



## Feasibility and Swot Analysis of Upland Rice Farming in Cingkes, Simalungun, Indonesia

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### Keywords

*Cost, Feasibility, SWOT Analysis, Upland Rice Farming.*

### Abstract

The purpose of this study was to determine the farmers' production costs for upland rice farming per hectare in one year, to find out the net income earned by farmers from upland rice farming per hectare in one year, knowing how feasible upland rice farming is, and knowing how upland rice farming strategies are in the research area. The research location was determined purposively (deliberately). The data analysis method used is descriptive analysis, farming feasibility analysis, and SWOT analysis. The results showed that the average production cost of upland rice farming in the study area was Rp. 6,786,522/ha/year, the average income of upland rice farming was Rp. 15,7985,000/ha/year, and the average net income of IDR 9,008,478/ha/year. The feasibility of farming or the R/C ratio in the research area is 2.3, this indicates that upland rice farming is feasible to cultivate. in Cingkes Village, Dolok Silau District, Simalungun Regency is feasible to cultivate. The strategy for developing upland rice farming in the research area can be done by increasing the role of farmer groups, and increasing upland rice productivity.



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## 1. Introduction

Indonesia is a country where most of the population works in the agricultural sector. The agricultural sector has an important role, which is able to make a major contribution to the nation's economy and increase national income (Simbolon et al., 2021). This increase in national income through the agricultural sector is also able to increase the income of rural residents who are still not prosperous (Aulia, 2021). Rice is an important commodity in Indonesia. The Indonesian population uses rice as a staple food, 95% of the Indonesian population consumes this food. One of the rice commodities that plays an important role in the agricultural system of the Indonesian people is upland rice (Aulia et al., 2022). Upland rice or land rice is one type of rice cultivation, namely rice cultivation on dry land. Upland rice is usually planted singly on open land/fields, or intercropped with food crops or young plantations (Widyanto & Subanu, 2023).

According to the Ministry of Agriculture of the Republic of Indonesia (2017), East Java was the province with the highest upland rice production in 2017, reaching 627,671 tons from a harvested area of 148,820 ha. The productivity level of upland rice in East Java was 4.21 tons/ha. North Sumatra was another province that produced

upland rice, with a production of 466,407 tons from a harvested area of 123,784 ha. The productivity level of upland rice in North Sumatra was 3.76 tons/ha. These data show that East Java had higher productivity than North Sumatra. In Simalungun Regency, a district in North Sumatra, the average productivity of upland rice in 2016-2020 was only 3.49 tons/ha, which was lower than the provincial and national averages. In Dolok Silau District, another district in Simalungun Regency, the average productivity of upland rice in 2016-2020 was even lower at 3.42 tons/ha. This indicates that there is a need to improve the quality of seeds and varieties, as well as the management of cultivation and post-harvest handling, to increase the yield of upland rice (Dzakiroh et al., 2021).

Rangkuty (2009) SWOT analysis is a strategic planning method used to evaluate the strengths, weaknesses, opportunities and threats that occur in a business or business (Aulia, 2021). To analyze by identifying internal and external factors can provide a more competitive advantage with various factors of weakness, strength, opportunity and threat that can hinder or benefit the achievement of goals. Therefore, the weakness factors can be minimized and the strengths can be increased so as to achieve competitive advantage. While opportunities are more utilized and for threat factors so that they can be handled properly.

Cingkes is one of the villages in Dolok Silau District. Most of the residents in Cingkes Village live from the agricultural sector which operates upland rice farming, with an area of upland rice cultivated by farmers  $\pm 0.2 - 1$  hectare/family (Development Village Index, 2019). Farmers in Cingkes village complain that it is difficult to get subsidized fertilizer from the government while the price of non-subsidized fertilizer in the market is quite expensive, resulting in the largest cost incurred by farmers in purchasing fertilizer, so that rice productivity in Cingkes Village is low, and farmers' income are low.

Based on the background and formulation of the problems described previously, the purpose of this study is to determine the cost of production, to determine the amount of net income, to determine the feasibility of upland rice farming, and to determine the farming strategies carried out by upland rice farmers in Cingkes Village, Dolok Silau District. , Simalungun Regency.

