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Impact of Income on Interest in Arabic Coffee Fermentation in Sumberwringin Bondowoso Sub-District

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Abstract

The fermentation process determines the quality of coffee beans in terms of color, taste and aroma. One of the problems is the low quality of coffee beans. This is caused by the low interest of farmers who carry out fermentation in accordance with Standard Operating Procedures. Farmers' interest is influenced by several factors, one of which is the income received by coffee farmers. This study examines the effect of income on farmers' interest in fermenting Arabica coffee. The variables used in this study are income and farmers' interest in fermenting in accordance with the applicable SOPs on Geographical Indications of java arabica coffee ijen raung. The location was purposively selected in Sumberwringin Subdistrict with the consideration that the area is the main producer of coffee. The research sample was 103 farmer group members selected by simple randomization. The method used was descriptive quantitative. Data analysis using simple linear regression with the help of SPSS. The results showed that the amount of income had a significant effect on farmers' interest in doing the coffee fermentation process with a significance value of 0.040. While the rest is influenced by other factors not examined in this study. Ijen Raung Arabica coffee farmers' income is at a moderate level, between 1.6 and 3.1 million rupiah. Farmers can budget part of their income to finance various needs during the coffee fermentation process.

Keywords: Arabica Coffee; Bondowoso; Coffee Fermentation; Farmer Interest; Income

Introduction

Coffee is one of the plantation commodities that is widely cultivated by several countries around the world. In terms of production, Indonesia ranks fourth. after Brazil, Vietnam and Colombia. In 2017 Indonesia's coffee production reached 675 thousand tons (Alexander & Nadapdap, 2019). According to the results of a survey conducted by the Indonesian Coffee Export Association in 2014 in (Firdaus, 2018), the demand for downstream coffee products in the form of coffee drinks in Indonesia has a fairly high opportunity of 1.03 kilograms per capita. Coffee has great potential to be

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developed in several regions in East Java Province, in accordance with the opinion expressed by Tanti Kustiari, et al 2020 that coffee is a plantation product that has the potential to be developed in several districts in East Java Province such as Jember Regency and its surroundings.

The area of Mount Raung and Mount Ijen is administratively located in Bondowoso, Situbondo and Banyuwangi regencies, where this region is known as the main producer of people's coffee in the East Java Province which has an area of 18,338 Ha (BPS East Java Province). Of this area, 9,871 Ha is a type of arabica coffee spread across 9 Districts and the rest is robusta coffee (DPKP Bondowoso Regency 2022). A good post-harvest processing process can affect the quality of arabica coffee beans in addition to a good and correct cultivation process (Firdaus, 2018). (Pradipta & Fibrianto, 2017) argue that coffee as one of the drinks that are often consumed in various countries the role of taste, color and aroma is an important sensory attribute. Coffee is processed through several stages ranging from fruit picking, sorting, mining, fruit skin peeling, fermentation, drying, dry HS coffee packaging, dry HS coffee grinding, griding to packaging.

(Atmaja, Tamba, & Kardi, 2015) The difference in prices obtained by farmers, the existence of goods ridiculed by buyers occurs because of variations in the quality of production produced. The implementation of post-harvest standards has not been carried out consistently. In addition, the uneven interest of farmers in Bondowoso Regency, especially in Sumberwringin District, has not been evenly distributed to implement Good Agriculture Practice (GAP) standards. This condition is in accordance with the findings of a study presented by (Murad, Sukmawaty, Sabani, Ansar, & Kurniawan, 2020) that it is difficult to make improvements in post-harvest handling due to fluctuating prices and not having clear incentives. This is further explained that if this is not done carefully, it is likely to reduce the value of Indonesian coffee exports and the possibility of high supply will occur in the domestic coffee market so that in the future it will result in a decrease in the price of coffee (Murad, Sukmawaty, Sabani, Ansar, & Kurniawan, 2020).

Conversely, according (Sanaky & Nashori, 2018) the existence of institutions that manage and supervise quality management based on SOPs and good post-harvest quality management practices must have an impact on the added value of products, economic, social, environmental continuity and existing natural resources. In addition to the above constraints there are price differences, the variety of arabica coffee production is also caused by the low interest of farmers to apply coffee postharvest standards. Coffee fermentation is one of the stages of coffee processing that is able to add value to the products produced by coffee farmers. Coffee fermentation is one of the efforts to reduce the caffeine content of coffee (Usman, Suprihadi, & Kusdiyantini, 2015) where this process has a major influence on the quality of coffee that has high caffeine. If fermentation is done well, the coffee produced is also good.

