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Does Credit Access Affect Decision-making within Farmer Groups? Evidence from Smallholder Coffee Farmers: Case Study in Bondowoso, Indonesia

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ABSTRACT

Background: The government and numerous institutions have pushed the formation of farmer groups as one of the agricultural development initiatives to increase the well-being of coffee producers. However, many coffee farmers are still hesitant to join owing to a variety of concerns. This lack of interest is frequently associated with financing challenges for agricultural capital via lending access. The goal of this study is to investigate the factors that influence farmers' decisions to join farmer groups, particularly in terms of finance access.

Methods: This study was carried out in East Java's coffee production area, notably in the Sumber Wringin District of Bondowoso Regency. During the 2023 agricultural season, the sample consisted of 173 coffee producers from the examined area. To create a homogeneous sample of coffee farmers, a multistage sampling procedure was used and the data were analyzed using binary logistic regression (logit biner).

Result: Farmers who join farmer groups are influenced by criteria such as their age, length of education, quantity of produce, land size and labor. According to field research, credit access has no effect on small coffee farmers who join farmer groups. Farmers who do not belong to farmer groups can nevertheless obtain agricultural finance. Similarly, gender and the number of dependents in the family had little bearing on farmers' decisions to join farmer groups.

Key words: Binary logistic, Credit access, Farmer groups, Smallholder.

INTRODUCTION

Coffee is one of the plantation commodities whose products are widely popular among Indonesians and even globally (Ababu and Getahun, 2021; Goshme *et al*., 2023). The tradition of drinking coffee has become a part of the lifestyle for the people of Indonesia (Suisa and Febrilia, 2014). Until 2021, Indonesia was able to produce 765 thousand tons of coffee, with 61% of it being exported and the rest used to meet domestic needs (Ginting *et al*., 2023). Coffee's strong market demand, if not met by increased production, can lead to economic instability (Martauli, 2018). Coffee is an important source of revenue for small coffee producers, with coffee accounting for 42.30% of smallholder household income (Hartatri and Neilson, 2021). Number of population in developing countries which depend on agriculture for survival (Ighodaro *et al*., 2021). Bondowoso Regency is the largest coffee grower in East Java (Nangameka *et al*., 2023). The plantation area in Bondowoso Regency reached 12,798 hectares in 2017, with an output of 8,670 tons (Badan Pusat Statistik, 2017).

Agricultural products are risky due to swings in output quantity and quality, which has led to a lack of interest from various funding institutions in supporting agricultural activities. Government initiatives can also provide capital, mainly in the form of in-kind agricultural production facilities distributed through farmer groups. Unlike commercial banks that require collateral, capital from the government and some large buyers require farmers to join a farmer association or farmer group to access capital. Farmer groups play an important role in agricultural development.

Farmers groups, according to Lestari and Idris (2019), allow the sharing of ideas, experiences, knowledge and innovations among farmers from various sources, ultimately increasing agricultural activity. Furthermore, being a member of a farmer association makes it easier for farmers to obtain government support and allows the government to more efficiently monitor farmers' actions. Farmer groups can also be used indirectly as an effort to increase farm productivity (Hasan *et al*., 2021). Currently, most of farmers groups in Indonesia are not formed by farmers themselves, but they are mostly formed asa response to the government

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program that requires farmers tobecome members of a farmers' group. Most of government support for farmers, such as distribution of subsidized fertilizer, agricultural extension, subsidized farm credits and other programs aredistributed to farmers' group or farmers' groups association (Nuryanti and Swastika, 2011). Although the potential advantages and benefits of joining a farmer group are well known, many coffee farmers still choose not to join. The decision to join or not to join a farmer group is influenced by various factors. Farming is not an individual effort so the consequence of decision by one is always experienced by the others. A small group of people including family members and fellow farmers influence the decision process (Suman, 2021).

Factors influencing farmers' decisions to join farmer groups, according to Safitri *et al*. (2020), include business turnover, level of education and land size. Significant factors influencing farmers' decisions to join farmer groups, according to Anggraini *et al*. (2015), are business income, training involvement and selling pricing. According to Jati *et al*. (2022) research, turnover, education, land size, number of family dependents and age influence farmers' interest in joining farmer groups. Gender, age, education level, use of production technology, acceptance of agricultural assistance, participation in extension programs, membership in cooperatives and partnerships, on the other hand, are factors influencing farmers' decisions to join farmer groups, according to Wahidah's study (2023).

Numerous coffee studies have been conducted in Bondowoso Regency, including Sari *et al.* (2018); Purwatiningsih and Ismanto's (2018); Cristantoa *et al.* (2018); Rizki *et al.* (2016). Despite multiple studies, there is still a dearth in research on the factors influencing coffee farmers' decisions to join farmer groups, making it a fresh feature to investigate in this study.

