

Financial Feasibility Analysis of Cocoa Farming Business in Southeast Sulawesi

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Abstract. *This study aims to determine the financial feasibility of cocoa cultivation in Southeast Sulawesi Case Study at LEM Sejahtera Tinete in East Kolaka District Aere District Tinete Village. The study was conducted from June 2014 to June 2015. Determination of the sample is a case study at LEM Sejahtera Tinete in East Kolaka District Aere District Tinete Village. Methods of data collection in this study was conducted by library study method and field survey. Variable research in cocoa cultivation feasibility analysis include: investment costs, fixed costs, variable costs, production and producer prices. Feasibility of cultivation of cocoa diana lysis by using the financial indicators consisting of: PBP, NPV, IRR, NBCR, BEP and sensitivity.*

The results showed that the cultivation of cocoa in the garden area of 1 hectare, case studies LEM Prosperous Tinete Eastern District of Kolaka Aere Tinete village is still worth doing. It can be seen from the NPV of Rp 28,479,204, NBCR value of 2,60, the IRR of 27.44%, PBP value of 7.8, the BEP unit value of 28.33 kg per year, BEP value price of USD 4573.70 per kg.

Keywords: *Feasibility, Finansial, Cultivation, cocoa*

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I. Introduction

Potential pengemb wishful commodities is the main reason to make the plantation sub-sector as a source of economic growth for the agricultural sector at this time. One of the leading commodities of plantation is cocoa. Cacao (*Theobroma cacao L.*) is one of the plantation commodity whose role is quite important for the national economy. Cocoa also plays a role in encouraging regional development and agro-industry development.

Developing agro-industry is one option to consider. Agro-industry development can provide various advantages such as: 1) provide higher added value; 2) increasing the income of smallholders; 3) make the product form durable; 4) can save and utilize the harvest; 5) give higher profits to compete; 6) can expand employment (Azis, 1993; Sinaga and Susilowati, 2007; Indrawanto, 2008) Furthermore, m Problem commonly encountered in the development of agro-industry in Southeast Sulawesi cocoa is very large agro-industrial potential has not been fully able to be realized in efficient and effective manner. So that cause agroindustri less developed. This condition is due to the quality and continuity of raw materials. The low quality of cocoa produced is the main problem in cocoa farming and needs to be solved. The quality of cocoa beans exported by Indonesia known to be very low. This is due to the traditional management of cocoa products (85% of national cocoa beans are not fermented) so that the quality of Indonesian cocoa is low. Low quality causing prices of Indonesian cocoa beans and products in the market inte rnasional subjected discount 3 USD 00 / t on (Ministry of Industry, 2009).

To develop the downstream industry of cocoa products, the government issued Regulation of the Minister of Finance No. 67 / PMK.011 / 2010 and refurbished mel alui Minister of Finance Regulation No. 128 / PMK.011 / 2011, which establishes a 15% export duty for cocoa beans to be exported in force since April 2010. According to the Decree, the policy aims to ensure the availability of raw materials as well as improving the competitiveness of domestic industry. In other words, this regulation is also intended to encourage the growth of the cocoa processing industry in the country and increase the export of processed cocoa products that are added value. Based on data from BPS 2013, cocoa imports as of May 2013 reached 4,336 tons worth US \$ 10.5 million. The import in April 2013 was only 2,209 tons with a value of US \$ 5,279 million having increased approximately 50%. The increase of cocoa import is due to the domestic processing industry is in the stage of improving the quality of its products so that it requires overseas cocoa beans that have better quality and aroma because it has been fermented.

Cocoa production development program should be in line with efforts to improve the quality of cocoa. To anticipate this, the government issued Regulation of the Minister of Agriculture no. 67 of 2014 on the quality and marketing requirements of cocoa that will be enacted in May 2016. This regulation is intended as a basis for meeting the requirements of quality of cacao beans in circulation. For example through the

Fermentation and Marketing Unit of Kakao Seed (UFP-BK), this regulation aims to improve the competitiveness and added value of cocoa beans, support the development of domestic-made industries, provide protection to consumers from circulation of cocoa beans that do not meet quality requirements, increase farmer's income, and facilitate re-search for possible deviation of production and circulation.

Referring to the facts and phenomena described above, it needs an integrated and comprehensive study of feasibility analysis financial the cultivation of cocoa In Southeast Sulawesi Case Study at Prosperous LEM Tinete in East Kolaka District Aere Subdistrict Tinete village.

II. Research Methods

This study was carried out on cocoa production centers in Southeast Sulawesi provinces, namely East Kolaka District. Lokasi research determined by *purposive* considerations East Kolaka a cocoa development centers in Southeast Sulawesi estates with an area of 69 211 hectares. Research was conducted on June 2014 until June 2015. Determinants of early samples of the feasibility of cocoa cultivation are a case study in the Prosperous LEM Tinete in the Eastern District of Kolaka Aere Tinete village.