One of the decreases in coffee quality is influenced by the fermentation process, where this process usually takes 2-3 days to produce good quality coffee beans (Kusmiah, Waris, & Manggabarani, 2021). The implementation of the Arabica coffee

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fermentation process in accordance with SOPs is carried out by farmers who are interested in implementing this process. The interest of farmers in implementing the fermentation process in accordance with the SOP is influenced by several factors. Income is one of the factors that can affect the interest of farmers (Rahmah, Mariati, & Maryam, 2021). Farmers' interest in conducting fermentation SOPs is still very low in in Sumberwringin District, Bondowoso Regency, therefore factors that can affect farmers' interest in fermentation are very important to analyze, one of which is income.

Literature Review

The fermentation process is the release of organic compounds by microorganisms which usually occurs in anaerobic environments or without oxygen through the release of gases. Fermentation of coffee beans is the first step in the process of making coffee beans, and occurs in post-harvest processing. Fermentation is carried out with the aim of decomposing the mucous layer on the surface of the hornskin of coffee beans. In addition, fermentation reduces bitterness and encourages the formation of a "mild" impression on the taste of brewed Arabica coffee. Fermentation is carried out in a plastic bucket whose bottom is given a hole as a place for the release of oxygen, water and carbohydrates resulting from the fermentation process. woven plastic sacks or plastic fermentation tubs or those made of cement with holes at the bottom. This fermentation process takes between 18-36 hours (36 hours if started in the afternoon, water and stir at 18 hours), or watering and stirring is done at 28 hours if it starts in the morning. Furthermore, washing is carried out using clean water, this is done with the aim of cleaning the remaining mucus that is still attached to the horn skin of coffee beans after fermentation (BPS, 2021).

Income is a reward received in the form of money or goods, which is paid by the company/office/employer. In-kind rewards are assessed at local prices (BPS, 2021). The income of the head of the family and other family members who are in one house according to (Hadi, 2015) is a measure of socioeconomic status where income can be a factor that can influence farmers' interest in implementing coffee fermentation. Coffee farmers tend to pay attention to the income that will be obtained after carrying out the coffee fermentation process. If farmers have low incomes, farmers tend to choose to increase the quantity rather than the quality of arabica coffee cultivated, but if farmers have high incomes, farmers tend to prefer to improve the quality of coffee beans in addition to increasing the quantity of arabica coffee production.

Interest according to Crow & Crow 1973 in Panurat et al., 2014 explains that one's interest is basically caused by an experience that someone experiences. Interest develops as a result of one activity and will be an impact will be used again in other activities. Interest arises when there is attention, in other words, interest will be the cause and effect of attention. There are many factors in life that affect a person's interests, such as knowledge, personality, experience, income, education, expectations, and so on. According to Baga et al, 2008 external factors can be triggered by various factors / sources such as leaders, friends / colleagues, or other more complex factors.

The fermentation activity of arabica coffee java ijen raung in Sumberwringin District is not necessarily easy to apply by farmers because to implement this series in

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addition to requiring sufficient capital also requires an infestation of time and energy to meet the fermentation stages in accordance with the standards. Capital adequacy sourced from coffee farmers' income is one of the drivers of farmers. With the high income they get, they can easily meet all the facilities and infrastructure needed to carry out all series of fermentation processes.

The application of the fermentation process in accordance with the standards here requires a large cost. In addition to buying supporting equipment, it is also to pay for labor because in post-harvesting arabica coffee requires a lot of energy. In carrying out the fermentation process requires a long time to immediately get benefits. This condition makes arabica coffee farmers must have large capital while waiting for fermentation to complete. This situation will affect the mindset of farmers so that there will be many considerations to implement coffee fermentation, so this will be an obstacle for farmers who have small capital to buy all facilities to implement coffee fermentation.

This research is able to have implications, especially for the government and stakeholders in the form of the importance of income on farmers' interest in carrying out coffee fermentation activities. This can be a reference for the government to implement policies related to the price of coffee that has passed the fermentation process and coffee that has not passed the fermentation process so that this can attract farmers to carry out fermentation activities so that the income obtained from coffee production is high. This study is able to provide an overview of how farmers' income is able to affect farmers' interest in fermenting coffee.

Research Methods

Based on the level of explanation, this study is included in the category of associative research. According to (Sugiyono, 2013)associative research is research whose final results aim to determine the influence and relationship between two or more variables. The implementation technique used in this study is a survey technique. According to Singarimbun and Effendi (1995) in (Hulyati, Syamsuardi, & Arbain, 2013) survey research techniques are critical observation or investigation techniques to obtain clear and good information on certain problems and in a certain area. One of the main advantages of this study is that it is possible to make generalizations in large populations. This research is classified as quantitative research.

