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Is Arabica Coffee Farming Financially Feasible?

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Abstract.

The objectives in this study are to determine the benefits of arabica coffee farming in Jampit Village, Ijen District and to analyze the feasibility of arabica coffee farming in Jampit Village, Ijen District, Bondowoso Regency. The research method used is descriptive and quantitative methods. Descriptive method is a method for analyzing data by describing the data that has been collected as it is without intending to make general conclusions or generalizations. The quantitative method is a type of research whose specifications are systematic, planned and clearly structured from the start as far as the research design. The results showed that the profit of arabica coffee farming based on analysis using NPV is Rp. 30,621,659 over a period of 4 years, it was said to be profitable and based on NPV analysis obtained at an interest rate of 6% produced a positive NPV value of Rp. 19,613,917.09 is greater than zero (NPV > 0) then it is said to be feasible. Arabica coffee farming in Jampit Village, Ijen District, Bondowoso Regency is feasible based on the analysis of R/C Ratio, Net B/C and IRR. Based on the R/C Ratio analysis, the result is 1.82 which is greater than 1, so it is efficient. Based on the Net B/C analysis, the result is 0.82 which is less than 1, which means it is not feasible, and based on the IRR analysis, it produces an IRR value of 58.62. % is greater than 6% (interest rate) then it is stated to be feasible because it meets the investment criteria.

Keywords: financial feasibility, arabica coffee, and farming.

I. INTRODUCTION

Coffee is a plantation commodity that has an important role in plantation activities and economic activities in Indonesia. This is because coffee has contributed significantly to the country's foreign exchange which is a non-oil and gas export [1]. In addition, it can provide jobs and a source of income for coffee plantation farmers and for other economic actors involved in cultivation, processing and in the marketing chain. There are two species of coffee plants developed in Indonesia, namely Arabica coffee and Robusta coffee. Arabica coffee is a type of traditional coffee that is considered to have the most delicious taste and Robusta coffee has higher caffeine so that it can be developed in an environment where Arabica coffee cannot grow with a bitter and sour taste [2]. Over the past five years, Indonesia has been in fourth position as a coffee exporter after Brazil, Colombia and Vietnam [3]. There are 6 central coffee producing districts in East Java. Bondowoso Regency is in third position with a total production of 4,135 tons consisting of 2,900 tons of robusta coffee and 1,235 tons of arabica coffee. Bondowoso Regency is one of the centers for producing Robusta and Arabica coffee in East Java Province. The coffee plantation area in Bondowoso Regency is dominated by smallholder plantations. The production of Robusta and Arabica coffee in Bondowoso Regency always increases every year. 2013 showed that the productivity of smallholder coffee plantations was only 0.31 tons/ha. The increase in land area and amount of production began to occur in 2014 to 2016 so that it was able to increase productivity up to 0.70 tons/ha but experienced a slight decrease in 2017 which was 0.68 tons/ha.

Increasing the productivity of people's coffee in Bondowoso Regency cannot be separated from the role of the Bondowoso Regency government in providing support and assistance to smallholder coffee farmers through a program to develop community coffee commodity economic clustering in several regions in Bondowoso Regency [4] Arabica coffee farming is expected to be able to make a sizable contribution to the improvement and welfare of farmers in Jampit Village, Ijen District, Bondowoso Regency. Until now, this farming is still running as a livelihood for them which is a livelihood that has been passed down from generation to generation from their ancestors. The condition of the selling price of coffee which is currently felt to be unstable by the farmers causes them to be uneasy in running their farming business, so that in running their business, of course the Arabica coffee farmers in Jampit Village take into account the problems of costs and profits they get. They hope that from the results of their farming they will get the maximum possible profit with the minimum possible cost so that they can be used to meet the daily needs of their

family. [5] So that farming can provide more profits, coffee can be downstreamed by agro-industry. [6] The low income of farmers raises questions regarding the ability of coffee farming to meet the economic needs of families in the future, so a feasibility analysis is necessary.

