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Analysis of Characteristics and Level of Efficiency on The Development of Organic Rice (*Oryza sativa, L.*) Farming Business in Boyolali Regency

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Abstract
Certified organic agriculture is a product that has competitiveness and opportunities for export. This study aims to determine and analyze the characteristics of farmers, the total cost and revenue and income of organic rice, ze the level of efficiency, and BEP (Break-Even Point) of certified organic rice farming. The sampling method used in this study was simple random sampling with a sample of 40 farmers calculated using the Slovin formula. The analysis used is: (1) the analysis of the mean score for the characteristics of the farmers, (2) the method of analyzing costs and revenues and farm income, and (3) the analysis of the efficiency of the farming business using the R/C (Return Cost Ratio) analysis method. The research location was determined purposively, namely Dlingo Village, Mojosongo District, Boyolali Regency. The results of the study concluded that: (1) The characteristics of organic farmers were that men are more involved than women, the age of organic farming business practicioners were above 50 years old, most of the farmers in Dlingo village have lived for more than 30 years, the main livelihood farmers in the agricultural sector. (2) Based on the total average cost for organic farming, the certified group has an average of Rp.20,495,000,- and The average revenue was Rp. 35,000,000,-. The income per planting season is Rp. 14.505.000,-. Organic certified farmer groups get an R/C ratio value of 1.7; the R/C > 1 means that farming with certified organic systems is efficient. Rice farming with a certified organic system is profitable because the BEP value of production volume was 2,927 < farmers' production, while the BEP value for production price was 4,099 < selling price at the farmer level.

Keywords: organic rice; income; efficiency;

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Introduction

The development of the agricultural sector needs to be continuously improved to be more advanced, efficient, and resilient, as well as maintain the diversity of farm products. These efforts are carried out through diversification, intensification, extensification, and rehabilitation of agricultural land by developing and utilizing science and technology (1). Farm management is an organizational unit of production in the farming field. There will always be elements of land, capital, labor, and management in every farming business, the four of which cannot be separated. The land is a durable element of production that can be passed down from generation to generation.

Along with population growth, the need for land for housing, offices, and government buildings is also increasing, and it has an impact to production land for farming which is becoming increasingly narrow. This problem causes farmers' bargaining position to become weaker, limited access to economic opportunities as a source of income outside of agriculture, and

will ultimately affect their families' social structure and values . This situation causes farmers to live below the poverty line, so solutions are needed to increase farmers' income.

In addition to increasing farmers' income, it can be done by increasing farm productivity through optimal utilization of land potential and the application of agribusiness concepts in farming. Modern farming systems that have long been farmers' choice using chemical inputs have reduced soil fertility, decreased biodiversity, and increased pest, disease, and weed attacks. Another negative impact is the contamination of agricultural products by chemicals, which will harm human health (2).

Organic agriculture is an agribusiness development effort by increasing land productivity by utilizing local potential, namely natural resources and human resources. According to (3), organic farming is part of the latest efforts to promote a farming system that is both socially and ecologically sustainable.

Public awareness of the dangers to health and the environment has shifted from cultivation to organic systems. Organic agriculture, according to (4), is a sustainable agricultural system because it has the aim of meeting human needs while at the same time maintaining or improving the quality of the environment and conserving natural resources. Therefore, sustainability in organic agriculture must be seen in a holistic sense, which includes ecological, economic, and social aspects (5).

According to (6), all organic products circulating in Indonesia and claiming "organic" must include the "Indonesian organic logo" and are required to apply for certification to the Organic Certification Institute (LSO).) which has been accredited by the National Accreditation Committee (KAN). The development of certified organic farming aims to give consumers confidence (7). The organic rice cultivation business of the Pangudi Boga farmer group has been referred to following the provisions of SNI 01-6729-2010 and has subsequently been updated to SNI 01-6729-2016, whose application in groups has been made a guide in the form of SOI (Internal Organic Standards) and for practice guidelines for farmers Prepared Standard Operating Procedures (SOP) for Good Organic Farming Cultivation (GAP-Organic). And SOP for good postharvest handling (GHP-organic) (8).

