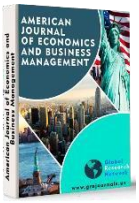

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Article

Analysis of Financial Feasibility and Sustainability of Rice Farming in South Ogan Komering Ulu Regerency South Sumatera Province

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Abstract: This research aims to analyze the financial feasibility of lowland rice farming in South Ogan Komering Ulu Regency. The data analysis method used is a qualitative and quantitative analysis method with a sample size of 60 responses from lowland rice farmers in South Ogan Komering Ulu Regency. The results of the research show that the costs incurred to run a lowland rice farming business are divided into fixed costs and non-fixed costs incurred during one planting season, which is IDR 10,982,715/ha/MT. Fixed costs are IDR 6,748,440/ha/MT and variable costs are IDR 4,234,275/ha/MT. Analysis of the financial feasibility of lowland rice farming usingDiscount Factor14% indicated that the lowland rice farming project was feasible to run. This is shown by a positive NPV value of IDR 45,648,607, a Net B/C Ratio value of 2.87 (Net B/C Ratio>1) and an IRR value greater than the applicable interest rate, which is 98% over time. return on capital for 2.36 (2 years 4 months 7 days). Analysis of the sustainability of lowland rice farming uses three dimensions, namely the ecological dimension consisting of 6 attributes, namely (1) land area, (2) potential land area, (3) suitability of rice fields, (4) level of pest attacks, (5) use of pesticides and, (6) use of chemical fertilizers with a percentage of 47.60%, the economic dimension consists of 5 attributes, namely (1) area of cultivated land, (2) amount of production, (3) marketing system, (4) effectiveness of the marketing system and, (5) the selling price of grain with a percentage of 49.85%, and the social dimension consists of 4 attributes, namely (1) the farmer's latest education, (2) farmer family participation, (3) farmer side jobs and, (4) social system in lowland rice cultivation activities with a percentage of 49.80%. Based on analysisMultidimensional rapfishof each dimension is in value >0.25 means that the value indicates good attribute accuracy (good of fit). Meanwhile, the coefficient of determination (R2) each dimension and multidimensional quite high (close to 1). Thus, these two statistical parameters show that all the attributes used for each dimension are good enough to explain the sustainability of lowland rice farming in South Ogan Komering Ulu Regency.

Keywords: Lowland Rice, Financial Deasibility, Sustainability

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1. Introduction

The agricultural sector in Indonesia plays an important role in development and the national economy. The role of the agricultural sector is very important as a provider of food, a provider of raw materials for industries, a provider of business opportunities and a source of income for farmers. One of the agricultural commodities that people really need is rice. Several important reasons are necessary increasing rice production in a sustainable manner, namely rice is a food ingredient for the Indonesian people and is an important commodity to maintain food security (Maksum, 2023).

South Sumatra is one of the provinces located on the island of Sumatra. South Sumatra is one of the regions that has potential as a supplier of rice needs, because South Sumatra is one of the largest food storage areas in Indonesia with a harvest area of 502,162 hectares and rice production of 2,762,060 tons (Central Statistics Agency, 2023). South Ogan Komering Ulu Regency or often referred to as South OKU is a part of South Sumatra Province which is the result of the expansion of Ogan Komering Ulu Regency which was inaugurated by Law No. 37 of 2003. The agricultural sector of South Ogan Komering Ulu Regency makes a large contribution compared to with other sectors because the agricultural sector has a very important role in the economy of South Ogan Komering Ulu Regency[1]–[3]. Looking at the condition of the agricultural sector in South Ogan Komering Ulu Regency, it has a big role, but it is still far from what was expected because there are problems faced by farmers in general, namely weak capital, resulting in low levels of use of inputs, and weak bargaining positions of farmers when harvesting, causing low prices. accepted by farmers fluctuates according to traders' provisions[4]. Apart from internal problems, the availability of supporting factors such as infrastructure, economic institutions, the role of farmer groups, and government policies are very necessary to encourage farming and increase farmers' access to markets[5], [6]. It is necessary to provide guidance for farmer groups in implementing their farming activities (Liyandri, 2021).

