(Turnitin) Eka Martiningsih et al_AgBioForum - Investment in Coffee Farming Based on Community Encouragement

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Submission date: 11-Sep-2023 01:59AM (UTC-0400)
Submission ID: 2160621176
File name: Coffee_Farming_Investment_Based_On_Community_Encouragement.docx (1.56M)
Word count: 5723
Character count: 31097

Investment in Coffee Farming Based on Community Encouragement

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The development of Arabica coffee farming requires substantial investment costs and a long economic life. Additionally, the cultivation of coffee plantations offers opportunities to create natural tourist destinations. The research problem addressed in this study is the assessment of the profitability of such investments. The primary objectives are to analyze the profitability and financial feasibility of investing in Arabica coffee farming and to gauge the response of farmers to the development of Arabica coffee as a natural tourist destination. The research was conducted in Kintamani District, Bali, using a sample of 100 farmers selected through a multistage sampling method, which involved selecting samples in stages to represent the population. Profitability was assessed by comparing the present value of benefits and costs, while financial feasibility was analyzed using the Net Benefit Cost Ratio (Net B/C), Net Present Value (NPV), and Internal Rate of Return (IRR). Additionally, five informants were chosen for in-depth interviews to explore the potential for Arabica coffee to become a tourist destination. The results of the study indicate that investment profits in Arabica coffee farming are realized between the 4th and 30th years. The feasibility analysis reveals a Net B/C of 4.443, NPV of Rp. 107,672,034, and an IRR of 35.06%, indicating that Arabica coffee farming is a viable venture. Moreover, 85% of farmers responded positively to the idea of developing coffee tourism destinations. This research provides valuable information to farmers and investors regarding investment costs, economic viability, and profits associated with Arabica coffee farming, as well as the potential for natural tourism development in Kintamani, Bangli, Bali.

Key words: Arabica coffee, farming, investment, finance, profit, natural tourism.

1. INTRODUCTION

Coffee stands as a primary tropical commodity traded worldwide, representing half of the total tropical commodity exports. Its global popularity and allure can be attributed to its distinctive flavor and are further supported by historical, traditional, social, and economic factors. Additionally, coffee serves as a natural source of caffeine, a substance known to stimulate the brain, enhance cognitive abilities, and improve memory. Moreover, the presence of chlorogenic acid in caffeine is linked to a reduced risk of diabetes and heart disease. Beverages made from coffee bean extract are consumed at an astonishing rate of approximately 2.25 billion cups daily worldwide. In 2015, the International Coffee Organization (ICO) estimated the global demand for ground coffee to be around 8.77 million tons (ICO, 2015).

Indonesia held the position of the third-largest coffee-producing country in 2012; however, this ranking was subsequently overtaken by Colombia, relegating Indonesia to the fourth position among coffee-exporting nations worldwide, trailing behind Brazil, Vietnam, and Colombia (Director General of Plantations, Ministry of Agriculture, 2018). Indonesia's relatively lower coffee production productivity can be attributed to the persistence of traditional coffee plantation techniques (Baso & Anindita, 2018). Presently, Indonesian coffee yields an average of 0.552 tons per hectare, with a total coffee production of 685,090 tons and a coffee plantation area spanning 1,241,710 hectares. In contrast, Vietnam boasts a coffee productivity rate of 2.175 tons per hectare, yielding a total production of 1,395,600 tons, across a coffee plantation area of 641,700 hectares.

Bali is one of the areas that produce coffee in Indonesia, recognized in both the domestic and export markets, including Asia and Europe. In the first semester of 2016, Bali earned foreign exchange of US$ 60,131.42 from coffee export activities. Coffee shipments actually increased by 146.22% from 5.15 tons in the first half of 2015 to 12.68 tons in the first half of 2016 (Bali Provincial Office of Industry and Trade, 2016).

Bangli Regency boasts the highest coffee planting area, approximately 4,736 ha, compared to other regencies. As the largest Arabica coffee producer, Bangli Regency saw an increase in production from 2,247 tons in 2019 to 2,249 tons in 2020. The cultivated Arabica coffee holds a Geographical Indication and is registered as a Geographical Indication Protection Society (GIPS) known as "*Kopi Arabika Kintamani Bali*" (Ardana, 2019). Arabica coffee cultivation is undertaken by individuals who are members of the Subak organization.

The results of research conducted by Winantara et al. (2014) indicate that investing in development of civet coffee in Bali is profitable, with an internal rate of return of 21%, and an economic age calculated at 5 years. Similarly, research by Pahlevi et al. (2014) demonstrates the profitability of developing civet coffee in West Lampung on both micro and macro scales. Meanwhile, Wahyuni et al. (2012) find that the financial feasibility of Arabica coffee, with an economic age of 10 years, exhibits a Net B/C Ratio of 2.17, NVP (Net Present Value) of Rp. 18,847,733, and an IRR (Internal Rate of Return) of 26.60%.

Arabica coffee also benefits from a 20% - 25% annual increase in export demand, making it a viable and profitable option for development. According to the Indonesian Plantation Research and Development Center, the economic life of Arabica coffee ranges from 20 to 25 years, with coffee plants starting to bear fruit after 4 to 5 years. However, there is a period during which coffee production may not be maximized, leading to declining yields as the coffee plants age. This is compounded by the high investment capital required, as indicated by research conducted by Roidah (2013), which found it to be IDR 20,000,000 per hectare.

The primary research question addressed in this study is the profitability of investing in Arabica coffee cultivation over its economic life of 30 years. In line with this question, the research objectives are twofold: (1) to analyze the cash flow of benefits and costs using forecasting methods over the economic lifespan, and (2) to assess the benefits of Arabica coffee farming development throughout economic life, utilizing investment criteria such as Net Present Value (NPV), Net Benefit Cost Ratio (Net B/C), and Internal Rate of Return (IRR).

The phenomenon observed in investing in Arabica coffee farming in Bangli is that the practitioners, specifically the coffee farming community comprising members of the Subak organization, lack a comprehensive understanding of coffee investment intricacies. These farming communities have traditionally functioned solely as raw material suppliers, without direct involvement in investment decision-making. There exists a disparity in comprehension that warrants analysis to discern the responses and expectations of the coffee farming community concerning Arabica coffee cultivation investment in Bangli.

2. Literature Review

Coffee is a type of plantation crop that has been cultivated for a long time and has high economic value. Up to 70% of coffee consumption in the world comes from Arabica coffee species and 26% from Robusta coffee. Coffee comes from Africa, namely the mountainous region of Ethiopia. However, coffee itself only became known to the world community after the plant was developed outside its area of origin, namely Yemen in southern Arabia through Arab traders (Gumulya & Helmi, 2017).

The coffee fruit consists of several parts, namely the outer skin layer (*excocarp*), a layer of flesh (*mesocarp*), mucus (*musilage*), thin skin (*spermoderm*), and coffee beans (*endoscarp*). The outer skin layer (*excocarp*) is the green layer which is found in young fruit and gradually turns green yellow, yellow and finally red in ripe coffee cherries. The flesh of the fruit will be slimy when it is ripe and tastes a bit sweet. The inner skin, namely the endocarp, is quite tough and this skin is usually called horn skin (Mubarok et al., 2014).

Processing of coffee beans can be done in two ways, namely the wet method and the dry method. Processing in the dry way can be done by directly drying the coffee cherries under the hot sun, while the wet method through several stages of processing which produces several types of waste that can be used as animal feed, for example coffee skin (*coffeepulp*) (Nadhiroh, 2018).

Investment Valuation

Arabica coffee cultivation is a business that can be called an agricultural project. Because in this business investment activities are carried out with the hope that in the future results or benefits will be obtained. The benefits referred to in the Arabica coffee plantation development business are income derived from receiving money from the sale of production, while the investment in question is costs incurred until benefits are obtained.

A project proposal is feasible or proper if the benefits are greater than its costs or sacrifices. In general, investment projects in the plantation sector are long-term. In this regard, the assessment of benefits must calculate the time. Both receipts and expenses are expressed in terms of money and so that t are the same, what is commonly used to calculate present value. The present value of money is not the same as value of money in the future. The process of calculating the present value of a sum of money to be received in the next few years is called discounting.

Whether or not an investment is worth it from a financial perspective can be determ d or measured by several criteria because investment is an index for measuring and comparing the benefits of various projects, through investment criteria it can be assessed whether a project is profitable or not profitable (Husnan & Suwarsono, 2005). Three important measures in assessing projects related to discounting principles (Kadariah & Gray, 1978; Vawda et al., 2003)

(1) Net Present Value (NPV)

NPV is the difference in the present value between the benefits and costs of the project. Like Net B/C, the discount rate used is the opportunity cost of capital. The decision making method is that the project is accepted if the net present value is positive. The N is equal to zero, meaning that the project retur exactly the same as the opportunity cost of capital and if the NPV is less than zero the project is rej ted.

(2) Net Benefit-Cost Ratio (Net B/C)

Considering the present value between the benefits and costs of the project and expressed in the ratio. The discount rate used is usually the opportunity cost ratio of capital. Calculating Net B/C is after discounting, gross benefits with gross costs (including investment costs, maintenance an operating costs of production). How to accept a project, if the Net B/C is greater than one and reject it if it is less than one

(3) Internal Rate of Return (IRR)

It is also called the internal rate of return, is a criterion that is independent of external fac s such as rising interest rates, inflation rates and so on. IRR is the interest rate used to calculate the present value in such a way that the costs

and benefits are the same. At this rate the Net B/C should be as close to one as possible, the NPV as close to zero as possible and the net benefit amount to be positive. IRR can be calculated by trial and error considering that there is no simple mathematical formula that can be used. At first, one interest rate is chosen to calculate the NPV, if it turns out that the NPV obtained is positive, then it is tried with a higher discount rate, if it turns out to be negative, it is tried at a lower discount rate, and so on.

