



## Farming Analysis of Rainfed Rice Field in Nagari Bukik Gadang, Sawahlunto Regency, West Sumatera

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Received on 12 August 2025, Accepted on 23 October 2025, Available online on 15 December 2025

### ABSTRACT

This study aims to describe the cultivation technique carried out by rainfed rice farmers and analyze the income and profit generated by farmers from rainfed rice farming. This research was conducted in August 2023 in Nagari Bukik Gadang, Talawi District, Sawahlunto Regency. The sample in this study was taken using a purposive sampling method by as many as 30 rainfed rice farmers. The research found that the cultivation technique of rice farming practiced by farmers in the research area is not in line with the literature. Consequently, the yield of rainfed rice was less than optimal, and based on the research, the farmers' average income was Rp5.689.068,6/ha, and the average profit was Rp1.471.826,62/ha. The R/C ratio analysis result was 1,15, meaning that rainfed lowland rice farming in Nagari Bukik Gadang is profitable and financially viable to implement. Based on the findings, the farmers should apply the guidance from the agricultural extension officer to get optimal yields.

**Keywords:** food crops, income, rainfed farming, profits, R/C Ratio

### INTRODUCTION

The agricultural sector is one of Indonesia's most essential sectors. The development of the agricultural sector plays a crucial role in improving the welfare of individuals and communities, particularly in developing countries where a significant portion of the population relies on agriculture for their livelihoods. One indicator of the welfare of the community is the income. The income generated by farmers depends on the results of their farming efforts.

In Indonesia, rice is an essential commodity, considering Indonesians generally consume rice as a primary source of carbohydrates. Almost 95% of the Indonesian population consumes rice as a staple food, which causes the demand for rice to increase every year, along with the increase in the population of Indonesia (Pratiwi, 2016).

There are two types of rice fields: irrigated and rainfed rice fields. Rainfed rice farming is an agricultural system whose irrigation system comes from rainwater only. Farmers will have sufficient water availability for the rice planting process when the rainfall is high, but if the rainfall is low, farmers experience a lack of water availability. This condition can hinder rainfed rice farmers because they can only plant depending on nature. Hence, the productivity and income received by rainfed rice farmers could be less than optimal compared to farmers who use the irrigation system.

Sawahlunto Regency has an agricultural land area of 18,713 ha, which means that 70 per cent of the area of Sawahlunto Regency is agricultural land. Moreover, 60% of the rice fields in Sawahlunto are rainfed rice fields. According to the BPS data of Sawahlunto Regency (2022), The number of rainfed rice fields in Sawahlunto Regency is 878 ha, and irrigated rice fields are only 693 ha. The most significant rainfed rice fields in Sawahlunto Regency are located in Nagari Bukik Gadang, Talawi District.

The problem that is often encountered in rainfed rice farming is climate. The uncertainty of monthly rainfall patterns in a year impacts rainfed rice planting. In addition, rainfed land generally has low soil fertility because the water source only comes from limited rainwater, and the content of nutrients in the soil is relatively low. Another problem includes rainfed land, which demands higher costs. There is a significant difference in expenses due to the high wages for ploughing rainfed rice fields. The wages spent on ploughing rice fields on rainfed land are 15% higher than those for ploughing irrigated rice fields. Based on the background and discussion, it is essential to examine whether or not rainfed rice farming in Sawahlunto Regency is profitable and feasible to implement.

## **METHODS**

The research method used in this study is quantitative research. Quantitative research is a systematic investigation that uses numerical or statistical data to quantify the problem and determine the relationship between variables (Siyoto and Sodik, 2015). Data were collected from rainfed rice farmers in Nagari Bukik Gadang. Sampling was done using non-probability sampling with a purposive sampling technique. The sample used in this study was 30 rainfed rice farmers.

The types of data used in this study are primary and secondary. Primary data were obtained through interviews with sample farmers using questionnaires. Secondary data are used to support the data. Secondary data are obtained from literature, previous research, books, and files from related institutions or agencies.

