer, processor, and seller groups; and they have complied with all rules or standard requirements as mentioned in Temanggung Robusta Coffee’s Geographic Indication Protection Guidelines [1].The benefits the farmers get in the presence of Geographical Indications are: 1) improving and maintaining GI product’s quality and reinforcing the farmers’ competitiveness, 2) reinforcing the farmers’ right through GI product association (example: AEKI), 3) improving and creating job opportunity to farmers in local areas with GI product potential [5]. Marketing based on geographical indications (“GI-based marketing”) can bring higher incomes to these farmers. And for GI-based marketing to work, adequate legal protection of GIs is absolutely necessary [6].

The coffee produced and processed corresponding to the Temanggung Robusta Coffee’s Standard GI is entitled to use Temanggung Robusta coffee brand. The standard is mentioned in the Temanggung Robusta Coffee’s Geographic Indication Protection Guidelines including physical characteristic, taste quality, production method, harvest and post-harvest, and processing method. The standardized production will improve the coffee’s quality and competitiveness, and then price and income.

This article focuses on the farmers’ attitude to (on farm) coffee production method standard corresponding to Temanggung Robusta Coffee’s Geographic Indication. This article will be published
in series by conveying the parts of research on farmers’ attitude to the standard requirement of Temanggung Robusta Coffee’s Geographic Indication Protection that has been conducted in 2018.

Attitude can affect behavior; therefore, understanding the farmers’ attitude as coffee producer and processor to (on farm) production method standard of Temanggung Robusta Coffee can help predict the farmers’ behavior, even in broader context the farmers’ adoption to the standard requirement. In addition, only few studies have been conducted on Standard GI of Coffee.

Scholars defined attitude as an individual’s response to an object [8] – a tendency to act, to achieve, to think, and to perceive in dealing with an object [9] attitude is a self-evaluation on many social world aspects and how the evaluation generates preference or non-preference to issue, idea, people, social group, and object [10]. The attitude of farmers plays an important role in their behaviour intent, which usually leads to actual adoption behavior [11]. Farmer may have the requisite knowledge, and be unconstrained by other factors, whether the farmer will adopt or reject an innovation depends largely on the attitude of the farmer [12] [13] [14].

The factors affecting attitude are, among others, formal education, non-formal education, and others’ influence considered as important ([15] [16] [17] [18] [19]). Recognizing the underlying factors, we can get solution to improve the farmers’ positive attitude, so that furthermore, the farmers’ behavior to the standard requirement of Temanggung Robusta Coffee’s GI will improve as well. Research on the attitude of farmers is still important until now, such as research, among others [20] [21] [22] [23] [24] [25]. Many studies have been conducted on Coffee’s GI, but only few studies have been conducted on Geographical indication viewed from farmers (coffee producers’) social psychological aspect. In addition, the opportunity of developing Temanggung Coffee is still opened widely, but studies and researches on Temanggung Coffee development are still very limited in number. For that reason, this research aims 1) to analyze the farmers’ attitude to standard coffee production method appropriate to Temanggung Robusta Coffee’s Geographical Indication, and 2) to identify the factors related significantly to the farmers’ attitude.

2. Material and Method

The research method used in this study was a descriptive one with survey technique. Research location was selected purposively with a consideration that Kandangan Sub District is the location where MPIG-KRT secretariat is located. This location belongs to the big three Robusta Coffee plantation area width with 1,124.46 hectare area width and dry seed coffee production of 1,426.38 ton. In addition, the coffee produced from this sub district has been dubbed as National and International Champion in the term of Robusta coffee taste. Data was collected using questionnaire, in-depth interview, observation, and documentation. The respondents consisted of 80 coffee farmers in Kandangan Sub District taken from 16 villages using random sampling technique. Data was analyzed using Likert Scale and presented using frequency distribution, while the inter-variable correlation was tested using Spearman’s Rank correlation test with SPSS version 20 software.

3. Result and Discussion

3.1. General Description of Research Location

Temanggung is one regency in Central Java with Temanggung as its capital and adjacent to Kendal Regency in the North, Semarang Regency in the East, Magelang Regency in the South, and Wonosobo in the West. Temanggung is one of main coffee producing areas in Central Java. In 2015, coffee plantation area was reported more than 11,000 ha in width. Out of the width, 8,158.55 ha is Robusta coffee plantation area or with mean productivity of 1.2 ton/ha. The development of Robusta coffee commodity agribusiness in Temanggung Regency is still opened sufficiently, through whether extensification (area expansion), intensification to improve productivity, or improving the quality and developing the upstream industry. Robusta coffee coming from this area is expected potentially to be specialty product (specialty coffee) as it has typical taste character [1].