Community Role

Community is social capital in development, so community participation is the most important component in efforts to grow independence and the process of empowerment (Adiyoso, 2018). Neglect of the community in development is the beginning of the failure of the implementation of empowerment in supporting development. The community must be involved as a subject of development [in development], not an object of development [on development]. Communities should be encouraged to identify their own goals of action and direct development independently and responsibly (Edelia & Aslami, 2022). People will feel they have [a sense of belonging] if they immediately understand the goals of development and empowerment (Ife, 2016). Community response to a development plan is very important to assess involvement in the development activity.

3. Research Methods

Location and Time

The research was conducted among Arabica coffee farmers in Serahi, Bantang, and Sukawana Villages, Kintamani District, Bangli Regency. The research took place during the period of 2020-2021. The research locations were selected using the purposive sampling method based on the consideration that Arabica coffee production was in progress and had the longest years of planting.

Research Framework

Investing in Arabica coffee farming requires considering the flow of benefits and costs over its economic lifespan. To forecast benefits, a quadratic equation was employed due to the consideration that coffee production reaches a maximum level. For cost forecasting, a simple regression equation was used, taking into account the costs associated with production. Arabica coffee farmers use three investment criteria to assess business profitability: Net Present Value (NPV), Internal Rate of Return (IRR), and Net Benefit/Cost Ratio (Net B/C/R). The investment framework for Arabica coffee farming is depicted in the following figure:

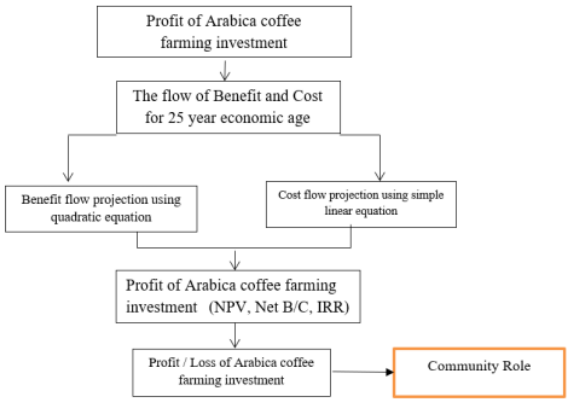

Figure 1: Research Framework

Population and Sample

The population in this study comprised Arabica coffee farmers who had planted Arabica coffee from 2015/2016 to 2019/2020, divided into five planting years. The sample was selected using the multistage sampling method, which involves determining the sample in stages, with each level representing a segment of the population. A total of 100 respondents were chosen, with the proportional random sampling method employed for each level of the population.

Table 1: Number of Respondent Farmers in Each Sample Village

No	Village	Year of Planting					Amount
		2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	
1	Serahi	20	10	10	0	0	40
2	Bantang	0	10	10	10	0	30
3	Sukawana	0	10	10	0	10	30
Amount		20	30	30	10	10	100

Data analysis

Analysis of the investment benefits of developing Arabica coffee farming business is carried out using the cash flow method, which calculates the inflow of receipts and the outflow of expenditures.

1) Receipt Current Calculation (Bt)

Revenue is obtained from the multiplication of dry coffee production with the selling price of dry coffee. The available production data is 5 times, this data is used to estimate production at the age of t year, using the quadratic equation, on the basis of the consideration that Arabica coffee production has a maximum production. The quadratic equation used with the following formulation:

$$Yt = a + bt + ct2$$

Yt is dry coffee production in year t, while a,b,c and c are the estimated parameters, t is time.

2) Expenditure Flow Calculation (Ct)

Expenditures are costs incurred for investment costs and

production costs, because production cost data is only available 10 times, the data is used to estimate subsequent production costs up to t-year, with an estimate of the application of a simple regression equation, with the following formulation:

$$Ct = a + bY$$

Ct, is production cost in t year, Y is production, while a,b are the estimated parameters

3) Profit Analysis of Arabica Farming Investment

Analysis of investment returns using the cash flow method, namely inflow and outflow, to obtain an equalization of the value of money from the flow of receipts (Bt) and flows of expenditure (Ct) each multiplied by the discount factor, with the formula:

$$Po = St(1 + i)t$$

Po, is the present value of money, St, is the value of money in t year, i is the discount factor, t is the time.

Criteria for Net Benefit Cost Ratio (Net B/C)

Profits from investment in Arabica coffee development are analyzed using the Net-Benefit Cost Ratio criteria, with the formulation:

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

NetB/C is the Net Benefit Cost Ratio, Bt is the net benefit in year-t (Rp), Ct is the cost in year-t (Rp), i is the prevailing interest rate, n is the economic age of Arabica coffee, and t is year

Criteria of Net Present Value (NPV)

Net Present value (NPV) is the current value (present value) of the difference between (benefits) and costs (costs) at a certain discount rate. NPV shows the advantages of benefits compared to costs

$$NPV = \sum_{t-1}^{n}((Bt-Ct))/〖(1+i)〗^t$$

NPV is the Net Present value, Bt is the net benefit in the t-year (Rp), Ct is the cost in the t-th year (Rp), i is the prevailing interest rate, n is the economic age of the Arabica coffee, and t is the year. . If NPV > 0, then Arabica coffee farming is profitable, and if NPV < 0, Arabica coffee farming is unprofitable.

Criteria for Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) is a method for calculating interest rates that can equate the present value of all cash inflows with cash outflows from an investment in developing an Arabica coffee farming business, with the formulation:

$$IRR= i\_1 〖+ 〖NPV〗^{+}/((〖NPV〗^{+}- 〖NPV〗^{-}))) (i\_2-i\_(1))〗^$$

i1 is the value of the first discount rate to obtain a positive NPV, i2 is the value of the second I discount rate to obtain a negative NPV, if the Internal Rate Of Return (IRR) of the proposed Arabica coffee investment is greater than the prevailing interest rate when the Arabica coffee investment business is carried out, it is declared profitable, and conversely, if the proposed Arabica coffee Investment Internal Rate Of Return (IRR) is less than the prevailing interest rate when the Arabica coffee investment business is carried out, it will be declared unprofitable.

4. Research Findings

Benefits of Arabica Coffee Farming

The average age of the Arabica coffee plants cultivated by farmers starts at the age of 4. From the results of the regression calculation, the relationship between age and production is obtained by the equation of the production function estimator Yt = 199.1019 + 73.1031 t*** – 2.4702 t2***t- count is significant at 1 % level real. Table 2 shows that cultivated Arabica coffee starts producing at the age of 4. The increase in production is not the same every year, as well as the increase in benefits. The increase in production and benefits increases, maximum at 15 years of age, product at 740 kg/ha and benefits of IDR 48,100,000/ha. Then at 16 years of age, production and benefits decrease until the economic age is 30 years. The average price of dry coffee/rice coffee in farmer level is IDR 65,000/kg, Arabica coffee production in Kintamani is oriented to the export market, different from research ((A) (D) (B) Π*, n.d.) in Kenya coffee production is oriented to the local market, in Costa Rica, the research results of (Babin, 2020) many farmers left coffee farming because of low coffee prices. Research by Draeger (2002) many farmers left the agricultural industry, on the other hand coffee farmers rejoice because there is an increase in coffee prices.

Table2. Benefits and relationship between plant age and Arabica Coffee production in Kintamani District, Bangli, Bali

Coffee Age (Year)	Production* (Kg/Ha)	Benefit (Rp/Ha)
1	0	0
2	0	0
3	0	0
4	452	29380000
5	503	32695000
6	549	35685000
7	590	38350000
8	626	40690000
9	657	42705000
10	683	44395000
11	704	45760000
12	721	46865000
13	732	47580000
14	738	47970000
15	740	48100000
16	736	47840000
17	728	47320000
18	715	46475000
19	696	45240000
20	673	43745000
21	645	41925000
22	612	39780000
23	574	37310000
24	531	34515000
25	483	31395000
26	430	27950000
27	372	24180000
28	309	20085000
29	242	15730000

30	169	10985000

Description: *) estimated from the equation of Yt = 199.1019 + 73.1031 t – 2.4702 t2

Cost of Arabica Coffee Farming

The investment and maintenance costs of Arabica coffee farming are presented in Table 3. Investment and maintenance costs in the first year amount to Rp. 25,365,500/ha, covering expenses for seed purchase, protective trees, land preparation, planting holes, manure, and the costs associated with non-producing plants. Costs from the second to the third year total Rp. 6,517,110/ha, encompassing expenses for fertilizer and pesticide acquisition, depreciation of tools, land taxes, and labor wages. Plant-related expenses commence production in the fourth year, amounting to IDR 6,596,708/ha, which includes costs for maintaining productive plants, harvesting, and processing. Utilizing the results of regression analysis to establish the relationship between harvesting and processing costs and production, we derive an estimated cost function, Ct = 175.9730 + 0.1292 Y ***. The t-statistic is significant at the 1% confidence level.

