A FEASIBILITY ANALYSIS OF P.I.R. SWADAYA OIL PALM PLANTATIONS IN EAST KALIMANTAN

ABSTRACT

In the framework of East Kalimantan's regional economic development, one of the important development sectors, apart from oil and gas, is agriculture, especially the oil palm plantation subsector, among others in the scheme of the People's Nucleus Plantation (PIR) Swadaya scheme. This study aims to analyse the PIR Swadaya oil palm development program in East Kalimantan, mainly in terms of financial feasibility through financial analysis. Study used primary and secondary data. To find those data, methods of interviews and list of questionnaires are used. The financial potential projection is carried out during the economic life of the plant for 25 years, and to identify the state of the business against the possibility of fluctuations in the discount value, calculated the condition of the oil palm plantation venture independently with a discount of 10%, through Sensitivity analysis shows that NPV, IRR, PP and B / C ratio at varying interest rates of 8%, 12%, 15% and 20% investment is still safe.

Keywords: *oilpalm, Self-Reliant Nucleus Scheme, Analisys of Sensitivity, capital cost*

A. INTRODUCTION

Indonesia is the largest global producer of palm oil. Global production of palm oil is expected to increase by 32% to almost 60 Mt by 2020. In Indonesia, 50% of palm oil plantations are owned by huge companies with mills. Small farmers in Indonesia own 40% oil Indonesian plantations. The remaining 10% of plantations are owned by Indonesian Government [1]. Considering the important position of oil palm plantations in the country's economic structure, the government provides the most important facilities for the existence of oil palm plantations, which are facilities for obtaining land and cheap labour as well as political protection provided by the government to investors[2].

Furthermore, the government also provides facilities to investors, such as ease of licensing through policy deregulation, capital facilities through soft credit from state banks, cheap labour through the People's Nucleus Plantation or Perkebunan Inti Rakyat (PIR) pattern, and exemption from land rent by granting Cultivation Rights Title [1,3].

Regarding this, the local government launched a million hectare oil palm development programme as outlined in the Governor's Letter No.525/5001/Proda-2.1/ek/2004, which is expected to contribute to regional economic development. The development of oil palm plantations using the PIR Swadaya pattern is one of the steps needed as an activity in utilising these less productive lands [4].

The prospects for the development of PIR Swadaya oil palm plantations are largely determined by the presence of local government policies that favour the people in order to encourage the realisation of community welfare [5]. To support these government programs and empower the people's economy, the local government through the East Kalimantan Plantation Office developed the PIR Swadaya oil palm plantation program, because it is an important commodity for the development of agro-industry, so as to maintain the sustainability of the oil palm plantation business, and increase the added value of oil palm. so as to increase the income and welfare of the community [5,6].

B. RESEARCH METHODS

Study was located in east Kalimantan and choosed purposively as research area. East Kalimantan is centra of smallholder oil palm farming which has the highest area of oil palm

plantation [6]. Study used primary and secondary data. To find those data, methods of interviews and list of questionnaires are used.

The number of samples from the population of farmers who manage their oil palm plantations in the PIR Swadaya pattern using simple random sampling techniques. (*simple random sampling*), using the Riduwan formula [5,6]: $n = \frac{N}{Nd^2 + 1}$

Description:

n : sample size

N : population size

d : degree of error (α = 0,10)

By applying the above formula, a sample size of 87 oil palm smallholders was obtained, with details for each location: Samboja (38 samples), Loa Janan (14 samples), Samarinda Utara (6 samples) and Muara Badak (29 samples).

Beside primary data, many sources of data such as Statistics Board, and other sources and institutions was also collected. Evaluation project methods used was NPV, IRR, and B/C [7] for analyze and evaluate it. The financial analysis was used to analyse the financial feasibility of managing the PIR Swadaya oil palm plantation business *Net Present Value* (NPV), *Net Benefit Cost Ratio* (Net B/C), *Internal Rate of Return* (IRR), with the formula as follows:

a. *Net Present Value* is the present value of the net profit. Formulation *Net Present Value* (NPV) is:

$$NPV = \sum_{t=0}^{t=n} \frac{B\,\mathrm{t} - \mathrm{C\,t}}{(1 + \mathrm{i})^t}$$

b. Analisys *Payback Periode* (PP) Used to determine the period of return on investment spent. The payback period formula is:

$$PP = n_1 + (n_2 - n_1)[\frac{a_1}{a_1 + a_2}]$$

c. *Internal Rate of Return* (IRR) the rate of return on investment of profit at a certain interest rate. The IRR formulation is: $\mathrm{IRR} = i_1 + \frac{NPV^+}{NPV^+ - NPV^-}(i_2 - i_1)$

d. *Net Benefit Cost Ratio* (Net B/C) is the ratio of the sum of the present value of profits to the sum of present costs. If the Net B/C ratio is 1 then the business plan is feasible, but conversely if the Net B/C ratio is smaller than 1 then the business is not feasible.. Formulation *Net Benefit Cost Ratio* adalah

