



FEASIBILITY OF FINANCIAL ANALYSIS RUBBER PLANT IN POST COAL MINING IN KUTAI KARTANEGARA EAST KALIMANTAN

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ABSTRACT

The research aimed was to analyze input and output cost to study business feasibility of replanting of rubber mined out area in Kutai Kartanegara District, East Kalimantan. Methode that used do with field survey, discuss with expert in Kutai Kartanegara District.

Feasibility study for rubber replanting to mined out area need investment budget Rp.18,044,730,000,-. The investment budget was funded by 40% capital industry owner and 60% debt. Sensitivity analysis with planned production and planned price: NPV analyses was shows 140,448 billion values, 40,73 IRR, Net B/C 3,26, PBP for 7 year and 6 month and BEP 16.035.298 metric ton. Based on decreased production 10% and planned price NPV analysis was shows 119,997 billion values, 35,96 IRR, Net B/C 2,93, PBP for 7 year and 7 month and BEP 18.365.413 metric ton. Depend on planned production and decreased price 10% NPV analyses was shows 117,533 billion values, 35,56 IRR, Net B/C 2,89, PBP for 7 year and 8 month and BEP 21.035.210 metric ton. After that sensitivity analysis for production and decreased price 10% NPV analysis was shows 96,782 billion values, 31,34 IRR, Net B/C 2,56, PBP for 8 year and 4 month and BEP 24.453.841 metric ton. If production increased and planned price NPV analysis was shows 166,659 billion values, 45,54 IRR, Net B/C 3,68, PBP for 7 year and 3 month and BEP 12.303.284 metric ton, and sensitivity analysis for planned production and increased price NPV analysis was shows 169,122 billion values, 45,94 IRR, Net B/C 3,72, PBP for 7 year and 2 month and BEP 10.806.888 metric ton, and finally if production and price increased price NPV analysis was shows 196,252 billion values, 51,32 IRR, Net B/C 4,16, PBP for 6 year and 10 month and BEP 8.020.646 metric ton.

INTRODUCTION

Rubber is an export commodity that is able to contribute to efforts to increase Indonesia's foreign exchange. Indonesian rubber exports over the past 20 years have continued to show an increase from 1.0 million tons in 1985 to 1.3 million tons in 1995 and 1.9 million tons in 2004. Foreign exchange earnings from this commodity in 2004 reached US \$ 2.25 billion, which is 5 % of non-oil and gas foreign exchange earnings. A number of locations in Indonesia have conditions that are suitable for rubber plantations, most of which are in Sumatra and Kalimantan.

The area of rubber plantations in 2005 was recorded at more than 3.2 million ha spread throughout Indonesia. Among them 85% are rubber plantations belonging to the people, and only 7% are large state plantations and 8% are large privately owned plantations. National rubber production in 2005 reached around 2.2 million tons. This amount will still be increased by empowering farmers' agricultural land and empty / unproductive land suitable for rubber plantations (Anwar. C, 2001).

Today the world's rubber consumers are increasing. Until 2005 world rubber consumption will increase from 15 million tons to 20 million tons. In addition, the price of world rubber penetrated 1 US dollar per kilogram and is believed to continue to rise to close to 1.77 US dollars per kilogram as in the heyday of rubber in 1958. These assumptions, the future promising prospects of plantation commodities are rubber, and this is a business opportunity that can be utilized for the benefit of the local community and the state (Wulandari. A, 2006).

Many benefits can be obtained from investment activities. Among them are absorption of labor, increased output produced, saving foreign exchange or additional foreign exchange, and so forth. If investment increases, economic activity will also be boosted. This investment activity is certainly a healthy investment, meaning that the investment is profitable, so that economic life becomes crowded in the area (Husnan. S, Suwarsono. M, 2005). Investment results from 1 hectare rubber planting in North Sumatra show that NPV is 26.6 million rupiahs, IRR is 34.5 and B / C ratio is 1.3, so this is very profitable (Anwar. C, 2001).