Consideration of food problems requires a balance between food availability and food needs on the financial feasibility of sustainable rice farming in South Ogan Komering Ulu Regency[7]–[9]. Because if food availability and demand are not balanced, this will threaten food security conditions. Based on the above background, it is necessary to study the issue of financial feasibility and sustainability of lowland rice farming in South Ogan Komering Ulu Regency based on data to predict future food availability. The results of this analysis are also very important for determining food availability programs and activities related to food security, especially lowland rice in South Ogan Komering Ulu Regency.

2. Materials and Methods

Method

This research was conducted in South Ogan Komering Ulu Regency, South Sumatra Province. This location was determined by considering that the area has potential as a supplier of rice needs, and this area is the fifth largest food storage area in Indonesia. The sampling method is*Random Sampling*or a random sampling technique without paying attention to the existing levels in the population, so that elements of the population have the same and known chance of being selected as an object (Juliansyah, 2011).

Method of Collecting Data

The data used in this research comes from primary and secondary data. Primary data was obtained through direct interviews with farmers using a list of questions (questionnaire) that had been prepared in advance. Secondary data was obtained from literature or government agencies related to the research carried out, such as previous research, journals, BPS Ogan Komering Ulu Selatan, and other literature related to the research. The sampling method for lowland rice farmers in this research was the population of 150 lowland rice farmer respondents, located in South Ogan Komering Ulu Regency, South Sumatra Province. Determination of sample size uses the Slovin formula with a tolerable error rate of 10%.

Data Analysis Method

The data analysis method used in this research is qualitative and quantitative analysis. Financial feasibility analysis is an analysis that takes into account benefits*(benefits)*and cost*(cost)*a business using measuring instruments *Net Present Value*(NPV),*Net Benefit-Cost Ratio*(Net B/C Ratio),*Internal Rate of Return*(IRR) and *Payback Period (PBP)*to see whether the business being implemented is feasible or not (Kadariah, 2001). Next, the sustainability analysis applies the MDS technique

(*Multidimensional Scaling*) obtained results including (1) determining each dimension and its attributes determined through expert discussions, studies, literature and field observations using 15 attributes in 3 dimensions, (2) assessing each attribute on a scale ordinal to determine sustainability in each dimension, ordinal scoring ranging from 0 (bad) to 2 (good) based on field surveys, (3) ordination analysis with MDS to determine the sustainability status of each dimension on the scale*index* sustainability, (4) assessing the sustainability index and status in each dimension, (5) determining sensitive lever attributes in each dimension through analysis*leverage*,Sensitive attributes are attributes that have a value*Root Mean Square*(RMS) on the x-axis, the greater the RMS value, the more sensitive the role of the attribute is to increasing sustainability statistics. (6) The final stage is carrying out a Monte Carlo analysis to take into account the dimension of uncertainty, with a confidence interval of 95 percent. (Kavanagh, 2001 in Hidayanto, 2009) the Monte Carlo index value is compared with the MDS index, Stress value and coefficient of determination R2has a function to determine whether additional attributes are needed or not, and reflects the accuracy of the dimensions studied with the actual situation. S grade-*Stress*the low one shows *good fit*, According to Kavanagh and Pitcher 2004 in Hidayanto 2009, the analysis results are quite good, indicated by an S-Stress value of less than 0.25 (S<0.25), and R2approaching 1 (100%) (Hidayanto 2009).

3. Results and Discussion

Analysis of Production and Revenues

Lowland rice farming costs are the total costs incurred by farmers in the production of lowland rice farming over a period of 1 year. To determine the amount of production costs, farming costs are divided into two, namely fixed costs (Fixed Costs) and variable costs (Variable Cost)[10]–[12].

Fixed Cost

Fixed costs are costs incurred by farmers for production facilities and are used repeatedly. The components of fixed costs incurred in rice farming in South Ogan Komering Ulu Regency consist of equipment depreciation costs and land tax costs. The calculation of fixed costs for rice farming in South Ogan Komering Ulu Regency can be seen in table 1.