Table 3: Cost of Arabica Coffee Farming in Kintamani District, Bangli, Bali

Coffee Age (Year)	Maintenance and Investment Cost (Rp/Ha)	Processing and Harvesting Cost* (Rp/Ha)	Total Cost (Rp/Ha)
1	25365500	0	25365500
2	6517110	0	6517110
3	6517110	0	6517110
4	6517110	79598	6596708
5	6517110	88579	6605689
6	6517110	96680	6613790
7	6517110	103900	6621010
8	6517110	110240	6627350
9	6517110	115699	6632809
10	6517110	120278	6637388
11	6517110	123976	6641086
12	6517110	126970	6644080
13	6517110	128907	6646017
14	6517110	129963	6647073
15	6517110	130316	6647426
16	6517110	129611	6646721
17	6517110	128202	6645312
18	6517110	125913	6643023
19	6517110	122567	6639677
20	6517110	118517	6635627
21	6517110	113586	6630696
22	6517110	107775	6624885
23	6517110	101083	6618193
24	6517110	93510	6610620
25	6517110	85057	6602167
26	6517110	75724	6592834
27	6517110	65510	6582620
28	6517110	54416	6571526
29	6517110	42617	6559727
30	6517110	29761	6546871

Description: *) estimated from the equation of Yt = 175.9730 + 0.1292 Y

The Analysis of Arabica Farming Investment Profit

The development of Arabica coffee farming aims to increase the income of smallholder farmers. This is in line with research (Duaja et al., 2020; Sunanto et al., 2019) it is necessary to empower farmers to increase the capacity and productivity of coffee farming. So, to analyze the benefits of investment are calculated from the financial aspect, namely the benefits received by farmers as implementers. The results of the present value analysis of the benefits and costs of Arabica coffee farming over an economic life of 30 years are shown in Figure 2 bellow.

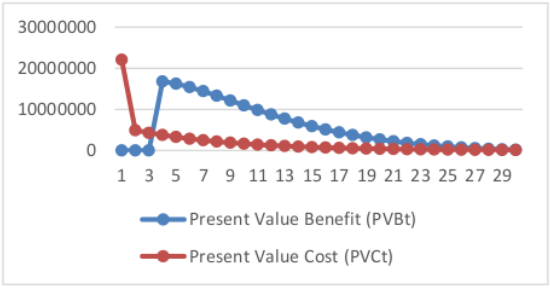

Figure 2: The Ratio o Present Value Benefit and Cost Arabica Coffee Farming

In Figure 2, the present value of investment in the first year is IDR 22,056,957, while the present value of the benefits from the first year to the third year does not yet exist (zero), because coffee is not yet in production, coffee farming has not yet made a profit, this is also shown by the present value curve of costs in on the benefit curve, the present value of benefits begins to appear in the fourth year, IDR 16,113,894 of coffee has started to produce, coffee farming begins to gain profits because the present value of profits is greater than the present value costs, this is shown by the benefit value curve above the present value curve of costs, the older the coffee plants are, there is a tendency for the profit earned to decrease and in the end the 30 year old coffee must be rejuvenated because the profit earned is low namely at Rp 131.535, it is shown at Figure 2 of present benefit value curve and the costs are already tight.

5. Discussions

Financial feasibility analysis

This financial feasibility analysis was carried out to find out whether Arabica coffee farming is profitable or not. This analysis uses the assumptions: (1) the project life is 30 years (2) the interest rate (discount) is 15% per year, (3) Arabica coffee production follows the prediction of coffee production, and (4) production costs follow the predicted cost of coffee farming. The results of financial analysis calculations can be seen in Table 4

Table 4: The results of the feasibility analysis of Arabica coffee farming in Kintamani District, Bangli Bali

Criteria	Value	Feasibility Indicator	Result
NPV	Rp. 107.672.034	NPV > 0	Proper
Net B/C	4,443	Net B/C > 1	Proper
IRR	35,05	IRR > DF	Proper

Note: DF = Discount Factor

1) Net Present Value

The results of the Net Present Value (NPV) show that the present value of the net benefits obtained during the business period is IDR 107,672,034 (NPV > 0). This NPV value shows that the Arabica coffee farming business is profitable, or the average annual net profit of Arabica coffee farming is IDR 8,972,670. Based on the NPV investment criteria, this business is feasible to run because it is profitable. This research is in line with the research of (Pahlevi et al., 2014; Wahyuni et al., 2012; Winantara et al., 2014) analysis of the financial feasibility of civet coffee in Bali, West Lampung and South Sulawesi seen from the profitable NPV analysis.

2) Net Benefit-Cost Ratio (Net B/C)

Net Benefit-Cost Ratio (Net B/C) is the ratio between the net profits that benefit the business and the net profits that harm the business. The Net B/C value is 4.444 indicating the efficiency of investment in the use of costs in Arabica coffee farming, an investment of IDR 1,000 will be returned in the amount of IDR 4,444. The Net B/C value is greater than one, meaning that investment in Arabica coffee farming produces greater benefits than the costs incurred or it can be said that investment in Arabica coffee farming is profitable (Pahlevi et al., 2014; Wahyuni et al., 2012; Winantara et al., 2014). Analysis of the financial feasibility of civet coffee in Bali, West Lampung and South Sulawesi seen from the analysis of Net B/C which is profitable (Ni Wayan Purnami Rusadi & Pande Made Ari Antha Paramarta, 2023).

3) Internal Rate of Return (IRR)

IRR analysis is to see how much the ability of Arabica coffee farming to generate profits from the investment invested is. The IRR shows the interest rate generated from investment in Arabica coffee farming with a percentage unit. The feasibility criteria are carried out by comparing the IRR value with the interest rate used. Based on the results of the analysis, the IRR was obtained 35.05 percent, meaning that the internal interest rate of return on Arabica coffee farming to the invested investment was 35.05 percent. The IRR value obtained was greater than the interest rate used at 15%, so Arabica coffee farming was profitable and feasible to cultivate. This research is in line with previous research analysis of the financial feasibility of civet coffee in Bali, West Lampung and South Sulawesi seen from profitable IRR analysis (Pahlevi et al., 2014; Wahyuni et al., 2012; Winantara et al., 2014).

In addition to the financial benefits obtained from investing in Arabica coffee farming, other benefits are also obtained such as the addition of plantation commodity exports, the orientation of farmers to cultivate Arabica coffee for export market purposes, preserving nature preventing landslides, in Kintamani District area because its land type is hilly and prone to landslides. Providing an economic impact on the community around the coffee farming land by absorbing a lot of labor.

Community Role

A good development must accommodate the opinions, views, or expectations of farmers regarding investment in Arabica coffee farming, so this research also analyzes data using the NVIVO R1 application which refers to the expectations of predetermined informants. The analysis process begins by entering a data file containing information records from informants. From this informant's data, coding was then carried out based on nodes and cases. Nodes are a process of grouping or coding based on related phrases or sentence meanings, while cases function to classify informants. The nodes in this study are all expressions about expectations from informants which are generalized into 5 child nodes consisting of capital facilities, market certainty, good management, involvement in training, and improving the quality of community resource (see Figure 2).

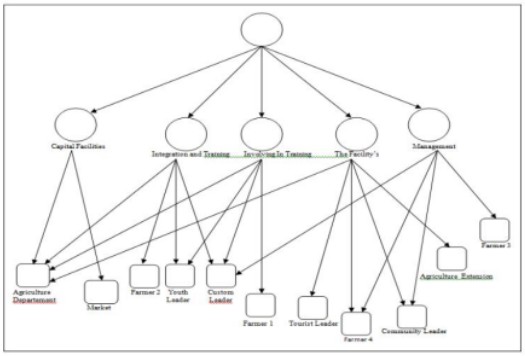

Figure 2: The Community Role for Coffee Investment

Based on the results of the processed visualization of coding data and cases, it can be concluded as follows:

1. Child nodes capital facilities are the hope of the Department of Agriculture [Agricultural Extension] and coffee farmers. Community involvement including local farmers is given more attention and priority so that they can compete if there are large investors who enter and involve local communities for all tourism activities.
2. Child node integration and training is the hope of the Tourism Office, tourists, youth leaders, and community leaders. Integration includes connecting various locations [views] and attractions around the coffee tourism area. (Itamar et al., 2014). Integration is important to create diverse new activities and avoid development stagnation. this can be started by identifying products and attractions that are mutually supportive and related, then a tourist itinerary is made in one travel package.
3. Child nodes Involving in training is the hope of the Tourism Office, youth leaders, community leaders, and tourists. Quality improvement includes services to tourists, tourism knowledge, and training related to tourism activities and coffee plantation management.
4. Child nodes the facilities are the hope of visitors, tour guides, tourists, travel agents, and farming communities. Facilities include adding and improving

the quality of facilities to support tourist activities

5. Child nodes management is the hope of community leaders, tourists, and travel agents. Good management includes maintaining security, creating visitor comfort, and being able to manage tourism activities efficiently.

6. Conclusions

Based on the results of the research and discussion, it can be concluded that the investment requirements for Arabica coffee farming in the first-year reach Rp. 25,365,500/ha. Production begins to be obtained in the fourth year, with maximum production in the 15th year reaching 740 Kg (dry bean coffee). Coffee farming profits are obtained from the 4th year to the 30th year, and the coffee must be rejuvenated. The financial feasibility of efficient cost utilization is evident with a Net B/C of 4.443, a net profit of NPV of IDR 107,672,034, or an annual net profit of IDR 8,972,670/ha. The investment has the ability to generate profits with an IRR of 35.05%. From the three investment criteria, Arabica coffee farming is feasible to develop and profitable. The development of coffee tourism destinations requires the active involvement of the coffee farming community, government support, community leaders, and a joint commitment to sustainability.

The results of research in Kintamani on Arabica coffee farming indicate that one of the reasons for choosing Arabica coffee over robusta coffee as the primary focus of coffee farming in Bali is its ability to provide a net profit of Rp. 8,972,670/ha, with an IRR value of 35.05%. Therefore, investing in Arabica coffee is highly profitable. Another reason is that Arabica coffee has a larger consumer base abroad, making it more competitive on a global scale. The development of coffee tourism destinations holds great potential for adding value to products and diversifying business opportunities.

