

## Feasibility Analysis of the Cinnamon (*Cassiavera*) Farming in the Village of Koto Agung Sub-District Keliling Danau Kerinci Regency

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**ABSTRACT:** Cinnamon (*cassiavera*) farming in Kerinci Regency has not been carried out economically. This can be seen from the pattern of cinnamon harvest that has not been carefully planned, some farmers harvest at the age of 20 years or even more, but some farmers harvest cinnamon when the price is high even though the cinnamon plant is still young, namely 5–8 years. In connection with this situation, the authors encourage the author to examine how the use of costs and income in cinnamon farming. This study aims to determine the general description of Cinnamon (*Cassiavera*) farming in Koto Agung Village, Keliling Danau District, Kerinci Regency, to determine the amount of cinnamon (*cassiavera*) farming income in Koto Agung Village, Keliling Danau District, Kerinci Regency, and to determine the feasibility of cinnamon (*cassiavera*) farming in Koto Agung Village, Keliling Danau District, Kerinci Regency. The analytical method used in this research is descriptive quantitative using farm analysis and the financial feasibility of farming with three investment criteria, including NPV, Net B/C ratio, and IRR. The results of the analysis show that the farming system in the research area is still relatively simple and traditional. The average production of cinnamon (*cassiavera*) farming is 4,548.4 kg per harvest with an average income of IDR. 170.169.294.00,-. Cinnamon (*cassiavera*) farming with an average land area of 0.61 Ha in Koto Agung Village is feasible to be cultivated with the results of a business feasibility analysis on the investment criteria of Net Present Value of IDR 215,237,894.00,-, Net B/C Ratio is 4.39, and the IRR is 17.436%.

**Published Online:**  
**March 02, 2024**

**KEYWORDS:** Farming, Cinnamon (*Cassiavera*), Income, Feasibility

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### INTRODUCTION

Kerinci Regency, Jambi Province, is the center of Indonesian cinnamon production, this region supplies 80 percent of Indonesia's total cinnamon exports (Effran et al., 2021). Based on data from the Plantation Service of Jambi Province, 2020 the area of cinnamon in Keliling Danau District reached 4,616 Ha, with a production of 3,220 tons, and productivity of 1,632 Kg/Ha and was cultivated by 917 families (Dinas Perkebunan Provinsi Jambi, 2021), (Badan Pusat Statistik Kabupaten Kerinci, 2020). This shows that Keliling Danau District is a sub-district that is one of the centers of cinnamon production in Kerinci Regency. Based on data from the Keliling Danau Agricultural Extension Agency in 2021, in Keliling Danau District, there is one of the highest cinnamon-producing villages, namely Koto Agung Village.

Cinnamon (*cassiavera*) farming in Koto Agung Village has been running naturally from generation to generation with a subsistence pattern. In cinnamon farming, so far, the people of Kerinci have not been too focused on doing their farming. Seeing the various reasons farmers develop the cinnamon business, the farmers are not too determined when the cinnamon should be harvested. This can be seen from the pattern of cinnamon harvest that has not been carefully planned, some farmers harvest at the age of 20 years or even more as a tangible form that this cinnamon plant is an investment plant for the future (Jaya et al., 2009). In general, cinnamon (*cassiavera*) farmers in Kerinci Regency sell cinnamon in wet and dry forms (Sari & Divinagracia, 2021). The limited ability of farmers in developing cinnamon-processed products has resulted in farmers only getting a small profit from the sales (Sari & Divinagracia, 2021). With this condition, it is necessary to analyze the income of cinnamon farming in Koto Agung Village with the following objectives: (1) Knowing the general description of Sweet Skin (*cassiavera*) farming in Koto Agung Village, Keliling Danau District, Kerinci Regency. (2) To find out the income of cinnamon (*cassiavera*) farming in Koto Agung

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Village, Keliling Danau District, Kerinci Regency. (3) Knowing the feasibility of farming cinnamon (*cassia vera*) in Koto Agung Village, Keliling Danau District, Kerinci Regency.

### MATERIAL AND METHODS

This research was conducted in Koto Agung Village, Keliling Danau District, Kerinci Regency. This research was chosen purposively, considering that Koto Agung Village is located in Keliling Danau District, where Keliling Danau District is the third largest sub-district in developing cinnamon (*cassia vera*) farming in Kerinci Regency. The object of this research is the owner farmer who cultivates cinnamon (*cassia vera*) and has been producing or harvesting it in the last two years (2019-2021). The sample in this study was farmers who sold cinnamon in dry form. Due to the limitations of recording farmers, the production data taken is the production at the last harvest.

