

Comparison of Palm Oil and Rice Business Feasibilities: Study of Land Function Conversion Lubuk Pinang District, Mukomuko Regency

Alex Robinson Siagian, Ketut Sukiyono*, and Reswita

Department of Agricultural Socio-Economics, Faculty of Agriculture, University of Bengkulu.

Corresponding Author: ksukiyono@unib.ac.id

ABSTRACT: This study aims to (1) analyze the level of financial and non-financial feasibility of oil palm and rice farming, (2) analyze the sensitivity level of oil palm and rice farming, (3) determine the comparability of the feasibility of oil palm and rice farming and to know what is the most profitable in Lubuk Pinang District, Mukomuko Regency, Bengkulu Province. The data used in this study are primary data and secondary data. The sampling of oil palm farmers in this study used a stratified random sampling technique, while the rice farmers used accidental sampling techniques. The data analysis technique used in this study is the analysis of the Present Net Value (NPV) and Net B / C Ratio. The results showed that from a financial perspective, oil palm and rice farming in Lubuk Pinang District, Mukomuko Regency, Bengkulu Province, were declared feasible to continue; this can be seen from the NPV and B / C Ratio values. The NPV value in oil palm farming is IDR 44,682,270.66, while the NPV in rice farming is IDR 168,218,082.21. The Net B / C Ratio in oil palm farming was 2.31, while the Net B / C Ratio value in rice farming was 6.94. From a non-financial perspective, oil palm and rice farming are considered feasible due to the availability of production factors for both farms, such as seeds, labor, and other production inputs.

Keywords: farming feasibility, land conversion, oil palm, rice.

Reference to this paper should be made as:

Siagian, A.R., K. Sukiyono, and Reswita. 2022. Comparison of Palm Oil and Rice Business Feasibilities: Study of Land Function Conversion Lubuk Pinang District, Mukomuko Regency. *Agritropica: Journal of Agricultural Science*. 5(2): 116-124. Doi: <https://doi.org/10.31186/J.agritropica.5.2.116-124>.

INTRODUCTION

The dynamics of agricultural activities occur so fast. From the 1970s to the 1990s, the agricultural sub-sector of food crops such as rice experienced its heyday. However, in the early 2000s, the planting preferences carried out by the Indonesian people experienced a shift where they were more inclined towards plantation crops, especially oil palm plants. However, the community's interest in cultivating this plant decreased again over time, so the land was converted back to rice planting. According to BPS Mukomuko (2020), the total area of oil palm plantations in 2013 was 103,309.00 hectares, while in 2019, the plantation area decreased to 102,822.00 hectares. This case can be found in Lubuk

Pinang District, Mukomuko Regency, Bengkulu Province.

There are hundreds of hectares of oil palm and swamp plantations in Lubuk Pinang District, Mukomuko Regency, Bengkulu, which were converted into new rice fields in March 2019. Land conversion aims to increase rice production and the income of the surrounding community to improve the farming community's living standard, which can be achieved through sustainable agricultural development. Sustainable agricultural development is marked by the existence of continuity of production, which provides benefits and freedom for farmers to make the best choices in farming (Fadjarajani, 2008).

Comparison of the feasibility of oil palm and rice farming in the study of land conversion functions to determine what farming is more feasible and profitable to run, whether oil palm farming or rice farming programmed by the government. A business being pioneered or developed must be avoided losses. Mistakes in planning a business will result in investment swelling. It can also happen if a business owner wants to expand without careful calculations. Therefore, a business feasibility analysis is important to pay attention to (Suliyanto, 2010).

Several studies are related to the feasibility of oil palm plantations, first by Putri et al. (2013) and second by Hidayati et al. (2017). This study shows that the B / C ratio is 2.815 and 1.9, respectively. Gunardi and Rustam do research related to the feasibility of rice farming. The research shows the B / C ratio values of 1.58 and 1.56. From these studies, it can be concluded that oil palm farming is more feasible because it has a higher B / C ratio.