7. Limitations

This study acknowledges several inherent limitations. Firstly, its scope was confined to a particular geographical area and a relatively modest sample size, thus limiting the extent to which its findings can be extrapolated to broader populations or regions. Secondly, the study made certain assumptions, such as fixed interest rates, which may not accurately mirror the complexities of real-world financial markets. Additionally, it did not comprehensively delve into the environmental ramifications or intricate aspects of community engagement in sustainable finance. The study's temporal context and external variables also necessitate careful consideration. While it offers valuable insights, prudence is advised when attempting to generalize its conclusions across different contexts or over time. Subsequent research endeavors should address these limitations to foster a more nuanced and comprehensive understanding of the subject matter.

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Investment in Coffee Farming Based on Community Encouragement

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The primary objective of the study conducted in the Kintamani District of Bali was to evaluate the economic viability and financial feasibility of engaging in Arabica coffee cultivation. Additionally, the research sought to investigate the possibility of leveraging Arabica coffee production as a means to attract tourists to the region. A rigorous data analysis methodology was implemented, commencing with the identification of a sample of 100 farmers through the utilisation of a multistage sampling technique to guarantee inclusivity of the wider population. The assessment of profitability was conducted with a high degree of rigour, wherein the present value of both the benefits and costs related to Arabica coffee farming were thoroughly compared. The assessment of financial feasibility involved the utilisation of key metrics, namely the Net Benefit Cost Ratio (Net B/C), Net Present Value (NPV), and Internal Rate of Return (IRR). The metrics presented offer quantitative insights, indicating that returns on investment in Arabica coffee farming become evident within the period spanning from the fourth to the thirtieth year. The net benefit-cost (B/C) ratio was calculated to be 4.443, indicating a favourable financial outcome for the venture. Additionally, the venture exhibited a positive net present value (NPV) of Rp. 107,672,034 and an impressive internal rate of return (IRR) of 35.06%. These findings confirm the financial viability of the project. The findings of this study indicate that a majority of the farmers surveyed (85%) expressed a favourable attitude towards the establishment and growth of coffee tourism destinations. These insights were obtained through the use of qualitative research methods, specifically in-depth interviews conducted with a sample size of five informants. This study offers essential insights for farmers and prospective investors pertaining to investment expenditures, economic feasibility, and profitability prospects in the cultivation of Arabica coffee. Furthermore, this highlights the potential opportunities for the development of ecotourism in the Kintamani region of Bangli, Bali, thereby enhancing our comprehension of the local economic environment.

Keywords*:* Arabica coffee, farming, investment, finance, profit, natural tourism

Introduction

Coffee is a prominent tropical commodity that is globally traded, accounting for approximately 50% of total tropical commodity exports. The global appeal and widespread popularity of this phenomenon can be attributed to its unique flavour profile, which is bolstered by a combination of historical, traditional, social, and economic influences. Moreover, coffee functions as an inherent reservoir of caffeine, a compound recognised for its capacity to activate the brain, augment cognitive functions, and enhance memory. Additionally, the association between the presence of chlorogenic acid in caffeine and a decreased susceptibility to diabetes and heart disease has been established. The global consumption of beverages derived from coffee bean extract is estimated to be approximately 2.25 billion cups per day, signifying a remarkable rate of consumption. According to the International Coffee Organisation (ICO), in 2015, the estimated global demand for ground coffee was approximately 8.77 million metric tonnes (ICO, 2015). Coffee occupies a prominent position in the global market when viewed through an economic lens. Examining the long-term profitability of coffee cultivation yields valuable insights regarding the economic sustainability of this agricultural practice. The financial aspects of Arabica coffee farming are comprehensively assessed through the utilisation of economic theories pertaining to investment, cost-benefit analysis, and agricultural economics.

Based on the research conducted by Amanda and Rosiana (2023), Indonesia's ranking as the fourth largest global coffee producer has been displaced to the fifth position as a result of a decline in coffee exports. However, Colombia surpassed Indonesia in this ranking, causing Indonesia to drop to fourth place among the leading coffee-exporting countries globally. According to the Director General of Plantations at the Ministry of Agriculture in 2018, Indonesia is now behind Brazil, Vietnam, and Colombia. The decline in coffee production in Indonesia has been attributed to climate change, resulting in unpredictable patterns of rainfall that have adversely impacted both coffee production and the well-being of farmers. The coffee production in Indonesia in 2021 exhibited a notable surge, marking the highest output achieved in the past ten years (Setyo Andi et al., 2022). The total production volume amounted to 774.6 metric tonnes, reflecting a growth rate of 2.75% compared to the preceding year. The decline in coffee production in Indonesia has been attributed to climate change, specifically the adverse effects of irregular rainfall patterns on both coffee cultivation and the well-being of farmers (Sujatmiko & Ihsaniyati, 2018).The lower productivity of coffee production in Indonesia can be

attributed to the continued use of traditional coffee plantation techniques (Baso & Anindita, 2018). Currently, the average yield of Indonesian coffee stands at 0.552 metric tonnes per hectare, resulting in a total coffee production of 685,090 metric tonnes. The coffee plantation area in Indonesia spans 1,241,710 hectares. In contrast, Vietnam exhibits a coffee productivity rate of 2.175 metric tonnes per hectare, resulting in a cumulative production of 1,395,600 metric tonnes, encompassing a coffee plantation area spanning 641,700 hectares.

Bali is a prominent coffee-producing region in Indonesia, renowned for its contributions to both the domestic and international markets, encompassing Asia and Europe. During the initial semester of 2016, Bali generated a total of US$ 60,131.42 in foreign exchange through its coffee export endeavours. The quantity of coffee shipments experienced a notable surge of 146.22%, rising from 5.15 tonnes in the initial six months of 2015 to 12.68 tonnes in the corresponding period of 2016 (Bali Provincial Office of Industry and Trade, 2016).

Bangli Regency is renowned for having the largest coffee cultivation area, estimated at approximately 4,736 hectares, in comparison to other regencies. Bangli Regency, being the foremost producer of Arabica coffee, experienced a marginal rise in production from 2,247 metric tonnes in 2019 to 2,249 metric tonnes in the subsequent year of 2020. The Arabica coffee variety that is grown in a specific region has been granted Geographical Indication status and is officially recognised by the Geographical Indication Protection Society (GIPS). This particular variety is referred to as "Kopi Arabika Kintamani Bali" (Ardana, 2019). The cultivation of Arabica coffee is carried out by individuals who are affiliated with the Subak organisation.

Based on the findings of a study conducted by Winantara, Bakar, and Puspitaningsih (2014), it has been determined that investment in the cultivation of civet coffee in Bali yields a profitable outcome. The study reveals that the internal rate of return stands at 21%, while the economic age is estimated to be 5 years. In a similar vein, Rico, Wan Abbas, and Umi (2014) conducted a study that showcases the economic viability of cultivating civet coffee in the region of West Lampung, with positive outcomes observed at both the micro and macro levels. In a study conducted by Wahyuni, Utama, and Mulyasari (2012), it was discovered that Arabica coffee, with a projected lifespan of 10 years, demonstrates a net benefit-cost ratio (B/C ratio) of 2.17, a net present value (NVP) of Rp. 18,847,733, and an internal rate of return (IRR) of 26.60%.

Within the framework of market dynamics, coffee is susceptible to variations in worldwide demand and supply. The present study acknowledges the aforementioned market dynamics and proposes to incorporate theories from the field of international trade and market analysis. The objective is to investigate the potential impact of changes in the global coffee market on the long-term profitability of Arabica coffee cultivation.

Arabica coffee also experiences notable annual growth in export demand, ranging from 20% to 25%, thereby establishing itself as a feasible and lucrative avenue for economic development. As per the findings of the Indonesian Plantation Research and Development Centre, the Arabica coffee species exhibits an economic lifespan spanning from 20 to 25 years, during which the coffee plants commence fruit production after a period of 4 to 5 years. Nevertheless, there exists a specific timeframe in which the optimisation of coffee production may not be achieved, resulting in a decrease in yields as the coffee plants mature. This issue is further exacerbated by the substantial amount of investment capital needed, as evidenced by a study conducted by Roidah (2013), which revealed that it amounts to IDR 20,000,000 per hectare.

The study's significance is derived from its capacity to provide valuable insights to a range of stakeholders. The main objective of this study is to evaluate the economic feasibility of investing in the cultivation of Arabica coffee over a significant time frame of 30 years. The findings of this research are of great importance to potential investors, policymakers, and coffee farmers, as they provide essential information that can assist in making well-informed decisions. In addition, this study makes a valuable contribution to the ongoing scholarly conversation surrounding sustainable agriculture. Specifically, it examines the enduring financial viability of coffee farming and its compatibility with environmental and social factors. The study highlights the significance of local economies and livelihoods by examining particular regions, such as Bali and Bangli Regency. It provides valuable insights into the potential of coffee cultivation to drive regional development and generate income.

Furthermore, the research is in accordance with the principles of agricultural sustainability, which is a key area of interest in academic and policy circles. The analysis of long-term profitability in Arabica coffee cultivation serves as a valuable contribution to the discourse surrounding sustainable agricultural practices. The research can draw upon theories pertaining to sustainable agriculture, trends in crop yield, and the enduring environmental consequences of coffee cultivation, thereby elucidating the interplay between economic considerations and environmental and social factors.

The central research inquiry examined in this investigation pertains to the financial viability of engaging in the cultivation of Arabica coffee throughout its 30-year economic lifespan. In accordance with the aforementioned inquiry, the research aims to achieve two primary objectives: (1) to examine the cash flow of benefits and costs by employing forecasting techniques throughout the economic lifespan, and (2) to evaluate the advantages associated with the development of Arabica coffee farming over its entire economic existence, utilising investment criteria such as Net Present Value (NPV), Net Benefit Cost Ratio (Net B/C), and Internal Rate of Return (IRR).