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

e. Sensitivity Analysis;

To determine the state of the project against the possibility of obstacles that are difficult to predict in the implementation of the project, thus affecting the value of NPV, Net B / C ratio and IRR sensitivity analysis is used [8]. In this study, a simulation will be made of changes in the decrease in revenue and increase in total costs with certain assumptions.

B. RESULT AND DISCUSSION

1. Result

1.a. Short Background of Oil Palm

Oil palm manor essentially comes from West Africa. It develops greatly since this planting is reasonable in Indonesia condition. It develops in numerous sorts of arrive. Since it can deliver effectively and enormously, so it can be key product and contribute in huge parcel of Indonesia GDP. This product can be extended from essential to auxiliary or indeed tertiary product. In later year, it has been major source of human require such as vegetable oil, biofuel, and other.

Oil palm can produce a large portion of FFB so it can contribute to a large part of agricultural life.In addition, oil palm can also grow easily in Indonesian lands such as the plains, midlands and highlands.Therefore, oil palm is growing rapidly in many places in Indonesia, especially East Kalimantan province. Clearly, oil palm has high potential and prospects as a source of agricultural income so acumen is needed to maintain it. This plant requires proper attention in its management, including the provision of fertilizers, pesticides and others. And total oil palm production also depends on this interest. Economically, when productivity is high, profits ultimately increase. In other words, it can be said that the better the management of oil palm plantations, the higher the profit value will be and it can be said that in financial terms, oil palm is a commodity with very high potential, which can generate high profits [9]

A study shows that oil palm productivity changes due to the influence of climate change, genetic conditions and the relationship between the two in the adoption of new technology. The tree that has many benefits is growing oil palm. In recent years, oil palm has become a strategic commodity. Therefore, this plant grows quickly and becomes one of the land conversion products, a popular, promising product that requires little operation, is quite immune to weeds and pests, and technology unnecessary and less labor intensive [9,10].

Palm oil thus became a primitive commodity. Most of the oil palm producers are small farmers in the study area and they occupied about 1/3 of the total oil palm area in 2016. Therefore, this situation can be found in most areas research and some of them operate sustainable oil palm operations. Furthermore, the research results show that, from an economic and financial perspective, oil palm has become a key commodity. Economically, it supported the GDP of East Kalimantan and financially, it fully contributed to the living conditions of farmers [11]

1.b. PIR Swadaya Financial Feasibility

To evaluate oil palm cultivation in terms of investment, it is necessary to study an in-depth cost-benefit analysis, including cash flows, project evaluation methods and other factors. The project appraisal method is used to know and analyze how to manage and operate oil palm plantations from a financial perspective. Therefore, from this method it is possible to judge whether the plantation is a viable operation or not [12]. These methods include net present value (NPV), B/C ratio, and internal rate of return (IRR). To apply these methods, a number of assumptions are used regarding operational financial issues and a concern for evaluating project indicators as well as paying attention to disruptive forces.

According to research results, the value of expenditure varies depending on the age of the oil palm tree. At first, the cost of old trees increases. For example, the cost of a 0-year-old tree is lower than the cost of a 1-year-old tree. The variety of costs is due to the fact that the number of plants initially increased and its costs are also calculated. In 2-year-old plants, production costs decrease compared to 1-year-old costs. This is because many activities such as nurseries, land cultivation and seedlings require less cost. When the tree is 3 or 4 years old, the expenditure requirement is high and at the age of 5 years, the average production cost increases compared to a 4-year-old tree.

Because the inputs used such as fertilizers are more necessary than before, the costs are also greater. Similarly, the average expenditure on oil palm production among people aged 5 to 21 also increased. Between the 22 and 25 year old plants, the average final production cost became low if we compare with the previous year of plant age. The reduction in these expenditures is

because they are considered inappropriate. Considering that total costs in establishments over 25 years increase and total income decreases, it is better to proceed with replanting [11,13,14].

