

# Business identification of upland rice farming in Banyumas District, Central Java, Indonesia

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## Business identification of upland rice farming in Banyumas District, Central Java, Indonesia

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**Abstract.** Upland is one of the agroecosystems that has great potential for agricultural business of both food crops, horticulture, and annual crops. Ajibarang is one of the Banyumas' sub district which has approximately 70% of upland area and the rest is rainfed rice field. The success factor of upland rice farming is influenced by the farmer's ability to manage production factors into a profitable business and sustained. This study was aimed to identify the efficiency and its profitability of rice farming business in upland area of Banyumas district. Data were collected using survey method. Simple random sampling technique was done and 51 farmers were selected. Based on the data analysis, we found the average income of farmers was Rp989,817.55/production process with revenue cost ratio is 1.36. The role of community institutions in upland rice farming was very important. Farmers can improve their productivity and increase their income by expanding the cultivation area for upland rice. The rice cultivation in upland area is also suitable for rainfed land.

### 1. Introduction

Banyumas District is an area which its territory is mostly upland. Ajibarang as sub district of Banyumas has 70% of its land is upland type, and the rest (30%) is rainfed rice fields. The area of rice fields of Ajibarang sub district is shown in **Table 1**.

**Table 1.** State of rice fields in Ajibarang sub district

Type of watering	Year			
	2014	2015	2016	2017
Technical	309.18	309.18	309.18	309.18
Half Technical	370.99	370.99	370.99	370.99
Simple	419.25	419.25	419.25	419.25
Rainfed	509.21	509.21	509.21	509.21
Amount	1608.63	1608.63	1608.63	1608.63

Source: Monograph of Ajibarang Sub district extension center, 2018.

Most of the upland agroecosystem in Ajibarang Sub district is used for fields followed by the use of community forests and state forests. Large area in this field is not used for farming system in optimal way. The use of upland area in Ajibarang Sub district are shown in **Table 2**.



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**Table 2.** Condition of upland in Ajibarang district

Type of Land	2014	2015	2016	2017
Yard	893.64	893.64	893.64	893.64
Field	1,699.53	1,699.53	1,699.53	1,699.53
Fish pond	9.98	9.98	11.23	18.36
Community Plantation	416.05	416.05	416.05	407.67
Private Plantation	227.60	227.60	227.60	227.60
Community Forest	936.95	936.95	936.95	936.95
State Forest	604.08	604.08	604.08	604.08
Others	256.82	256.82	255.57	255.57
Total	6,653.26	6,653.26	6,653.26	6,653.26

Source: Monograph of Ajibarang Sub district extension center, 2018.

The problems experienced in agricultural sector are low quality and quantity of rice production. Lowland rice has only reached productivity of 6.2 tones/ha unhulled dry rice while upland rice only reaches 3.4 tons/ha. The failure and success of upland rice farming were influenced by the farmer's ability to manage, create, and control the production factors into a profitable business and its sustainability. According to this study was aimed to identify the business of upland rice farming in Ajibarang sub district, by determine the level of income and the efficiency, as part of business parameter

## 2. Research methods

### 2.1. Sampling method

The basic method used in this research is descriptive analysis by examine group of people, a set of conditions, a thought or a class of events in the present or at least a period of time that is within the memory of the respondent(s). Data were collected using survey method and sample of respondents were selected using simple random sampling. Every member of the population has equal chance of being taken as sample. This method is used by considering that the research area is homogeneous. This was indicated by the value of coefficient variant is 25%. Additionally, the farmer population at the study site was 146 peoples. To determine the number of samples, this study is referring to the previous report [1] with the following formula:

$$n = \frac{NZ^2S^2}{Nd^2 + Z^2S^2}$$

Information:

n = The number of samples studied

N = Total population

S<sup>2</sup> = Variance of sample estimates

Z = Normal variable for the 95% confidence level, namely 1.96

d = degree of deviation (5% = 0.05)

The results of the calculation show that the samples which need to be select is 51 farmers.

### 2.2. Data analysis

**2.2.1. Cost analysis, farm revenue, and income.** Total cost is the sum of Total Fixed Cost (TFC) and Total Variable Cost (TVC). The total cost formula is formulated as follows:

$$TC = TFC + TVC$$

Information:

TC = Total Cost

TFC = Total Fixed Cost

TVC = Total Variable Cost

2.2.1.1. *Total revenue (TR)*. Total revenue can be obtained from the multiplication of the amount of rice produced (sold) and unhailed dry rice's price. Total revenue is formulated as follows:

$$TR = P \times Q$$

Information:

TR = Total Revenue (Rp)

Q = Total Product (kg)

P = Price of unhailed dry rice (Rp/kg)

2.2.1.2. *Net revenue*. Rice farming income is the final result of revenue minus the total cost of production. Net Revenue is formulated as follows:

$$NR = TR - TC$$

Information:

NR = Net Revenue (Rp/Production process)

TR = Total Revenue (Rp/Production process)

TC = Total Cost (Rp/Production process)

2.2.2. *Business efficiency*. Efficiency is defined as an effort to use as small as possible of input to get the maximum production. Efficiency can be determined by calculating the Revenue of Cost Ratio (RCR) as the ratio between total revenue and total cost [2]. RCR is formulated as follows:

$$RCR = \frac{\text{Total Revenue}}{\text{Total Cost}}$$

Information:

If  $RCR > 1$ , rice farming is efficient (profitable) to cultivate, the inputs were used appropriately

If  $RCR < 1$ , rice farming is not efficient (not profitable) to cultivate, in this condition to achieve input efficiency is needed.