Quantitative research is an activity to focus on collecting data in the form of numbers to then be analyzed using quantitative analysis tools and with mathematical calculations. The advantage of this quantitative research is that it is able to provide a more objective assessment (Mardikanto, 2001).

This research was conducted in Sumberwringin District, Bondowoso Regency, the choice of location here was determined intentionally (purposive sampling) with the population in this study being Arabica coffee farmers in Sumberwringin District, Bondowoso Regency totaling 690 arabica coffee farmers. According to (Suharsimi, 2010)if the subject or population is less than 100 people should be taken all, but if the subject is large or more than 100 people then it can be taken 10-15% or 20-25% or 25-

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50%. Thus, the determination of the sample in this study researchers used 15% multiplied by the total population, which is 690 people.

Referring to the opinion above, the number of samples used in this study was 103 respondents. In this study, the sampling technique used was probability sampling with purposive sampling techniques. According to (Sugiyono, 2013) that : purposive sampling is a sampling technique with certain considerations. Researchers choose Purposive Sampling techniques that determine certain considerations or criteria that can meet the sample to be used in the study. The considerations used are as follows:

The respondents of this study focused on arabica coffee farmers in 1 sub-district, namely Sumberwringin District. The respondents of this study are arabica coffee farmers who have farming experience > 5 years. Arabica coffee farmers who were respondents were farmers who annually cultivate arabica coffee. The respondents of this study focused on arabica coffee farmers in 1 sub-district, namely Sumberwringin District. The respondents of this study are arabica coffee farmers who have farming experience > 5 years. Arabica coffee farmers who were respondents were farmers who annually cultivate arabica coffee.

The method used in this study is quantitative descriptive, which is the method used to describe the actual conditions of existing social phenomena. To determine the effect of farmer income on farmers' interest in coffee fermentation, data was analyzed using simple linear regression. Data analysis techniques can be explained as follows:

Descriptive Analysis

According to (Sugiyono, 2013) descriptive analysis method is a statistic used to analyze data by describing or describing the data that has been collected as it is without intending to make generally accepted conclusions or generalizations. To get an idea of the effect of income on farmers' interest in applying arabica coffee harvesting standards through coffee fermentation in Sumberwringin District, Bondowoso Regency, the answer scores obtained from respondents are analyzed descriptively to provide a systematic picture and data related to the variables used so that researchers can process and present data systematically, accurate and accountable. Narimawati (2011), that descriptive analysis is used by compiling a distribution frequency table to find out whether the level of value acquisition (score) of the variables used falls into the categories of good, good enough, less good and not good can be achieved through determining the minimum, maximum and interval index values and interval distances.

Test Instrument Validity and Reliability

A good measuring instrument must meet validity requirements because an unreliable or invalid measuring instrument will provide inaccurate information about the state of the subject or model being tested. Item validity is the extent to which the precision and accuracy of a measuring instrument / instrument. Measuring instruments can be said to have high validity if the tool performs its measuring function (Azwar, 2012). While reliability refers to the understanding that the instrument used can measure something that is measured consistently over time. The qualification

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requirements for a measuring instrument are consistent, reliable, or not changing (Azwar, 2012). Reliability (reliability) is a measurement of the stability and consistency of respondents in answering matters related to question constructs which are dimensions of a variable and arranged in the form of questionnaires. The reliability of a variable construct is said to be good if it has a Cronbach's Alpha value of >0.60. The SPSS output for the reliability test will be generated together with the validity test results.

The variables used in this study are income variables as independent variables and farmers' interest in carrying out coffee fermentation as dependent variables. Research variables are measured based on predetermined indicators, namely:

Table 1. Variable Measurement

Variable	Indikator	measurement
Income	1. Head of Houssehold Income	1. IDR 1.5 Million 2. IDR.1,6-3,1 Million 3. IDR.3,2-4,7Million 4. IDR.4,8-5 Million 5. > IDR. 5,1 Million
	2. Income of Family Members	1.IDR. 1,5 Million 2.IDR.1,6-3Million 3.IDR.3,2-4,7Million 4.IDR.4,8-5Million 5.IDR. > 5,1 Million
Interest in Fermenting Java Ijen Raung Arabica Coffee	Length fermentation time carried out by respondents 1. Frequency practiced by respondents	1. 10-16 Hours 2. 17-21 Hours 3. 22-26 Hours 4. 27-31 Hours 32-36 Hours 1. Always 2. Often 3. Rare 4. Sometimes 5. Never