The observed phenomenon in the context of investing in Arabica coffee farming in Bangli is characterised by a lack of comprehensive understanding among practitioners, particularly within the coffee farming community consisting of members affiliated with the Subak organisation. Historically, these agricultural communities have primarily operated as providers of raw materials, with

limited participation in the process of making investment decisions. This study is motivated by the need to address a knowledge gap pertaining to the responses and expectations of the coffee farming community in Bangli with regards to investment in Arabica coffee cultivation. Consequently, a thorough analysis is required to gain insights into this matter.

Literature Review

Coffee is a widely cultivated plantation crop with a long history of cultivation and significant economic importance. Approximately 70% of global coffee consumption is derived from the Arabica coffee species, while the remaining 26% is attributed to Robusta coffee. Coffee originates from the African continent, specifically the elevated terrain of Ethiopia. Nevertheless, global recognition of coffee was only achieved subsequent to its cultivation beyond its original region of Yemen in southern Arabia, facilitated by Arab merchants. The research conducted by Gumulya and Helmi (2017) shed light on the historical origins of coffee, revealing its initial cultivation in Ethiopia and subsequent dissemination to global markets facilitated by Arab traders. The historical context underscored the worldwide importance of coffee cultivation.

The coffee fruit is composed of various components, specifically the outermost layer known as the excocarp, a flesh layer called the mesocarp, a mucus-like substance referred to as musilage, a thin protective skin known as the spermoderm, and the coffee beans themselves, also known as the endoscarp. The outermost layer of the fruit, known as the exocarp, initially appears green in young coffee cherries. As the cherries mature, this layer undergoes a colour transformation, progressing from green to yellow and ultimately turning red when fully ripe. When the fruit reaches ripeness, its flesh will exhibit a slimy texture and possess a mildly sweet taste. The endocarp, which comprises the inner layer of the skin, is characterised by its considerable toughness and is often referred to as horn skin. Mubarok, Suwasono, and Palupi (2014) offered valuable insights by providing a description of the various constituents of the coffee fruit, which encompassed the horn skin, a resilient inner layer. This knowledge was specifically pertinent in comprehending coffee processing techniques, which is a crucial element for coffee farmers aiming to enhance their methodologies.

The processing of coffee beans can be conducted using two distinct methods, specifically the wet method and the dry method. The dry processing method involves the direct exposure of coffee cherries to solar radiation for drying purposes. On the other hand, the wet processing method entails a series of sequential stages, resulting in the generation of various forms of waste, such as coffee skin (also known as coffee pulp), which can be repurposed as animal feed. The study by Nadhiroh (2018) examined the production of byproducts like coffee skin as well as the two main methods of processing coffee, wet and dry. The waste management component is relevant to both the sustainability of the environment and the potential for supplementary revenue streams for coffee farmers.

In general, the methodology utilised in this study incorporates historical research, archival analysis, literature review, and data analysis techniques to provide a comprehensive understanding of the historical origins of coffee and emphasise its global importance. The objective of this multifaceted approach is to offer a comprehensive and nuanced comprehension of the trajectory of coffee, starting from its origins in Ethiopia and culminating in its status as a globally traded commodity. Moreover, prior research studies play a crucial role by providing solid groundwork and offering indispensable contextual knowledge for the present investigation. The aforementioned studies provide valuable perspectives on the historical importance of coffee, its botanical attributes, and the techniques employed in its processing. These aspects hold great relevance in conducting a thorough examination of the economic viability of cultivating Arabica coffee in Bali for a span of 30 years.

Investment Valuation

The cultivation of Arabica coffee can be classified as an agricultural enterprise. Business investment activities are undertaken with the expectation of future outcomes or gains. The Arabica coffee plantation development business entails deriving income from the sale of production, while the investment involved encompasses the costs incurred prior to obtaining these benefits.

A project proposal is considered feasible or appropriate when the benefits derived from it outweigh the associated costs or sacrifices. Typically, investment endeavours within the plantation industry exhibit a long-term nature. In this context, the evaluation of advantages necessitates the consideration of time. Both receipts and expenses are quantified in monetary terms, thereby necessitating a common measure to determine their equivalence. In this regard, the concept of present value is commonly employed for such calculations. The concept of present value distinguishes the current worth of money from its future value. The act of determining the present value of a future cash flow is commonly referred to as discounting.

The financial viability of an investment can be evaluated using various criteria. Investments serve as indicators for measuring and comparing the merits of different projects. By employing investment criteria, it becomes possible to assess the profitability of a project (Husnan & Muhammad, 2000). There are three crucial measures that play a significant role in the evaluation of projects pertaining to discounting principles (Kadariah & Gray, 1978; Vawda, Moock, Price Gittinger, & Patrinos, 2003).

(1) Net Present Value (NPV)

The Net Present Value (NPV) refers to the disparity in present value that arises from comparing the benefits and costs associated with a given project. Similar to the Net Benefit/Cost (Net B/C) approach, the discount rate employed represents the opportunity cost of capital. The

decision-making criterion entails accepting a project if its net present value is positive. The net present value (NPV) is deemed to be zero, indicating that the project generates returns equivalent to the opportunity cost of capital. Conversely, if the NPV falls below zero, the project is deemed unfavourable and thus rejected.

(2) Net Benefit-Cost Ratio (Net B/C)

When evaluating the project, it is essential to assess the present value of both its benefits and costs, and express this relationship as a ratio. The discount rate employed typically represents the ratio of capital's opportunity cost. The calculation of the Net Benefit-to-Cost ratio (Net B/C) involves the discounting of gross benefits and gross costs, which encompass investment costs, maintenance expenses, and operating costs associated with production. In the event that the Net Benefit/Cost (Net B/C) ratio exceeds one, the appropriate course of action would be to accept the project. Conversely, if the Net B/C ratio falls below one, it would be advisable to reject the project.

(3) Internal Rate of Return (IRR)

The term "internal rate of return" refers to a criterion that remains unaffected by external factors such as fluctuations in interest rates or inflation rates. The Internal Rate of Return (IRR) is a financial metric employed to determine the interest rate at which the present value of costs and benefits is equal. In order to optimise the economic evaluation of the project, it is desirable for the Net Benefit-to-Cost ratio (Net B/C) to approach unity, the Net Present Value (NPV) to approach zero, and for the net benefit amount to be positive. The calculation of the internal rate of return (IRR) typically involves a trial-and-error approach, as there is no readily available mathematical formula that can be employed for this purpose. Initially, a specific interest rate is selected for the purpose of computing the net present value (NPV). If the resulting NPV is positive, subsequent attempts are made using a higher discount rate. Conversely, if the NPV is negative, subsequent attempts are made using a lower discount rate. This iterative process continues until an appropriate discount rate is determined.

Community Role

Community serves as a form of social capital in the context of development. Consequently, the involvement of the community becomes a crucial element in endeavours aimed at fostering self-reliance and facilitating the process of empowerment (Adiyoso, 2018). The failure to prioritise community involvement in development initiatives serves as the initial catalyst for the ineffective implementation of empowerment strategies in supporting overall development efforts. The active involvement of the community is crucial in the process of development, and they should be regarded as active participants rather than passive recipients. It is imperative to promote the empowerment of communities in determining their own objectives for action and guiding their development autonomously and conscientiously (Edelia & Aslami, 2022). Individuals are likely to experience a sense of belonging when they possess a clear comprehension of the objectives pertaining to development and empowerment (Ife, 2016). The assessment of community involvement in a development activity is contingent upon the significance of the community's response to the development plan.

This study provides novel perspectives on multiple significant aspects. The initial section of the paper presents an innovative investment framework for Arabica coffee cultivation, which incorporates the use of surveys and interviews to thoroughly assess its economic viability. Furthermore, in contrast to numerous studies that primarily examine immediate benefits, the present research investigates the extended financial viability of coffee cultivation spanning a duration of 30 years, thereby shedding light on its temporal dynamics. Moreover, this approach adopts a community-centric perspective, taking into account the roles and expectations of local farmers and stakeholders rather than solely focusing on financial considerations. Furthermore, the system acknowledges the ecological consequences, particularly in mountainous areas susceptible to landslides, underscoring the significance of implementing sustainable methodologies. The present study investigates the potential of coffee tourism as an innovative area of research that extends beyond conventional agricultural studies. It aims to identify novel approaches for enhancing local economies and advancing environmental sustainability within the context of coffee farming. Collectively, these distinctive elements offer a comprehensive and invaluable viewpoint on the cultivation of Arabica coffee.

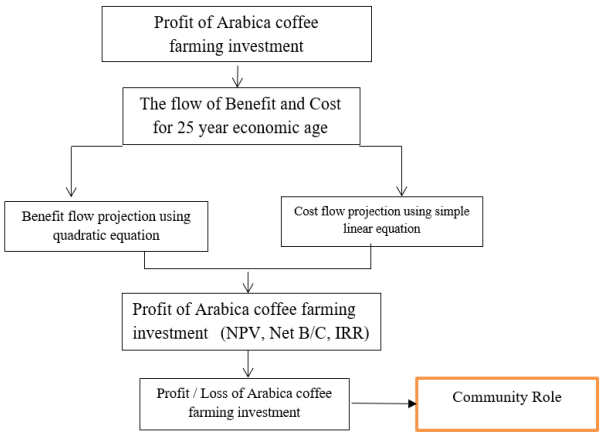
Research Methods

Location and Time

The study was carried out among coffee farmers cultivating Arabica coffee in the villages of Serahi, Bantang, and Sukawana, located in the Kintamani District of the Bangli Regency. The study was conducted between the years 2020 and 2021. The selection of research locations was conducted using the purposive sampling method, taking into account the ongoing production of Arabica coffee and its extensive years of cultivation.