## 2. Materials and Methods

This research was conducted in Cingkes Village, Dolok Silau District, Simalungun Regency. Determination of the research area is done purposively (deliberately). This village was chosen as the research area for the reason that Cingkes Village is one of the upland rice producing areas in Dolok Silau District, so that farmers in Cingkes Village are considered to be able to represent upland rice farmers in Dolok Silau District. The method used in sampling is simple random sampling method because the population of farmers who grow upland rice in the study area is only 39 families, therefore in this simple random sampling method, all 39 farmers are designated as samples. The data collected in this study are primary data and secondary data. Primary data was obtained from direct interviews with sample farmers with the help of a previously prepared questionnaire, while secondary data was obtained from the Central Statistics Agency and the Village Head Office . Data obtained from direct observations in the field by interviewing upland rice farmers using questions (questionnaires). Then tabulated, after tabulating according to the research objectives, it is used with the following calculations:

- The total cost of production is used the formula:

$$TC = TFC + TVC$$

explanations:

TC = *Total Cost*

TFC = *Total Fixed Cost*

TVC = *Total Variable Cost*

- the formula for calculating net income is used:

$$\begin{aligned}\pi &= TR - TC \\ TR &= P \times Q \\ TC &= TFC + TVC\end{aligned}$$

Explanations :

$\pi$  = *Profit*

TR = Total Revenue  
 TC = Total Cost  
 P = Price  
 Q = Earned production

- Knowing the feasibility of farming is used the following formula:

$$R/C = \frac{TR}{TC}$$

Explanation:

TR = Total Revenue

TC = Total Cost

R/C > 1: Farming is feasible (profitable)

R/C = 1: Break event point farming (no profit/no loss)

R/C < 1: Farming is not feasible (not profitable)

- Knowing the upland rice farming strategy carried out by farmers in Cingkes Village, Dolok Silau District, Simalungun Regency. SWOT analysis carried out by farmers in a qualitative descriptive manner is described according to the answers given to farmers or informants at the research location.

### 3. Results and Discussions

The results showed that the average age of upland rice farmers was 49 years with a farmer's age range from 28 to 65 years. The average level of education of farmers is low, where high school graduates are high and the lowest are Diploma/Bachelor graduates. The higher the level of education, the better the farmer's mindset. Most of upland rice farming experience ranges from 2-40 years, which means that it has been quite a long time. Experience in farming affects the technical ability of farmers so that farming activities can run well.

#### 3.1 Total Production Cost

Total production costs are all costs incurred for rice farming activities. Such as the purchase of fertilizers, herbicides, labor, equipment depreciation, PBB and land rent. Details of the total production costs of upland rice farming per year issued by farmers can be seen in Table 1.

Table 1: Average Total Production Cost of Cassava Farming in 2022

No	Description	Total Cost (Rp)		Persentase (%)
		Per Farmer	Per Hectare	
1	Seed	187.333	381.804	5,62
2	Fertilizer	1.209.590	2.380.311	35,07
3	Herbicide	126.923	490.048	7,22
4	Labor	880.513	1.933.211	28,48
5	Tool Shrink	367.793	787.943	11,61
6	UN	48.077	100.000	1,47
7	Land lease	46.154	128.205	1,88
8	Land lease	585.000	585.000	8,61
<b>Total Cost</b>		<b>3.451.383</b>	<b>6.231.316</b>	<b>100</b>

The data in Table 1 shows that the average production cost per hectare per year for upland rice farming in the study area is the highest for fertilizer costs and the lowest for PBB costs; then the average production cost for upland rice farming is Rp. 6,231,316/ha/year; This figure is much higher than (Apriyanti et al., 2017) analysis, which is IDR 5,703,070/ha/year. This is because of the wages of labor and the prices of different means of production such as fertilizers and medicines.

### 3.2 Net Profit of Gogo Rice Farming

Farmer's income is the amount of physical production and selling price prevailing at the time of sale, assuming the production is sold at harvest so that farmers' income can be calculated. If the selling price of upland rice is relatively high, the farmers will also get a relatively high income and vice versa, which means that if the selling price of upland rice is low, the farmers' income will also be low (Saragi et al., 2022). This will affect farmers' income. The average net income of upland rice farming can be seen from Table 2.

