Prospects and Feasibility of Implementation of Agricultural

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Prospects and Feasibility of Implementation of Agricultural Transformation for Food Crops on Sub Optimal Land in Ogan Ilir Regency, South Sumatra

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Abstract. Agricultural transformation is currently being pursued in sub-optimal land areas, as an effort to increase agricultural production. Ogan Ilir Regency is one of the areas planned to carry out agricultural transformation. This study aims to analyze the prospects and feasibility of implementing agricultural transformation. This research is a survey that takes primary data which is processed and analyzed using various eligibility criteria from technical, market, social, environmental and financial feasibility aspects. From the technical aspect, it can be concluded that the implementation of agricultural transformation in this area is feasible with recommendations for the type of commodity, namely Lebak rice. In the market aspect, it is also feasible to implement but requires improvement of the marketing chain to be simpler through empowering farmer groups. In the social and environmental aspects, agricultural transformation which will have an impact on increasing job opportunities, improving and adding infrastructure, as well as developing community mindsets, knowledge, and skills. The results of the financial analysis complement the feasibility of agricultural transformation in this area, which is indicated by the NPV value of Rp. 74.312,570, B/C ratio of 2.88, with an IRR value of 34%, and a BEP value of 2,268 Kg.

1. Introduction

Agricultural transformation, which is defined as the utilization and conversion of idle lands to become productive land in agricultural development, is currently being encouraged as an effort to increase agricultural production. According to [1], agricultural transformation is defined not only as changing idle lands from the production aspect, but also changing various supporting aspects such as agricultural machinery, institutions, marketing and other aspects. One of the areas currently planned to carry out agricultural transformation is Ogan Ilir Regency, South Sumatra Province. Since the spearhead of this activity are farmers, the majority are motivated to implement the program if it is profitable and feasible from various aspects, it is very important to raise the motivation of farmers through providing the results of the feasibility analysis of the business. In line with [2] which states that the process of transformation in rural areas cannot only be done by transforming the equipment, but must also make changes to the awareness of the community and individuals. Thus, the research results aim to analyze the prospects and feasibility from various aspects of feasibility, so as to describe the prospects for its implementation in the future.

2. Methodology

This study uses a descriptive analytical design, with the type of survey method. The sampling method used Random Sampling, because the sample was relatively homogeneous, 90 people were

taken randomly from 3 sub-districts that had the highest potential for wetlands in Ogan Ilir District, namely Muara Kuang, Tanjung Batu and Lubuk Keliat Districts. The data collected were primary and secondary data, which were analyzed using a structured tabulation technique, for further analysis activities were carried out based on [3] namely data reduction, data analysis, data interpretation, data presentation, and conclusion/verification. To determine the prospects and feasibility analysis is carried out from technical, market, social and environmental aspects as well as a feasibility calculation from the financial aspect.

3. Result and Discussion

3.1. Characteristics of Rice Farming in the Target Areas of Agricultural Transformation

The average land area owned by farmers is 1.5 Ha with the largest range 1–2 Ha (66.67%), followed by land area < 1 Ha (24.44%), and only 8.89% owning land. 2.1–3 Ha. Land ownership status, consisting of own land (66.67%) and leased land (33.33%). The majority of farmers cultivate the land in two ways, namely using non-machine equipment (sickle, machete, hoe) as much as 30% and using hand-tractor machine (70%). Variations in land management methods are also caused by variations in the level of soil fertility. For land that is categorized as fertile, land management is still relatively easy and can be done manually, but for land that is classified as less fertile, which is classified as acid land, farmers generally overcome it by using lime (30%), using coarse salt (20%), as well as organic matter (10%). The use of soil improvement materials in Lebak lands can use lime, salt, rice husks, sawdust ash, weed biomass, and agricultural waste; while nutrient management with the provision of biological fertilizers, fertilizers N, P and K[4].

The types of seeds used by farmers in the study areas are divided into 2 groups: local and superior seeds. For local seeds, the majority use pegagan seeds, while the superior rice seeds used by farmers are generally Ciherang, IR 42, Inpari and Mekongga, with the dominant types being Ciherang and IR 42. Lebak rice plants in the study areas generally can only be planted once a year, except in areas that have carried out technological engineering. Generally, planting to harvesting takes place from April to September. Under normal climatic conditions, levee curd is planted in April-May, mid-May-June and mid-July-August. Planting is done by moving rice that has been sown to the land. In the maintenance phase, the activities carried out by farmers include irrigation that relies on rainwater sources, and some have used pumps to drain water from rivers. In fertilization activities, the types of fertilizers that are usually given are NPK and Urea, but the doses are not ideal. Likewise with efforts to eradicate pests and diseases, using insecticides with doses that are also not ideal.