Research Framework

When making the decision to invest in Arabica coffee farming, it is essential to carefully evaluate the economic lifespan of the investment and analyse the associated benefits and costs. In order to predict the advantages, a quadratic equation was utilised, taking into account the notion that coffee production attains a peak level. In order to predict costs, a basic regression equation was employed, considering the expenses linked to the production process. Arabica coffee farmers employ three investment criteria to evaluate the profitability of their business ventures, namely Net Present Value (NPV), Internal Rate of Return (IRR), and Net Benefit/Cost Ratio (Net B/C/R). The investment framework for Arabica coffee farming is illustrated in Figure 1.



Source: Researcher's Data
Figure 1: Research Framework

Population and Sample

The study population consisted of Arabica coffee farmers who had cultivated Arabica coffee plants between the years 2015/2016 and 2019/2020, with a division based on five distinct planting years. The sample was chosen utilising the multistage sampling technique, which entails the selection of the sample in a step-by-step manner, where each stage corresponds to a distinct subset of the population. A sample size of 100 participants was selected using the proportional random sampling technique, which was applied to each stratum of the population.

Table 1: Number of Respondent Farmers in Each Sample Village

No	Village	Year of Planting					
		2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Amount
1	Serahi	20	10	10	0	0	40
2	Bantang	0	10	10	10	0	30
3	Sukawana	0	10	10	0	10	30
Amount		20	30	30	10	10	100

Data Collection

The study employed a comprehensive data collection methodology that incorporated a combination of quantitative and qualitative methods as its primary techniques. The structured surveys were meticulously developed to collect quantitative data pertaining to different facets of Arabica coffee farming, such as production costs, revenue, and investment criteria. This development process involved a rigorous approach, which encompassed a thorough literature review and consultations with experts. Subsequently, the surveys underwent pre-testing to ensure their clarity and effectiveness.

In contrast, the study employed a qualitative approach to gather insights. In-depth interviews were conducted with a carefully selected sample of five informants. A structured interview guide made up of open-ended questions served as the interview's direction. The purpose of these interviews was to explore the potential of Arabica coffee as a tourist attraction. Prior to the main data collection, the interview guide was pilot-tested to ensure its effectiveness and make necessary refinements.

The data collection process adhered to a methodical sequence, commencing with the identification of research locations through purposive sampling and subsequently selecting a representative sample of Arabica coffee farmers via multistage sampling. The research endeavour was guided by ethical principles, which included important considerations such as obtaining informed consent, ensuring anonymity and confidentiality, promoting voluntary participation, and implementing rigorous data security measures.

Data Analysis

The present study employs the cash flow method to analyse the investment advantages associated with the development of Arabica coffee farming enterprises. This method entails the assessment of both incoming revenues and outgoing expenses.

1) Receipt Current Calculation (Bt)

Revenue is obtained from the multiplication of dry coffee production with the selling price of dry coffee. The available production data is 5 times, this data is used to estimate production at the age of t year, using the quadratic equation, on the basis of the consideration that Arabica coffee production has a maximum production. The quadratic equation used with the following formulation:

$Yt = a + bt + ct2$

Yt is dry coffee production in year t, while a,b,c and c are the estimated parameters, t is time.

2) Expenditure Flow Calculation (Ct)

Expenditures refer to the expenses associated with investment and production activities. Due to the limited availability of production cost data, it is utilised to estimate future production costs for a period of t years. This estimation is achieved through the application of a simple regression equation, formulated as follows:

$Ct = a + bY$

Ct, is production cost in t year, Y is production, while a,b are the estimated parameters

3) Profit Analysis of Arabica Farming Investment

The present study focuses on the analysis of investment returns utilising the cash flow method. Specifically, this method involves examining the inflow and outflow of funds to achieve a balance in the value of money. This balance is achieved by multiplying the cash inflows (Bt) and cash outflows (Ct) by the discount factor, as indicated by the following formula:

$Po = St (1 + i) t$

Po is the present value of money, St, is the value of money in t year, i is the discount factor, t is the time.

Criteria for Net Benefit Cost Ratio (Net B/C)

Profits from investment in Arabica coffee development are analyzed using the Net-Benefit Cost Ratio criteria, with the formulation:

$Net B/C=(\sum_{t=1}^{n}((Bt-Ct))/〖(1+i)〗^t)/(\sum_{t=1}^{n}((Ct- Bt))/〖(1+i)〗^t)$

NetB/C is the Net Benefit Cost Ratio, Bt is the net benefit in year-t (Rp), Ct is the cost in year-t (Rp), i is the prevailing interest rate, n is the economic age of Arabica coffee, and t is year.

Criteria of Net Present Value (NPV)

The Net Present Value (NPV) refers to the present value of the disparity between benefits and costs, considering a specific discount rate. The Net Present Value (NPV) metric demonstrates the favourable outcomes of benefits in relation to costs.

NPV = ∑_(t-1) ^n▒((Bt-Ct))/ 〖(1+i)〗 ^t

The Net Present Value (NPV) represents the difference between the present value of net benefits (Bt) and the present value of costs (Ct) in a given year (t) for a specific economic age (n) of Arabica coffee. The net benefit (Bt) is measured in Rp (Indonesian Rupiah), while the cost (Ct) is also measured in Rp. The prevailing interest rate (i) is a factor that influences the calculation of NPV. If NPV > 0, then Arabica coffee farming is profitable, and if NPV < 0, Arabica coffee farming is unprofitable.

Criteria for Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) is a financial technique used to determine the interest rate at which the present value of all cash inflows from an investment in developing an Arabica coffee farming business is equal to the cash outflows. This calculation is based on a specific formulation.

IRR= i_1 〖+ 〖NPV〗 ^+/((〖NPV〗 ^+- 〖NPV〗 ^(-))) (i_2-i_(1))〗 ^

The value denoted as i1 represents the initial discount rate required to achieve a positive Net Present Value (NPV), while i2 represents the subsequent discount rate needed to yield a negative NPV. The profitability of the proposed investment in Arabica coffee is determined by comparing its Internal Rate of Return (IRR) to the prevailing interest rate at the time of execution. If the IRR exceeds the prevailing interest rate, the investment is deemed profitable. Conversely, if the IRR falls below the prevailing interest rate, the investment is considered unprofitable.

Research Findings

Benefits of Arabica Coffee Farming

The average age of the Arabica coffee plants cultivated by farmers starts at the age of 4. From the results of the regression calculation, the relationship between age and production is obtained by the equation of the production function estimator Yt = 199.1019 + 73.1031 t*** – 2.4702 t2***t- count is significant at 1 % level real. Table 2 shows that cultivated Arabica coffee starts producing at the age of 4. The increase in production is not the same every year, as well as the increase in benefits. The increase in production and benefits increases, maximum at 15 years of age, product at 740 kg/ha and benefits of IDR 48,100,000/ha. Then at 16 years of age, production and benefits decrease until the economic age is 30 years. The average price of dry coffee/rice coffee in farmer level is IDR 65,000/kg, Arabica coffee production in Kintamani is oriented to the export market, different from research ((A) (D) (B) Π∗, n.d.) in Kenya coffee production is oriented to the local market, in Costa Rica, the research results of Babin (2020) many farmers left coffee farming because of low coffee prices. Research by Draeger (2002) many farmers left the agricultural industry, on the other hand coffee farmers rejoice because there is an increase in coffee prices.

Table2. Benefits and relationship between plant age and Arabica Coffee production in Kintamani District, Bangli, Bali

Coffee Age (Year)	Production* (Kg/Ha)	Benefit (Rp/Ha)
1	0	0
2	0	0
3	0	0
4	452	29380000
5	503	32695000
6	549	35685000
7	590	38350000
8	626	40690000
9	657	42705000
10	683	44395000
11	704	45760000
12	721	46865000
13	732	47580000
14	738	47970000
15	740	48100000
16	736	47840000
17	728	47320000
18	715	46475000
19	696	45240000
20	673	43745000
21	645	41925000
22	612	39780000
23	574	37310000
24	531	34515000
25	483	31395000
26	430	27950000
27	372	24180000
28	309	20085000
29	242	15730000
30	169	10985000

Description: *) estimated from the equation of Yt = 199.1019 + 73.1031 t – 2.4702 t2

Cost of Arabica Coffee Farming

Table 3 displays the investment and maintenance costs associated with Arabica coffee farming. The initial year incurs investment and maintenance expenses totaling Rp. 25,365,500/ha, encompassing costs related to seed procurement, protective trees, land preparation, hole digging, manure application, and expenditures associated with non-productive plants. The cumulative expenses incurred from the second to the third-year amount to Rp. 6,517,110 per hectare. These costs encompass various components, such as the acquisition of fertilisers and pesticides, the depreciation of tools, land taxes, and labour wages. The costs associated with plant-related activities are initiated in the fourth year of production, totaling IDR 6,596,708 per hectare. These expenses encompass various aspects, such as the maintenance of productive plants, harvesting, and processing. By employing regression analysis, we are able to establish a correlation between the costs associated with harvesting and processing and the level of production. Consequently, we derive an estimated cost function, denoted as Ct = 175.9730 + 0.1292 Y ***. The t-statistic exhibits statistical significance at a confidence level of 1%.