The background that became the reason for the researcher to take the research title "Comparison of the feasibility of oil palm and rice farming in the study of land use change" is that quite a several people have converted their land from oil palm to paddy fields on their own accord as well as government program support for the paddy field printing program by local government. It is a question mark because previous research shows that oil palm farming has a higher B / C value than rice farming. It is a question mark for researchers whether rice farming is more feasible and profitable than oil palm farming. A study on the comparative feasibility of oil palm farming and rice farming will be important for other farmers' farming planning.

METHODS

The research area was determined purposively, namely in Lubuk Pinang District, Mukomuko Regency, Bengkulu Province.

Respondents Determination Method

Lubuk Pinang sub-district randomly selected two villages (Random) as the research area. The villages are Tirta Makmur and Sumber Makmur villages. The total number of respondents was 108, with each sample consisting of 55 samples of oil palm farmers and 53 samples of rice farmers.

Respondents of Oil Palm Farmers

Determination of the sample of oil palm farmers using the stratified random sampling method based on plant age. The total population of oil palm farmers in the two villages is 180 farmers. Based on the formula for determining the number of research samples in Sukiyono's textbook (2018), the number of samples obtained was 53 respondents, but because the researchers wanted to allocate identically or equally to strata, the number of oil palm farmer respondents to be studied was 55 farmers with each of them stratum of 11 farmers.

With an error rate of 0.05. Then the number of respondents to be taken by the researcher is as follows:

$$n = \frac{L \sum_{i=1}^L N_i^2 \sigma_i^2}{N^2 D + \sum_{i=1}^L N_i^2 \sigma_i^2}$$

Rice Farmer Respondents

The total population of rice farmers in the two villages, Tirta Makmur and Sumber Makmur, is 311. The acceptable error rate is 0.05, and the broadest range of land area for rice farmers and the smallest is 0.80 ha, so the number of samples of rice farmers is 53 farmers. The sample size is determined based on the sample calculation in Sukiyono (2018).

Data analysis method

Oil palm farming is a long-term business that incurs various investment costs. The investment costs starting from planting to harvesting with the economic age of the oil palm plantations are 0-25 years, while rice farming is farming with the actual expense being the cost of function transfer. In this feasibility analysis, rice farming is viewed as a company concept, where rice farming is considered a project with an investment cost in the form of land conversion costs with the hope of providing benefits for an economic life of 25 years.

Financial Feasibility

Net Present Value Analysis Method

Net Present Value is a method used to calculate the time value of money on the value of an investment. The method will determine whether investments made in the past or present will provide future benefits. In this case, it is feasible or not oil palm and rice farming in the study of land use change. Net Present Value analysis formula (Ibrahim, 2003):

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

Notes:

Bt = Benefit (gross revenue in year t);

Ct = cost (gross cost in year t);

i = prevailing interest rate;

t = length of time/period;

n = economic life

NPV has three values with the following meanings:

- NPV < 0 (negative), farming is not feasible
- NPV = 0, currently, there is no profit and no loss for farming.
- NPV > 0, indicates that the farming conditions are favorable, and the greater the NPV, the greater the profits will be obtained by farmers.

Net B / C Analysis (Net Benefit Ratio)

This Net B / C illustrates how often the benefits (benefits) obtained from the costs (costs) have been spent. The Net B / C ratio is the additional net benefit received by the project for every 1 unit cost incurred. Net B / C in analyzing a project is more reflective of the ratio of the benefits that will be obtained because costs have reduced the benefits. In addition, this method considers the cash flow over the life of the investment project.

The formula for the analysis of the net B / C ratio (Ibrahim, 2003):

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

Information:

Bt = Benefit (gross revenue in year t)

Ct = cost (gross cost in year t)

n = economic life of the project

i = prevailing interest rate

The criteria that can be obtained from calculating the Net B / C include:

Net B / C > 1, the farming is profitable;

Net B / C = 1, then farming is not profitable and not detrimental;

Net B / C < 1, then farming is detrimental.

Sensitivity Analysis

The sensitivity analysis is carried out with an estimate of an increase or decrease in production x%, an increase or decrease in costs x%, or an increase or decrease in productivity x%. The determination of change is based on the conditions in the research area.