Previous research has carried out a lot of analysis of the financial feasibility of arabica coffee farming in several regions in Indonesia such as analyzing the financial feasibility of arabica coffee farming in Kepahiang using the Net B/C, Gros B/C, PV/K, NPV and IRR approaches [7] which was continued with in Sukorambi District, Jember Regency with the addition of PR and PP investment criteria [6]. While in Simalungun Regency with an analysis of R/C ratio, Return on Investment (ROI), NPV, IRR, Net B/C, and PP [8]. [9] in Gayo Lues Regency with NPV, IRR, PP analysis, [10] in Pesawaran Regency with NPV, Net B/C, Gross B/C, PP. The financial feasibility of Arabica coffee farming in Sudalarang Village [11] with NPV, IRR, B/C Ratio, and PP analysis, and [12] in Bandung Regency with the NPV, Net B/C, IRR approach. Meanwhile, in Bondowoso Regency, as one of the centers for the development of Arabica coffee production, a study on the financial feasibility of Arabica coffee farming has not been carried out, so this research needs to be carried out using a feasibility analysis approach using NPV, R/C Ratio, Net B/C and IRR. Research on coffee in Bondowoso has been carried out related to the efficiency of coffee marketing distribution channels and about modern business inclusive Arabica coffee value chains [13][14]. Management of female coffee farmer cadre [15] and analysis of profit and cost efficiency of coffee farming [16]

II. METHODS

The determination of the research area was done in Jampit Village, Ijen District, Bondowoso Regency. The location selection was done purposively (purposive method). Because the average population of Jampit Village is Arabica coffee cultivation. In this study using descriptive and quantitative research methods. The population of this study were 68 Arabica coffee farmers in Jampit Village, Ijen District, Bondowoso Regency. The sampling technique in this study was carried out by simple random sampling according to the strata of land area. The farmers who were included in the data collection were arabica coffee farmers in Jampit Village, Ijen District, Bondowoso Regency, so the data obtained was very accurate. The number of samples in this study used slovin so that the number of samples was determined to be 40 respondents.

Table 1. Determination of number of the samples

Land Area	Population	Sampel
< 0,5	7	3
0,5 – 1	23	10
>1	38	27
Total	68	40

In this study the level of confidence is 95% or with the desired error rate of 10%. With the number of Arabica Coffee Farmers in Jampit Village as many as 68 people. A total of 68 populations were taken for the sample, namely 40 people based on the strata of land area. To answer the first problem formulation, namely the profit of Arabica coffee farming, the NPV formula analysis is used. NPV (Net Present Value) is the benefit obtained during a project period which is measured at a certain interest rate. If the $NPV > 0$, then the farming is feasible [17].

$$NPV = \sum_{t=0}^n \frac{Bt - Ct}{(1+i)^t}$$

Notes:

NPV = value of money today and in a certain time

Bt – Ct = Net income in year of t

i = prevailing interest rate

t = Timeframe (year to)

I = Initial business investment

Furthermore, to analyze the feasibility of arabica coffee farming in Jampit Village, Ijen District, Bondowoso Regency, an analysis of R/C Ratio, Net B/C ratio, and Internal rate of return (IRR) was used.

R/C Ratio = TR/TC

Notes:

TR = Total Revenue

TC = Total Cost of Production

If:

R/C Ratio > 1, then arabica coffee farming is efficient

R/C Ratio = 1, then Arabica coffee farming break even

R/C Ratio < 1, Arabica coffee farming is not efficient [18]

The Net B/C ratio measures whichever is greater, the costs incurred compared to the results (output) obtained. The costs incurred are denoted by C (cost). The resulting output is denoted by B(benefit) [17]

$$\text{Net } \frac{B}{C} = \frac{\sum_{t=1}^n \frac{Bt - Ct}{(I+i)^t}}{\sum_{t=1}^n \frac{Ct - Bt}{(I+i)^t}}$$

If net B/C > 1, coffee farming is feasible. Vice versa, if net B/C < 1, then farming is not feasible to carry out.