The implementation of ICS (Internal Control System), part of SNI 01-6729-2016, has been carried out to obtain organic certification from certification bodies. Organizing farmers in organic rice farming innovation, ICS must be robust; without solid farmer groups and suitable group mechanisms, the work of organic rice farming innovation and ICS will not be able to be carried out optimally (8). For the implementation of the organic rice cultivation business of the Pangudi Boga farmer group, it has complied with the provisions of SNI 01-6729-2010, which was updated in 2016, which was further compiled in the SOI (Internal Organic Standards), and for practice, it used the provisions on Good Organic Farming Practices (GAP). -Organic) (9). This group applies organic rice farming by utilizing manure, livestock urine, or dried and processed plants into compost. To prevent plant pests and diseases (HPT), biological insecticides are used made from plants, namely betel leaf, tobacco, young areca nut roots, and others. Data from the Pangudi Boga Farmers' Poktan shows that from 2008 to 2017, there was an increase in the number of sales of organic rice and the price of organic rice. The purpose of the organic rice sales market from year to year has grown from the city of Boyolali to sales partners in and outside Central Java Province. Poktan Tani Pangudi Boga is currently cooperating in selling organic rice with several distributors selling organic rice. This study aims to determine and analyze the characteristics of farmers, Analyze the total cost and Revenue and income of organic rice, analyze the level of efficiency, and BEP (Break-Even Point) certified organic rice farming

Material and Methods

The study was conducted from March to August 2017 in Dlingo Village, Mojosongo District, Boyolali Regency, Central Java Province. The data collected include (1) primary data obtained through field observations and interviews with respondents (farmers) who cultivate organic rice plants using a list of questions that have been prepared (10); and (2) secondary data obtained through literature studies, village monographs, and related agencies related to research (Boyolali

District Agriculture Office).

The method of determining the research sample was done by a simple random sampling method. The samples taken in this study were members of the Pangudi Boga farmer group, as many as 40 farmers who had participated in certified Organic Rice Practices. According to (11,12), the simple random method is a sampling method in such a way that all members of the population have the same opportunity to be selected as samples.

Data analysis carried out are:

1) Analysis of the Average Score to see the characteristics of farmers
   The average score analysis was conducted to determine the characteristics of farmers, which include: gender, age, main occupation, primary income, land ownership.
2) The total costs incurred in the organic rice farming business use the formula:
   TC = TFC + TVC (where TC = total cost; TFC = total fixed cost, and TVC = total cost variable) (13,14)
   The amount of Revenue is calculated using the formula according to (15), namely:
   TR = P x Q (where : TR = total revenue, P = price; and Q = total production).
3) Revenue is calculated by subtracting the Total Revenue from the total cost, with the formula, according to (14) ,is as follows: I = TR - TC (where: I = income, TR = total revenue, and TC = total cost).
4) To find out the efficiency of farming is calculated using the R/C ratio approach, namely the ratio between the amount of revenue and the total cost) is calculated using the formula (12) as follows:

$$\text{R/C Ratio} = \frac{\text{Total Revenue (TR)}}{\text{Total Cost (TC)}}$$

   Decision rule:
   - R/C > 1 means that the farming is done is efficient.
   - R/C < 1 means that farming is done is inefficient.
   - R/C = 1 means that the farming is done is to break even.
5) BEP analysis (break-even point)
   BEP (break-even point) is a condition where a business is declared neither profit nor loss and is called the break-even point. BEP is divided into two parts, namely:
   (1) Production Price BEP

$$= \frac{\text{total production cost (Rp)}}{\text{total production (kg)}}$$

   (2) BEP Production Volume

$$\text{BEP} = \frac{\text{total production cost (Rp)}}{\text{price of farmer's product (Rp/Kg)}}$$

Results and Discussion

Characteristics of Farmers

Gender

The role of men and women in the development of organic agriculture is critical because some activities are suitable for men, whereas some others are suitable for women (16). From the identification of respondents in the management of organic agriculture in Dlingo village, it can be seen from that organic farming activities are identical with men while women only help (17). From 40 respondents, it was observed that 38 people, or 95%, were men whom carried out organic farming activities, while 2 or 5% were women. From these data, the role of women is still less.