Table 2: Average Net Income of Cassava Farming in 2022

No	Description	Net Income (Rp)	
		Per farmers	Per Hectare
1	Production (Kg)	1.245	2.430
2	Price (Rp)	6.500	6.500
3	Revenue (Rp)	8.092.500	15.795.000
4	Production Cost (Rp)	3.451.383	6.786.522
5	Net Income (Rp)	4.641.117	9.008.478

Table 2 shows that the average net income of upland rice farming is Rp. 9,008,478/ha per year. When compared with the results of research conducted by (Hartono et al., 2019) the average income obtained from upland rice farming is Rp. 6,855,419/ha per year with a production price of Rp. 6,000/Kg. When compared with the results obtained in the research area, it shows that the income of upland rice farming in the study area is higher than the research conducted by (Hartono et al., 2019).

### 3.3 Feasibility Analysis of Upland Rice Farming

Financial feasibility of upland rice farming can be determined by calculating the value of the R/C ratio, the value of the R/C ratio greater than 1 indicates that the farm is feasible to be cultivated and developed. The resulting R/C value can be seen in Table 3.

Table 3: Feasibility of Upland Rice Farming per Hectare per Year (August-March) 2022.

No	Description	Per Farmer	Per Ha
1	Reception	8.092.500	15.795.000
2	Production cost	3.451.383	6.786.522
3	Net income	4.641.117	9.008.478
	<b>Eligibility (R/C)</b>	<b>2,3</b>	<b>2,3</b>

Based on Table 3, it can be seen that the R/C value of 2.3 indicates that upland rice farming is feasible to be cultivated and developed. When compared with the research results of (Nearti et al., 2020) in Sungai Dua Village, Banyuasin Regency stated that the R/C value of 2.05 means that the feasibility value in the study area is higher than the results of (Nearti et al., 2020) research, this is because the production price upland rice in the study area is higher than the upland rice production price from the research of (Nearti et al., 2020).

### 3.4 SWOT Analysis

Upland rice or land rice is one type of rice cultivation, namely rice cultivation on dry land. In general, upland rice is planted once a year. Upland rice is very useful to meet the basic needs of the community, besides upland rice also has advantages that can be developed in the agricultural sector. In this study, it can be seen that upland rice farming is feasible to be cultivated as shown in the R/C ratio in table 3. Thus the results of the feasibility study for upland rice farming have potential in developing farming. Therefore, the development of a swot analysis matrix for upland rice farming in Cingkes Village in more detail is presented in table 4.

Table 4: Internal and External Factors for Gogo Rice Farming Development 2022

Internal factors	
Strength (S)	Weakness (W)
1. Upland rice farming ( <i>Oryza nivara</i> I) is not difficult and access to capital is not too high.	1. It is difficult to get subsidized fertilizer from the government while the price of non-subsidized fertilizer in the market is quite expensive.
2. Upland rice can grow well on dry land and does not require irrigation channels. Upland rice water needs can only rely on rainfall alone.	2. Upland rice productivity in Cingkes Village is lower than lowland rice productivity.
3. Upland rice in Cingkes Village includes farming of local wisdom or a culture.	3. Lack of role of farmer groups in the research area, so that upland rice farmers in Cingkes Village find it difficult to coordinate between farmers.
4. Upland rice plants can also be planted in intercropping patterns such as corn and chilies.	4. The harvest time for upland rice is longer than lowland rice.
5. The majority of upland rice farmers in Cingkes Village do not depend on external rice prices, because some farmers in the study area use upland rice farming results for household consumption in the long term.	
Eksternal Factors	
Opportunity (O)	Threat (T)
1. Upland rice productivity in Cingkes Village reaches 2 tons/ha per year.	1. Produktivitas padi gogo di Desa Cingkes belum memberikan hasil yang maksimal.
2. Have good prospects to meet household needs.	
3. Strategic location both in terms of growing conditions and market access.	2. There is a change in the farming pattern of farmers in Cingkes Village.

Table 4 shows that internal factors consist of 5 strengths and 4 weaknesses, so it can be said that rice farmers in Cingkes Village have greater strengths so that they can minimize existing weaknesses. Meanwhile, external factors consist of 3 opportunities and 2 threats. Opportunities owned by upland rice farmers can be used to develop upland rice farming in Cingkes Village compared to the threats they have.

#### 3.4.1 Strengths

Upland rice (*Oryza nivara* I) care is relatively easy and access to capital is not too high. Based on the results of interviews with farmers in Cingkes Village, upland rice processing can be done without using technological tools such as tractors. Upland rice in Cingkes Village is included in local wisdom farming or has become a culture because the people in Cingkes Village have been farming upland rice for a long time. Therefore, upland rice farming has become a tradition that is carried out simultaneously by planting in one year (Aulia et al., 2022).