Results and Discussion

The results of the analysis that has been carried out to determine how the influence of farmers' income on the interest of arabica coffee farmers in Sumberwringin District, Bondowoso Regency in carrying out the arabica coffee fermentation process are as follows:

Table 2. Distribution of Respondents' Answers in Fermenting Coffee

	Criteria	N	Percentage
The length of fermentation time	1.10-16 Hours	-	%
	2.17-21 Hours	-	%
	3.22-26 Hours	11	11%

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carried out by respondents	4.27-31 Hours 5.32-36 Hours Total	36 56 103	36% 56% 100%
Frequency performed by respondents	1.Always 2.Often 3.Rare 4.Sometimes 5.Never Total	61 39 3 - - 103	3% 38% 59% % % 100%

Source: Data Processed (2023)

Based on the results of the analysis, it can be seen that from the number of respondents as many as 103 people, as many as 56 or 56% of farmers fermented for 32-36 hours, and those who always fermented as many as 61 or 61%farmer. Then those who answered the fermentation time of 27-31 hours as many as 36 or 36% of farmers, then those who answered often did as many as 39 or 39% of farmers. For farmers who answered the length of fermentation time for 22-26 as many as 11 or 11% of farmers. And that rarely does as many as 3 or 3% of farmers. This condition can be concluded, that most arabica coffee farmers in Sumberwringin District, Bondowoso Regency as many as 61 people or 61% of 103 respondents are able to carry out the arabica coffee fermentation process in accordance with the Standard Operating Procedures (SOP) of Java arabica coffee Ijen Raung.

Table 3. Descriptive Characteristics of Respondents

Respondent Characteristics		Frequency	Percent
Age	46-55 Years	53	51,5
	26-45 Tahun	50	48,5
Gender	Male	92	89,3
	Fermale	11	10,7
Education	SD	59	57,3
	SMP	26	25,2
	High School	17	16,5
	S1	1	1,0
Land Area	1 – 2,7 Ha	76	73,8
	2,8 – 4,5 Ha	22	21,4
	4,6 – 6,3 Ha	4	3,9
	8,2 – 10 Ha	1	1,0
Total Farmer Income	< IDR. 1.500.000	39	37,9
	IDR. 1.600.000 - IDR. 3.100.000	55	53,4
	IDR. 3.200.000 - IDR. 4.700.000	9	8,7
Total Family Income	< IDR. 1.500.000	72	69,9
	IDR. 1.600.000 - IDR. 3.100.000	31	30,1

Sumber : Data diolah (2023)

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Based on the results of the analysis above, it can be concluded that there are 5 or 51.5% of coffee farmers aged between 46-55 years. Those aged between 26-45 years are 50 or 48.5% coffee farmers. This condition can be illustrated that the characteristics of arabica coffee farmers in Sumberwringin District, Bondowoso Regency, are mostly at a productive age and are able to carry out the arabica coffee fermentation process in accordance with existing coffee Standard Operating Procedures (SOP).

While the gender of Arabica coffee farmers in Sumberwringin District is mostly men, namely as many as 92 people from 103 respondents or 92%, while the rest are women, namely as many as 11 people or 11% of the total respondents of 103 respondents. This condition can be concluded that most coffee farmers in Sumberwringin District, Bondowoso Regency are men. This condition shows that men in Sumberwringin District, Bondowoso Regency are more interested in coffee cultivation than women.

Based on the results of the analysis above, it can be concluded that the education level of respondents in Sumberwringin District, Bondowoso Regency has an elementary school education of 59 people or 57%, a junior high school education of 26 people or 25% of a high school education of 17 people or 16%. This condition shows that most coffee farmers in Sumberwringin District, Bondowoso Regency have elementary school education, this condition is then one of the causes of the lack of awareness in farmers regarding the importance of fermentation processes in accordance with SOPs to support the quality of arabica coffee produced by farmers. Poorly educated farmers tend to prioritize quantity over quality of coffee cultivated.

Land Area worked by research respondents in Sumberwringin District, Bondowoso Regency Based on the results of the analysis above, it can be concluded that there are 76 coffee farmers or 74% have a land area of 1 – 2.7 Ha, an area of 2.8 – 4.5 Ha as many as 22 coffee farmers or 21%, an area of 4.6 – 6.3 Ha as many as 4 farmers or 4%. Then those who have a land area of 8.2 – 10 Ha as much as 1 farmer or 1%. This condition shows that most coffee farmers in Sumberwringin District, Bondowoso Regency have a narrow area of land to cultivate coffee. This shows that even though the area of land owned by farmers in Sumberwringin District, Bondowoso Regency is relatively narrow, farmers still have a high willingness to cultivate coffee.

