

FINANCIAL FEASIBILITY STUDY PTPN VIII NEW PALM OIL PLANTATION IN KERTAJAYA, BANTEN

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Abstract. Palm oil is one of the main commodities of Indonesia. Every year, Indonesia send thousand tons of palm oils to overseas (export). Hence, palm oil commodities become one of the commodities that become source of devise for Indonesia. PTPN VIII is one of state owned company that produce palm oil as their main commodities. See this big opportunities, PTPN VIII plan to add 1 unit new palm oil plantation in Kertajaya, Banten, where before was tea plantation. This study have aim to know whether project of 1 unit new palm oil plantation in Kertajaya, Banten financially feasible or not. This financial feasibility study using several financial variables approach such as NPV, IRR, WACC, Profitability Index and Payback Period. Beside of that, sensitivity analysis and financial ratios analysis are add to know the sensitivity variables&financial performance of palm oil. The result shown that 1 new palm oil in Kertajaya, Banten is feasible and shows good financial performance, with 2 sensitive variables. In order to improve PTPN VIII performances in the future, PTPN VIII recommended to have guidance and standards to do investment and complete another aspects to being considerate for feasibility study analysis.

Keywords: Palm oil, Plantation, Financial Feasibility Study Parameters, Sensitivity Analysis, Financial Ratios Analysis.

Introduction

Palm oil (*Elaeis*) is one of the economic commodities in Indonesia that can be a source for the foreign exchange earnings. Based on **Green Palm Sustainability Foundation Research (last data March 2014)**, Indonesia is ranked 1st as the biggest producer for palm oil in the world, whether the second country is Malaysia. Both Indonesia and Malaysia, have 84% market share of palm oil industries in the world. Based on Bloomberg research (taken from SWA article "Laba Emiten Perkebunan Naik 201%"), most all palm oil plantation in Indonesia, shows the great positive financial performance and it is increasing year by year since year 2013 until the projection financial performance of palm oil company.

PTPN VIII is one of plantation state owned company in Indonesia already produced palm oil since 1997. Their main commodities of products are tea, rubber and palm oil. But see this big business opportunities, they plan to more invest to palm oil plantations rather than other commodities start from year 2015. One of the plan is to add 1 new palm oil plantation located in Kertajaya, Banten to change tea plantation. PTPN VIII plan to do this because some of internal reasons that cause top management PTPN VIII decided to more put investment to palm oil plantations. Firstly almost all main commodities products of PTPN VIII have decreasing profits during 5 last years except for the palm oil. Secondly, among all of the commodities palm oil plantation showed the highest rate of production and productivity since 2009 until now. This problem caused PTPN VIII to add 1 new palm oil plantation in Kertajaya, Banten. Related with this issue, PTPN VIII has done a feasibility analysis of the technical side, the side of the market, and from a social aspect for new palm oil plantation. But, feasibility analysis from the financial aspect has not been done by PTPN VIII, whereas feasibility analysis from the financial aspect is an important issue. Based on those facts, this

research will do and focus financial feasibility analysis to convince the PTPN VIII and the outside parties which are will be related with this plan of new plantation of palm oil. For this research, the researcher will use a plan for new plantation of palm oil which located in Banten Province, which was at first a tea plantation and will be renewable by changing it into a palm oil plantation.

Literature review

Due to this research, there are some theories being used to analyze and processing the data, the theories that conducted in this research are: Financial Feasibility Parameters, Sensitivity Analysis and Financial Ratios Analysis

Financial Feasibility Parameters

In the feasibility study, the financial feasibility study is the most important feasibility study that always being do by the company. This is because from the financial feasibility study, the investor can know how the profit that can be accelerated by an investment activities. The financial feasibility analysis can be analyze through quantitative data from an investment project to calculate the parameters financial feasibility analysis such as NPV, IRR, WACC, Payback Period, and Profitability Index.