This study uses a survey method. The research population is owner farmers who cultivate cinnamon (*cassia vera*) in Koto Agung Village, Keliling Danau District, Kerinci Regency which has produced or has carried out the harvest process in the last two years (2019-2021). 120 farmers cultivate cinnamon in Koto Agung Village. While the total population of cinnamon farmers who have produced in the period 2019 to 2021 there are 40 farmers, where the total population will be sampled in this study.

The first objective of this research is to use a descriptive analysis tool, namely by describing the conditions or descriptions of cinnamon (*cassia vera*) farming in Koto Agung Village, Keliling Danau District, Kerinci Regency. The second goal in this study uses a farming analysis tool with a cost and revenue approach to finding out how much income farmers get from cinnamon (*cassia vera*) farming, while the third goal in this study uses an investment feasibility analysis tool, namely NPV, IRR, and Net B/C. Ratio to see the feasibility of cinnamon (*cassia vera*) farming at the research site.

Cinnamon farming income analysis (*cassia vera*) consists of an analysis of revenue and production costs of cinnamon (*cassia vera*) farming, where the cost structure intended in this study is the grouping of costs into fixed costs and variable costs (Saeri, 2018).

#### Total Cost

The total cost of farming cinnamon (*cassia vera*) can be calculated using the formula:

$$TC = FC + VC$$

Information:

FC = Fixed costs (Rp)

VC = Variable cost (Rp)

#### Revenue

To calculate the total revenue of cinnamon (*cassia vera*) farming, use the formula:

$$TR = Y \cdot Py$$

Information:

Y = Production (Kg)

Py = Price received (Rp)

#### Income

Cinnamon (*cassia vera*) farming income can be calculated using the formula:

$$I = TR - TC$$

Information:

I = Income (Income)

TR = Total revenue (Rp)

TC = Total Expenditure (Rp)

Then to calculate the feasibility of cinnamon (*cassia vera*) farming, the calculation method used is the analysis of investment criteria with the following criteria (Ekowati et al., 2020):

NPV

NPV is the present value (Present Value) of the difference between benefits (benefits) and costs (costs) at a certain discount rate. NPV shows the advantages of benefits compared to costs. If the present value of benefits is greater than the present value of costs, it means that the project is feasible or profitable. How to calculate NPV is as follows:

$$NPV = \sum_{i=1}^n \frac{NB_i}{1+i}$$

Information:

NPV = Net Present Value (Rp)

NB<sub>i</sub> = net benefits = benefit - cost

n = year

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$i$  = interest rate

### Net B/C Ratio

Net B/C Ratio aims to determine the comparison between the net benefits that have been compounded positive (+) with the net benefits that have been compounded negative (-). The formula for the Net B/C Ratio is as follows (Soekartawi, 2002):

$$\text{Net B/C Ratio} = \frac{\sum_{t=1}^n B_t - C_t(1+i)^t}{\sum_{t=1}^n C_t - B_t(1+i)^t}$$

Information:

Net B/C = Net Benefit Cost Ratio

$B_t$  = Net revenue in year  $t$

$C_t$  = Cost in year  $t$

$i$  = Interest rate

$t$  = Year (economic time)

If the Net B/C Ratio is more significant than one, then the business is feasible, and conversely, if the Net B/C Ratio is less than one, then the business is not feasible.

### IRR

Internal Rate of Returns an interest rate that describes the net present value (NPV) equal to the total number of project investments or in other words the interest rate that produces an NPV equal to zero, is used to find an interest rate that maintains the present value of expected future cash flows by issuing initial investment (Kadariah, 2001). This IRR formula can be formulated as follows (Suratijah, 2015):

$$\text{IRR} = i + \text{NPV}_1(\text{NPV}_1 - \text{NPV}_2)(-i_2i_1)$$

Information:

$i_1$  = Interest rate which produces  $\text{NPV}_1$

$i_2$  = Interest rate which produces  $\text{NPV}_2$

$\text{NPV}_1$  = positive NPV

$\text{NPV}_2$  = negative NPV

Decision-making criteria:

If  $\text{IRR} > 1$ , then cinnamon (*cassia vera*) farming is feasible for working out.