From the results of the analysis in the table above, it can be concluded that the income of the heads of families of the research respondents, it can be seen that there are 39 coffee farmers or 38% have a total income of less than Rp. 1,500,000, as many as 55 coffee farmers or 53% have a total income between Rp. 1,600,000 – Rp. 3,100,000, then as many as 9 coffee farmers or 8.7% have a total income between Rp. 3,200,000 to Rp. 4,700,000. This condition shows that most of the income of coffee farmers in Sumberwringin District, Bondowoso Regency is classified as medium.

While the total income received from family members of the study respondents, it can be seen that as many as 72 coffee farmers or 70% have a total family income of less than Rp. 1,500,000, as many as 31 coffee farmers or 30% of farmers have a total family income between Rp. 1,600,000 – Rp. 3,100,000. This condition

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shows that most of the income of coffee farmers in Sumberwringin District, Bondowoso Regency is relatively low.

Table 4. The Effect of Income on Interest

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	16,590	,704		23,559	,000
	Farmer Income	,468	,225	,203	2,085	,040

a. Dependent Variable: Farmers'_Interest_in_Fermentation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,203[a]	,041	,032	1,997

a. Predictors: (Constant), Farmers'Income
Source : Data processed (2023)

Based on the results of the analysis above, it can be seen that the income of coffee farmers has a significant effect on the interest of coffee farmers in fermenting arabica coffee in accordance with the SOP in Sumberwringin District, Bondowoso Regency. The value of the influence of income variables on interest is 0.041 or 4.1%, while the rest is influenced by other variables that are not included in this study. This is in line with the results of research by Rahmah, et al. (2021) which states that income and marketing are factors that greatly influence farmers' interest and are one of the pull factors for farmers' interest. Farmers with high incomes are able to realize the importance of fermenting arabica coffee in accordance with SOPs. By applying the fermentation process will produce coffee beans that have good quality quality, so that the selling price that will be received is higher than unfermented coffee beans. This will have an impact on the income that will be received by farmers who process their coffee through fermentation. By producing good quality coffee, they will get a higher selling price compared to unfermented coffee. Thus they will be encouraged by their interest to always process their coffee with a fermentation process.

With the income they earn, they will have a strong belief that coffee processed through fermentation will produce good quality both in terms of color, taste and aroma, so that the potential to attract business people and buyers to buy their products. Because quality coffee is certainly much in demand in the market, both local and international markets. Thus farmers will be interested in fermenting arabica coffee in accordance with standards. Business actors in the coffee sector will consider the quality of coffee to be purchased. Good quality coffee will be easier to compete to attract buyers.

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The application of the arabica coffee fermentation process is not necessarily easy to do by coffee farmers in Sumberwringin District. Many things must be considered by farmers because the coffee fermentation process requires a long outpouring of time, large production costs and more energy when fermenting Java Ijen Raung arabica coffee. For example, in the case of red harvest,, Perform sorting that requires quite a lot of energy. In addition, in applying the fermentation process requires a pulper machine tool that will be used for stripping the red skin of coffee. In addition, there are many other requirements that must be met to produce good quality coffee beans. Coffee farmers who have low incomes will be constrained to implement fermentation processes in accordance with SOP. They prefer to process their coffee conventionally so that this has an impact on their interest in carrying out the fermentation stages that have been set out in the requirements of the Java Arabica Coffee Geographical Indication protection society Ijen Raung. However, if farmers in Sumberwringin District have a high level of income, it is suspected that all obstacles faced by farmers will be resolved, so that their interest will be strong to always process their coffee through the fermentation process. Because they believe that processing their coffee with fermentation will be directly proportional to the income that will be received.

Conclusion

Based on the results of the analysis that has been carried out, it can be concluded as follows:

A total of 56 people or 56%, farmers, are able to carry out the arabica coffee fermentation process in accordance with applicable SOPs. The age of those who enter the productive category, which is between 26-45 years old as many as 50 people or 48% while those who enter the old age category between 46-55 years as many as 53 people or 51%. Arabica coffee farmers in Sumberwringin District, Bondowoso Regency are dominated by the male gender. The last level of education of the study respondents was mostly at the Elementary School Level. For the area of respondents' land ownership is relatively narrow, which is around 1-2.7 Ha.The total income received by repondent farmers for one month ranges from Rp. 1.6 - Rp. 3.1 for the head of the family. While the total income received from other family members is less than Rp. 1.5. Furthermore, income has a significant effect on farmers' interest in fermenting coffee based on existing Standard Operating Procedures (SOPs).

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