Net Present Value (NPV)

Net Present Value (NPV) or also known is see an investment feasibility based on the difference between the whole present worth of future income in the present value and the whole present worth of future expenditures in present value. The following is an equation of the NPV formula (Gitman & Zutter, 2012, p. 397):

$$NPV = \frac{CF_t}{(1+r)^t} - C_{fo}$$

Basically, the following is the interpretation summary for the results of NPV:

If the NPV is positive, it is mean that particular investment plan will provide benefits for the company so the investment should be run.

If the NPV is negative, it means that in certain planning horizon investments will result in losses for the company so the investment should be rejected.

If the NPV is zero, it means that the investment are in the breakeven point (BEP). The company should consider other criteria to determine the eligibility of the investment.

Internal Rate of Return (IRR)

Internal Rate of Return (IRR) or *Rate of Return (ROR)*, is the interest rate which the present worth is zero (White, 2010). Following the equation method of IRR (Gitman & Zutter, 2012, p. 401)

$$IRR = \text{IRR} = \frac{CF_t}{(1+IRR)^t} - C_{fo}$$

If IRR is greater rather than WACC it is a feasible investment, otherwise if the IRR is smaller than the rate WACC, the investment is not feasible.

Weighted Average Cost of Capital (WACC)

Weighted Average Cost of Capital is the average cost of capital. Generally, WACC found in the case, where the funding are mix between debt and equity. Following the equation of WACC:

$$WACC = W_d \times K_d (1-T) + W_e \times K_e$$

W_d = Weight of Debt W_e = Weight of Equity

K_d = Cost of Debt K_e = Cost of Equity

T = Income Tax

Whether, the value of Cost of Equity (K_e) could be find by using the equation with based on CAPM approach below:

$$K_e = K_{rf} + (K_m - K_{rf}) \beta$$

K_e = Cost of Equity β : stocks/industry beta

K_{rf} : Risk Free Rate K_m : return rate of company stock in market

The value WACC will be use as the discount rate for 2 parameters of feasibility study, NPV and IRR

Payback Period

The payback period is a period of time required by an investment to reach break-even when the investment is made generate income to cover all expenses incurred or in other words when NPV = 0. Following the equation of Payback period based on White, 2010

$$\sum_{t=0}^n C_t = 0$$

Profitability Index (PI)

Profitability Index (PI) is a value that shows compared ratio of income earned from an investment with investment costs incurred.

Profitability Index = $\frac{\text{PV of Future Cash flow}}{\text{Initial Investment}}$

Initial Investment

Sensitivity Analysis

According to Newnan (2004), "sensitivity analysis is a variation of what kind of data can affect the outcome of the decision. In other words, what and how the variations of data can alter the results of the feasibility parameters significantly." Based on White (2002), a sensitivity analysis being done by changing several parameters that are considered important and have significant effect on the problem being discussed. By testing this, it can be determined which parameters that more sensitive and less sensitive to further mitigation analysis.

Financial Ratios Analysis

According to Van Horne (2005), financial ratio is a tool to analyze the financial condition and performance of the company. In this research, the financial ratios that being analyze are leverage ratio, solvency ratio and profitability ratio.

Leverage Ratio

The leverage ratio measures how much of the company's assets are financed by debt and of equity. There are 2 leverage ratios, total debt to equity and total debt to asset. And below is the equations of each leverage ratios (Ross, 2010, p.57):

Total Debt to Equity: $\frac{\text{Total Debt}}{\text{Total Equity}}$

Total Equity

Total Debt to Asset: $\frac{\text{Total Debt}}{\text{Total Asset}}$

Total Asset

Solvency Ratio

Solvency ratio are used to measure the extent to which the company is able to meet its financial obligations. This ratio is commonly used by companies to make funding decisions between financing from its own capital or loan. Solvency ratio cover by Debt to Ebitda, Interest Coverage Ratio, and Debt Service Coverage Ratio. Below are the equations of each solvency ratios:

Debt to Ebitda: $\frac{\text{Total Debt}}{\text{Total Ebitda}}$

Total Ebitda

Interest Coverage Ratio: $\frac{\text{EBIT}}{\text{Loan Interest}}$

Loan Interest

Debt Service Coverage Ratio: $\frac{\text{EBITDA}}{\text{Principal Repayment + Loan Interest}}$