If  $\text{IRR} = 1$ , then cinnamon (*cassia vera*) farming is in a state of point break even (BEP)

If  $\text{IRR} < 1$ , then cinnamon (*cassia vera*) farming is not feasible for working out.

## RESULT

### Overview of Cinnamon (*Cassia vera*) Farming in Koto Agung Village

Farmers who do cinnamon (*cassia vera*) farming in Koto Agung Village, Keliling Danau District, Kerinci Regency have various goals in developing their business, including as future investments, savings that can be harvested at any time when needed, as protection for critical soil on hillsides, and some of the respondent farmers own cinnamon land in the form of inheritance given by their families. Cinnamon (*cassia vera*) planting systems in the research area are monoculture and intercropping systems.

Farmers in the study area generally use seeds that come from shoots taken directly from the forest and former cinnamon plants that have been cut down. Seeds that are propagated generatively are planted using polybags, and after 6 to 8 months of age, they can be transferred to cultivated land. Planting distances for cinnamon with monoculture systems generally range from  $1.5 \times 1.5 \text{ m}^2$ ,  $2 \times 2 \text{ m}^2$ , and  $3 \times 3 \text{ m}^2$ , while in intercropping systems it is usually less common, namely  $4 \times 4 \text{ m}^2$  to  $6 \times 6 \text{ m}^2$  or more. After planting, plant maintenance in the form of weeding and weeding is carried out 2-3 times a year. Cinnamon plants in Kerinci Regency do not require fertilizer, because the soil conditions in Kerinci Regency are very fertile and suitable for planting cinnamon, as well as foreign market demand for organic cinnamon.

Cinnamon should be harvested on plants that are  $> 10$  years old. Harvesting is done by taking the bark, branches, and twigs of the cinnamon tree. Cinnamon that is traded is in the form of dry skin. The harvesting system will determine the quality of the cinnamon produced, if the harvest method is not correct, the quality of the cinnamon will decrease. To get cinnamon with KM quality, farmers have to wait for cinnamon with a plant age range of 20-30 years. For the quality of KF, farmers have to wait for sweet skin with an age range of 16-20 years. Meanwhile, to get cinnamon with KS and KA quality, farmers have to wait for the sweet skin to be 10-15 years old.

After the harvest process, the next thing to do is process the sweet skin. In general, the processing of cinnamon (*cassia vera*) plants carried out by farmers is only in the form of scraping or stripping and drying the product to dry and then marketing it.

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### a. Cultivation Land Area

The area of cinnamon (*cassia vera*) cultivated by respondent farmers in Koto Agung Village is quite varied. The land area ranges from 0.15 to 3 Ha with an average land area of 0.61 Ha. The largest land area owned by farmers is 3 hectares. This explains that the current area of land owned by farmers can maximize the use of land in farming so that the productivity obtained by farmers may be high.

### b. Plant Age

The age of the cinnamon plant greatly affects the yield, the older the plant, the better the quality of the cinnamon, and the thicker the skin, so the production will be higher. The highest quality of cinnamon, which is called grade KM, is obtained from cinnamon that is more than 20 years old, with an essential oil content of 4.5%. For the second highest quality cinnamon, grade KF is produced from cinnamon that is 15 to 20 years old and has an essential oil content of 3.1 – 4.9%. The next quality of cinnamon, grade KS, is produced from cinnamon that is 8 to 15 years old, and its essential oil content is 2.7 – 3.0%. The fourth quality of cinnamon is grade KA which is produced from cinnamon aged 5 to 8 years, with an essential oil content of 2.0 – 2.69%. The quality of sweet skin after KA, which is called grade KTP is also produced from sweet skin aged 5 to 8 years, but with an essential oil content of 1.5-1.99%. Likewise, for KB grade, only the essential oil content is 1.0-1.49%, and the lowest quality of cinnamon, namely KC grade is produced from bark twigs that are 5 to 8 years old and the essential oil content is less than 0.99% (Dinas Perdagangan dan Perindustrian Kabupaten Kerinci, 2020).

From the results of the study, the average cinnamon plant of the sample farmers in Koto Agung Village was over 10 years old with an average plant age of 20 years, so the farmers were in the productive age of the plant or were producing well, with productive plant age. This will result in the desired output.