The data analysis used is quantitative and qualitative. The qualitative analysis describes and analyses the cultivation technique practiced by rainfed rice farmers. Meanwhile, the quantitative analysis was addressed to calculate the profitability and financial viability of rainfed rice farming in Nagari Bukik Gadang. The formula used to calculate the profit gained by farmers of rainfed rice farming in this study can be seen below:

$$\text{Profit} = \text{Total Revenue} - \text{Total Costs}$$

Moreover, to measure how efficiently a business generates profit relative to its expenses, we need to calculate the profitability using the R/C ratio or Revenue-Cost Ratio. R/C Ratio helps farmers determine whether a farming practice is financially viable. The formula to calculate the R/C ratio can be seen below:

$$\frac{R}{C} \text{ Ratio} = \frac{\text{Total Revenue}}{\text{Total Cost}}$$

Interpretation:

$R/C > 1$  indicates that the revenue generated exceeds the costs incurred. The higher the ratio, the more profitable the farming.

$R/C = 1$ : This means the revenue is equal to the costs. Farming is breaking even with no profit or loss.

$R/C < 1$ : This shows that the costs are higher than the revenue. Farming is operating at a loss.

## **RESULT AND DISCUSSION**

### **The Characteristics of Rainfed Rice Farmers' Respondents**

Farmer characteristics provide crucial insights into their farming practices, decision-making, and potential for adopting new technologies or strategies. Understanding these characteristics could help researchers, policymakers, and extension workers to develop targeted interventions and support systems that cater to the specific needs of different farmers and farmer groups. The characteristics of rainfed rice farmers measured in this study are age, education, land area, experience in farming, and land ownership status.

Table1. Characteristics of Rainfed Rice Farmers' Respondents

No	Characteristics	Number	Percentage (%)
1	Farmers' Age:		
	15 – 55	21	70
	> 55	9	30
2	Formal Education:		
	No Formal Education	1	3
	Elementary School	9	30
	Junior High School	6	20
	Senior High School	14	47
3	Land Area (Ha):		
	< 0,5	7	23
	0,5 – 1	22	73
	> 1	1	4
4	Land Ownership Status:		
	Land Owner	17	57
	Rent	13	43
5	Farming Experience (Years):		
	< 10	5	17
	10 – 20	12	40
	> 20	13	43

Based on the table above, it can be seen that most of the farmers' respondents (70%) are in their productive age (15-55 years old). It indicates that most rainfed rice farmers in this area are relatively young and physically strong. Soekartawi states that the age of farmers influences their way of thinking and productivity.

Education is one of the factors affecting the way farmers manage their farming. The level of education also significantly affects the farmers' way of thinking and decision-making when adopting technology. Fifty-seven per cent of farmers' respondents have a lower formal education than those in high school. This finding implies that most rainfed rice farmers in Nagari Bukik Gadang have relatively low education.

Land is one of the input factors that significantly affect production—the wider the land owned by farmers, the higher the output that can be produced. The average land area of rainfed rice fields cultivated by farmers is 0.5-1 ha. More than half of the farmers' respondents (57%) own their rice fields, while the rest rent it. Based on farming experience, most farmers (83 %) have more than 10 years of rainfed rice farming experience. Farmers' experience relates to their ability to manage and maintain their farms.

### Farming Analysis of rainfed rice field in Nagari Bukik Gadang

#### 1. Rainfed Rice Production

The average rainfed rice production in Nagari Bukik Gadang was 811 kg/planting season, while the average rainfed rice production per hectare was 1,501 kg/ha. Compared to national production, rainfed rice productivity in Nagari Bukik Gadang is relatively low and has not reached optimal productivity. The Ministry of Agriculture noted that the productivity of rain-fed rice ranges from 1.8 to 4.5 tons per hectare.

#### 2. Price

Most farmers in Nagari Bukik Gadang do not sell their harvest in the form of rice but in the form of grain. This analysis uses the prevailing price of grain during harvest in the research area. The prevailing price of grain was Rp6,500/kg.