The data used in this research consists of two types, namely: Primary data, that is data obtained through in-depth discussions and interviews with experts actors (*stakeholders*) of cocoa using questionnaire that has been provided, and secondary data, the data obtained through Office of Southeast Sulawesi Plantation and Horticulture, Department of Industry and Trade of Southeast Sulawesi, Central Bureau of Statistics (BPS), and a review of the literature relevant to substance of the study. Methods of data collection in this study were conducted using literature study and field surveys. Literature study is used to obtain secondary data includes cultivation technology, post-harvest handling, the government's policy of cocoa agro-industry development, market demand for agro-products are developed and the availability of processing technology. While the field surveys conducted to obtain primary data and verification of the model financial feasibility of cultivation of cocoa.

Variable research in cocoa cultivation feasibility analysis include: investment costs, fixed costs, variable costs, production and producer prices. Appropriateness cultivation of cocoa and analysis by using the financial indicators consists of :

a. Pay Back Period (PBP)

Pay Back Period (PBP) is the payback periods are needed to recoup an investment that is calculated based on net cash flow. The calculation is based on both annual cash flow and the residual value. Alternative investment that has an economic life greater than the return period then the alternative is declared feasible. Conversely, if PBP is greater than the estimated economic life of an investment then it is said the investment is not feasible (Soeharto 2002). PBP can be calculated by the following formula

$$PBP = (t - 1) + \left[Cf - \sum_1^{n-1} At \right] \left(\frac{1}{At} \right)$$

Information :

Cf = Initial investment cost

At = Cash flow in the year to-t

t = Year of return plus 1 (the period during which the case of cash flow Net cumulative positive first)

b. Net Present Value (NPV)

Net Present Value (NPV) is the present value of the difference between the total benefit and *total cost* at a certain *discount rate* over the term of the life of the project (Padangaran, 2008) is formulated as follows:

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

Description:

NPV = *Net Present Value*

B_t = *Benefit* in year t

C_t = *Costs* incurred in year t

T = *Year of Investment Period*

I = *Rate of interest*

N = *Economic life*

The feasibility criteria are:

If the value of NPV = 0 means the investment is feasible to be implemented, and

If the value of NPV <0 then the investment loss or not feasible to be implemented.

c. Internal Rate of Return (IRR)

Internal Rate of Return (IRR) showed percentage gains from investment each year during the life of the project (Padangaran, 2008), with the following formula:

$$IRR = Df^+ + \frac{NPV^+}{NPV^+ - NPV^-} (Df^- - Df^+)$$

Description:

Df = *Discount factor*

With the following criteria:

If the IRR > bank interest means investment worth

If IRR < bank interest means investment loss

If IRR = bank interest means return home principal

d. *Net Benefit Cost Ratio (NBCR)*

Net Benefit Cost Ratio (NBCR) is a number that indicates the amount of net profit derived from each of the rupiah invested (Padangaran, 2008), with the following formula:

$$NBCR = \frac{\sum NPV^{(+)}}{\sum NPV^{(-)}}$$

Description:

If NBCR > 1 means worth investing

If NBCR < 1 means an investment loss

If NBCR = 1 means principal return investment

f. *Break Even Point (BEP)*

Break even point (BEP) or the breakeven point is the point where the total cost of production Equal to income. The BEP gives a hint that the production rate has generated an income equal to the total cost of production (Suharto, 2002). The number of BEP production units is calculated by the formula:

$$Q_i = \frac{FC}{P - VC}$$

Description:

Q_i = Number of units (volume) generated and sold

FC = Fixed costs

P = Selling price per unit

VC = Variable cost per unit

BEP analysis can also be used to determine the minimum product selling price to break even with the following mathematical formula:

$$P^* = \frac{FC + VC}{Q}$$

Description:

P* = Home resale price

Q = Quantity of product produced

g. *Sensitivity Analysis*

Sensitivity analysis is used to find out the sensitivity of cocoa agroindustry to the changes that occur. The variables were observed for cocoa cultivation feasibility that price changes of wet cocoa beans, yes bia and variable interest rates, with the changing scenario:

- The selling price of wet cocoa beans decreased by 10%
- The variable cost rose 10% cocoa
- Interest rate up 10%
- If there are three

While the variables observed for the feasibility of agro-industry, namely changes in the selling price of fermented cocoa beans, and bank interest rates, with the scenario of change:

- The purchase price of wet cocoa beans rose 10%
- The selling price of fermented cocoa beans decreased by 10%
- Interest rate up 10%
- If there are three

III. Results And Discussion

Financial Feasibility Analysis of Cocoa Cultivation

Put on the sub model in analyzing the financial feasibility of the cultivation of cocoa is the investment costs, fixed costs and variable costs.