### c. Cinnamon (*Cassia vera*) Production

In the results of the study, the amount of cinnamon production by each sample farmer was different according to the frequency of the stem and the age of the plant. The average production of the sample farmers in the study area was 4,548.4 Kg with the lowest production of 500 Kg and the highest of 30,000 Kg.

## Analysis of Cinnamon (*Cassia vera*) Farming in Koto Agung Village

### a. Cinnamon (*Cassia vera*) Farming Costs

The costs incurred in cinnamon farming include the cost of seeds, equipment investment costs, and labor costs. Due to the cinnamon plant does not require fertilization and other special care (use of drugs), the labor costs used are only labor costs for land preparation, planting, weeding, harvesting, and post-harvesting. This is in line with research conducted by (Pribadi, Rini, 2016), (Habib, 2020), and (Jaya et al., 2009) explained that for cinnamon plants the labor required is only for planting and harvesting because there is no treatment for maintenance and fertilization.

Cinnamon is a commodity that is cultivated for investment purposes. Considering that time can affect the value of money, to compare the value of money at different times of output and receipt, it is necessary to equalize the value of money through the compounding factor method. This is in line with research conducted by (Hidayani, 2012), the initial investment costs incurred in rubber plantations such as purchasing seeds, planting costs, costs for making planting holes, planting, and inserting in the initial year of planting were carried out using the method compounding factor to Bank Indonesia's average inflation.

From the results of the study, the average total cost used in the cultivation of cinnamon (*cassia vera*) in Koto Agung Village can be seen in Table 1.

**Table 1. Average Cost of Cinnamon (*Cassia vera*) Farming in Koto Agung Village in 2019-2021.**

No.	Farming Cost	Total cost (IDR)
1.	Seeds	355.633
2.	Tool investment cost	316.947
3.	Soil tillage labor cost	1.737.666
4.	The labor cost of planting	1.287.689
5.	The labor cost of weeding	6.141.284
6.	Harvesting labor cost	27.292.125
7.	Post-harvest labor cost	13.270.125
	<b>Total</b>	<b>50.401.469</b>

**Source:** Primary Data Processed Results, 2021

### b. Cinnamon (*Cassia vera*) Farming Acceptance

Cinnamon (*cassia vera*) farming revenue is a multiplication between the production of cinnamon (Kg) produced and the selling price set by collectors in units of IDR/Kg. Cinnamon in the study area was harvested with a plant age range of 6 to 31 years. Different

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age levels will produce different skin qualities or grades, the older the plant will produce grade cinnamon with good quality and thick bark, so the selling price will be higher.

Revenue in this study is the average income obtained from the products produced by 40 respondent farmers in one planting season. The average income obtained by farmers in Koto Agung Village is Rp. 48,949/kg so the average cinnamon production of 4,548.4 kg will result in an income of Rp. 220,570,763.

**c. Cinnamon (*Cassia vera*) Farming Income**

Revenue from cinnamon farming is the difference between the revenue earned and reduced by the total cost. The description of the average income from cinnamon (*cassia vera*) farming in Koto Agung Village is as follows:

**Table 2. Average Cinnamon (*Cassia vera*) Farming Income in Koto Agung Village in 2019-2021.**

Component	Total (IDR)
Total Revenue	220.570.763
Total Cost	50.401.469
<b>Income</b>	<b>170.169.294</b>

Source: Primary Data Processed Results, 2021

Table 2 shows that the average cinnamon farm income obtained from the reduction in revenue and total production costs is Rp. 170.169.294.00. Based on the calculation of the income of cinnamon (*cassia vera*) farming, it can be seen that the income of each respondent farmer varies. which is influenced by the amount of product produced to reduce the production costs incurred.

**Financial Feasibility Analysis of Sweet Skin (*Cassia vera*) Farming in Koto Agung Village**

The result of the investment appraisal is an indicator of the invested capital, which means the comparison between the total benefits (benefits) obtained and the total costs that must be incurred in the form of present value during the economic life of the business (Wijaksono, 2019).