In harvesting activities, the harvesting age for local rice reaches 5 to 6 months while for superior rice it is only 3 to 4 months. The types of harvesting equipment used are mostly using combine harvester machines, but there are still quite a few who harvest in traditional ways (using sickles and ani-ani).

3.2. Rice Farming Income in Target Areas of Agricultural Transformation

To calculate the income earned by farmers, the production costs incurred by farmers must first be calculated, which consists of fixed costs and variable costs (Table 1, 2, 3).

Table 1. Total Fixed Cost of Rice Farming.

No.	Description	Total Cost (Rp/hectare/year)
1.	Hoe	24,279
2.	Handsprayer	145,112
3.	Machete	35,592
4.	*Penyojo*/Rice transplanter	7,614
5.	Rake	7,531
	Total Fixed Cost	**220,128**

Table 2. Total Variabel Cost of Rice Farming.

No.	Description	Total Cost (Rp/hectare/year)
1.	Seed	184,310
2.	Fertilizer	416,826
3.	Pesticide	267,685
4.	Labor	537,520
5.	Bag	149,429
6.	Tractor	840,000
7.	Combine	1,200,000
8.	Land lease	844,444
	Total Variable Cost	**4,440,214**

Table 3. Total Production Cost of Rice Farming

Description	Total Cost (Rp/hectare/year)
Total Fixed Cost	**220,128**
Total Variable Cost	**4,440,214**
Total Production Cost	**4,660,342**

Most of the products sold by farmers are harvested dry rice (GKP) which are usually sold directly to collectors at a price of Rp. 4,200/Kg. Farmer's income is the amount obtained from the income minus the total production costs incurred by the farmer.

Table 4. Average production, revenue and income of rice farming in the study areas.

No.	Description	Average
1.	Production (Kg)	2,997
2.	Price (Rp/Kg)	4,200
3.	**Total Revenue**	12,587,400
4.	Production Cost	4,660,342
5.	**Total Income**	7,927,058

The average income of rice farmers is Rp. 7,927,058 per hectare per planting season, with revenues of Rp. 12,587,400 per hectare per planting season. This income is still classified as not optimal considering the production produced is still relatively low due to the use and exploitation of production inputs that are not ideal.

3.3. Feasibility Analysis of Rice Farming on Transformation Target Lands

The feasibility analysis made is based on the pattern of rice farming which is expected to be carried out during the transformation activity, namely rice farming using a water pump machine that is considered the most appropriate for use on land with the majority of the lebak type.

3.3.1 Technical Aspect Eligibility

The technical aspect is an aspect related to the process of technically developing a business project and its operation[5]. Technically, the location of the implementation of agricultural transformation is planned to be carried out on unused land with relatively the same land conditions, namely lowland land with water problems that inundate land in the rainy season and dry land in the dry season, so a water pump is needed as a solution. The availability of labor is not a problem in the technical aspect because there are local workers from the community. If technical support in a village is available, then agricultural transformation in rural areas can be carried out properly [6].

3.3.2 Marketing Aspect

The market aspect in business and investment feasibility studies discusses the amount of demand, supply, price, and also the marketing strategies carried out through the marketing mix. The components of the marketing mix consist of product, place, promotion and price[7]. The product produced and marketed by rice farmers in the form of grain. The choice of product was deemed

inappropriate because the selling price of grain was lower than selling it in the form of rice, however sales in the form of GKP were still feasible because there were still many traders who accepted it. The Place aspect shows that the land used for farming is strategic because it is near to the main road so it is easy to distribute the harvest, and the middlemen are ready to accommodate the harvest. The promotion aspect is not carried out by farmers, because farmers only focus on selling their products to middlemen, with a selling price of Rp. 4,000/Kg, whereas if promoted to other sales places, the price reaches Rp. 4,618/Kg.

3.3.3 Social and Environment Aspect

Generally, social aspects can be assessed in terms of the benefits provided by a business to the development of the community's economy, for example the opening of job opportunities, increasing income and production facilities/infrastructure, opening underdeveloped areas[8]. From the social aspect, in the study area, the program can open up job opportunities, and on the environmental aspect, rice farming activities on unused land will help improve land conditions.

3.3.4 Financial Aspect

The financial aspect in calculating the feasibility of rice farming includes calculating costs to farm income. A farm feasibility is measured from Net Present Value (NPV), Internal Rate of Return (IRR), B/C ratio, Payback Period (PP), and Break Even Point (BEP).

Basic Assumptions

Table 5. Basic assumptions of rice farming financial feasibility analysis.

No	Description	Value	Unit of Measure
1	Production period	12	Month
2	Project period	5	Year
3	Frequency of planting season	2	times/year
4	Time Length of planting season	4	Month
5	Average land area	1.5	Hectare
6	Production	7,133	Kg/Hectare/year
7	GKP selling price	4,000	Kg/Hectare
8	Interest rate	6.25	Percent/year
9	Capital proportion	Private capital	%

Investment Cost

Investment costs in rice farming in the form of pumping in the study area include the procurement of equipment that will be used in rice farming which is issued in year 0. (Table 6).