Age

The age factor strongly influences the ability to work or perform physical activities, and the age factor (18) strongly influences even one's way of thinking. Likewise, concerning farmers in carrying out their work, farmers aged under 40 years will work more effectively than farmers aged over 40 years. This is because younger farmers, namely under 40 years of age, are physically stronger and healthier than older farmers above 40 years of age. Meanwhile, judging from the period that has been involved in the management of organic agriculture, the average age ranges from 40-50 years. From the 40 respondents, the data obtained from the age of farmers who manage organic farming are as follows: Age 20 years - 30 years obtained data 0 respondents or empty, age 30 years - 40 years as many as five respondents or 12.5%. While the age of 40 years - 50 years as many as two people or 5%. Next are the age of 50 - 60 years as many as 23 people or 57.5%, Age 60 years - 70 years

as many as six people or 15%. Age 70 years - 80 years as many as three people or 7.5%. At the same time, the age above 80 years is one person or 2.5%. From the data above, agricultural businesses are still dominated by farmers aged over 50 years, while the involvement of young people is still low. This will raise concerns about the sustainability of organic farming development in Dlingo village.

Domicile time

The domicile time of farmers is very influential on the interaction relationship between farmers. The longer farmers live in an area, the more they know the character between farmers so that it will affect the cohesiveness of farmers in doing farming in groups (19,20). From the results of respondent identification, for the domicile time in the village, on average the farmers has been resicendes since birth, thus also these 40 respondents are very aware of the conditions and situation of their village. From 40 respondents, the data obtained that those who live in the village 20 years-30 years one person or 2.5%, 31 years - 40 years four people or 10%, 41 years - 50 years a total of 9 people or 22.5%, 51 years – 60 years as many as 22 people or 55%, while > 60 years four people or 10%. From the description above, it shows that most of the farmers in Dlingo village have resided for more than 30 years, so this supports harmony between farmers in developing organic farming in Dlingo village.

Livelihood

Farmers' livelihoods affect the seriousness of farmers in managing organic farming (21). As for the primary occupation category, only a few people are non-farmers. From 40 respondents, data obtained that 38 respondents or 95% became farmers, one person or 2.5% was a retired civil servants, and one person or 2.5% was a teacher.

Land ownership status

Land ownership is very influential on the sustainability of the development of organic agriculture (22). Ownership of the land itself will be more assured of the organicity of agricultural land than leased land whose farming systems have different management. Land ownership by Dlingo village farmers from 40 respondents 39 people or 97.5 is owned by themselves, while one person 2.5% rents land. From the results of the analysis of land ownership data, most of the organic farming lands are owned by themselves.
Farmer characteristics are the characteristics or traits possessed by a farmer displayed through mindsets, attitudes, and patterns of action towards their environment (23). Inherent variables in a person can be said to be a farmer characteristic. Research results Basriwijaya, KMZ. And Pratomo, H. (24) stated a positive and significant correlation between farmer characteristics (age, education, dependents, experience, and land area) and lowland rice production.

Farming Income Analysis

Farming Fee

Costs in an economic sense are all materials that must be borne to provide goods to be ready for use by consumers (25). The selection of production inputs influences farming costs. It requires knowledge of the relationship between production inputs, namely land readiness, labor, seeds, fertilizers, pesticides, irrigation, participation in counseling, and production (output). Farming income is strongly influenced by the costs incurred, both variable costs and fixed costs (26,27). The variable cost components for certified and uncertified organic farms are the same, covering costs for purchasing seeds, fertilizers, vegetable/organic pesticides, and labor.