Based on the description above, the author tries to find out more about how much influence caused by several factors related to the demand for rubber exports. For this reason, the authors put it in this Dissertation.

METHOD

Time and Location of Research

This research was conducted for 12 (twelve) months, starting in December 2015 to December 2016. The study sites were in Kutai Kartanegara Regency, East Kalimantan.

Types and Data Sources

The types of data needed in the financial analysis of replanting efforts for post-coal mine land in Kutai Kartanegara Regency are as follows: costs of soil chemical analysis, nursery costs such as procurement of polybags, making nurseries, fertilizers, limestone, drug costs (pesticides) labor costs, costs for planting cover crops, maintenance and monitoring costs, acid mine prevention costs, infrastructure costs, costs for transporting employees and others.

Data collection

Primary data collection in this study was obtained by field survey using field survey interviews, discussions, in the study area consisting of various experts and stakeholders related to the research topic.

Data Analysis Methods

Data analysis methods used in the business of replanting for post-mining land In the Kutai Kartanegara Regency is a method of financial analysis. Financial analysis to help develop a

policy of financial problems to be taken, methods and costs are needed. One of them is the calculation of Internal Rate of Return (IRR), Break Even Point (BEP), Period of return or Payback Period.

Internal Rate of Return (IRR) is the interest rate that will cause the equivalent value of costs / investments to be equal to the equivalent value of revenue. IRR is calculated using the formula:

Net monthly value = 0

Monthly Value of Receipt - Monthly Value = 0

$$NPV = 0 = \left[\sum_{t=1}^n \frac{CF_t}{(1+IRR)^t} \right] - I_0$$

By: CF_t = cash flow in year t

I₀ = initial investment

IRR = interest rate when NPV = 0

n = project age

Break Even Point (BEP) is a condition of the meeting point between income from sales and variable costs. This meeting point states the level of activity (volume of production) that causes the results of sales (total income) equal to total costs, in other words at the level of activity there are no gains or losses. With the help of graphics, the Break Even Point (BEP) is calculated as the point of intersection between the income graph and the total cost graph.

Break Even Point (BEP) can be calculated based on the formula:

$$BEP = n + ((n+1) - n) \times \frac{KCF_n}{KCF_{n+1} + KCF_n}$$

By: BEP = Break Even Point

n = n year production

KCF_n = Cumulative year n Cash Flow

The period of return or payback period of a project can be defined as the time needed so that the amount of revenue equals the amount of investment / cost. The formula used to calculate the Return Period is as follows:

$$APP = n + ((n+1) - n) \times \frac{KCF_n}{KCF_{n+1} + KCF_n}$$

By: APP = Analysis of Return Period

n = n month production

KCF_n = Cumulative month n Cash Flow

RESULTS AND DISCUSSIONS

Financial analysis aims to determine the extent to which business activities can provide benefits during economic life. The results of this financial analysis can be used as material for consideration in making decisions whether investors are willing to invest their capital in post-mining land management activities.

There are several methods or criteria for measuring the feasibility of a business activity or project financially, which are widely used are: (1) NPV (net present value), (2) IRR (internal rate of return), (3) Net B / C (net benefit cost ratio), and (4) PBP (payback period). The investment made in post-rubber land management in Kutai Kartanegara Regency certainly requires a certain amount of capital (money), in addition to other expertise. The capital used is starting from the cost of investment costs, to working capital.

The feasibility of a post-rubber mine land management business activity has been carried out economic analysis which includes the following components: (1) Plan for Investment Cost Requirements, (2) Feasibility Analysis. The currency used is the United States Dollar with the exchange rate: US \$ 1 = Rp. 10,200. Investment and feasibility analysis is prepared based on the work patterns of tillage, fertilization, breeding, planting and production.

Labor and Production Period

Procurement of labor needed by the project, there are two things that need to be considered, namely the structure of labor supply available in the project location area and the breakdown of labor requirements and the estimated amount of labor budget needed.