Non-Financial Eligibility

Descriptive analysis will be used to analyze the non-financial feasibility of oil palm and rice farming. Descriptive analysis is statistics that function to process data by describing or describing the data that

researchers have collected without intending to make conclusions that apply to generalizations (Sugiyono, 2014).

RESULTS AND DISCUSSION

Oil Palm Farming Feasibility Analysis

Oil Palm Financial Feasibility

The Net Present Value (NPV) of oil palm farming is the present value of the difference between gross benefits and total costs at the prevailing discount rate (Bank Rakyat Indonesia credit interest rates). Following is Table 1, which details the analysis of the financial feasibility of oil palm farming.

Table 1. Details of Oil Palm Farming Financial Feasibility Analysis

No	Description	Total (Rp)	Criteria	Score
1.	Gross Benefit	645,857,142.86	Net B/C Ratio	2.31
2.	Total Cost	135,638,266.23	NPV	44,682,270.66
3.	Diskon Faktor 15%	5.42		
4.	Investasi	64,713,857.14		
5.	O&M	70,924,409.09		
6.	P.V Gross B	89,921,076.74		
7.	P.V. Gross C	45,238,806.08		
8.	Total Net B-C (+)	78,767,061.52		
9.	Total Net B-C (-)	34,084,790.86		
10.	Net Benefit	510,218,876.62		
11	Diskon Faktor 20%	5.95		
12	NPV	44,682,270.66		

Table 1 shows that oil palm farming in Lubuk Pinang District, Mukomuko Regency is financially feasible. It can be seen from the value of the Net B / C Ratio, namely 2.31. In accordance with the business feasibility criteria, if the Net B / C Ratio > 1, the business is feasible to continue. In addition, the feasibility of farming is also evident from the NPV value, where the NPV of oil palm farming is IDR 44,682,270.66 / Ha/year. From the results of the analysis, it was found that the net profit was IDR 44,682,270.66 / Ha/year. It means that at a factor discount rate of 20%, investing a cost of IDR 63,653,909.09 in oil palm farming will provide an annual net income of IDR 44,682,270.66 / Ha/year.

Non-Financial Feasibility of Oil Palm Farming

Technical Aspects

The oil palm seeds used by farmers in Lubuk District are obtained by buying from other oil palm farmers. The seeds purchased by farmers are significant and ready for planting at approximately 12 months old. The oil palm seeds are sold at different prices based on the year the respondents purchased them. Before the oil palm seeds are planted, the farmers will do land processing first. Land processing by cutting down wild trees is continued by spraying. It aims to clear the planted area for oil palm. The spacing applied by farmers has followed the recommendation, which is 9m x 9m x 9m. Spacing will affect agricultural production because it is related to the availability of nutrients, sunlight, and space for plants (Fauzi et al., 2002).

Management Aspects

According to Stoner (2006), management is a process of planning,

organizing, leadership, and controlling the efforts of organizational members and the use of all existing resources in the organization to achieve predetermined organizational goals. Management carried out in oil palm farming is still simple, where farmers act as managers of their farms. Permanent workers in oil palm farming are the families of the owners of the capital. Completion of work is submitted to workers under the command of the owner of the capital. The use of labor in oil palm farming comes from within and outside the family. The need for work outside the family in oil palm farming is less than in rice farming in hectares.

Social Aspects

In the social aspect, oil palm farming has also been proven empirically, including its role in rural development and poverty reduction (Suryahadi and Sumartono 2006). Oil palm farming activities can provide employment opportunities for communities

around Lubuk Pinang District. In addition, oil palm plantations improve income inequality and development (Syahza, 2007). According to BPS (2020) data, the number of the male and female workforce in Mukomuko Regency in 2019 was 88 721 people.

Rice Farming Feasibility Analysis

Rice Farming Financial Feasibility

The eligibility criteria for investing in rice farming are used to determine whether or not farming is financially feasible. The criteria used are NPV and Net B / C Ratio. In analyzing the feasibility of rice farming, some of the data were guided by all rice farming activities in Lubuk Pinang District and supporting sources. All costs incurred in cultivating rice are converted into units per hectare. Below is a detailed table of costs for the feasibility analysis of rice farming in Lubuk Pinang District.