#### 3.4.2 Weakness

Farmers in Cingkes Village find it difficult to get subsidized fertilizer from the government, while the price of non-subsidized fertilizer in the market is quite expensive. Based on interviews with farmers, the lack of role of farmer groups in the research area, so that upland rice farmers in Cingkes Village find it difficult to coordinate between farmers. In terms of harvest time, upland rice is longer than lowland rice. Upland rice has a harvest age of about 5-6 months while in general the harvest age of lowland rice is 3 months (Sinambela et al., 2020).

3.4.3 Opportunity

In the research area, upland rice productivity has not been maximized considering that the average upland rice productivity reaches a productivity level of 3.76 tons/ha (Ministry of Agriculture, 2017). The prospect of upland rice farming in Cingkes Village can provide good benefits to meet household consumption needs in the long term. In addition, the location of upland rice fields in Cingkes Village is not too far from settlements and road access is quite good.

3.4.4 Threat

Upland rice productivity in Cingkes Village has not been maximized due to limited fertilizers and the lack of role of farmer groups in the research area so that upland rice farmers in Cingkes Village find it difficult to coordinate between farmers. Based on the results of interviews with farmers, there is a change in farmers' agricultural patterns in Cingkes Village, namely the transfer of land functions from upland rice plants to planting other commodities, for example, farming corn and chilies..

After knowing some of the strengths, weaknesses, opportunities and threats contained in upland rice farming in Cingkes Village, several strategies can be formulated that can be an alternative for upland rice farming (Awotide et al., 2016).

*Table 5: SWOT Matrix for Gogo Rice Farming Development Strategy 2022*

IFAS	<p><b>STRENGTH (S):</b></p> <ol style="list-style-type: none"> <li>1. Threat for upland rice (<i>Oryza nivara</i> I) is not difficult and access to capital is not too high.</li> <li>2. Upland rice can grow well on dry land and does not require irrigation channels. Upland rice water needs can only rely on rainfall alone.</li> <li>3. Upland rice in Cingkes Village includes farming of local wisdom or a culture.</li> <li>4. Upland rice plants can be planted for intercropping patterns such as: corn and chilies.</li> <li>5. The majority of upland rice farmers in Cingkes Village do not depend on outside rice prices, because farmers in the study area have been growing for consumption for the long term.</li> </ol>	<p><b>WEAKNESS (W):</b></p> <ol style="list-style-type: none"> <li>1. It is difficult to get subsidized fertilizer from the government while the price of non-subsidized fertilizer in the market is quite expensive.</li> <li>2. Upland rice productivity in Cingkes Village is lower than lowland rice productivity.</li> <li>3. Upland rice does not support the economy of farmers in Cingkes Village.</li> <li>4. Lack of role of farmer groups in the research area so that upland rice farmers in Cingkes Village find it difficult to coordinate between them and between groups.</li> <li>5. In terms of harvest time, upland rice is longer than lowland rice</li> </ol>
EFAS		

<p><i>OPPORTUNITY</i> (O)</p> <ol style="list-style-type: none"> <li>1. Upland rice productivity in Cingkes village reaches 2 tons/ha per year.</li> <li>2. There is an understanding of farmers related to upland rice farming.</li> <li>3. Prospects for the future are good, and can meet the needs of life for the long term.</li> <li>4. Strategic location both in terms of growing conditions and market access.</li> </ol>	<p><i>STRATEGI SO :</i></p> <ol style="list-style-type: none"> <li>1. Maintaining upland rice productivity with the skills of farmers related to upland rice farming.</li> <li>2. Maintaining upland rice as local wisdom seen from the productivity which reaches 2 tons/ha per year.</li> <li>3. Expanding market access so that it is not only limited to middlemen.</li> </ol>	<p><i>STRATEGI WO :</i></p> <ol style="list-style-type: none"> <li>1. Increasing the role of farmer groups in overcoming the limitations of subsidized fertilizers.</li> <li>2. Encouraging increased productivity of upland rice.</li> <li>3. Increase public demand by expanding market access.</li> </ol>
<p><i>THREATS (T)</i></p> <ol style="list-style-type: none"> <li>1. Upland rice productivity in Cingkes Village has not been maximized.</li> <li>2. There is a change in the farming pattern of farmers in Cingkes Village.</li> </ol>	<p><i>STRATEGI ST :</i></p> <ol style="list-style-type: none"> <li>1. Improving post-planting land management methods by using technological innovations.</li> <li>2. Strive to increase upland rice production.</li> </ol>	<p><i>STRATEGI WT :</i></p> <ol style="list-style-type: none"> <li>1. Increasing the role of farmer groups.</li> <li>2. Farmers maintain land for upland rice farming.</li> </ol>