Financial feasibility analysis on cinnamon (*cassia vera*) farming uses three investment criteria (NPV, Net B/C Ratio, and IRR). The values for each investment criterion are as follows:

**Table 3. Average NPV, Net B/C Ratio, IRR of Sweet Skin (*Cassia vera*) Farming per Hectare in Koto Agung Village.**

No.	Criteria	Value
1.	NPV	Rp. 215.237.894,00,-
2.	Net B/C Ratio	4,39
3.	IRR	17,436%

Source: Primary Data Processed Results, 2021

Calculations carried out on the 3 investment criteria in Table 16 indicate that each value has a positive number, meaning that cinnamon (*cassia vera*) farming in the study area is profitable and feasible. Calculation of the financial feasibility of cinnamon farming can be seen in.

**a. Net Present Value (NPV)**

Net present value (NPV) is an analysis that is often used in investment appraisal because it can overcome the weaknesses of other valuation methods, namely paying attention to the time value of money (M Fuad, et al, 2006), (Karmini, 2018). NPV is often used to measure the feasibility of a project to be undertaken and shows the advantages of benefits (benefits) compared to costs (costs). The average NPV value of cinnamon (*cassia vera*) farming per hectare in Koto Agung Village is IDR.215,237,894,- per ha. Based on the analysis of NPV criteria, cinnamon farming in the research area is feasible because it has an NPV value of more than 0.

**b. Net B/C Ratio**

The net benefit-cost ratio is the ratio between the gross benefits and the compounded overall costs. The net benefit-cost ratio is obtained from the comparison of the total positive present value with the negative total present value (Rusdianto et al., 2020). Based on the calculation of the investment analysis using an interest rate of 17%, to obtain the calculation of net benefits for an average plant age of 19.5 years, the results of the analysis are as follows:

$$\begin{aligned}
 \text{Net B/C Ratio} &= \frac{\sum_{i=1}^n \text{NBt} (+)}{\sum_{i=1}^n \text{NBt} (-)} \\
 &= \frac{361.591.414,75}{82.440.693,74} \\
 &= 4,39
 \end{aligned}$$

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The results of the financial analysis show that the value of the Net B/C Ratio is greater than 1, which is 4.39, so it can be said that the cultivation of cinnamon (cassia vera) in Koto Agung Village is feasible. The Net B/C Ratio value of 4.39 means that each additional cost of IDR. 1 will receive an additional net benefit of IDR 4.39.

### c. IRR (Internal Rate of Return)

In this study, the internal rate of return is a compound factor level that produces a net present value equal to zero. The results of data processing show that the negative NPV value is at an interest rate of 18% with an NPV value of IDR. 33,104,419 while the positive NPV value is at an interest rate of 17% with an NPV value of IDR. 25,594,584. From these results, the IRR value can be calculated as follows:

$$\begin{aligned} \text{IRR} &= i + \frac{NPV1}{(NPV1 - NPV2)}(i_2 - i_1) \\ \text{IRR} &= 17\% + \frac{25.594.584}{25.594.584 - (-33.104.419)}(18\% - 17\%) \\ &= 0,17 + (0,436) \times (0,01) \\ &= 0,17436 \\ &= 17,436\% \end{aligned}$$

The results of the IRR calculation above show an IRR value of 17.436%, this indicates that the IRR value is greater than 1, so it can be concluded that the cultivation of cinnamon (cassia vera) is feasible to be cultivated in terms of the IRR criteria.

## CONCLUSION

Cinnamon (cassia vera) farming in Koto Agung Village, Keliling Danau District, Kerinci Regency is still carried out traditionally with one of the reasons as an investment. The average harvesting age of cinnamon plants in the study area is 19.5 years. The average land area of respondent farmers in the research area is 0.61 Ha. The average production of cinnamon (cassia vera) in the study area was 4,548.4 kg of dry skin per harvest.

Analysis of the income of cinnamon (cassia vera) farming in Koto Agung Village based on the calculation results obtained that the average cost incurred by cinnamon farmers during one production process is IDR. 50,401,469,00,-, with an average income of IDR. 220,570,763.00,-, then the average income of cinnamon farming in Koto Agung Village during one production process is IDR.170.169.294.00,- per harvest.

The results of the analysis of the financial feasibility of farming using three investment criteria indicate that the cultivation of cinnamon (cassia vera) in Koto Agung Village is profitable and feasible to operate.

## ACKNOWLEDGEMENTS

We appreciate the assistance provided by the Agribusiness Department, Faculty of Agriculture, Jambi University, Jambi Province, Indonesia

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