Table 2. Details of Investment Feasibility of Rice Farming in Lubuk Pinang District

No	Description	Total (Rp)	Criteria	Score
1.	Gross Benefit	1,831,715,566.04	B/C Ratio	6.94
2.	Total Cost	660,218,274.06	NPV	269,211,430.52
3.	Diskon Faktor 15%	7.46		
4.	Investasi	72,680,142.26		
5.	O&M	587,538,131.80		
6.	P.V Gross B	473,619,300.03		
7.	P.V. Gross C	204,407,869.51		
8.	Total Net B-C (+)	314,518,459.57		
9.	Total Net B-C (-)	45,307,029.05		
10.	Net Benefit	1,171,497,291.98		
11.	Diskon Faktor 20%	5.95		
12.	NPV	269,211,430.52		

Table 2 shows that rice farming in Lubuk Pinang District is feasible to be cultivated financially. It can be seen from the Net B / C ratio value and NPV > 1. Net B / C Ratio and NPV amount to 6.94 and IDR 269,211,430.52. Net B / C Ratio of 6.94 means that the ratio of profits obtained by rice farmers for 25 years is 6.94 times the total costs

incurred. NPV means that rice farmers will get a profit of IDR 269,211,430.52 of the total investment of IDR 72,680,142.26 over 25 years.

Rice Farming Non-Financial Analysis

Technical Aspects

The rice seeds used by farmers in Lubuk Pinang District are obtained by buying them at kiosks around the village. The types of seeds used are various, and there are types of Impari and shoimah. Based on the interviews, the quality of each type of seed is the same. It just depends on the processing to produce maximum production. Before use, rice seedlings will be sown for approximately 15-25 days in moist soil but not waterlogged and not dry for planting. The planting technique applied is the legowo row planting technique. The legowo row planting system, often referred to as Si Jarwo, alternates between two or more rice plants and one empty row (BPTP, 2013).

Management Aspects

Management is a process of realizing organizational goals through a series of activities in the form of planning, organizing, directing, and controlling people and other corporate resources. Rice farming in Lubuk Pinang District is a farm that requires a lot of labor outside the family. It is because the farming run is profit-oriented, not subsistence farming. Rice farming uses two sources of labor, namely labor within and outside the family. The availability of labor outside the family in Lubuk Pinang District is an advantage for rice farmers. This makes it easier for farmers to use labor.

Social Aspects

Rice farmers in Lubuk Pinang District have participated in the land conversion program. Several factors cause farmers to switch, namely because the price of palm oil tends to be unstable so that it cannot meet their daily needs due to government programs, of their own will, and agreement with the government because irrigation channels have been made. In participating in this land conversion program, some farmers have encountered many obstacles, such as the large number of palm fronds still stuck in new printing areas, lack of business capital, and difficulty obtaining water channels, so many new paddy fields are still idle and left unattended.

Comparative Analysis of the Sensitivity of Oil Palm and Rice Farming

The sensitivity analysis aims to see what will happen with an analysis of the feasibility of investing in oil palm farming with changes in the calculation of costs and revenues in farming. The farming analysis is based on estimates that contain a lot of uncertainty about what will happen in the future.

Table 3. Comparison of the Sensitivity Analysis of Oil Palm and Rice Farming on Prices, Production, and Costs.

Analysis component	Investment Criteria			
	Palm Oil		Rice	
	Net B/C Ratio	NPV	Net B/C Ratio	NPV
Prices go down 30%	1.51	17,478,761.03	3.81	127,125,640.51
Production goes down 15 %	1.92	31,368,606.64	5.37	198,168,535.52
Costs go up 2,9%	2.27	43,737,242.45	5.58	207,649,672.49

Commodity prices in the market fluctuate significantly, so it is necessary to carry out a sensitivity analysis to determine

the extent to which price reductions can affect the feasibility of oil palm and rice farming. The sensitivity of production prices is known

by dividing the lowest price by the highest price experienced by oil palm farmers, then multiplying it by 100%. IDR 4800/Kg divided by IDR 1,600/Kg multiplied by 100%, the result is 30%. If the price drops by 30%, oil palm farming will provide a Net B/C Ratio of 1.51 and an NPV of IDR 17,478,761.03, while rice farming will give a Net B / C ratio of 3.81 and an NPV of Rp127,125,640.51. It means that when the selling price drops by 30%, oil palm and rice farming are still feasible to continue because they still have a Net B / C Ratio and NPV > 1.