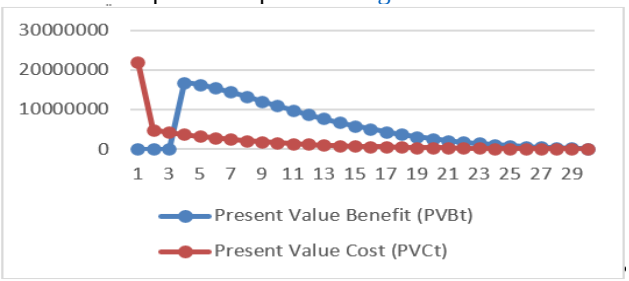
Table 3: Cost of Arabica Coffee Farming in Kintamani District, Bangli, Bali

Coffee Age (Year)	Maintenance and Investment Cost (Rp/Ha)	Processing and Harvesting Cost* (Rp/Ha)	Total Cost (Rp/Ha)
1	25365500	0	25365500
2	6517110	0	6517110
3	6517110	0	6517110
4	6517110	79598	6596708
5	6517110	88579	6605689
6	6517110	96680	6613790
7	6517110	103900	6621010
8	6517110	110240	6627350
9	6517110	115699	6632809
10	6517110	120278	6637388
11	6517110	123976	6641086
12	6517110	126970	6644080
13	6517110	128907	6646017
14	6517110	129963	6647073
15	6517110	130316	6647426
16	6517110	129611	6646721
17	6517110	128202	6645312
18	6517110	125913	6643023
19	6517110	122567	6639677
20	6517110	118517	6635627
21	6517110	113586	6630696
22	6517110	107775	6624885
23	6517110	101083	6618193
24	6517110	93510	6610620
25	6517110	85057	6602167
26	6517110	75724	6592834
27	6517110	65510	6582620
28	6517110	54416	6571526
29	6517110	42617	6559727
30	6517110	29761	6546871

Description: *) estimated from the equation of Yt = 175.9730 + 0.1292 Y

The Analysis of Arabica Farming Investment Profit

The primary objective of the Arabica coffee farming industry's development is to enhance the financial earnings of small-scale farmers. In accordance with previous studies conducted by Duaja, Kartika, and Johannes (2020) and Sunanto, Salim, and Rauf (2019), it is imperative to provide support and resources to farmers in order to enhance their capabilities and improve the overall productivity of coffee cultivation. Examining the financial perspective, particularly the benefits received by farmers as the main actors in the implementation process, is essential in order to evaluate the benefits of investment. The findings of the present value analysis pertaining to the benefits and costs associated with Arabica coffee farming over a 30-year economic lifespan are depicted in Figure 2 below.



Source: Researcher's Data
Figure 2: The Ratio of Present Value Benefit and Cost Arabica Coffee Farming

In Figure 2, it can be observed that the initial year's investment has a present value of IDR 22,056,957. However, the present value of benefits from the first to the third year is nonexistent (zero) due to the absence of coffee production and profitability in coffee farming. This is evident from the overlapping present value curve of costs on the benefit curve. The emergence of benefits, with a present value of IDR 16,113,894, begins in the fourth year when coffee production commences and coffee farming becomes profitable. This is indicated by the benefit value curve surpassing the present value curve of costs. As the coffee plants age, there is a tendency for the earned profit to decline. Eventually, at 30 years of age, the coffee plants need to be rejuvenated due to the low profit of only Rp 131,535. This is illustrated in Figure 2 by the present benefit value curve intersecting with the already tight costs.

Discussions

Financial Feasibility Analysis

The purpose of conducting this financial feasibility analysis was to determine the profitability of Arabica coffee farming. This analysis is based on the following assumptions: (1) The projected lifespan of the project is 30 years, (2) The interest rate (discount rate) is 15% per annum, (3) The production of Arabica coffee aligns with the projected coffee production, and (4) The production costs adhere to the projected cost of coffee farming. The outcomes of the financial analysis computations are presented in Table 4.

Table 4: The results of the feasibility analysis of Arabica coffee farming in Kintamani District, Bangli Bali

Criteria	Value	Feasibility Indicator	Result
NPV	Rp. 107.672.034	NPV > 0	Proper
Net B/C	4,443	Net B/C > 1	Proper
IRR	35,05	IRR > DF	Proper

Note: DF = Discount Factor

1) Net Present Value

The findings of the Net Present Value (NPV) analysis indicate that the current value of the net benefits acquired over the duration of the business period amounts to IDR 107,672,034 (where NPV > 0). The NPV value indicates the profitability of the Arabica coffee farming business, with an average annual net profit of IDR 8,972,670. According to the Net Present Value (NPV) investment criterion, this business demonstrates feasibility as it exhibits profitability. This study aligns with the research conducted by Rico, Wan Abbas, and Umi (2014), Wahyuni, Utama, and Mulyasari (2012), and Winantara, Bakar, and Puspitaningsih (2014) on the financial viability of civet coffee production in Bali, West Lampung, and South Sulawesi. The analysis primarily focuses on assessing the profitability of the venture through the Net Present Value (NPV) analysis.

2) Net Benefit-Cost Ratio (Net B/C)

The Net Benefit-Cost Ratio (Net B/C) represents the relationship between the net profits that accrue as a result of positive impacts on the business and the net profits that arise from negative impacts on the business. The Net Benefit/Cost (B/C) ratio of 4.444 suggests that investing in the utilisation of costs in Arabica coffee farming is highly efficient. This means that an investment of IDR 1,000 will yield a return of IDR 4,444. The Net B/C value exceeds one, indicating that investing in Arabica coffee farming yields benefits that outweigh the associated costs. This

implies that investing in Arabica coffee farming is a profitable endeavour (Rico, Wan Abbas, & Umi, 2014; Wahyuni, Utama, & Mulyasari, 2012; Winantara, Bakar, & Puspitaningsih, 2014). This study examines the financial viability of civet coffee production in Bali, West Lampung, and South Sulawesi. The analysis focuses on the profitability of the venture, as indicated by the Net Benefit-Cost (Net B/C) ratio (Rusadi & Paramarta, 2023).

3) Internal Rate of Return (IRR)

The purpose of conducting an Internal Rate of Return (IRR) analysis is to assess the profitability potential of investing in Arabica coffee farming. The internal rate of return (IRR) quantifies the interest rate derived from investments in Arabica coffee farming, expressed as a percentage. The assessment of feasibility criteria involves a comparison between the internal rate of return (IRR) value and the prevailing interest rate. According to the findings of the analysis, the internal rate of return (IRR) was determined to be 35.05 percent. This indicates that the internal interest rate of return for Arabica coffee farming in relation to the initial investment was 35.05 percent. The internal rate of return (IRR) obtained exceeded the utilised interest rate of 15%, indicating that Arabica coffee farming was both profitable and viable for cultivation.

This study generally agrees with earlier research on the financial viability of civet coffee in Bali, West Lampung, and South Sulawesi by Rico, Wan Abbas, and Umi (2014), Wahyuni, Utama, and Mulyasari (2012), and Winantara, Bakar, and Puspitaningsih (2014). This alignment is evident in the analysis of the project's profitability, as indicated by the positive net present value (NPV), favourable net benefit-cost ratio (Net B/C), and satisfactory internal rate of return (IRR). The research findings presented in this study offer significant insights for coffee farmers and potential investors, shedding light on the practical viability of Arabica coffee farming as a financially lucrative and environmentally sustainable enterprise. The findings of the study emphasise that Arabica coffee cultivation is not solely an agricultural endeavour but rather a dynamic and economically sustainable enterprise that is closely connected to the wider context of coffee production in the region. The cultivation of Arabica coffee holds great significance as it has the potential to enhance the financial well-being and livelihoods of local farmers while also exerting a substantial influence on the broader economic dynamics of the region.

As it progresses, this coffee enterprise emerges as a symbol of economic stability and advancement, yielding consistent financial gains for farmers and enhancing the regional economy. This study provides further evidence to support the notion that Arabica coffee serves not only as an agricultural product but also as a means of generating sustainable income, promoting environmental stewardship, and fostering community development. These interconnected aspects are integral to the overall economic landscape of the region. Apart from the economic advantages derived from investing in Arabica coffee cultivation, there are additional benefits that arise. These include the augmentation of plantation commodity exports, the cultivation orientation of farmers towards Arabica coffee for the purpose of the export market, and the preservation of nature to mitigate the occurrence of landslides in the hilly and landslide-prone Kintamani District area. The coffee farming industry contributes significantly to the local community's economy by generating employment opportunities and absorbing a substantial amount of labour.

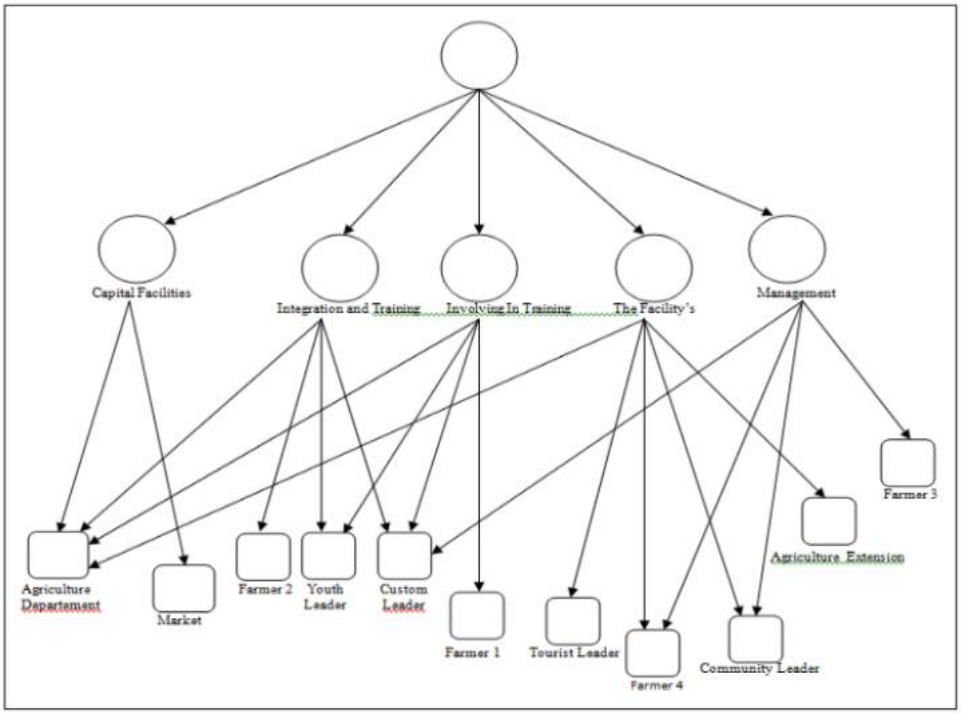
The implications of the findings of this study have significant relevance for Arabica coffee farming and its impact on the local economy in the real world. The study places significant importance on the enduring profitability of coffee cultivation, extending for a period of more than three decades. This focus is congruent with the practical aspirations of coffee producers in areas such as Kintamani. Farmers, who frequently work with constrained resources, demonstrate a strong desire to ensure that their investments generate sustainable returns over prolonged durations.