Principal Repayment + Loan Interest

Profitability Ratio

Profitability ratios are used to measure the level of income or level of operational success of the company in a period of time specified. Below are the equations of each Profitability Ratio:

Return on Sales: $\frac{\text{EBIT}}{\text{Sales}}$

Sales

Return on Investment: $\frac{\text{EBIT}}{\text{Total cost of investment}}$

Total cost of investment

Methodology

To conduct the financial feasibility research, the researcher use methodology below which consist of 4 stages of methodology: preliminary stage, data processing, data analysis and conclusions and recommendation. Below is the complete methodology that will be use in this research

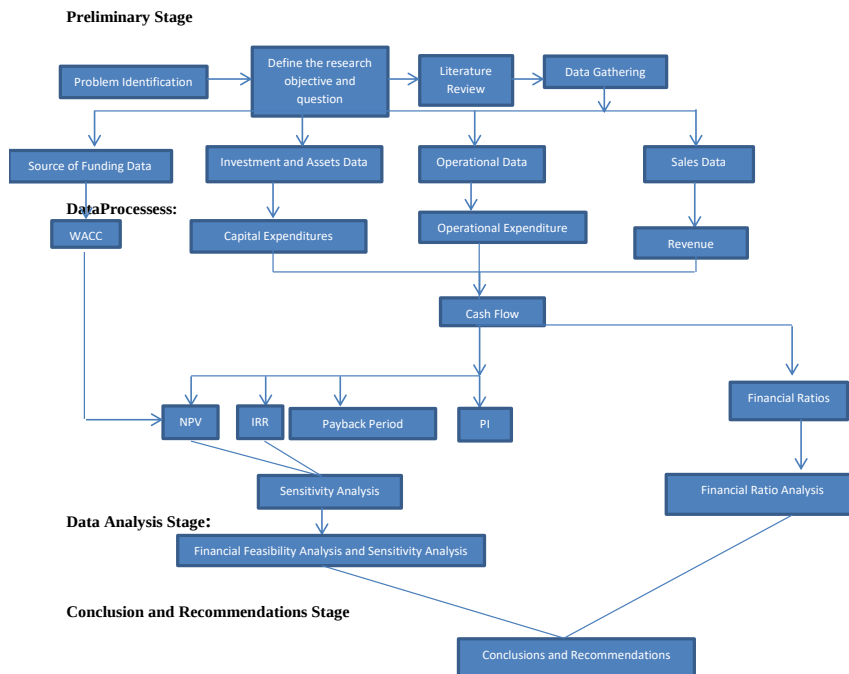


Figure 1: Research Framework

Preliminary stage:

In the preliminary stage, there are 4 steps of the research which are: problem identification, define research objective and question, literature review and gathering the data. First step is, problem identification of the research, in this research the problem identification is PTPN VIII plan to adding the new plantation of palm oil by change the tea plantation to palm oil plantation, in fact the PTPN VIII, main commodities profit have been decreasing for lately 5 years.

The second stage is to define the research objectives and questions from the problem identification that faced in this research. Third stage is literature review, in this stage, there are explanations some of theories that being used in this research. The theories that will be use to analyze the financial feasibility are:

NPV.

IRR.

Payback Period.

Profitability Index.

WACC.

Sensitivity Analysis.

Financial Ratios.

Beside the financial feasibility analysis parameters, in this research there are the use of the sensitivity analysis to know some of the important variables that may affect feasibility study parameters. Next, is the financial ratios theories which being use to know the performance of the financial of the company, those ratios being analyze to know the financial condition of the company (based on new palm oil plantation project) and to know the financial lending of the company if they are borrow the loan from the bank.

The last step is the data gathering from the company, some of data that being need are source of the funding data for the project, investment and assets data for this project, company operational data (palm oil plantation) and the last is sales data for the palm oil.

Processing data

In this stage, the data that have been gathered from the company in data gathering step being analyze for the further analysis, first is the funding data being analyze, from this data, the researcher can generate the value WACC of the project. Then WACC will be use as the discount rate for NPV & IRR.