Apart from price sensitivity, farm production is another component of sensitivity being analyzed. In this case, the sensitivity of oil palm farming follows the sensitivity of rice farming, which is 15%. It is done to facilitate calculations and to be able to compare the two farms. The magnitude of sensitivity was obtained from direct interviews with rice farmers from the previous year. The average rice farming experienced a decline in productivity by 15%. The decline in oil palm and rice farming production gave a Net B / C Ratio and NPV of 1.92 and IDR 31,368,606.64 and 5.37 and IDR 198,535.52, respectively. It means that when there is a decrease in production by 15%, the two farms, namely oil palm and rice, are still feasible to continue. It is because of the value of the Net B / C Ratio and NPV > 1.

The average inflation measures sensitivity cost at Bank Indonesia's interest rates during the study year. In this case, the average inflation rate from January 2020 to October 2020 is used, namely 2.9%. The sensitivity analysis for the cost component is based on a comprehensive cost analysis between the two farms in Lubuk Pinang District. When the cost increases by 2.9%, the Net B/C Ratio and NPV for oil palm and rice farming are 2.27 and IDR 43,737,242.45 and 5.58 and IDR 207,649,672.49, respectively. It means that even though there will be an increase in costs in the future by 2.9%, oil palm and rice farming are still feasible to continue and still provide returns on the investment that each farmer has planted. From the three components of the sensitivity analysis above, farming is still feasible to continue when there is a decrease in productivity, a decrease in prices, and an increase in costs in the future.

Investment Feasibility Comparison

Investment feasibility comparison indicates which farms are more feasible to continue. Investment feasibility in this study uses two indicators: Net B / C Ratio and NPV. Below is a table comparing the feasibility of farming between oil palm farming and rice farming.

Table 4. Comparison of the feasibility of oil palm and rice farming

Investment Criteria	Oil Palm Farming	Rise Farming
Net B/C Ratio	2.31	6.94
NVP	44,682,270.66	168,218,082.21

Table 4 shows that the two farms, namely oil palm and rice, are declared feasible to be cultivated. Oil palm farming is more feasible to cultivate than rice farming in terms of the Net B/C Ratio Value. The Net B/C Ratio value in oil palm farming was 2.31, while the Net B / C Ratio value in rice

farming was 6.94. On the other hand, regarding investment criteria for the NPV value, rice farming is more feasible to run than oil palm farming. The NPV value in oil palm farming is IDR 44,682,270.66, while the NPV in rice farming is IDR 168,218,082.21. A farm's success, so it is feasible to run, cannot

be separated from the production factor. Several factors of production that affect the feasibility of farming are the availability of production inputs such as seeds, fertilizers, and pesticides, as well as outside labor (Griffin, 2006).

Oil palm and rice farming revenue is obtained by multiplying the production yield with the overall price level. The average oil palm production was 23,516.92 Kg/UT/year or 28,174.62Kg/Ha/year with the TBS price level in Lubuk Pinang District when the research was Rp1,200/Kg, so the average oil palm farm revenue was amounting to IDR 28,220,307.69/UT/Year or IDR 33,809,538.46/Ha/Year. While the average rice farming production is 12,661.32 Kg/UT/year or 14,431.11 Kg/Ha/year with an intermediate price level of IDR 5,066.04/Kg, so the average rice farm revenue is IDR 64,142,728.73 /UT /year or IDR 73,108,538.29/Ha/Year.