Considering the organizational system that has been planned to support rubber planting activities on post-coal mine land and its administration in Kutai Kartanegara Regency, then in planning the energy needs to fill the formation in the organization's system, it is necessary to develop labor criteria. The workforce to fill the formation in the organizational system is divided into 2 groups of workers, namely:



Fig 1. One of the rubber plants are planted in post-coal mining land in Kutai Kartanegara Regency

a) Employees of Specific Position

Is a workforce appointed as a company employee based on a mutually agreed work agreement. As an employee, the tenure and compensation of this employee is not a function of the amount of coal produced by the company. The number of employees of certain position employees who will be used in this mining activity is 5 people.

b) Employees

Workers are appointed as employees based on mutually agreed work agreements. As employees, the tenure and compensation of these employees is a function of the amount of rubber produced by the company. The employee labor group is company employees employed during a certain period of time to carry out direct work on rubber planting on post-mining land. The number of employees that will be used in mining activities is 108 people.

The qualifications and amount needed for each operation depend on the number of rubber production targets. So that there are differences in rubber production targets, there will be differences in qualifications and the number of employees needed. All non-skilled personnel are taken from the

surrounding community, while experts are taken from outside the area if there is no community around them who have expertise in rubber planting. In accordance with the scale of the work done, the payroll is adjusted to the abilities or skills of the person doing the task according to their respective functions. The labor requirements at the mining operation stage in Table 1

Table 1. List of rubber planting workers on post-coal mine land in Kutai Kartanegara Regency

No.	Description	Total of Employees
A. CERTAIN EMPLOYEE OFFICES		
1	Operations & Production Manager	1
2	nursery and transport superintendents	1
3	Superintendent of planting	1
4	Nursery and transport supervisors	1
5	Planting Supervisors	1
Sub Amount =		5
B. Employees		
1	- Workshop Foreman	1
	- Mechanics	1
	- Helper	1
2	- Driver Mitsubishi PS 120	14
	- Driver Employee Car	1
	- Operasional Car	1
3	- Foreman Nurseries	1
	- Helper Nurseries	2
4	- Foreman Planting	1
	- Helper planting	20
5	- Supervisor Production	1
	- Foreman	2
	- Helper	50
6	Security	2
7	Cleaning Service	2
8	Cookers	3
Sub Amount =		103
TOTAL		108

Investment Cost Requirements

a. Fixed capital

Fixed Capital is a cost whose relative size does not change or depends on changes in production volume or level of activity carried out. Fixed Capital consists of:

- Pre-production costs, which consist of: (1) Costs of transferring soil for the provision of post-rubber land reclamation, (2) Costs for planting rubber for each hectare, (3) Costs for nursery per hectare, (4) Costs for managing crops per hectare in one month
- The cost of building facilities and infrastructure, which consists of: (1) Construction of Office & Office Equipment, (2) Construction of Mess, Polyclinic & Canteen, (3) Construction of Generator Houses, (4) Construction of Work Shop & Warehouse.
- Cost of purchasing equipment, which consists of: (1) For land clearing, namely chain saw, (2) For nurseries and planting, among others: Hoes, machetes, axes and shovels, (3) For rubber tapping, among others: rubber place and knife tapping, (4) For transporting rubber, that is the car truck PS 120, (5) Car operations include: Field cars, passenger cars and bus cars, (5) Other tools such as Handy Talkie and other.