Based on the average data from organic certified farmer groups, the most variable cost components are labor costs, namely Rp. 7,820,000/ha/planting season or 82.3% of the total variable costs, organic fertilizer Rp. 1,250,000/ ha/planting season (13.2%), seed Rp.300,000/ha/planting season (3.2%), and the cost of vegetable pesticides Rp. 125,000/ha/planting season (1.3%). The low cost of fertilizer in the certified organic group, because it uses manure and forages manure. Complete data for the average variable costs in the group are in Table 1.

Table 1.Average Variable cost/hectare/MT

Cost Component	Total (Rp/ha/MT)	percentage (%)
seeds	300.000	3,2
Manure	1.250.000	13,2
Organic pesticide	125.000	1,3
Labor	7.820.000	82,3
Total	9.495.000	100

The components of fixed costs for organic rice farming in the study include purchasing equipment and land rent (28). Based on the data, the average fixed costs for the two groups are relatively the same because the equipment used, land rent is relatively the same (Table 2). The most significant fixed cost component comes from land rent, which is Rp. 6,000,000/ha/planting season or 55%. Another fixed cost is equipment Rp 5,000,000/ha/ planting season. In comparison, the tax component is not calculated because it becomes the landowner's burden, which is already included in the land rental fee (28). Based on the total costs (variable and fixed costs), organic farming from the certified group has a total cost of IDR 9,495,000/ha/ planting season.

Table 2.Average Fix Cost/hectare/season

Cost Component	Total (Rp/ha/MT)	percentage (%)
Land rent Tools rent Depreciation Tax	6.000.000 5.000.000	55 45
Total	11.000.000	

Table 3. Total Cost/hectare/season

Cost Component	Total (Rp/ha/MT)	percentage (%)
Variable cost	9.495.000	36
Fix cost	11.000.000	54
Total Cost	20.495.000	100

Farm Revenue

The amount of income obtained by farmers is influenced by the number of products produced by farmers, and the reasonable selling price, the higher the payment that farmers will obtain. The average productivity for the certified group is 7 tons/ha. This is estimated because the use of organic fertilizers that are used continuously and for a long time will increase the organic matter in the soil. This, of course will affect the fertility of the soil and plants.

The selling price of certified organic rice by farmer groups is harvested dry rice from certified organic groups purchased and organized by farmer groups at a price of Rp. 5,000,000/ton. Certified organic rice. The type of rice planted is red rice of the local type "slegreng" which has a market segment separately.

Farming revenue is calculated based on the income per planting season. All groups harvested three times in one year. Based on the average farm income, the certified group received an income of IDR 35,000,000/ha/planting season. Total farm revenue after deducting the total cost generates total income. The organic certified group earns Rp. 14.505.000,-. / ha/ growing season. Can be seen in table 4.

Table 4. Income/MT organic farmers groups

Description	Organic Certified
production (ton/ season)	7,0
Price (Rp/ton)	5.000.000
Revenue (Rp/season)	35.000.000
Cost (Rp/season)	20.495.000
income (Rp/season)	15.495.000

Farming revenue is the multiplication of the production obtained with the selling price of the product. Total Revenue or gross income is the total production value before deducting production costs. The net income of the farm is the difference between Revenue and all costs or total costs. Farmers in obtaining high net income, farmers must strive for high revenues and low production cost (29).

R/C ratio analysis and BEP analysis (break even point)

Certified organic farmer groups get an R/C ratio of 2.04, meaning that every 1 rupiah spent will be able to provide 2.04 rupiah in Revenue. The value of Return Cost Ratio (R/C ratio) of 2.04 indicates that R/C >1, then farming with organic systems is profitable (additional benefits/revenues are greater than additional costs). The calculation of the value of the R/C ratio is seen in Table 5.