Notes:

Bt = Farming benefits in year t

Ct = Cost of farming in year t

n = Economic age

t = Time period (year to)

I = Initial business investment

i = prevailing interest rate

The internal rate of return (IRR) is the rate of return on investment, calculated when the NPV is zero [17].

The formula is as follows:

$$\text{IRR} = i1 + \frac{\text{NPV1}}{\text{NPV1} - \text{NPV2}} (i2 - i1)$$

If IRR ≥ i then farming is stated to be feasible

If IRR ≤ i then farming is stated to be not feasible

III. RESULT AND DISCUSSION

Feasibility is an activity to assess the extent to which benefits can be obtained in carrying out a business activity. Various kinds of opportunities and opportunities that exist in business activities, have required an assessment of the extent to which these activities or opportunities can provide benefits (benefits) if attempted. The financial feasibility value of Arabica coffee farming in this study uses several investment feasibility criteria including NPV analysis, R/C Ratio, B/C Ratio and IRR. A business can be said to be feasible to continue if it meets the criteria, namely the NPV value is more than zero, the R/C Ratio and B/C Ratio analysis is greater than one (R/C Ratio > 1 and B/C Ratio > 1) and the IRR value is greater than bigger than the interest rate. The profit of Arabica coffee farming in this study was also measured by the financial feasibility of a project through the Net Present Value (NPV) investment criteria. The calculation of the NPV value is determined using the interest rate in effect at the time of the study. The interest rate used is 6%. It is equivalent to interest rate of *Kredit Usaha Rakyat* (KUR) or People's Business Credit. The determination of the use of *Kredit Usaha Rakyat* (KUR) as a benchmark for the interest rate used is because a lot of farming

communities use KUR to make loans as agricultural business capital. The production period in this study is 4 years. The results of the calculation of the financial feasibility analysis can be seen in table 2.

Table 2. NPV Analysis of Arabica Coffee Farming in Jampit Village, Ijen District, Bondowoso Regency

Indicator	Year to-	Benefit	Discount Factor	Present Value	Criteria
	0	-9.616.398	1,00	-9.616.398	Feasible
	1	-3.380.362	0,94	-3.189.021	
	2	17.095.233	0,89	15.214.696	
	3	26.523.186	0,84	22.269.378	
NPV				19.613.917	

Net Present Value (NPV) is often translated as net present value. The NPV of a project or business idea is the present value of the difference between benefits and costs at a certain discount rate. NPV is the excess of benefits (benefits) compared to costs / costs. NPV is an investment criterion that is widely used to measure whether a project is feasible or not. Based on Table 2, arabica coffee farming in Jampit Village, Ijen District is said to be feasible to run. This can be seen from the calculation of the NPV value obtained at an interest rate of 6% resulting in a positive NPV value of IDR 19,613,917.09. The NPV value resulting from these gains indicates that the NPV value is greater than zero ($NPV > 0$). This means that if you invest capital in Arabica coffee farming, you will get a profit of IDR 19,613,917.09. Therefore, Arabica coffee farming in Jampit Village, Ijen District is said to be feasible to continue because Arabica coffee farming provides benefits, namely the benefits received are greater than the total costs incurred for 4 years.

This is in line with research [19][20][21][22] that the NPV value of arabica coffee farming is greater than zero. The NPV value at the discount rate is greater than zero. It can be seen that the results of the analysis show that coffee farming is financially profitable. This indicates that smallholder coffee farming is feasible to continue. Return cost ratio is an attempt to determine the level of efficiency of an activity carried out by farmers. A business is declared efficient or still at an efficient level if the value of the R/C ratio is more than one, the greater the value of the R/C ratio, the greater the level of efficiency. [18] Businesses that are run efficiently or not can be known using R/C analysis. R/C stands for return cost ratio or the comparison between revenue and costs. R/C Ratio analysis of arabica coffee farming is an analysis to determine the efficiency of arabica coffee farming efficiently or not. The analysis can be seen below:

Table 3. R/C Ratio Value of Arabica Coffee Farming in Jampit Village, Ijen District, Bondowoso Regency

Notes	Value
Acceptance (R)	67.792.488
Total Cost (C)	37.170.829
R/C Ratio	1,82

Based on Table 3, it is known that the average efficiency of Arabica coffee farming based on the calculation of the R/C Ratio in Jampit Village, Ijen District, reaches 1.82. The average income of Arabica coffee farmers for 4 years from 2018 to 2021 is Rp. 67,792,488, - received by all Arabica coffee farmers in Jampit Village, Ijen District. While the average total cost incurred for 4 years is Rp. 37,170,829, - issued by all arabica coffee farmers in Jampit Village, Ijen District, resulting in an average efficiency of all arabica coffee farmers in Jampit Village, Ijen District of 1.82. This is in line with research [11], that the R/C ratio value of Arabica coffee in Sudaralang Village can be said to be feasible because the R/C ratio value is 2.27. In addition, [23] [24][25][26] the results of his research also showed that the value of the R/C ratio of coffee was more than 1. Even the R/C ratio of coffee in Enrekang Regency reached 15.12 [27]. It can be seen that the level of efficiency obtained by Arabica coffee farmers varies due to differences in the amount of income and costs owned by farmers. This happens because the results of the division between total revenue and total costs, so that the average R/C ratio is 1.82, it can be concluded that Arabica coffee farming in Jampit Village, Ijen District, Bondowoso Regency is efficient to cultivate.

The driving factor that resulted in an efficient R/C Ratio of Arabica coffee farming up to 1.82 was the amount of income earned and the costs incurred in carrying out Arabica coffee farming were not too large because Arabica coffee farming is plantation farming so maintenance is only possible at any time within 1 year. Treatment 1 to 2 times so the cost is not too much. Subsequent analysis with Net B/C Ratio analysis is used to determine the feasibility of Arabica coffee farming in Jampit Village, Ijen District so that

researchers know whether the business is feasible to develop. In order to know the feasibility of Arabica coffee farming is feasible or not to be developed in the future, it is obtained through analysis of the Net B/C ratio, namely the division between total income (Benefit) and total cost (Cost). For this analysis can be seen in the table below:

Table 4. Net B/C Ratio Value of Arabica Coffee Farming in Jampit Village, Ijen District, Bondowoso Regency

Notes	Value
Income (B)	30.621.659
Total Cost (C)	37.170.829
R/C Ratio	0,82

Based on Table 4, it is known that the average feasibility of Arabica coffee farming based on the calculation of the Net B/C Ratio in Jampit Village, Ijen District, Bondowoso Regency reaches 0.82. The average income of arabica coffee farmers for 4 years is Rp. 30,621,659, - received by all Arabica coffee farmers in Jampit Village, Ijen District. While the average total cost incurred for 4 years is Rp. 37,170,829, - issued by all arabica coffee farmers in Jampit Village, Ijen District, resulting in an average feasibility of all arabica coffee farmers in Jampit Village, Ijen District of 0.82 for 4 years. The calculation of the net B/C ratio is the result of the division between the calculation of income and the calculation of the total cost of production. Thus, based on the total B/C ratio obtained at 0.82, it can be concluded that the B/C ratio of Arabica coffee farming in Jampit Village, Ijen District, Bondowoso Regency is not feasible to develop. This is contrary to research [28], the calculation of Arabica coffee farming in Doloksanggul District, Humbang Hasundutan Regency, was stated to be feasible and profitable for Arabica coffee farmers, because the B/C Ratio = $1.25 > 1$ (feasible/profitable). In fact, the results of research [12] net B/C of arabica coffee farming in Bandung Regency reached a net B/C ratio = 8. B/C analysis is a comparison between income and costs in a business.