The financial viability of Arabica coffee farming is indicated by the positive net present value (NPV) and net benefit-cost ratio (Net B/C). This empirical observation serves as a catalyst for both established farmers and prospective investors to contemplate coffee cultivation as a financially lucrative pursuit. These insights have the potential to enhance engagement in Arabica coffee cultivation, thereby strengthening the domestic sector and making a positive contribution to economic stability. The possibility of coffee farming yielding significant returns on investment is indicated by the Internal Rate of Return (IRR) surpassing the current interest rate. This observation implies that Arabica coffee cultivation has the potential to yield better returns compared to other investment alternatives in practical contexts, thereby attracting financial resources and promoting economic development. Moreover, the study's recognition of the environmental factors in mountainous regions susceptible to landslides aligns with the practical difficulties faced by the local area. The implementation of sustainable coffee farming practices not only yields enduring economic advantages but also functions as a protective measure against the deterioration of the environment. This is consistent with the community's imperative for ecological conservation, especially in regions where coffee cultivation takes place. The investigation conducted in this study regarding coffee tourism as a supplementary revenue stream for the community aligns with the overarching pattern of economic diversification observed in rural areas. Coffee tourism has the potential to positively impact local revenue streams, facilitate cultural exchange, and generate novel employment prospects. In actuality, this has the potential to uplift the entire community and enhance the attractiveness of coffee farming as a multifaceted enterprise.

Community Role

In order to ensure a successful development, it is imperative to consider the perspectives, opinions, and expectations of farmers with regards to investing in Arabica coffee farming. Therefore, this study incorporates the use of the NVIVO R1 application to analyse data, specifically focusing on the predetermined informants' expectations. The initial step in the analysis process involves inputting a data file that comprises information records obtained from informants. The coding process was subsequently conducted by utilising

nodes and cases, as indicated by the data provided by the informant. Nodes refer to the practice of categorising or coding information based on the semantic relationships between phrases or sentences, whereas cases serve the purpose of classifying individuals providing information. The nodes examined in this study encompass various expressions pertaining to informants' expectations. These expressions have been categorised into five distinct child nodes, namely capital facilities, market certainty, good management, involvement in training, and enhancing the quality of community resources (see Figure 3).



Source: Researcher's Data
Figure 3: The Community Role for Coffee Investment

Based on the results of the processed visualization of coding data and cases, it can be concluded as follows:

1. Child nodes capital facilities are the hope of the Department of Agriculture [Agricultural Extension] and coffee farmers. Community involvement including local farmers is given more attention and priority so that they can compete if there are large investors who enter and involve local communities for all tourism activities.
2. Child node integration and training is the hope of the Tourism Office, tourists, youth leaders, and community leaders. Integration includes connecting various locations [views] and attractions around the coffee tourism area (Itamar, Alam, & Rahmatullah, 2014). Integration is important to create diverse new activities and avoid development stagnation. this can be started by identifying products and attractions that are mutually supportive and related, then a tourist itinerary is made in one travel package.
3. Child nodes Involving in training is the hope of the Tourism Office, youth leaders, community leaders, and tourists. Quality improvement includes services to tourists, tourism knowledge, and training related to tourism activities and coffee plantation management.
4. Child nodes the facilities are the hope of visitors, tour guides, tourists, travel agents, and farming communities. Facilities include adding and improving the quality of facilities to support tourist activities
5. Child nodes management is the hope of community leaders, tourists, and travel agents. Good management includes maintaining security, creating visitor comfort, and being able to manage tourism activities efficiently.

Conclusions

Based on the findings and subsequent deliberation, it can be deduced that the initial investment required for Arabica coffee cultivation in the first-year totals Rp. 25,365,500 per hectare. Production begins in the fourth year, with the peak level of production being reached in the fifteenth year, resulting in a total output of 740 kilogrammes of dry bean coffee. The period of coffee farming profitability occurs between the fourth and thirtieth years, requiring the rejuvenation of coffee plants. The financial feasibility of efficiently utilising expenses is evident through a net benefit-to-cost ratio of 4.443, a net present value (NPV) of IDR 107,672,034, or an annual net profit of IDR 8,972,670 per hectare. The investment demonstrates the potential to generate profits, as evidenced by an internal rate of return (IRR) of 35.05%. Based on the examination of the three investment criteria, it can be inferred that the cultivation of Arabica coffee demonstrates both viability and profitability. The active involvement of the coffee farming community, government support, the participation of community leaders, and a shared commitment to sustainability are essential for the establishment and development of coffee tourism destinations.

The findings of the study conducted in Kintamani regarding Arabica coffee cultivation reveal that one of the key factors influencing the preference for Arabica coffee over robusta coffee as the primary focus of coffee farming in Bali is its capacity to generate a net profit of Rp. 8,972,670 per hectare, accompanied by an internal rate of return (IRR) value of 35.05%. Consequently, the investment in Arabica coffee yields significant profitability. An additional factor to consider is the broader international consumer base of Arabica coffee, which enhances its competitiveness within the global market. The potential for enhancing product value and expanding business opportunities is significant in the realm of coffee tourism destination development.

The promotion of Arabica coffee cultivation is imperative due to its advantageous financial viability and profitability. It is imperative for local and regional agricultural agencies to proactively endorse the cultivation of Arabica coffee by providing comprehensive assistance such as training programmes, high-quality planting materials, and financial incentives. This support is crucial in order to stimulate the growth and expansion of Arabica coffee production. It is recommended that financial institutions and government entities offer readily available loans in order to alleviate the burden of initial investment expenses. The promotion of sustainable practices, particularly those that prioritise environmentally friendly farming methods, is of utmost importance. The establishment of collaborative partnerships between local governments and coffee farming communities has the potential to foster the development of coffee tourism destinations, thereby facilitating the diversification of income streams.

Additional areas of research that could be explored encompass the examination of the long-term viability of Arabica coffee farming, the analysis of consumer preferences in relation to this particular variety of coffee, and the exploration of global market trends pertaining to Arabica coffee production. Furthermore, conducting an evaluation of the wider economic implications associated with coffee cultivation in the region, exploring the potential of coffee tourism, and undertaking a comparative examination of Arabica and robusta coffee farming can provide valuable insights for both farmers and policymakers. These insights can contribute to the advancement and long-term viability of the coffee industry.

It is advisable, from a practical standpoint, for local agricultural agencies to assume an active role in the promotion of Arabica coffee cultivation. This involves the provision of training programmes aimed at equipping farmers with the requisite knowledge and skills, facilitating access to high-quality planting materials, and providing financial incentives to promote wider engagement. Additionally, it is recommended that financial institutions and government entities take into account the customization of loans and credit facilities to cater to the unique requirements of coffee farmers. This approach would effectively reduce the financial obstacles faced by these farmers and consequently encourage greater investment in the coffee industry. Promoting sustainable farming practices is of utmost importance. It is imperative to provide farmers with education regarding environmentally sustainable practices in order to safeguard the long-term sustainability of coffee plantations and mitigate any potential negative ecological consequences. In conclusion, the exploration of coffee tourism destinations holds significant promise, and the establishment of cooperative initiatives involving governmental bodies, farmers, and local enterprises can contribute to the creation of captivating and culturally immersive coffee tourism encounters, thereby generating supplementary economic benefits for the community.

In terms of policy, it is crucial for policymakers to develop regulations that facilitate the expansion of the coffee farming sector. This entails the development of policies that promote sustainable agricultural practices and prioritise the welfare of local farmers. Furthermore, it is imperative to make investments in rural infrastructure, including the development of road networks and processing facilities, in order to effectively facilitate the transportation of coffee products and optimise the overall efficiency of the supply chain.

Regarding the pursuit of additional research, there are numerous prospective avenues that warrant exploration. A thorough evaluation of the sustainability of Arabica coffee cultivation, encompassing its ecological, societal, and financial ramifications, would offer a more comprehensive and well-rounded viewpoint. Examining the dynamic shifts in consumer preferences and market trends for Arabica coffee at a global level can provide significant insights for farmers and exporters seeking to adjust their strategies in response to evolving demand. A comprehensive examination of the economic and environmental aspects of Arabica and robusta coffee cultivation can provide valuable insights for farmers in making well-informed choices regarding diversification. In conclusion, conducting further research to evaluate the wider economic ramifications of coffee cultivation in the region, encompassing factors such as employment generation and income distribution, can provide additional clarity regarding its contribution to local development.

Limitations

The present study acknowledges several inherent limitations. Initially, the study's scope was limited to a specific geographic region and a comparatively small sample size, thereby constraining the generalizability of its findings to larger populations or broader regions. Additionally, the study incorporated certain assumptions, such as the presence of fixed interest rates, which may not fully capture the intricacies of real-world financial markets. Furthermore, the analysis failed to thoroughly explore the environmental consequences or intricate elements of community involvement in sustainable finance. A careful consideration of the study's temporal context and external variables is also required. Although this study provides valuable insights, caution should be exercised when attempting to extrapolate its findings to different contexts or over an extended period. Future research efforts should aim to address these limitations in order to cultivate a more nuanced and comprehensive comprehension of the subject matter.

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