Table 5. R/C Ratio

Description	Organic Certified
Revenue (Rp/MT)	42.000.000
Total Cost (Rp/MT)	20.495.000
R/C Ratio	2.04

Break event point (BEP) is a condition where in a company or farming operation neither profit nor loss/break-even (income = total cost). The break even point of organic rice farming means a situation where farmers in doing farming do not experience profits and also do not

experience losses, meaning that all costs incurred for production activities can be covered by sales income. Total costs (fixed costs and variable costs) are the same as total sales, so there is no profit or loss.

The BEP value for the production volume in table 6 means that the turning point for the organic rice cultivation business is reached if the production volume is 2927 kg/ha of dry grain harvested for one harvest. So that the total production of certified organic rice of 7000 kg/ha for one harvest has exceeded the break-even amount, in other words, making a profit.

Table 6. Break Event Point

Description	Organic Certified
Production (ton/ season)	7,0
Price (Rp/ton)	5.000.000
Total Cost (Rp/season)	20.495.000
BEP of Production	2,927
BEP of price	4,099

The BEP of production prices in table 6 means that the turning point is reached if the price of unhulled rice is sold at Rp. 4099/Kg. so that the average selling price of organic certified farmers of Rp. 5000/kg has been above the break-even price or in other words organic rice farming is in a profitable position.

Farmers who are advanced in doing farming will always think how to allocate inputs or production factors as efficiently as possible to obtain maximum production. If faced with limited costs in carrying out their farming, farmers need to try to increase profits with limited farming costs or in other words how to increase farm production with the smallest input costs (30, 31).

Debertin and Doll and Orazem (32), stated that there are two prerequisite conditions that must be met to achieve maximum profit. These conditions are a necessary condition and a sufficient condition. Efficiency is a method used in the production process by producing maximum output by suppressing production expenditures as low as possible, especially raw materials or can produce maximum production output with limited resources. Soekartawi (13) suggests that the principle of optimizing the use of production factors in principle is how to use these production factors as efficiently as possible. In the concept of production efficiency, technical efficiency and economic efficiency or price efficiency are known (32).

Technical efficiency requires a production process that can utilize small inputs to produce the same amount of output (25,33). Technical efficiency in organic rice farming is influenced by the quantity of production factors used. The combination of land area, seeds, organic fertilizers, organic pesticides and labor can affect the level of engineering efficiency (15,19,25). The proportion of the use of each of these production factors is different for each farmer. Analysis of production efficiency economically requires information on the selling price of production and the purchase price of production factors used in farming. This causes the assessment of production efficiency economically referred to as price efficiency. Economic efficiency of production needs to be done to see if the production factors used in farming are optimal and provide the maximum level of profit. Economic efficiency is a quantity that shows the comparison between the actual profits. Economic efficiency can be achieved if technical efficiency and price efficiency (allocative) can be achieved.

Conclusion

Based on the description of the research results above, it is concluded that The characteristics of farmers who are members of the Pangudi Boga farmer group are:

1. Men are more involved than women
2. The average age of organic farming business practicioners is above 50 years.
3. Most of the farmers in Dlingo village have resided for more than 30 years
4. The main livelihood of farmers is the agricultural sector
5. Most of the organic farming lands are their own property. Based on the total average cost for organic farming from the certified group an average of Rp.20,495,000,-. Average revenue Rp. 35,000,000,- with an average production of 7 tons/ha and the selling price of dry milled unhulled rice is Rp. 5000/kg. The income of certified organic farmers per planting season is Rp. 14.505.000,-. Rice farming with a certified organic system is efficient and profitable because the Return Cost Ratio (R/C ratio) value of 1.7 indicates that the R/C >1. Rice

farming with a certified organic system is profitable because the BEP value of production volume is 2,927 < farmer's production, while the BEP value of production price is 4,099 < selling price at farmer level.

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