The goal of this study is to investigate the factors that influence farmers' decisions to join farmer groups, particularly in relation to the ease of obtaining finance for coffee farming capital. The study's findings are likely to serve as a basis for the government, agricultural institutions and key stakeholders to establish more successful ways for expanding coffee farmers' engagement in farmer groups. Furthermore, it is expected that this research would provide significant insights for agricultural experts and academicians.

MATERIALS AND METHODS

The study was conducted between June-August 2023 utilizing a quantitative method, specifically descriptive statistical analysis. Purposive sampling was used to establish the research location in the Sumber Wringin Subdistrict of Bondowoso Regency, which is one of the coffee-producing districts in Bondowoso. This study incorporated both primary and secondary data. Secondary data from the Central Statistics Agency (BPS) were collected. In the Sumber Wringin Subdistrict, 173 people worked as coffee farmers. Total sampling was used in this study, with coffee growers who were members of farmer groups and those who did not live in the Sumber Wringin Subdistrict of Bondowoso included as samples.

The data analysis technique used binary logistic regression (logit biner). The logistic regression model specification and variables are based on prior research by Balgah (2018), Hayati and Maisaroh (2019) and Mawarni and Feryanto (2023), as follows:

$$pi = \ln\left(\frac{Pi}{1 - Pi}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e_i$$

Where:

Pi: Farmers' participation in joining farmer groups, with a value of (1) assigned to farmers who join and a value of (0) assigned to farmers who do not join farmer groups.
α: Intercept (Constant).
X_1: Farmer's age (years).
X_2: Gender (dummy, male = 1, female = 0).
X_3: Education (years).
X_4: Number of dependents (people).
X_5: Production (kilograms).
X_6: Land size (hectares).
X_7: Number of laborers (people).
X_8: Farmer's experience (years).
X_9: Credit access (Dummy, yes = 1, no = 0).

Several tests are used in the analysis, including the Nagelkere R Square test, simultaneous test (overall model test), partial/Wald test and model feasibility test (goodness of fit test) using the Hosmer and Lemeshow tests. The Nagelkere R Square test is carried out to determine the size of the independent variable in explaining the dependent variable. The simultaneous test (overall model test) was used to understand the simultaneous influence of independent factors on the dependent variable, using a Sig. 0.05 (significant) testing threshold. The partial/Wald test was used to determine the partial influence of independent factors on the dependent variable, using a Sig. 0.05 (significant) testing threshold. The model feasibility test (goodness of fit test) was used to determine whether the model was suitable for application, with Sig. >0.05 (appropriate) as the testing criterion. The Nagelkerke R Square test was equal to the coefficient of determination (R2) in linear regression, the simultaneous significance test (overall model test) in OLS and the Wald test in OLS (Damayanti and Khoirudin, 2016).

RESULTS AND DISCUSSION

Respondent characteristics

The characteristics of the sampled farmers in this study can be observed in the following Table 1. According to Table 1, the total number of coffee farmers used as responders is 173. Of the total number of responders, 56 have joined farmer groups, while the remaining 117 have not. This indicates that there is still low participation of coffee farmers

Table 1: Descriptive statistics of coffee farmers sample.

Variables	Total sample			Farmers who Joined			Farmers who did not join		
	N	Mean	Standard deviation	N	Mean	Standard deviation	N	Mean	Standard deviation
Farmer's age	173	42.39	11.693	56	44.71	10.297	117	41.27	12.189
Gender	173	.84	.364	56	.80	.401	117	.95	.999
Education	173	9.17	3.030	56	9.46	2.847	117	9.03	3.115
Number of dependents	173	3.34	1.178	56	3.25	1.148	117	3.38	1.194
Production	173	7431.79	5028.243	56	9773.21	5493.318	117	6311.11	4389.501
Land size	173	2.7087	1.78999	56	2.7634	1.25718	117	2.6825	1.99983
Number of laborers	173	13.21	6.661	56	17.57	7.986	117	11.12	4.685
Farmer's experience	173	7.76	3.936	56	8.02	2.475	117	7.64	4.475
Credit access	173	.77	.423	56	.91	.288	117	.70	.460

Source: Primary data processed.

Table 2: Nagelkerke R square test.

Step	-2 Log likelihood	Cox and snell R square	Nagelkerke R square
1	112.194[a]	.457	.638

Source: Primary data processed.

Table 3: Simultaneous test (omnibus tests of model coefficients).