Table 1. Calculation of Fixed Costs for Swamp Rice Farming in South Ogan Komering Ulu Regency

No	Information	Average (Rp/ha/MT)
1	Tool Depreciation	3.753.440
2	Land Lease	2.995.000
Total Fixed Costs		6.748.440

Source: Primary Data Processed, 2024

Table 1 shows that the average fixed costs used to support the continuity of lowland rice farming activities per year in South Ogan Komering Ulu Regency consist of two components, namely equipment depreciation and land rental. Depreciation tools consist of drying floors or tarpaulins, hand sprayers, hoes, picks and sickles. Total equipment depreciation costs are IDR 3,753,440/ha/MT. The next component of land rent issued in cash in one year is IDR 2,995,000/ha/MT. So, the average amount of fixed costs used in lowland rice farming in South Ogan Komering Ulu Regency is IDR 6,748,440/ha/ MT.

Variabel Cost

Non-fixed costs are costs incurred by farmers in one planting season which change in nature. Non-fixed costs include fertilizers, pesticides and labor. The calculation of variable costs for coffee farming in Karang Agung Village can be seen in table 2.

Table 2. Calculation of Non-Fixed Costs for Rice Farming in South Ogan Komering Regency

No	Information	Average (Rp/ha/MT)
1	Seed	407.583
2	Fertilizer	1.052.242
3	Pesticide	225.617
4	Labor	2.548.833
Total		4.234.275

Table 2 shows that the average amount of variable costs in lowland rice farming in one planting season in South Ogan Komering Ulu Regency is IDR 4,234,275/ha/MT. where the cost components consist of seeds, fertilizer, pesticides and labor. The average cost of seeds is IDR 407,583/ha/MT. The fertilizer used by lowland rice farmers in South Ogan Komering Ulu Regency includes chemical fertilizer. one planting season, namely 1,052,242/ha/MT. The cost of pesticides in one planting season is IDR 225,617/ha/MT. Meanwhile, labor costs for lowland rice farming in South Ogan Komering Ulu Regency are IDR 2,548,833/HOK/ha/MT. This labor cost is calculated based on Working Person's Days (HOK) and the working time required for paddy fields in South Ogan Komering Ulu Regency.

Total Cost

Total costs are the costs of the sum*Fixed Costs*And*Variable Cost*which is used in the one-time production process of lowland rice farming. The calculation of the total costs of lowland rice farming in South Ogan Komering Ulu Regency can be seen in table 3.

Table 3. Calculation of Total Costs of Rice Farming in South Oku Regency

No	Fee Type	Average (Rp/ha/MT)
1	Fixed Cost	6.748.440
2	Variabel Cost	4.234.275
Total Cost		10.982.715
Total		4.234.275

Table 3 shows that the total costs incurred by lowland rice farmers in South Ogan Komering Ulu Regency are IDR 10,982,715/ha/MT where costs consist of fixed costs of IDR 6,748,440/ha/MT and variable costs of IDR 4,234,275/ ha/MT.

Acceptance Fee

Revenue is the multiplication of production obtained by the selling price. Revenue is also determined by the size of the production produced and the price of that production. Income from lowland rice farming in South Ogan Komering Ulu Regency is obtained from sales in one planting season. Calculation of income from lowland rice farming in South Ogan Komering Ulu Regency can be seen in table 4.

Table 4. Calculation of income from lowland rice farming in South Ogan Komering Ulu Regency.

No	Information	Average
1	GKG Production (kg/ha/MT)	5.556
2	GKG Price (Rp/kg)	4.735
Reception		26.207.496

Source: Primary Data Processed, 2024

Table 4 shows that the total income from lowland rice farming in South Ogan Komering Ulu Regency in one planting season is IDR 26,207,496/ha/MT. The total

production of lowland rice farming in one harvest is 5,556/kg/ha/ MT. The selling price per kg of harvested dry grain (GKP) is IDR 4,735/kg

Analisis kelayakan Finansial

Analysis of the feasibility of lowland rice farming can be seen from the investment criteria of a farming business. Several investment criteria for assessing the feasibility of lowland rice farming include: *Net Present Value*(NPV),*Net Benefit Cost Ratio* (Net B/C), and*Internal Rate of Return*(IRR). The following are the assumptions used to calculate financial feasibility analysis activities for lowland rice farming.