After that, investment and asset data being processed, to find the capital expenditures, and then the operational data being processed to find operational expenditures and the last sales data is being processed to find the value of revenue. The capital expenditure, operational expense and revenue values will be the components for the form of the cash flow that will be the main data in this research.

Through the cash flow, every parameters of financial feasibility analysis can be analyze (NPV, IRR, Payback Period, Profitability Index). After parameters being analyze, the sensitivity analysis being done to testing the NPV & IRR. After that, it can be determined which variables that more sensitive and less sensitive to further mitigation analysis.

Beside of that, the cash flow is use to calculate financial ratio. The financial ratios that being calculate are leverage ratio, solvency ratio and profitability ratio.

Data analysis stage

In this stage, the data that already processed into the number of values are being analyze to know the whole financial feasibility of the project. The results of sensitivity analysis can be determined to know the sensitivity variables of the project. After that, the result from the financial ratios is used to deciding the loan lender (in this case bank) to give or not give the loan to the company for this project, because from financial ratios result, the financial performance of the project can be known.

Conclusions and recommendations stage

In this stage, the result of the analysis are beig conclude. Through this stage, it can be known the whole results of financial feasibility of this project (adding the new palm oil plantation). And last, the researcher could give some recommendations for the company to deciding or not this project and recommendations for the next study/research.

Result and discussion

In this chapter, the data being analyze as the result from the processing data. Below are the result of each variables in financial feasibility study in Kertajaya, Banten.

Financial Feasibility Study Parameters

Based on the calculation of Financial Feasibility Study Parameters, below shown the result of financial feasibility study in Kertajaya, Banten

Table 1: Financial Feasibility Study Parameters Results

FEASIBILITY STUDY PARAMETERS			
Parameters	Value	Information	
NPV	Rp 173.956.750.874,62	>0	Feasible
IRR	25%	>WACC (11%)	Feasible

Profitability Index	7,86	>1	Feasible
Payback Period	8 years 7 months	<25 years	Feasible

Based on the results above, it shows that every parameters financial feasibility study for new palm oil in Kertajaya, Banten is feasible. Firstly, the result NPV is bigger than 0 which means, that this project will generate more cash inflow rather than cash outflow in the future. Secondly, from the result of IRR. It shows, IRR is bigger than the rate of WACC (11%). It means that PTPN VIII will give enough return through this project. Thirdly, the result of Profitability Index is bigger than 1, in this case the value is 7,86. This means that, this project (New Palm Oil Plantation in Kertajaya, Banten) will give financial benefit, because a project cash inflow bigger rather than initial investment cost. The last, from the result of Payback Period. The payback period of this project (New Palm Oil Plantation in Kertajaya, Banten) is 8 years 7 months, which means this project will earlier recover from initial investment far before the useful lifetime palm oil plantation is end.

Sensitivity Analysis

From the sensitivity analysis result, there are only 2 variables that concluded sensitive through the results of 2 important financial feasibility study parameters. There are TBS Sales and TBS Prices

Sensitivity Analysis of TBS Sales

In this study, there is assumption TBS sales decreasing from data 8 years lately and being projected by linier regression method. Decreasing rate of TBS sales applied gradually start from rate 22,5% and 45% from normal sales state. Table 2 shows result of TBS sales sensitivity analysis if the sales decreasing 22,5% and 45%.

Table 2: Result of TBS Sales Sensitivity Analysis.

Rate percentage of sales decreasing	NPV	IRR
Normal (0%)	Rp173.956.750.874,62	25%
(-) 22,5 %	Rp85.034.802.895,72	19%
(-) 45%	Rp(3.887.145.083,18)	10%

From table above, it could be assumed that every 22,5% decreasing rate of TBS sales give big impact to result NPV and IRR. It proves that TBS Sales variable enough sensitive to feasibility study parameters. To prevent decreasing sales of TBS, its better for PTPN VIII to actively monitors the change TBS Sales from Kertajaya plantation, so it could be controlled in sales span that still could be accepted.

Sensitivity Analysis of TBS Prices

In this study, there is assumption, TBS Prices decreasing from data 8 years lately and being projected with linier regression method. Decreasing rate of price applied gradually start from rate 23% and 46%. Table 3 below shown the result of feasibility study parameters if the prices decreasing gradually.