A supportive step in the analysis of a cultivation business project is to determine the technical coefficients. This technical coefficient is a reference in the calculation of financial analysis. The assumption of technical coefficients that need to be considered in the cultivation of cocoa cultivation is as follows:

1. Spacing of 3 mx 3 m
2. Number of need for permanent crop protection (lamtoro), 300 stems / ha
3. The number of seed needs 1,200 stems / ha
4. The percentage of live plant *stump* lamtoro and cacao seeds, 90%
5. The age of cacao is first produced, estimated 4 years
6. Planting cover crops *stump* (lamtoro), is expected to be done one year earlier before cocoa seedlings are planted
7. Age of cocoa cultivation project project, estimated 20 years
8. Residual value of cocoa cultivation project, 0.

The production target of cocoa logs is designed based on a literature study which states that cocoa crops are first harvested at the age of the fourth year of planting. Cocoa crops peak production (> 1,200 kg / ha / year) at the age of 10-15 years, while at the age of 16-20 years its production is relatively stable 1,000 kg / ha / year (Siregar, 2002).

Cocoa production is converted to disk scenes, so model users simply enter production data per hectare each year. Production targets are designed based on bibliography theory. For feasibility validation purposes the model used assumptions based on situations and conditions when model validation is done as follows:

1. The area of the existing garden within the development area of 1 Ha
2. Source of conventional bank financing fund at interest rate 13%
3. Comparison of loan capital with own capital is (DER = 60: 40)
4. The loan repayment period is 10 years with a grace period of 5 years after the plant begins to produce
5. The selling price of wet cocoa beans is Rp 19,800, - / kg based on the annual average price when the model is verified in 2015

Based on the input structure investment costs and costs produks i, the obtained results of the analysis output mode l outlining income, cash flow (*cash flow*) and feasibility analysis in Annex 8, 9 and10. For program users especially related to cocoa cultivation feasibility model, the trial process can be done at fixed cost and variable cost or at DER along with interest rate, total area, product price, time period and grace period of loan repayment and economic age of cultivation of cocoa The cultivated. Feasibility analysis of cocoa cultivation business with end product of wet cocoa beans. This analysis was conducted on a 1 hectare garden. The financial criteria used are NPV, B / C ratio, IRR, PBP and BEP.

Based on the assumptions and input data then performed a financial feasibility analysis. The results of a financial analysis of cocoa cultivation is presented in Table 5.1 6.

Table 5.1 6. Result of Financial Feasibility Analysis of Cocoa Cultivation Business in Raw Material Production Center, Year 2015

Financial Criteria	Value	Description
NPV 13%	Rp 21. 595 036, -	Eligible for positive
NBCR	2, 21	Worth it because its worth more From 1
IRR	2 to 5.57 percent	Worthy because its value is greater than the prevailing interest rates (13 percent)
PBP	7.8 years	Feasible because it is faster than the repayment term of the loan for 10 years
BEP UNIT	28.33 kg	Eligible for smaller than actual sales unit 805 kg
BEP PRICE	Rp4.573,70 / kg	Eligible for less than the actual price of Rp18.000 / kg

Based on the results of the feasibility analysis financial presented in Table 5:16 menunjukkan that the NPV is US \$ 28. 479 204, - meaning that if the cultivation of cocoa made up to 20 years with an interest rate of 13 percent then the benefits sebesar Rp 28. 479 204, NBCR value by 2, 60 meaning that for every single rupiah incurred by farmers for cocoa farming activities will be obtained keuntungan financial Rp2, 60. Rated 7.44 percent IRR 2 shows the level of ability of return on invested capital for 20 years, which sebesar 2 7,44 percent or greater than the current bank rate is now 13 percent.

PBP value of 7.8 year payback period of the investment means bahwa cocoa cultivation is 7.8 years or the cultivation of cocoa made able to recoup the investment more quickly than the term of repayment of the loan set for 10 years. BEP unit value of 28.33 kg per year means that usaha cultivation of cocoa reached the condition return of the items in the sales volume of cocoa an average of 28.33 kg per year. Thus the cultivation of cocoa profitable because sales unit when conditions return principal is smaller than the actual penjualan unit that has been achieved is an average of 805 kg per year. BEP value price of USD 4573.70 per kg means a condition where the amount of the costs incurred equals the number of revenue that occurred on the sales price of cocoa USD 4573.70 per kg. The price BEP value jika lower than the actual sales price, which amounted to Rp 19. 8 00 per kg, so it can be concluded that cocoa farming profitable. Based on the results obtained shows that all financial criteria meet the eligibility standards.