Table 5. Assumptions in Financial Analysis

No	Assumption	Unit	Mark
1	Production Period	Year	5
2	Projection Period	Year	5
3	Length of Planting Season	Year	5
4	Farming Conditions		
	a. Land Area	ha	1,00
	b. Production	kg/ha/MT	5.556
	c. Selling Price	Rp/kg	4.735
5	Discount Factor		14%

Source: Primary Data Processed, 2024

Table 6. Results of Financial Feasibility Analysis of Rice Farming in South Ogan Komering Ulu Regency

No	Criteria	Results	Information
1	NPV	45.648.607	Worthy
2	Net B/C Ratio	2,87	Worthy
3	IRR	98%	Worthy

Source: Primary Data Processed, 2024

***Net Present Value* (NPV)**

NPV obtained from discount factor of 14% produces a positive NPV value of Rp 45,648,607/ha. The NPV value resulting from these profits shows that the NPV value is greater than zero (NPV>0). This means that if you invest capital in rice farming, you will get a profit of IDR 45,648,607/ha. Therefore, lowland rice farming in South Ogan Komering Ulu Regency is said to be worthy of continuing because lowland rice farming provides benefits, namely the benefits received are greater than the total costs incurred over 5 years.

***Net Benefit Ratio* (Net B/C)**

Analysis Net B/C Ratio conducted to see the level of efficiency of lowland rice farming in South Ogan Komering Ulu Regency. The analysis results show that the valueNetB/CRatioThe obtained value of 2.87 means that every time a farmer invests Rp. 1 in capital for lowland rice farming, it will increase the robusta coffee farmer's profit by Rp. 2.87. This shows that lowland rice farming in South Ogan Komering Ulu Regency is said to be feasible to run because the value meets the investment criteria, namely having a Net B/C Ratio value greater than 1 (Net B/C Ratio>1).

***Internal Rate of Return* (IRR)**

Mark Internal Rate of Return (IRR) is obtained by trying (trial and error) namely by increasing the value of interest rates. A business is said to be feasible if it has an IRR value greater thandiscount factorused during the research. Based on the results of the analysis, it shows that the IRR value of lowland rice farming in South Ogan Komering Ulu Regency is 98%. This shows that by investing capital in lowland rice farming for farmers, it is more profitable than depositing money in a bank because by investing the money in the form of lowland rice farming, farmers will get a profit of 98%.

***Payback Period* (PP)**

Payback Periodis an agribusiness feasibility study used to find out how long the farming business that will be carried out will be able to return the investment (Ibrahim, 2009). Based on the calculations, the value is obtained Payback Periodamounting to 2.36. This figure shows that investment in this farming business can be returned within a period of 2 years 4 months 7 days with a projected time of 5 years, so that rice farming in South Ogan Komering Ulu Regency is worth pursuing.

Analysis of the Sustainability of Rice Farming

Sustainability analysis is carried out using the method*Multi Dimensional Scaling*(MDS). The data used for the analysis came from interviews with lowland rice farmers in South Ogan Komering Ulu Regency. The sustainability of rice farming activities is considered from 3 dimensions, namely the ecological dimension, the economic dimension and the social dimension. In each dimension there are several attributes that have been determined based on each dimension, where these attributes can be measured qualitatively. The sustainability index for each dimension of each attribute has been assessed and analyzed. The index is divided into four categories, according to Fauzi and Anna (2005) which can be seen in table 7.

Table 20. Sustainability Status Categories

Index Value	Category
0-25	Not Sustainable
26-49	Less Sustainable
50-75	Quite Sustainable
76-100	Very Sustainable

Scource : Fauzi, 2005

Ecological Dimension Sustainablility Status

Attributes that are estimated to have an influence on the level of sustainability in the ecological dimension consist of 6 attributes, namely (1) land area, (2) potential land area, (3) suitability of rice fields, (4) level of pest attacks, (5) use of pesticides and , (6) use of chemical fertilizers (Figure 1).