Geomorphologically, Temanggung Regency area is complex ranging from level lands (plains), hills, mountains, valleys and mounts with declivity of 0% - 70% (slightly slope to very steep). Temanggung Regency has two mounts: Sindoro with 3,145 m height and Sumbing with 3,383 m
The types of soil in Robusta coffee plantation area are among others: brown latosol, reddish brown latosol, yellowish red latosol, and regosol. Generally, coffee plant requires deep, fertile, humic, and permeable upper layer of soil, or in other words, the soil should have good texture. The soil with good texture/structure is the one coming from volcano or containing adequate sand. Such soil has good air and water exchange within it. Robusta coffee plant does not require shallow groundwater, as it can decompose rooting. The ideal depth of groundwater is at least 3 meter from surface. Such condition is met in Temanggung area. The result of analysis on soil characteristics in Robusta coffee plantation area conducted by Indonesian Coffee and Cocoa Research Center in Temanggung Regency showed that the texture of soil is mostly silt clay loam, followed with silt loam, and silty clay and silt. Silty clay loam is distributed mostly at 700 m altitude and above, while silt loam at less than 700 m altitude.

From the result of preliminary survey, it can be seen that only 0.5% Robusta coffee farmers in Temanggung Regency have been affiliated with MPIG-KRT in this year and only few members of MPIG-KRT have implemented coffee production and processing consistent with the standard as included in the Temanggung Robusta Coffee’s GI Protection Guidelines. Such farmer behavior is putatively due to motivational factor such as attitude.

3.2. Farmers’ attitude to Temanggung Robusta Coffee’s Standard Production Method

| Indicator | Criteeria | Category | Number | Percentage (%) |
|-----------|-----------|----------|--------|----------------|
| 37.8 - 45.0 | Very agree | Very Good | 36 | 45 |
| 30.6 - 37.7 | Agree | Good | 41 | 51.25 |
| 23.4 - 30.5 | Neutral | Fair | 3 | 3.75 |
| 16.2 - 23.3 | Disagree | Bad | 0 | 0 |
| 9.00 - 16.1 | Very Disagree | Very Bad | 0 | 0 |
| **Total** | **80** | **100** | |

Source: Primary Data Analysis, 2018

Table 1 shows that 51.25% of farmers have good attitude and 45% show very good attitude to coffee production method appropriate to Temanggung Robusta Coffee’s Standard GI. The farmers’ attitude to production method includes cultivation, plant material and planting, and plant maintenance corresponding to the standard. The distribution of farmers’ attitude by some indicators of production method is presented in table below.

The coffee farming business process determines the coffee produced. From Table 2, it can be seen that 67.5% of farmers agree that the coffee seed planted should derive from the well-selected clones. It is because the coffee seed will affect the quality of coffee seed produced. In addition to being affected by seed quality, the planting spacing becomes an important factor in coffee cultivation. About 51.25% of farmers very agree that planting spacing is important to do. The weeds attacking coffee plant should be controlled as well, and 60% of farmers agree with it. Another factor affecting coffee production beyond production factor is security factor. Most farmers complain about the security level of coffee plant vulnerable to stealing around the harvest season. About 38.75% of farmers agree that security factor should be considered to minimize the risk of coffee stealing.
Table 2. Distribution of farmers’ attitude by some indicators of standard production method (cultivation, plant material and planting, plant maintenance)

| No | Statement                                                                 | Very Agree | Agree | Neutral | Disagree | Very Disagree | Total |
|----|---------------------------------------------------------------------------|------------|-------|---------|----------|---------------|-------|
| 1  | Robusta coffee tree is planted at 400 m altitude                          | 13         | 41    | 22      | 3        | 1             | 80    |
| 2  | Coffee seeds planted are the selected clones                              | 16         | 54    | 9       | 1        | 0             | 80    |
| 3  | Planting Robusta coffee should be combined with other plants functioning as shading or intercropping plant | 27         | 43    | 7       | 3        | 0             | 80    |
| 4  | Coffee planting space should be regulated                                 | 41         | 36    | 3       | 0        | 0             | 80    |
| 5  | Coffee planting is conducted in rainy season                              | 39         | 38    | 3       | 0        | 0             | 80    |
| 6  | Shade plant should be prepared before Robusta coffee seed is planted      | 24         | 43    | 10      | 3        | 0             | 80    |
| 7  | Weed control is conducted twice a year                                    | 18         | 48    | 9       | 5        | 0             | 80    |
| 8  | Coffee plant disease should be prevented and eradicated                   | 49         | 30    | 1       | 0        | 0             | 80    |
| 9  | Safeguarding the coffee plant is easy                                     | 6          | 31    | 18      | 25       | 0             | 80    |

Source: Primary Data Analysis, 2018

3.3. Factors Affecting Attitude
Age, formal education, non-formal education, and others’ influence factors are presented in the figure below.