Table 6. Average investment cost of rice farming per hectare in the study area.

No	Equipment investment	Cost (Rp)
1	Pump engine	5,000,000
2	Handsprayer	1,260,000
3	Machete	285,000
4	Hoe	227,500
5	Sickle	102,500
	Total Cost	6,925,000

Operational Cost

In this analysis the operational costs incurred in the 1st year to the 5th year on a constant basis. The summary of operational costs can be seen in Table 7.

Table 7. Operational cost.

No	Description	Total Cost (Rp/cultivated area/year)	Total Cost(Rp/hectare/year)
1.	Labor	8,157,000	5,989,179
2,	Fertilizer	2,145,500	1,486,321

No	Description	Total Cost (Rp/cultivated area/year)	Total Cost(Rp/hectare/year)
3,	Seed	900,000	620,692
4,	Pesticide	436,867	437,825
5,	Bag	375,600	285,303
6,	Fuel	546,000	418,000
Total Cost		12,560,967	9,237,320

Production and Revenue

Revenue on farming is calculated based on the multiplication between the rice production obtained and the selling price. Total rice production and income from year 1 to year 5 can be seen in Table 8.

Table 8. Production and revenue of rice farming

No	Description	Amount (Cultivated Area/Year)	Amount (Hectare/Year)
1.	Production (kg GKP)	9,930	7,133
2.	Price (Rp/kg GKP)	4,000	4,000
3.	Revenue (Rp/year)	37,560,000	28,530,256
4.	Income (Rp/year)	24,999,033	19,292,936

Financial Feasibility Analysis Results

The eligibility criteria used in this financial feasibility analysis consist of Net Present Value (NPV), Internal Rate of Return (IRR), B/C ratio, Payback Period (PP), and Break Event Point (BEP). A business is said to be feasible if the resulting NPV value is positive or greater than zero (NPV > 0), the resulting IRR must exceed the applicable interest rate. Gross B/C and Net B/C generated are more than 1 (Gross B/C > 1 and Net B/C > 1).

Table 9. Analysis of the financial feasibility of rice farming in the study area.

No	Feasibility Criteria	Unit of Measure	Value	Criteria
1	Net Present Value (NPV)	Rupiah	74,312,570	feasible
2	Internal Rate of Ratio (IRR)	Persen	34	feasible
3	Gross B/C ratio	Ratio	2	feasible
4	Net B/c ratio	Ratio	2.88	feasible
5	Payback Period (PP)	Tahun	0.32	feasible
6	Break Event Point (BEP) unit	Kg	2,268	feasible
7	Break Event Point (BEP) rupiah	Rupiah	9,073,171	feasible

From the results of the NPV analysis, rice farming with this pumping system has an NPV of Rp 74,312,570 while the IRR value is 34 percent. This value is greater than the interest rate used, which is 6.25 percent, so rice farming in the study area has the ability to run a business with a return of interest rates of up to 34 percent, can be declared feasible or provide benefits for the life of the business. The calculated value of Net B/C is 2.88 and the Gross B/C value is 2.00. The business is feasible because it has a B/C Ratio value equal to or more than one.

In the Payback Period (PP) criteria, a value of 0.32 is obtained from a period of 5 years, which means that the payback period in this farm is 18 months or 1 year 6 months. In the Break Event Point (BEP) criteria, the unit BEP value for rice farming is 2,268 kg and the BEP for rupiah is Rp. 9,073,171. So it can be concluded that this rice farming will experience a Break Event Point (BEP) when the production reaches 2,268 Kg and a total revenue of Rp. 9,073,171.

4. Conclusion

From the results of the feasibility analysis carried out it can be concluded that the implementation of agricultural transformation in this area is feasible with the recommendation of the type of commodity being lebak rice, but it requires several efforts to improve the water treatment system which is the main problem through the application of the pumping system. In the market aspect, it is also feasible to implement, but requires improvement of the marketing chain which is still relatively

long with solutions through empowering farmer groups. In the social and environmental aspects, it is highly recommended to implement considering that agricultural transformation will have an impact on increasing job opportunities, improving and adding infrastructure, as well as developing community mindsets, knowledge and skills. The results of the financial analysis complement the feasibility of agricultural transformation through the cultivation of food crops in this area, which is indicated by the NPV value of Rp. 74.312,570, B/C ratio of 2.88, with an IRR value of 34%, and a BEP value of 2,268 Kg. However, with the recommendation that the rice farming business be carried out with IP200, and irrigation settings using a large capacity water pump.

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