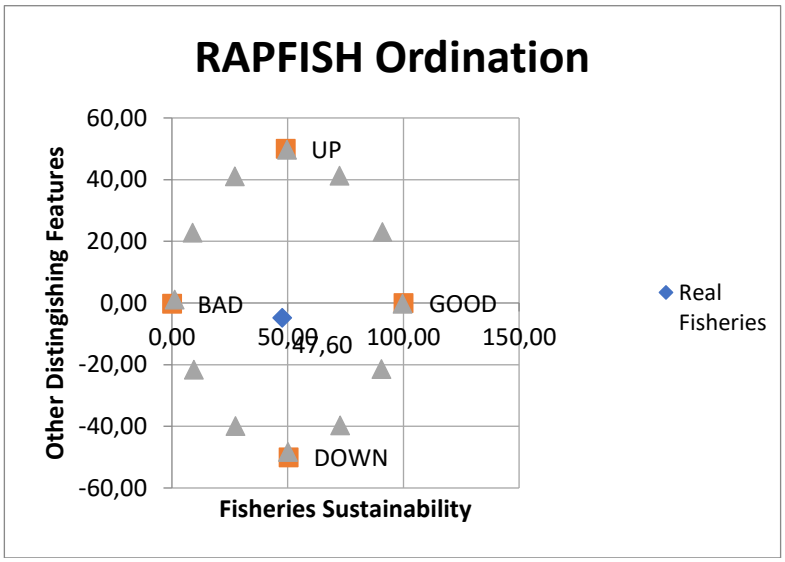

Figure 1. Ecological Dimension Sustainability Status Index

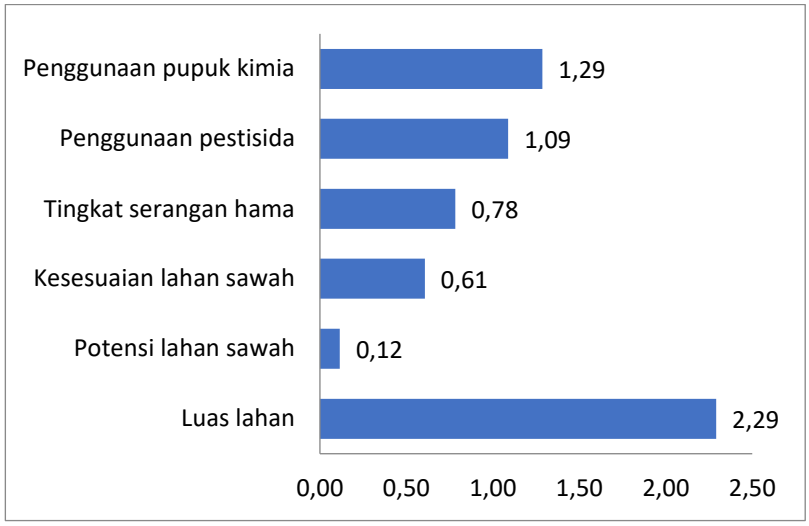

Figure 2. Analysis graph Leverage Ecological Dimensions

Results of MDS analysis carried out with*Rap Analysis*in South Ogan Komering Ulu Regency shows an ecological dimension sustainability index value of 47.60%. Based on the sustainability status qualification, this value indicates that the ecological condition of South Ogan Komering Ulu Regency is less than sustainable. MDS data processing results using*Rap Analysis*shown in Figure 1. Based on the results of the analysis*leverage*Regarding the attributes in the ecological dimension in Figure 2, 3 (three) attributes were found which were considered sensitive to the sustainability index of the ecological dimension, namely land area (2.29%), use of chemical fertilizers (1.29%) and use of pesticides (1.09%).

Economic Dimension Sustainability Status

The attributes that are estimated to have an influence on the level of sustainability in the economic dimension consist of 5 attributes, namely (1) area of cultivated land, (2) amount of production, (3) marketing system, (4) effectiveness of the marketing system and, (5) selling price of grain (Figure 3).