Table 3: Result of TBS Price Sensitivity Analysis.

Rate percentage of Price decreasing	NPV	IRR
Normal (0%)	Rp173.956.750.874,62	25%
(-) 23%	Rp 83.058.759.607,30	19%
(-) 46%	Rp(7.839.231.660,017)	9,961%

Table above shown that maximum decreasing for price is below 46%. Because in the rate decreasing of 46% feasibility study parameters not feasible anymore. Beside of that, every price decreasing of 23%, NPV value and IRR drastically decreasing. It means that TBS prices is one sensitive input variable for feasibility study parameters.

Financial Ratios

Table 4 below shown the result of each financial ratios during 25 years of the project (New Palm Oil Plantation in Kertajaya, Banten)

Year	1	2	3	4	5	6	7	8	9	10
1. Leverage Ratio										
Total Debt to Total Equity	2,83	2,64	2,42	2,18	1,91	1,61	1,28	0,9	0,474	0
Total Debt to Total Asset	0,71	0,66	0,61	0,55	0,48	0,4	0,32	0,22	0,119	0
2. Solvency Ratio										
Debt to EBITDA (<1)	-1,9	-1,6	2,16	1,33	0,87	0,57	0,37	0,22	0,097	0
Interest Coverage Ratio (>3)	-4,7	-5,3	3,04	5,1	7,83	11,6	17,1	26,2	43,97	96,64
Debt Service Coverage Ratio (>3)	-2,9	-3,1	2,11	3,1	4,17	5,32	6,54	7,85	9,218	10,66
3. Profitability Ratio										
Return on Sales	0%	0%	32%	40%	46%	51%	54%	57%	59%	60%
Return on Investment	-42%	-45%	24%	37%	51%	67%	83%	100%	118%	137%

Year	11	12	13	14	15	16	17	18	19	20
1. Leverage Ratio										
Total Debt to Total Equity										
Total Debt to Total Asset										
2. Solvency Ratio										
Debt to EBITDA										
Interest Coverage										
Debt Service Coverage										
3. Profitability Ratio										
Return on Sales	61%	62%	63%	63%	63%	63%	63%	62%	62%	61%
Return on Investment	157%	178%	199%	221%	243%	266%	289%	311%	334%	357%

Year	21	22	23	24	25
1. Leverage Ratio					
Total Debt to Total Equity					
Total Debt to Total Asset					
2. Solvency Ratio					
Debt to EBITDA					
Interest Coverage					
Debt Service Coverage					
3. Profitability Ratio					
Return on Sales	61%	60%	59%	58%	56%
Return on Investment	379%	400%	421%	441%	459%

Leverage Ratio

Based on financial ratio calculation that has been applied, especially for leverage ratio during 10 years for new palm oil plantation (see Appendix H), PTPN VIII proved can less dependency for the fund project, which 75% sourced from bank loan. It shows that the value of ratio decreasing year by year, until in year 10th of the project, the ratio value become 0. It shows that PTPN VIII can less the dependency of the funding that sourced from outside parties. And in year 10th, PTPN VIII can fully 100% funded the project from their own company equity.

Solvency Ratio

Solvency ratio being measure to described company ability to pay loan repayment. Based on calculation 3 solvency ratios, it could be assume PTPN VIII will be able to pay off on time principal repayment and loan interest repayment for new palm oil plantation project in Kertajaya, Banten

Profitability Ratio.

Based on ROI and ROS calculation result, it shows new palm oil plantation in Kertajaya could generate profit by positive result (except for first year and second year). It shows by the increasing rate of ROI and ROS year by year. So, it could be assume that new palm oil plantation in Kertajaya, Banten can generate profit during project time which bring financial benefit for PTPN VIII.

Conclusions and Recommendations

This chapter is the last chapter of the research which contains the conclusions of feasibility study for 1 unit new palm oil plantation project in Kertajaya, Banten and recommendations for PTPN VIII and future research

Conclusions

Based on calculation result of feasibility study paramaters (NPV, IRR, Payback Period and Profitability Index) for 1 unit new palm oil plantation project in Kertajaya, Banten, this project is feasible financially with the result below:

Net Present Value is Rp 173.956.750.874,62.