Working capital

Working capital consists of direct costs and indirect costs which will be used as working capital for post-mining rubber land management in Kutai Kartanegara Regency.

a. Direct cost

These direct costs consist of maintenance of supporting facilities, employee salaries, use of fuel and lubricating oil, parts and maintenance, community development, tire replacement costs and royalties. The amount of this direct fee is: Rp. 6,899,015,000, -

b. Indirect Costs

Indirect costs consist of: tool insurance, salary for certain office employees, labor insurance, office fees, environmental management and monitoring costs as well as K-3, fixed fees and the United Nations, Facilities & Infrastructure Maintenance Costs, procurement of safety equipment, training for employees, equipment insurance costs. The amount of this indirect cost is Rp. 918,820,000. The amount of working capital needed for the production of 7,500,000 tons per year of rubber is Rp. 7,907,835,000.

c. Source of funds

The replanting of land after the Kutai Kartanegara coal mine required relatively large funds of Rp. 18,044,730,000. The acquisition of this fund uses KUD (Koperasi Unit Desa) of 40% (Rp. 7,217,892,000, -) and bank loans of 60% (Rp. 10,826,838,000)

Feasibility Analysis**a. Production cost**

The rubber production cost of 7,500,000 tons is the cost needed to produce 1 ton of rubber calculated from fixed costs and variable costs. The amount of production costs based on calculations will increase by 5% to 10%.

b. Revenue and Sales Plans

Sales income can be calculated using the formula:

Income = Rubber Production (tons) x Rubber Prices (Rp / ton)

With a planned production of 7,500,000 tons of rubber per year and a planned selling price of rubber of US \$ 1.2 (exchange rate of US \$ 1 = Rp. 10,200), the estimated revenue from sales is as follows:

Table 2. Sales Income

Description	Income (Rp)
Production & prices according to plan	82,800,000,000
Production fell 10%, fixed price	74,520,000,000
Fixed production, prices fell 10%	74,520,000,000
Production and prices fell by 10%	67,068,000,000
Production rose 10%, fixed price	91,080,000,000
Fixed production, prices rose 10%	91,080,000,000
Production and prices rose by 10%	100,188,000,000

c. Plan for Cash Flow Projection

The flow of funds is prepared taking into account all elements of cash income and all elements of cash costs.

Cash Flow = (Income - Expenditures) – Tax

In detail, Cash Flow Projection can be seen in the Annex to the financial feasibility analysis, which can be briefly seen in Table 3 below.

Table 3. Cash Flow Projection

Description	Investation	Cash Flow Cummulative
Production & prices according to plan	109,556,330,000	1,111,176,517,900
Production fell 10%, fixed price	109,556,330,000	989,098,282,558
Fixed production, prices fell 10%	109,556,330,000	975,259,571,308
Production and prices fell by 10%	109,556,330,000	858,688,282,558
Production rose 10%, fixed price	109,556,330,000	1,251,220,860,058
Fixed production, prices rose 10%	109,556,330,000	1,265,059,571,308
Production and prices rose by 10%	109,556,330,000	1,420,751,860,058

Investment Assessment Criteria

a. Net Present Value (NPV)

Net Present Value, namely the difference between the present value of total revenue and the present value of expenditure over the life of the project at a given interest rate or discount rate. If NPV is positive, it means showing the amount of profit gained from project investment. NPV is an investment criterion that is widely used in measuring whether a project is feasible or not. The formula for finding NPV can be calculated by the equation as follows:

$$NPV = \sum_{t=1}^n \frac{B - C}{(1 + i)^t}$$

Where: B = Benefit (sales of production)

C = Cost (investment and production costs)

I = interest rate or factor discount (discount rate)

t = Time (year t)

n = Economical age (years)

The higher the income and the earlier the NPV is higher, but the higher the NPV discount rate gets lower. Post-coal land management projects in Kutai Kartanegara Regency are said to be feasible if $NPV > 1$, and are rejected if $NPV < 1$. NPV value can be seen in Table 4

Table 4. Analysis of Net Present Value from replanting rubber plants on post-coal mine land.