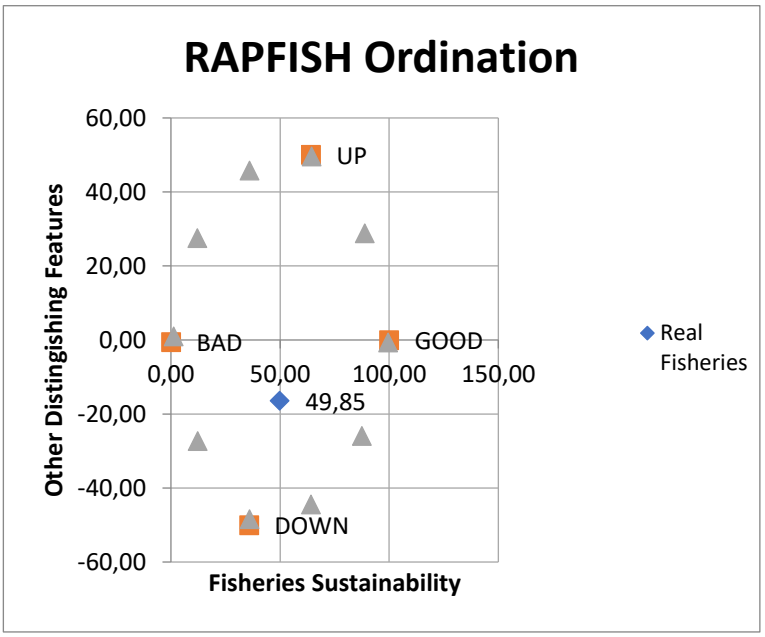

Figure 3. Economic Dimension Sustainability Status Index

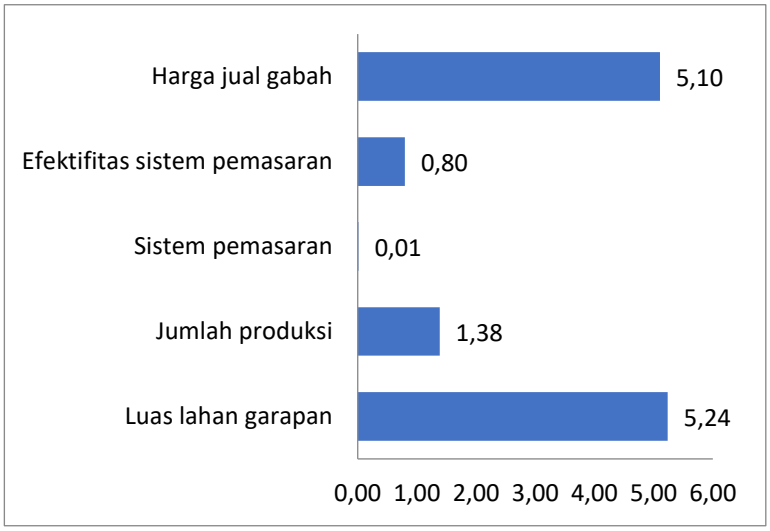

Figure 4. Analysis graph Leverage Economic Dimensions

Results of MDS analysis carried out with*Rap Analysis*in South Ogan Komering Ulu Regency shows an economic dimension sustainability index value of 49.85%. Based on the sustainability status qualification, this value shows that the economic condition of South Ogan Komering Ulu Regency is less than sustainable. MDS data processing results using*Rap Analysis*shown in Figure 3. Based on the results analysis*leverage*Regarding the attributes in the economic dimension in Figure 4, there are 2 (two) attributes that are considered sensitive to the sustainability index from the economic dimension, namely the area of cultivated land (5.24%) and the selling price of grain (5.10%).

Social Dimension Sustainability Status

Attributes that are estimated to have an influence on the level of sustainability in the dimensions The economy consists of 4 attributes, namely (1) farmer's final education, (2) farmer family participation, (3) farmer side jobs and, (4) social system in lowland rice cultivation activities (Figure 5).