If  $RCR = 1$ , rice farming is even, this means the effort to spend input is equal to the amount of revenue received.  $RCR = 1$  means farmers do not have benefit but also do not lose of their business, generally speaking farmers are at break-even point [3].

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### 3. Results and discussion

#### 3.1. Characteristic of respondent

The selected respondents in this study were the members of farmer groups in Ajibarang Sub district, Banyumas District. The data collected from the respondents were age, level of education, dependents of the family, and experience.

3.1.1. *Ages*. The age group can be classified as less than 14 years, 15-64 years, and more than 64 years. The distribution of respondents according to the age groups can be seen in Table 3. None of farmers are in the age group less than 14 years and farmers are mostly at productive group.

Table 3. The age groups of research respondents.

No	Ages Group (Year)	Number of Rice Farmer (Person)	Percentages (%)
1.	0 – 14	0	0
2.	15 – 64	33	64.71
3.	>64	18	35.29
Total (Person)		51	100
Averages of Age (Year)		58.39	

<sup>12</sup> 3.1.2. *Education level.* The higher a person's education level, the higher of his/her income [4]. The educational level of rice farmers can be seen in **Table 4**. It is showed that most of the rice farmers have education at the elementary school (78.43%). This certainly affects the adoption of knowledge and technology provided by farmer groups.

<sup>9</sup> **Table 4.** The respondent's education level group

No	Education Level	Number of Farmer (Person)	Percentage (%)
1.	No school	1	1.96
2.	Elementary	40	78.43
3.	Junior high	2	3.92
4.	Senior high	7	13.73
5.	University	1	1.96
Total		51	100

3.1.3. *Number of families.* According to the earlier study [5], number of family indicated the household needs. The greater number of family, the more amount of production needs to be increased [6]. The number of family groups of the respondent can be seen in **Table 5**. As we can see, the average number of family owned by farmers is 2 peoples.

**Table 5.** The number of family members of the respondent.

No.	Number of families (Person)	Number of farmers (Person)	Percentages (%)
1.	>5	0	0
2.	4-5	5	9.80
3.	<4	46	90.20
Total (Person)		51	100.00

### 3.2. Cost and income analysis

Cost and Income Analysis to determine the financial aspects of rice farming in each planting system [6-9]. The results showed the average total production of upland rice farmers in Ajibarang Sub district was 827.71 kilograms per planting season, this means 0.23 ha on average.

**Table 6.** Cost and income analysis in production process.

Type	Unit	Total
Average of land area	ha	0.23
Total production	kg unhulled dry rice	827.71
Productivity	kg/ha	3,598.74
Selling Price	Rp/kg unhulled dry rice	4,500.00
Revenue	Rp	3,724,695.00
Production Cost:		
Seed Cost	Rp	197,362.75
Fertilizer Cost	Rp	285,735.29
Pesticide Cost	Rp	53,468.95
Tractor	Rp	332,843.14
Treaser	Rp	268,725.49
Labor Cost	Rp	1,484,460.78
Transportation Cost	Rp	94,705.88
Land Tax	Rp	17,575.16
Total Costs	Rp	2,734,877.45
Net Revenue	Rp	989,817.55

The productivity of land rice is only 3,598.74 kilograms of unhulled dry rice per ha or equivalent to 3.6 tons/ha. This result is lower than previous study [10] which reported 5.5 tones/ha per planting season which in upland area of Boyolali, Central Java. Another study was conducted in Aceh District [11] stated that the productivity of Inpago 8 rice on upland reached 6.47 tons of unhulled dry rice per ha. The total cost incurred by farmers is Rp2,734,877.45 which include the cost of seeds, fertilizer, pesticide, tractor rental, transfer, labor, transportation, and land tax. The average selling price of unhulled dry rice at the time of the study was Rp4,500.00/kg while the total income of farmers for one planting season was Rp3,724,695.00. The income earned by farmers from upland rice farming during the planting season is Rp989,817.55.

### 3.3. Efficiency analysis

Efficiency is defined as effort to use as small as possible input to get the maximum production. Efficiency can be determined by calculating the Revenue of Cost Ratio (RCR) as ratio between total revenue and total cost [12]. RCR analysis is used to compare revenue and costs [13, 14]. The results of RCR analysis is 1.36, which means that the rice farming in upland area is efficient due to  $RCR > 1$ . This also indicated the upland rice farming is financially profitable as reported by previous study [15, 16].

## 4. Conclusion

The results showed that the farming business of rice in upland area is profitable. The farmer productivity can be improved by expanding the cultivating area of rice. Cultivating the upland rice variety is also suitable for rainfed land.

## Acknowledgments

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