2. **Analysis of Financial Feasibility**

In order to determine the feasibility of independent PIR oil palm plantation business, financial analysis is used. Financial projections are carried out during the economic life of the plant for 25 years, and to find out the state of the business against the possibility of fluctuations in the discount value, calculated the condition of the oil palm plantation business independently with a discount of 10%. (Table 1).

Research result found mean revenue, mean production expenditure, mean profit on hectare basis and mean profit on oil palm plantation farmer basis. The oil palm plantation business can be measured for its financial performance during the period through the following parameters:

Table 1. Sensitivity Analysis with Different Discounts

No.	Financial analysis	Diskonto			
		8%	12%	15%	20%
1	Net Present Value (NPV)	33,806,893	19,580,766	12,971,460	6,223,516
2	Internal Rate of Return (IRR)	21%	17%	13%	9%
3	Payback Period (PP)	7.91	8.36	8.84	9.81
4	B/C Ratio	2.25	1.96	1.76	1.46

a. Net Present Value (NPV)

The Net Present Value (NPV) is a single computed number that indicates the overall financial performance of a project or programme. Annual income and returns are first estimated as in an ordinary cost-benefit analysis for the whole project period, and then discounted to present values. The total discounted income and costs are then calculated, and the excess of total income over total costs is the net present value of the project [15].

By calculating the cashflow value over the economic life of the crop with a 10% discount rate, an NPV value of IDR 25,690,642.61 was obtained for a one-hectare farm. Of the four discount rates, the NPV value showed a positive result (Table 1)

b. Internal Rate of Return (IRR)

From the results of the financial analysis with a 10% discount, it shows that the IRR value is higher than the cost at a 10% discount rate. Since the IRR value is greater than the cost of capital, the farm investment is feasible and farmers will make a profit (Table 1).

c. Payback Period

According to the cash flow analysis obtained for the investment in oil palm plantation, the investment cost will break even or return on capital after 8 and 15 years for a 10% discount from the beginning of the investment year (Table 1).

d. Net B/C Ratio

Benefit-Cost Ratio (BCR) is the benefit received per unit cost of the development project, and is thus an indicator of the efficiency of project investment. Thus, the BCR can be used to determine the most cost-efficient choice of development, enabling the private investor or public sector authority to justify whether or not, and where, the project should be implemented [11]. . Considering the cashflow value for both costs and benefits, it is known that the B / C ratio value is 2.10, so the business plan is feasible to implement the Net B / C ratio (> 1), but on the contrary, if the Net B / C ratio is smaller than 1, the business is not feasible.

e. Sensitivity Analysis

Sensitivity analysis facilitates us to assess the economic risks. We explore how strong the oil palm cultivation from the financial perspective may appear within market place conditions [13,14]. Results show how sensitive is the analysis to change in some of the factors. Sensitivity can be determined with distinction between the highest and lowest value for each scenario[14]

The sensitivity analysis was calculated with reference to the assumption of a change in the discount rate of the 8%, 12%, 15% and 20 %, other factors are held constant. The results of the sensitivity analysis of each different discount rate can be seen in Table 1. The results of the sensitivity analysis in Table 1 show that NPV, IRR, PP dan B/C ratio for varying discounts of 8%, 12%, 15% and 20% all support that independent PIR oil palm plantations are feasible.
There have been several economic studies looking at profitability of oil palm plantation. Study by [15] is using the same discount rate at 4%. Results in their study show higher profi tability in oil palm production with IRR of 63%. Lower costs in their study are probably affected by exclusion of building costs, recurrent maintenance costs and very low investment costs compared to our study. If they include all proper costs, the study would be more relevant and IRR will be similar to ours. Malaysian study by [11] is using interest rate at 10%. They found that increasing the density up to 200 palms.ha −1 increase the NPV. The IRR varies between 21–27% (120–200 palms.ha^{-1}). This is more likely as our result.

CONCLUSION

1. PIR Swadaya oil palm plantation activities are feasible, because financial analysis shows: The Net Benefit Cost Ratio (Net B/C) value, greater than 1, is 2.10 at an interest rate of 10% and is achieved in year 8.15. The Internal Rate of Return (IRR) value obtained is 19% greater than the 10% interest rate.
2. The Sensitivity Analysis results show that the NPV, IRR, PP and B/C ratio at varying interest rates of 8%, 12%, 15% and 20% are still safe investments.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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