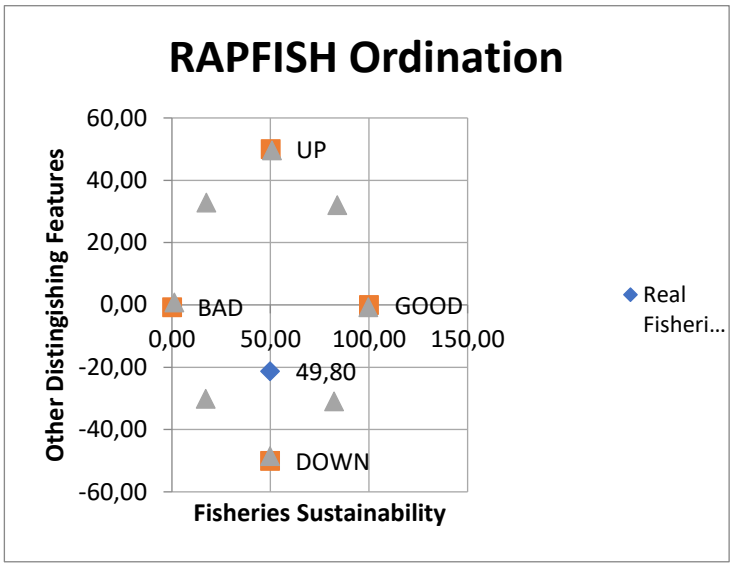

Figure 5. Social Dimension Sustainability Status Index

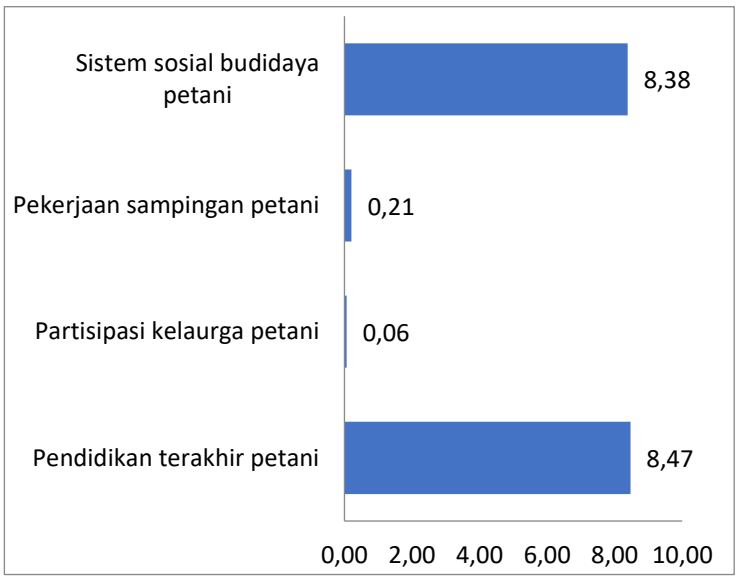

Figure 6. Analysis graph Leverage Social Dimension

Results of MDS analysis carried out with*Rap Analysis*in South Ogan Komering Ulu Regency shows a social dimension sustainability index value of 49.80%. Based on the sustainability status qualification, this value shows that the social conditions of South Ogan Komering Ulu Regency are less than sustainable. MDS data processing results using*Rap Analysis* shown in Figure 5. Based on the results of the analysis*leverage* Regarding the attributes in the social dimension in Figure 6, there are 2 (two) attributes that are considered sensitive to the sustainability index from the social dimension, namely the farmer's latest education (8.47%) and the farmer's social cultivation system (8.38%).

4. Conclusion

Based on the results of the analysis that has been carried out on lowland rice farming in South Ogan Komering Ulu Regency, conclusions can be drawn, namely (1) The costs incurred to run lowland rice farming in South Ogan Komering Ulu Regency are divided into fixed costs and non-fixed costs, namely equal to IDR 8,769,241/ha. The fixed costs incurred are IDR 5,924,000/ha. and variable costs of IDR 2,845,241/ha. Lowland rice farming in South Ogan Komering Ulu Regency receives revenues of IDR 8,092,378/year. (2) Analysis of the financial feasibility of lowland rice farming in Discount Factor14%

indicated that the lowland rice farming project in South Ogan Komering Ulu Regency was feasible to carry out. This is shown by a positive NPV value of IDR 13,263,500, a Net B/C Ratio value of 2.05 (Net B/C Ratio>1) and an IRR value greater than the applicable interest rate, which is 95%. (3) Analysis of the sustainability of lowland rice farming in South Ogan Komering Ulu Regency uses three dimensions, namely the ecological dimension with a percentage of 47.60%, the economic dimension with a percentage of 49.85% and the social dimension 49.80%

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