Based on Table 5, there are several alternative strategies that can be applied by upland rice farmers, including the following:

- Strategy S - O (*Strength - Opportunity*)

The S-O strategy is a strategy that uses the strengths you have with the opportunities that exist. So the strategies that can be used according to table 5 are; (i) Maintaining upland rice productivity with the skills of farmers related to upland rice farming. In this case, farmers can do this by selecting superior seeds, fulfilling sufficient nutrients in the soil, cleaning other plants that grow around upland rice, and eradicating pests. (ii) Maintaining upland rice as local wisdom seen from the productivity which reaches 2 tons/ha per year. In this case, it can be done by paying more attention to the treatment of upland rice, both by spraying herbicides and using existing fertilizers. (iii) Expanding market access so that it is not only limited to middlemen. For example, by packing upland rice harvests in a good size 1 Kg, 5 Kg, 25 Kg and 50 Kg then distributed to retail rice traders, in addition to marketing through social media such as Whatsapp, Facebook, and Instagram to expand the market and customers (Bhargavi et al., 2021).

- Strategy W - O (*Weakness – Opportunity*)

W-O strategies are strategies that take into account the weaknesses and threats that exist in upland rice farming. Then the strategies that can be used; (i) Increasing the role of farmer groups in overcoming the limitations of subsidized fertilizers. (ii) Encouraging increased productivity of upland rice. This means that there is a need for the

government's role in the resilience of upland rice farming considering that upland rice productivity in Cingkes Village is still low (Salleh et al., 2015).

- Strategy S - T (*Strength - Threats*)

S-T strategies are strategies that use their strengths to deal with the threats that exist in upland rice farming. Then the strategies that can be used; (i) Improving post-planting land management methods by using technological innovations. This means that new technology can be used in the field of land management by utilizing assistance obtained from the government such as tractors. (ii) Strive for upland rice production to increase with the skills of farmers regarding upland rice because it is the skills of farmers who are able to maintain something good or bring changes to upland rice production and can also be done by planting using superior seeds, fulfilling nutrients in sufficient soil, clean other plants that grow around upland rice, and eradicate pests (Guido et al., 2020).

- Strategy W - T (*Weakness - Threats*)

W - T strategies are strategies that take into account the weaknesses and threats found in upland rice farming. Then the strategies that can be used; (i) Increasing the role of farmer groups, with the role of farmer groups, it can help farmers in upland rice farming so that farmer groups direct farmers to use superior seeds, use fertilizers and so on. (ii) Farmers maintain land for upland rice farming. If farmers are tempted by other crop commodities to obtain maximum profits, it will cause the loss of upland rice farming. Therefore, farmers can maintain a partnership system among upland rice farmers. Because with this partnership system, upland rice farming can survive and develop better than when independent rice farmers (Malini et al., 2019).

#### 4. Conclusion

The results of the Feasibility Analysis and Swot Analysis of Upland Rice Farming (*Oryza nivara* L) in Cingkes Village, Dolok Silau District, Simalungun Regency, the production cost of upland rice farming in the research area is Rp. 6,786,522/Ha/Year. upland rice production costs per hectare are dominated by fertilizer costs. The net income of upland rice farming in the research area is Rp. 9,008,478/Ha/Year. Net income from revenue is Rp. 15,795,000/Ha/Year minus the average total cost of Rp. 6,786,522/Ha/Year. Feasibility of upland rice farming in the value of R/C ratio of 2.3 then  $R/C \text{ ratio} > 1$  indicates that upland rice farming is feasible to cultivate. This means that if the farmer spends 1, the farmer gets an income of Rp. 2.3, then the farmer's net income is 1.3. The strategy for developing upland rice farming in Cingkes Village, Dolok Silau District, Simalungun Regency can be done by increasing the role of farmer groups, increasing upland rice productivity, honing upland rice farmers' skills, improving post-planting land management using technological innovation, using superior seeds, maintaining land for upland rice farming.

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