		Chi-square	Df	Sig.
Step 1	Step	105.657	9	.000
	Block	105.657	9	.000
	Model	105.657	9	.000

Explanation: Signifince <0,05.

in farmer groups. Farmers do not join farmer groups for a variety of reasons, including occasional counseling, duties to pay contributions and monthly savings and loans, according to Lumban Gaol (2022).

Factors influencing coffee farmers' decisions to join farmer groups

A logit model is used to investigate the factors that influence farmers to join farmer groups. The dependent variable in the logit model is in the form of binary or dummy categories, with a value of 1 allocated to coffee growers who joined farmer groups and a value of 0 assigned to those who did not. Farmers' age (X_1), gender (X_2), education (X_3), number of dependents (X_4), production (X_5), land size (X_6), number of laborers (X_7), farmer's experience (X_8) and credit access (X_9) are among the independent variables. The data is subsequently processed with the SPSS program.

From Table 2, it can be seen that the Nagelkerke R Square value is 0.638, which means that the ability of the independent variables to explain the dependent variable is 63.8%, the remaining 36.2% are other factors not included in the model that explain the dependent variable. An overall model test or omnibus testing of model coefficients are used to investigate the simultaneous influence of independent factors on the dependent variable. According to the Table 3, the value of sig <0.05 (0.00<0.05) indicates that independent factors have a simultaneous effect on the dependent variable.

Meanwhile, to see the effect of each independent variable on the dependent variable, a partial/wald test was conducted. Table 4 shows the estimation results for determining if independent factors influence coffee growers' decision to join farmer groups using the partial/ Wald test with a significance threshold of 5%. At the 5% significance level, 5 of the 9 independent factors included in the model significantly impact coffee producers' decision to join farmer groups. Farmers' age (X_1), education (X_3), production (X_5), land size (X_6) and land size (X_7) are the independent variables that strongly influence their decision to join farmer groups. Because they have a Sig. (P-value) of 0.05, these five independent factors have a significant impact on farmers' decision to join farmer groups.

Meanwhile, a goodness of fit test is used to determine whether a model is acceptable or fits well (Syofyan and Herawaty, 2019). The findings of the goodness of fit test done with the Hosmer and Lemeshow test. Table 5 shows that the Chi-square value is 9.064 with a significance of 0.337. The goodness of fit test results in a significance level greater than the alpha level (α) of 0.05 (0.337 > 0.05). This means that the model is acceptable and can be used.

Farmers' age

The variable "age of farmers" has an Exp(B)/Odds Ratio of 1.083 with a positive regression coefficient, indicating that increasing farmers' age increases their likelihood of joining farmer groups by 1.083 times. These findings suggest that farmer age has a beneficial effect on farmer group membership. This finding is consistent with study by Mbagwu (2018), Gashaw and Kibret (2018), Adong *et al*. (2012) and Safitri *et al.* (2020), which found that farmers' age has a beneficial impact on their decision to join farmer groups. Farmers tend to join farmer groups as they get older in order to secure their requirements in farming, marketing and increasing agricultural production.

Table 4: Partial/Wald test.

Variable	B	S.E.	Wald	Sig.*	Exp (B)
Farmer's age	,079	.032	6.206	.013	1.083
Gender	-.193	.545	.125	.723	.825
Education	.279	.106	6.967	.008	1.321
Number of dependents	-.008	.209	.001	.969	.992
Production	.001	.000	29.049	.000	1.001
Land size	-2.181	.455	22.935	.000	.113
Number of laborers	.211	.048	19.321	.000	1.235
Farmer's experience	.011	.086	.017	.898	1.011
Credit access	-.650	.813	.639	.424	.522

Explanation: *Significant level α = 5%.

Table 5: Hosmer and lemeshow test.

Step	Chi-square	Df	Sig.
1	9.064	8	.337

Explanation: Significance >0.05.

Furthermore, older farmers are more likely to recognize the value and necessity of agricultural organizations such as farmer groups.

Education

The variable "duration of education" has an Exp(B)/Odds ratio of 1.321 with a positive regression coefficient, showing that the longer coffee farmers' education, the more likely they are to join farmer groups in the Sumber Wringin District. These findings suggest that the length of education has a beneficial effect on coffee producers' membership in farmer groups. This finding is similar with Mawarni and Feryanto's (2023) research, which found that the length of education had a significant beneficial effect on farmers' decision to join groups (cooperatives/farmer groups). Farmers with a higher level of education are more aware of the value of joining farmer groups (Pakpahan, 2017).