Internet Rate of Return is 25%.

Payback Period is 8 years 7 months.

Profitability Index is 7,86.

Beside of that, based on cash flow calculations start from year 4 until year 25 this project (New Palm Oil Plantation in Kertajaya,Banten) will generate positive cashflow and it increasing year by year.

Based calculation of sensitivity analysis, which applied on 4 different input variables (increasing investment cost, increasing operational cost, decreasing sales and decreasing price of palm oil), there are 2 input variables that enough sensitive and affected feasibility parameters result (NPV and IRR). Those 2 variables are price of palm oil and sales. Sales variable have maximum limit of sensitive below 45% while price variable have maximum limit of sensitive below 46%.

Based on projection calculation of financial ratio, which include leverage ratio, solvency ratio and profitability ratio, the result shown below:

Based on leverage ratios calculation, whose being judged by *debt to equity ratio* and *debt to asset ratio*, during 10 years, PTPN VIII able to less dependency of funding the project which most of the funds sourced from the bank. Even, in the end of year 10, PTPN VIII predicted 100% freely from funding that sourced from bank loan.

From solvency ratio calculation, by calculate *debt to ebitda ratio*, *interest coverage ratio*, and *debt service coverage ratio*, the result shown that all ratios qualified feasibility indicator value. In other words, for 10 years beginning of the project, PTPN VIII is capable to pay principal repayment and loan interest to the bank for pay off the funding from bank loan which being used for investment cost of the project (1 unit new palm oil plantation project in Kertajaya, Banten).

Based on profitability ratios, both Return on Investment ratio and Ratio on Sales ratio, shows the result during 25 years, new palm oil plantation could generated profit, so this project could give benefit for PTPN VIII from financial side.

Recommendations

The recommendations in this section referred to research objects which are PTPN VIII and the next research that have related theme with this research.

Recommendations for ptpn viii

Based on the research that has been conducted, the recommendations that could be given to PTPN VIII are stated below:

As this research conducted, PTPN VIII recommended to have up to date, relevant and accurately database system for every each of their business portfolio. This shown by during the research, its hard to gain financial data and information that complete, relevant and accurate, so this research use assumptions as the basis.

During this research conducted, it found out that PTPN VIII did not have any guidance and standard to do the investment. Whereas with the guidance and standard, it can help the company decision maker to analyze and determine step by step the rate of feasibility for every kind of any business investment in the future.

During this research conducted, PTPN VIII did not have any management system (both guidance and standard) to guide PTPN VIII for evaluate and set external funding source to fund the investment cost. for example guidance to set how maximum and minimum PTPN VIII should fund the total investment cost and other example is can loan the fund from other source such as Government of Indonesia (GoI) Two Step Loan or Export Credit Facility or others which have lower cost. Since PTPN VIII known to fund their external fund from the bank. With the guidance and standard, it will help decision maker (PTPN VIII) to determine which external fund source that suitable for PTPN VIII.

Recommendations for future research

Recommendation that could be given for the next/ future research are stated below:

The next/ future research that should be considered is add Monte Carlo analysis to estimate the financial risk of the investment for this project (1 unit new palm oil plantation in Kertajaya, Banten).

Other research that should be considered is to analyze the feasibility business for PTPN VIII to produce or make the business derivative products of palm oil beside the TBS itself such as soap, palm oil biodiesel, palm bioemollient, etc to increase the business value of palm oil plantation and add source another income for the company.

Other research that considered for the future research, is to complete analyze non financial analysis of feasibility study to this research. Such as the feasibility analysis from environment aspect, culture aspect, management aspect, etc, for this project (1 unit new palm oil plantation in Kertajaya, Banten).

Other research that should be conduct in the future, is considered the aspect of land fertility rate in this financial feasibility study analysis, so it can be known directly the effect of land fertility to the cashflow and feasibility study parameters of this project (1 unit new palm oil plantation in Kertajaya, Banten).

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