In making farm planning decisions, each farm has its advantages and disadvantages. Oil palm farming is an annual farming with a higher feasibility level in terms of the Net B / C Ratio value. Still, this farming generates IDR 0 in revenue from year 0 to year 4, and only in year five can it generate revenue. If the farmer decides to cultivate oil palm, then the farmer's income in 5 years is IDR 43,392,000.00/Ha/year. Meanwhile, rice farming is seasonal farming in which the farmers can enjoy the revenue from their farming in the first year. Revenue from rice farmers in the first year is IDR 73,26,622.64/Ha/year; within five years, rice farmers' revenue becomes IDR 366,343,113.21/Ha/year that in the same period, rice farmers can return the investment cost, while farmers palm is not.

CONCLUSIONS

Financially, oil palm and rice farming in Lubuk Pinang District, Mukomuko Regency, Bengkulu Province is declared

feasible to continue; this can be seen from the value of Net Present Value and Net B / C Ratio > 1. In non-financial terms, it is said that oil palm and rice farming are feasible to continue; this is due to the availability of production factors for both farms, such as seeds, labor, and other production inputs. Based on the sensitivity analysis, when a price decrease of 30% occurs, a reduction in production of 15%, and an increase in future costs of 2.9%, then oil palm and rice farming in Lubuk Pinang District are still feasible to continue. It is because the Net Present Value and Net B / C Ratio are > 1. From the feasibility of investing in the Net Present Value and B / C Ratio, rice farming provides a more significant profit than oil palm farming. Net Present Value (NPV) and Net B / C Ratio Rice farming provide a more significant profit. Therefore, farmers should continue increasing productivity in rice farming because it offers a higher profit level even though it requires a large amount of capital.

REFERENCES

- Balai Pengkajian Teknologi Pertanian (BPTP). (2013). Sistem Tanam Padi Jajar Legowo. Balai Besar Pengkajian Dan Pengembangan Teknologi Pertanian Badan Penelitian Dan Pengembangan Pertanian. Kementerian Pertanian.
- BPS Mukomuko. (2020). Kabupaten Mukomuko Dalam Angka 2020.
- Fauzi, Y. (2004). Budidaya Pemanfaatan dan Analisa Usaha dan Pemasaran Kelapa Sawit. Penebar Swadaya. Jakarta.
- Griffin, R. W dan Ebert. (2006). Bisnis. Erlangga. Jakarta.
- Hidayati, A., K. Tarigan, dan R. P. Wibowo. (2018). Analisis Kelayakan Finansial Perkebunan Kelapa Sawit Rakyat di Kabupaten Labuhan batu. *JOURNAL ON SOCIAL ECONOMIC*

- OF AGRICULTURE AND AGRIBUSINESS. 9(9): 12-20.
- Ibrahim, Y. 2013. Studi Kelayakan Bisnis. Rineka Cipta. Jakarta.
- Fadjarajani, S. (2008). Dinamika masyarakat dan konversi lahan pertanian serta pengaruhnya terhadap pengetahuan tentang lingkungan di kawasan Bandung Utara. *Majalah Geografi Indonesia*, 22(2), 102-123.
- Stoner, A.F. 2006. Manajemen Sumber Daya Manusia. Bumi Aksara. Jakarta.
- Subagyo, A. (2007). Studi Kelayakan Teori dan Aplikasi. PT Elex Media Komputindo. Jakarta.
- Sugiyono. (2014). Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D. Alfabeta. Bandung.
- Sukiyono, K. (2018). Penelitian Survei dan Teknik Sampling. Sosial Ekonomi Pertanian. Universitas Bengkulu.
- Suliyanto. 2010. Studi Kelayakan Bisnis, Pendekatan Praktis. Penerbit Andi. Yogyakarta.
- Suryahadi, A dan Sumartono, S. (2006). Ekonomi Pertumbuhan dan Pengentasan Kemiskinan di Indonesia. Lembaga Penelitian SMERU. Jakarta
- Syahza, A. (2011). Percepatan Ekonomi Pedesaan Melalui Pembangunan Perkebunan Kelapa Sawit. *Jurnal Ekonomi Pembangunan*. 12(2): 297-310