Production

The variable "production quantity" has a positive regression coefficient and an Exp(B)/Odds Ratio of 1.001. This means that increasing the quantity of coffee produced by farmers in the Sumber Wringin District increases the likelihood of coffee producers joining farmer groups by 1.001 times. These findings indicate that the quantity of coffee produced has a favorable effect on the membership of coffee growers in farmer groups. This finding is consistent with the findings of Jati *et al.* (2022) and Ogunlade *et al.* (2016), who found that turnover had a major influence on farmers' decisions to join farmer groups. Farmers' revenue will be affected by an increase in production quantity. Furthermore, according to field studies, farmers with substantial production numbers prefer to join farmer groups to expedite the marketing process.

Land size

The variable "land size" has a negative regression coefficient and an Exp(B)/Odds Ratio of 0.113. This means that coffee farmers with lower land holdings are 0.113 times more likely to join farmer groups. Despite having a negative coefficient value, the land size variable is considered significant due to its Sig. value of 0.05 (0.00 0.05). The findings of this study are congruent with the findings of Mawarni and Feryanto's (2023) study, which found that land size had a substantial influence on farmers' decisions to join farmer groups. However, the land size variable had a beneficial influence in that study. Small-land farmers have limited access to finance and financial resources. Joining farmer groups can increase their access to resources and money, hence increasing agricultural production. Farmers with small land holdings can also benefit from information exchange and shared learning by joining farmer groups.

Number of laborers

The variable "number of laborers" has a positive regression coefficient and an Exp(B)/Odds ratio of 1.235. This means that coffee growers with more laborers in Sumber Wringin District are 1.235 times more likely to join farmer groups than farmers with fewer laborers. Farmers with a greater labor force tend to operate on a larger scale. Farmer groups frequently have considerable production needs and by joining a collective, farmers with an appropriate work force can meet those needs more efficiently.

Gender

The variable "gender" had no substantial influence on coffee producers' decision to join farmer groups. This is due to the gender variable's Sig. value being more than 0.05 (0.723>0.05). The findings of this study agree with those of Mawarni and Feryanto (2023) and Ogunlade *et al.* (2016), who found that gender has no effect on farmers' decisions to join farmer groups.

Number of dependents and experience

The variables "number of dependents" and "experience" had little effect on farmers' decision to join farmer groups in Sumber Wringin District. This is because the Sig. value of the number of dependents variable> 0.05 (0.969> 0.05). The findings of this study are consistent with those of Debeb and Haile (2016), who found that the number of family dependents has no significant impact on farmers' decision

to join farmer groups. Farmers' varying "experience" has no substantial influence on their decision to join farmer groups in Sumber Wringin District. This is due to the fact that the Sig. value for the experience variable is more than 0.05 (0.898>0.05). This is consistent with the findings of Ogunlade *et al.* (2016) and Balgah (2018), who found that farmers' experience has no substantial influence on their decision to join farmer groups.

Credit access

The variable "credit access" has no effect on farmers' decision to join farmer groups. This is because the Sig. value for the credit access variable is greater than 0.05 (0.424 greater than 0.05). This study supports the findings of Balgah (2018), who found that the ease with which farmers can obtain loans has no substantial impact on their decision to join farmer groups. This contradicts the findings of Abdul-Rahaman and Abdulai (2020), who contend that joining farmer groups improves farmers' access to financing. The study discovered that even if coffee producers in Bondowoso do not join farmer cooperatives, they do not have difficulty acquiring loans. The fact that credit-giving banks do not need farmers to join farmer groups bolsters his case. So this is what makes coffee farmers unaffected by joining or not with farmer groups will still get easy access to credit and can continue farming through capital from existing credit institutions both formal and informal credit sources. Ullah *et al.* (2020) discovered that asset-rich farmers with more farming experience and better information access rely on banks more than input providers and informal finance sources. Microfinance institutions, according to Ouattara *et al.* (2020), are a crucial factor of small farmer success and farmers with easy access to financing have an impact on production (Kehinde and Ogundeji, 2022; Nordjo and Adjasi, 2019).

CONCLUSION

Based on the research findings regarding the factors influencing farmers' decisions to join farmer groups, it is possible to conclude that farmers' age, gender, education, the number of dependents, production, land size, the number of workers, farmers' experience and credit access all influence coffee farmers' decision to participate in farmer groups. Individually, the most important criteria influencing coffee producers' decisions to join farmer groups are age, duration of education, production quantity, land area and the number of workers.

Based on empirical results, it is recommended that the government and agricultural institutions decide coffee farmers to join farmer groups because it can provide benefits to farm productivity. So that in order to continue to provide maximum results, farmers should join farmer groups even though the factor of easy access to credit does not have an effect, but information related to farming can be obtained from farmer groups. Meanwhile, future researchers and academics can conduct the same research using variables outside this study and a wider coffee production area.

Conflict of interest

All authors declare that they have no conflicts of interest.

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