### 3. Cost Production

Production costs in agriculture consist of cash costs and non-cash costs. The cash cost spent in rainfed rice farming consists of the expenses for seed, fertilizer, pesticide, wages for non-member labour, tax and land rent. The total cash cost per land area was Rp1,315,816.7/ planting season. Meanwhile, the non-cash cost consists of the seed from the previous harvest, wage for family labour, tools depreciation, rent for their land, and capital interest. Total non-cash cost per land area was Rp 2,338,493.7 / planting season. Thus, the total production cost per land area for rainfed rice farming in Nagari Bukik Gadang was Rp 4.413.582,6 / planting season. The details of production costs in rainfed rice farming are as follows:

Table 2. Production Costs of Rainfed Rice Farming in Nagari Bukik Gadang

No	Criteria	Per Land Area (Rp)	Per Ha (Rp)
1.	Cash Costs:		
	Seed	16,250.0	28,750.0
	Fertilizer	295, 233.3	529,274.3
	Pesticide	29,666.7	61,939.2
	wages for non-member labour	1,032,000.0	2,019,132.2
	Tax	4,541.7	14,166.7
	Land rent	759,272.0	1,524,726.0
	<b>Total Cash Cost</b>	<b>1,315,816.7</b>	<b>2,338,493.7</b>
2.	Non-Cash Costs:		
	Seed	75,750.0	130,688.5
	Family labour	994,000.0	1,898,748.7
	Depreciation	68,593.6	32,580.0
	Own land rent	1,034,944.4	1,746,814.8
	Capital interest	202,659.3	373,836.4
	<b>Total Non-Cash Cost</b>	<b>2,338,493.7</b>	<b>4,217,242.0</b>
3.	<b>Total Cost</b>	<b>4,413,582.6</b>	<b>8,283,478.3</b>

### 4. Revenue

Revenue is the total income received by farmers from selling the yields. The value of revenue depends on the quantity of yields and selling price. The total revenue from rainfed rice farming in Nagari Bukik Gadang was Rp 5,271,500/ land area, which is equal to Rp 9,755,305/ha.

### 5. Profit

Profit is the result of subtracting total revenue from total costs. The total profit from rainfed rice farming in the research area per land area was Rp 857,917.4/planting season. Meanwhile, the profit per hectare received by rainfed lowland rice farmers was Rp1,471,826.62/planting season.

### 6. R/C Ratio

Return cost analysis (R/C ratio) is the ratio between revenue and costs incurred. The analysis helps determine whether or not the farming business farmers run is financially viable. The higher the R/C value obtained, the higher the revenue efficiency farmers receive. The R/C Ratio of rainfed rice farming in Nagari Bukik Gadang can be seen in Table 3 below.

Table 3. R/C analysis of Rainfed Rice Farming

No	Criteria	Per Land Area (Rp)	Per Ha (Rp)
1.	Revenue	5,271,500,0	9,755,304.9
2.	Total Cost	4,413,582.6	8,283,478.3
3.	Profit	857.917,4	1,471,826.62
4.	R/C Ratio	1.14	1.15

The R/C ratio of rainfed rice farming in Nagari Bukik Gadang per hectare for one planting season was 1.15. This value means that for every Rp 1 spent by farmers to run a rainfed rice farming, they will receive a revenue of Rp1.15, which means that the farmer gets a profit of 0.15. The value indicates that the revenue generated is greater than the total costs. A higher R/C ratio signifies higher profitability and indicates that rainfed rice farming in Nagari Bukik Gadang is financially viable to implement.

## CONCLUSION

The study found that the cultivation of rain-fed rice fields carried out in Nagari Bukik Gadang did not generally comply with the literature and cultivation instructions that should be. The low productivity, which is less than the national standard of productivity of rain-fed rice fields, indicates that farmers have not practiced the proper way of cultivating rain-fed rice fields.

Although the production of rain-fed rice fields is relatively low, the results of the R/C ratio analysis obtained were 1.15 per ha, which is higher than one. The R/C ratio value shows that rainfed rice farming in Nagari Bukik Gadang is profitable and financially viable to be implemented.

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