Because the calculation of the B/C Ratio of Arabica coffee farming in Jampit Village, Ijen District, is 0.82 which is less than 1, Arabica coffee farming in Jampit Village, Ijen District, Bondowoso Regency can be said to be infeasible because the income earned is less than the costs incurred by coffee farmers. arabica in Jampit Village, Ijen District, so that with the addition of 1 rupiah the costs incurred to carry out Arabica coffee farming will generate a profit/income of 0.82 rupiah. The factor that caused Arabica coffee farming in Jampit Village, Ijen Sub-District, was not feasible until it obtained a B/C Ratio value of 0.82, namely the lack of time for farmers to cultivate Arabica coffee so that from 4 years of planting Arabica coffee, new farmers earn 2 times their income while farmers have 4 times production costs. This causes a gap in the amount of expenditure which is still higher than the amount of profits obtained by Arabica coffee farmers in Jampit Village, Ijen District, Bondowoso Regency. The financial feasibility of a project can be assessed through investment criteria through the Internal Rate of Return (IRR) indicator. The calculation of the IRR value is determined using the interest rate in effect at the time of the study. The interest rate is 6%, equivalent to the interest rate of the *Kredit Usaha Rakyat* (KUR) or People's Business Credit. The determination of this bank is because Bank Indonesia (BI) is the central bank which functions as a regulator of monetary stability, regulates and supervises other banks. The production period in this study is 4 years. The results of the calculation of the financial feasibility analysis can be seen in Table 5.

Table 5. IRR Value of Arabica Coffee Farming in Jampit Village, Ijen District, Bondowoso Regency

Notes	Value	Creteria
IRR (%)	58,62	Feasible

The internal rate of return is the rate of return on investment, calculated when the NPV is zero. The decision to accept/reject the investment plan is made based on the results of a comparison of the IRR with the desired rate of return on investment. Arabica coffee farming in Jampit Village, Ijen District is said to be feasible to run. This can be seen from the calculation of the IRR indicator to determine the level of return on net investment in a company. A business is said to be feasible if it has an IRR value greater than the interest rate used at the time of the study. Based on the table above, it can be seen that the IRR value is 58.62%. This

value indicates that Arabica coffee farming is feasible because it meets the investment criteria. The IRR value of 58.62% is greater than 6%. This means that by investing capital in Arabica coffee farming, farmers will benefit more than depositing money in the bank because by investing their money in the form of Arabica coffee farming, farmers will get a profit of 58.62%. This is in line with research [29], which states that the IRR value for smallholder coffee farming in Jember Regency is 13.54% per year which is greater than the interest rate value of 10.50%.

The results of the study [30] also noted that the IRR for Arabica coffee in West Pasaman was 6.86% and [31] the IRR for Arabica coffee in Bangli Regency was 28.70% greater than the interest rate of 6%. Meanwhile, the IRR for Arabica coffee in Bandung Regency is higher than the IRR for Arabica coffee farming in Bondowoso Regency, which is 64.67% [12]. This value proves that in terms of feasibility assessment the IRR coffee farming is still quite feasible continued and still able to return the expenses incurred on the investment used at the beginning of doing farming up to the prevailing interest rate. Based on the data above, it can be concluded that the capital investment made by farmers for Arabica coffee farming in Jampit Village, Ijen District is feasible to run. This farming is profitable because the productivity of Arabica coffee in Jampit Village, Ijen District is very high. This cannot be separated from the condition of the land in Jampit Village, Ijen District which is very suitable for Arabica coffee cultivation where this location is known to be very fertile, has sufficient rainfall coupled with the ability to farm the surrounding community who have long been accustomed to farming activities with various kinds of planted commodities so that farmers are able to manage their Arabica coffee farming very well [32]. Better cropping systems and management of coffee plantations will reduce the technical inefficiencies of coffee farming.

IV. CONCLUSION

Profits obtained from Arabica coffee farming with a high level of investment feasibility. Farmers are expected to maintain Arabica coffee farming activities and even need to increase their farming through expanding land, utilizing resources to the maximum extent possible, seeking more information and technology for efficient Arabica coffee cultivation, collaborating with the private sector and the government regarding the cultivation and marketing of Arabica coffee.

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