Results of analysis of income shows a profit average rata cocoa cultivation in the gardens of 1 hectare of Rp 7. 829. 039, - per hectare per year or Rp652.420, - per month. If linked to the number of family members Average cocoa farmers -rata 5 people, the average income per capita per month amounted to Rp 130. 484. The amount is lower than the standard poverty line population of Southeast Sulawesi province Rp2 26, 990 / capita / month (Central Bureau of Statistics of Southeast Sulawesi province, 20 13). Based on these data can be explained that in fact the cultivation of cocoa 1 Ha is not able to provide a decent level for petani cocoa farmer in Southeast Sulawesi, as the farmers are poor. To gain the same benefits as the poverty line only, farmers should seek cultivation of 1.74 ha of cocoa. Therefore, farmers should cultivate cocoa with an area above 1.74 Ha. This is consistent with the results of research Ermianti (2014) that the minimum acreage to meet basic life needs of farmers is 2 hectares or productivity over 1.5 ton / ha / year. Projected profit and loss bisa usefully be put cocoa business conducted over 20 years of effort, where year-on-1 until the 2 nd has not given positive results or profit, and only started generating in the 3rd. With Application of conventional bank loans for 10 years with a grace period of 5 years, then the installment payment the first time done in the first month of the 6th or 6th month 1 since the start of activities cultivation of cocoa, and settled in the 15 months 1 to 80 or undergo installments over 1 2 0 months.

The need for funds to finance the management of cocoa cultivation is basically relatively large. The need for funds is allocated to finance the purchase of seeds and other facilities and infrastructure. Although farmers have spent relatively large amounts of money, the need for working capital is still needed. This is because the current expenditure on farming costs can only meet a small portion of working capital needs, particularly to finance the purchase of fertilizers, pesticides, agricultural equipment, labor costs and harvest costs. However, from the cultivation of cocoa from farmers shows that farmers still benefit from the results of his efforts.

Various scenarios are conducted on the model with the aim to know the variables that affect the investment criteria. Sensitivity analysis is important because possibilities can occur such as changes in the selling price of wet cocoa beans and changes in interest rates. The results of the sensitivity analysis of financial feasibility studies of cacao are presented in Table 5.1 7.

Table 5.1 7. Results of Sensitivity Analysis of Financial Feasibility Cocoa Cultivation in Local Raw Material Production Center, 2015

Change Scenario	Investment Criteria			
	NPV (Rp)	NBCR	IRR (%)	PBP (th)
Selling price of wet cocoa beans Rp19.800,- / kg (normal)	30.603.214	2,56	23.67	8.75
Interest rate up 10%	30.181.571	2,54	23.56	8.76
The selling price of wet cocoa beans decreased by 10%	23.221.303	2.19	25	10.07
Variable costs rose 10%	27.396.649	2.31	22.31	8.83
Interest rates rose 10%, selling price of wet cocoa decreased 10% and variable cost rose 10%	20.199.930	1.97	23.18	10.04

The results of the sensitivity analysis on various scenarios including changes in price changes of wet cocoa beans, the bank rate and variable costs shows that the IRR is still above the bank rate of 13 percent. Thus the cultivation of cocoa on a 1 hectare garden is still feasible with various scenarios change.

IV. Conclusions And Recommendations

Based on the results of the research, it can be concluded that the cultivation of cocoa in the garden area of 1 hectare, the case study LEM Sejahtera Tinete East Kolaka District Aere District Tinete Village is still feasible. It can be seen from:

1. NPV of USD 28. 479 204, - meaning that if the cultivation of cocoa made up to 20 years with an interest rate of 13 percent then the benefits Rp 28. 479 204, -.
2. NBCR value by 2, 60 meaning that for every single rupiah incurred by farmers for cocoa farming activities will be obtained financial profit Rp2, 60.
3. Rated 7.44 percent IRR 2 shows the level of ability of return on invested capital for 20 years, amounting to 2 7,44 percent or greater than the current bank rate is now 13 percent.
4. PBP value of 7.8 year payback period of the investment means the cultivation of cocoa which is 7.8 years or the cultivation of cocoa made able to recoup the investment more quickly than the term of repayment of the loan set for 10 years.
5. BEP unit value of 28.33 kg per year means that u saha cultivation of cocoa reached the condition return of the items in the sales volume of cocoa an average of 28.33 kg per year.
6. BEP value price of USD 4573.70 per kg means a condition where the amount of the costs incurred equals the number of revenue that occurred on the sales price of cocoa USD 4573.70 per kg.

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