Description	NPV
Production & prices according to plan	140,448,315,725
Production fell 10%, fixed price	119,997,314,869
Fixed production, prices fell 10%	117,533,798,548
Production and prices fell by 10%	96,782,207,802
Production rose 10%, fixed price	166,659,409,044
Fixed production, prices rose 10%	169,122,925,364
Production and prices rose by 10%	196,252,864,236

b. Net B / C

The Net Benefit Cost Ratio is a comparison between the net benefits that have been discounted positively (+) with a discounted net cost of negative (-). The formula for calculating Net B / C is as follows:

$$\text{Net B/C} = \frac{\sum_{t=0}^n \frac{B - C}{(1 + i)^t}}{\sum_{t=1}^n \frac{B - C}{(1 + i)^t}}$$

Post-coal land management decision making in Kutai Kartanegara Regency is based on the following criteria: If $B / C \geq 1$ (one), then the project is feasible to implement, and if $B / C < 1$, then the project is rejected or not feasible. Net B / C of post-coal mine land management in Kutai Kartanegara Regency can be seen in Table 5.

Table 5. Analysis of Net Benefit Cost Ratio from replanting rubber plants on post-coal mine land.

Description	Net B / C
Production & prices according to plan	3.26
Production fell 10%, fixed price	2.93
Fixed production, prices fell 10%	2.89
Production and prices fell by 10%	2.56
Production rose 10%, fixed price	3.68
Fixed production, prices rose 10%	3.72
Production and prices rose by 10%	4.16

c. Internal Rate of Return (IRR)

Internal Rate of Return (IRR) is the interest rate that will cause the equivalent value of costs / investments to be equal to the equivalent value of revenue. IRR is a tool to measure the rate of return on internal returns. IRR is calculated using the formula:

Net annual value = 0

Annual Value of Receipt - Annual Value of Cost = 0

$$NPV = 0 = \left[\sum_{t=1}^n \frac{CF_t}{(1 + IRR)^t} \right] - I_0$$

- By: CF_t = cash flow in year t
 I₀ = initial investment
 IRR = interest rate when NPV = 0
 N = project age

With the help of the interest rate table the IRR will be known. In the report, IRR is calculated using a formula. From the projection of cash flow, the IRR value can be seen in Table 6

Table 6. Internal Rate of Return (IRR)

Description	IRR
Production & prices according to plan	40.73%
Production fell 10%, fixed price	35.96%
Fixed production, prices fell 10%	35.56%
Production and prices fell by 10%	31.34%
Production rose 10%, fixed price	45.54%
Fixed production, prices rose 10%	45.94%
Production and prices rose by 10%	51.32%

The IRR when production and prices fall by 10% is 31.34%, which is higher than bank interest rates (ranging from 5% - 7%).

d. Analysis of Return Period (ARP)

The period of return or payback period of a project can be defined as the time needed so that the amount of revenue equals the amount of investment / cost. The formula used to calculate the Return Period is as follows:

$$APP = n + ((n + 1) - n) \times \frac{KCF_n}{KCF_{n+1} + KCF_n}$$

- By: APP = Analysis of Return Period
 n = n month production
 KCF_n = Cumulative month n Cash Flow

The period for returning post-coal mine land management in Kutai Kartanegara Regency as shown in Table 7.

Table 7. Analysis of Return Period

Description	ARP (Year To)
Production & prices according to plan	7.57
Production fell 10%, fixed price	7.86
Fixed production, prices fell 10%	7.90
Production and prices fell by 10%	8.31
Production rose 10%, fixed price	7.25
Fixed production, prices rose 10%	7.22
Production and prices rose by 10%	6.99

e. Break Even Point (BEP)

Break Even Point (BEP) is a condition of the meeting point between income from sales and variable costs. This meeting point states the level of activity (volume of production) that causes the results of

sales (total income) equal to total costs, in other words at the level of activity there are no gains or losses. With the help of graphics, the Break Even Point (BEP) is calculated as the point of intersection between the income graph and the total cost graph.