Figure 1. Distribution of Coffee Farmers’ Age (A), Formal Education (B), Non Formal Education (C), Others’ influence (D). (Source: Primary Data Analysis, 2018)
3.4. The relationship of Age, Formal Education, Non-Formal Education, and Others’ Influence to Farmers’ Attitude

Others’ influence has significant correlation \((r_s = 0.232 \text{ at } \alpha = 0.05)\) with farmers’ attitude to standard production method, but has not significant correlation with other three independent variables. Others’ influence is indicated with how much others influence the coffee farmers’ attitude. It can be seen in Table 3.

Table 3. The Relationship of Age, Formal Education, Non-Formal Education, and Others’ Influence to Farmers’ Attitude to Standard Production Method

| Factors Creating Attitude (X)                  | Farmers’ Attitude to Standard Production Method (Y) |
|-----------------------------------------------|------------------------------------------------------|
| Age \((X_1)\)                                 | \(0.098\)                                             |
| Formal Education \((X_2)\)                    | \(-0.086\)                                           |
| Non Formal Education \((X_3)\)                | \(0.185\)                                             |
| Others’ influence \((X_4)\)                   | \(0.232^d\)                                           |
|                                                | **Sig. (2-tailed)** \(b\) \(0.388\)                 |
|                                                | **Sig. (2-tailed)** \(b\) \(0.446\)                 |
|                                                | **Sig. (2-tailed)** \(b\) \(0.100\)                 |
|                                                | **Sig. (2-tailed)** \(b\) \(0.039\)                 |
|                                                | **t_{stat}^c** \(0.865\)                            |
|                                                | **t_{stat}^c** \(0.759\)                            |
|                                                | **t_{stat}^c** \(1.634\)                            |
|                                                | **t_{stat}^c** \(2.048\)                            |
| **Note** \(^a\)                               | Not significant                                      |
| **Note** \(^a\)                               | Not significant                                      |
| **Note** \(^a\)                               | Not significant                                      |
| **Note** \(^a\)                               | significant                                          |

Source: Primary Data Analysis, 2018

Based on the result showed that education level has not significant correlation to coffee farmer’s attitude toward standard production method. This observations in line with [27] and [28] that education level have not significant influence toward farmer’s attitude. So is the case, age founded have not significant influence to coffee farmer’s attitude toward production standard method. This is in line with [29] and [28] that found not significant influences of age to attitude of coffee farmer.

Figure 2. Distribution of people met by Farmers to help solve problem (Source: Primary Data Analysis, 2018)

Robusta coffee farmers in Temanggung are sometimes faced with some obstacles in cultivating coffee: pest and plant disease, labor, post-harvest, security, selling price, and etc. In solving the problems faced, coffer farmers generally discuss and share solution with some parties: family, fellow coffee farmer, extension officer, service officer, community leader, and coffee seller/buyer. However,
those to whom farmers often refer to discuss the solution to the problem are fellow farmers in one same village because they are considered as having social proximity and facing the same problems generally. In addition to with fellow coffee farmers, the farmers also often discuss with family members and community leader to solve the problems faced. Coffee farmers have a good social relation with people in their neighborhood and this condition becomes a strong capital to build a better attitude to the requirement of Temanggung Robusta coffee’s GI. Strong commonness and kinship can facilitate the adoption of Robusta coffee’s GI requirement.

An individual’s attitude to an object or behavior, in addition to being affected by personal factor, is also affected by others’ assessment on the object or behavior. Coffee farmers’ attitudes toward the Robusta Temanggung Coffee Geographical Indication Standards are also influenced by personal factors. The influence of others has a significant relationship with the attitudes of farmers towards standard geographical indications. Others in this case are family members, fellow coffee farmers, agricultural extension officer, agricultural service officer, community leader and broker. In addition, the character of coffee farmers tending to be resistant to innovation makes the adoption level of Robusta Coffee’s GI still very low. When a coffee farmer knows that other coffee farmers get no or less benefit from the application of Robusta coffee’s GI, the farmer will be more resistant to Robusta coffee’s GI. For example, a farmer in Ngemplak Village of Kandangan Sub District has applied Robusta Coffee’s GI requirement by means of conducting red picking, sorting, fulfilling coffee water level, and storing and packaging well. However, in fact when he sold the coffee to the broker, he was given price as same as the price given to those not fulfilling Robusta coffee’s GI requirement. It made the farmers reapplying GI requirement reluctantly. In addition, the farmers surrounding was not interested in applying GI considering the experience of fellow coffee farmers.

4. Conclusion
The attitude of most farmers (it’s 51.25%) to Temanggung Robusta coffee’s standard production method belongs to good category and that of 45% of farmers belongs to very good category. Others’ influence has significant correlation with farmers’ attitude to Temanggung Robusta coffee’s standard production method (α = 0.01, rs value = 0.232). The improvement of others’ influence will improve the farmers’ positive attitude to standard coffee production method corresponding to Temanggung Robusta coffee’s Geographical Indication. Age, formal education, and non-formal education have not significant correlation with the farmers’ attitude to Temanggung Robusta Coffee’s Standard Geographical Indication.

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