Break Even Point (BEP) can be calculated based on the formula:

$$BEP = n + ((n + 1) - n) \times \frac{KCF_n}{KCF_{n+1} + KCF_n}$$

By: BEP = Break Even Point
 N = n year production
 KCF_n = Cumulative year n Cash Flow

Break Even Point in the Appendix analysis of land feasibility after the coal mine in Kutai Kartanegara Regency. It can be seen that Break Even Point and Capital Return Time look like in Table 8. In the below

Table 8. Break Even Point (BEP)

Description	BEP (MT)
Production & prices according to plan	16,035,298.35
Production fell 10%, fixed price	18,365,413.36
Fixed production, prices fell 10%	21,035,210.40
Production and prices fell by 10%	24,453,841.58
Production rose 10%, fixed price	12,303,284.94
Fixed production, prices rose 10%	10,806,888.74
Production and prices rose by 10%	8,020,646.57

From the calculation of Break Even Point (BEP) and Internal Rate of Return (IRR) above, it is known that the rubber planting business with conditions of production and prices fell by 10% from the planned BEP of 24,453,841.58 MT and IRR of 31.34%, feasible to be continued.

Sensitivity Analysis

The sensitivity analysis will examine the extent to which changes in the parameters of production costs, the selling price of rubber and loan interest will affect the feasibility assessment carried out. In this case the sensitivity or failure of the feasibility assessment that has been decided on changes to the parameters mentioned above will be evaluated.

Sensitivity analysis will take the parameter of increasing rubber selling price by 10% and decreasing rubber selling price by 10%, then increasing rubber production by 10% and decreasing rubber production by 10%.

Table 9. Sensitivity Analysis

Description	IRR (%)	BEP (MT)	ARP (Year To)	NPV	Net B/C
Production & prices according to plan	40.73%	16,035,298.35	7.57	140,448,315,725	3.26
Production fell 10%, fixed price	35.96%	18,365,413.36	7.86	119,997,314,869	2.93
Fixed production, prices fell 10%	35.56%	21,035,210.40	7.90	117,533,798,548	2.89
Production and prices fell by 10%	31.34%	24,453,841.58	8.31	96,782,207,802	2.56
Production rose 10%, fixed price	45.54%	12,303,284.94	7.25	166,659,409,044	3.68
Fixed production, prices rose 10%	45.94%	10,806,888.74	7.22	169,122,925,364	3.72
Production and prices rose by 10%	51.32%	8,020,646.57	6.99	196,252,864,236	4.16

The results of the analysis show that if prices and production fall by 10%, post-coal land management business by planting rubber.

CONCLUSION AND SUGGESTION

1. Conclusions

The age of rubber is planned for 30 years, rubber can be produced in the 5th to the 30th year. The

post-mining land area of PT Tanito Harum is 9,000 hectares, with production per hectare in a year estimated to be between 825 tons and 830 tons so that 9,000 hectares of rubber production in one year is estimated at 7,500,000 tons.

The method or criteria for measuring the feasibility of a business activity or project financially, which are widely used are: (1) NPV (net present value), (2) IRR (internal rate of return), (3) Net B / C (net benefit cost ratio), and (4) PBP (pay back period), (5) BEP (Break even point).

Based on investment valuation criteria: (1) IRR if production and prices fall by 10% is 31.34%, which is higher than bank interest rates (ranging from 11% - 15%), (2) Period of payback period if production and price down 10% is 8.31 years, which is below the mine age of 30 years, (3) Break Even Point (BEP) if production and prices fall by 10% is 24,453,841.58 metric tons of total production for 25 years amounting to 187,500,000 tons, thus It can be concluded that the proposed investment project for replanting rubber plants on post-coal mine land in East Kalimantan's Kutai Katanegara Regency which will be implemented for 30 years is acceptable.

2. Suggestions

Kutai Kartanegara Regency is a very large district with relatively few residents, with a relatively large number of IUP (mining authorities), so that mining together will cause environmental degradation. The land is damaged, and this must be rehabilitated because it is based on the criteria that the investment is feasible.

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