A CASE STUDY OF FARMERS' PERCEPTION TOWARDS ORGANIC RICE CULTIVATION IN BANYUMAS REGENCY

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Abstract. Rice is one of the leading commodities in Banyumas Regency, but the rice cultivation system is still rarely practiced. The majority of farmers still feel unfamiliar with this organic rice cultivation. This study aims to find out farmers' perception towards organic rice cultivation, and determine the socio-economic characteristics of farmers who confirm to adopt organic rice cultivation in the future. The research was conducted from March to July 2023, in Banyumas Regency which covers three areas, namely Kedung Banteng, Watu Agung and Sumpiuh Districts. The research location was determined purposively with the consideration that some farmers in Kedung Banteng, Cilobgok, Watu Agung and Sumpiuh subdistricts have implemented an organic rice farming system. Meanwhile, the sampling technique is a census, where the entire population is sampled in this research. Data analysis used the attributes of innovation such as relative advantage, compatibility, complexity, trialability, and observability to measure farmers' perceptions and cross tabs to determine the distribution of confirmation to adopting/stop adopting organic rice cultivation. The results showed that farmers' perceptions of the relative advantage of organic rice cultivation were moderately satisfied, and very satisfied for compatibity, trialability, complexity, and observability. Respondents who confirmed to adopt organic rice cultivation had characteristics: 1) have an elementary school education; 2) have land ownership area <0.5 ha; 3) have rent rice fields ownership status; 4) have an age between 30-40 and 51-60 years, and 5) have 3-4 family members. The level of farmer satisfaction shows that there is an opportunity to continue implementing organic rice farming.

Keywords: Adoption of Innovation, Organic Rice Cultivation, Perception

1. Introduction

Food crops, especially rice, are the leading commodity in Indonesia. This is proven by the high consumption of rice by the Indonesian people. Rice is a staple food because almost 95% of Indonesian people consume rice [33]. Thus, special attention is needed in the development of agriculture in Indonesia. Currently, the development of organic farming systems is starting to become a trend, this is because many Indonesian consumers are starting to realize the dangers of using chemical residues in the environment and agricultural products. Public awareness of environmentally friendly agricultural products makes organic farming systems a new business field because of the higher selling price of its products [13]. Organic farming systems aim to repair land damage, create healthy and safe agricultural products, and reduce the occurrence of agricultural product pollution caused by the use of chemicals in conventional agricultural

systems [16]. Currently, various government programs as an effort to implement organic farming systems have been felt by some farmers. But it has not been fully realized. Some of the main obstacles in the development of organic farming systems are the lack of farmer knowledge, the absence of farmer group support, difficult market access, lack of training for farmers about organic farming systems, and the lack of openness of older farmers to new systems or technologies. In Kabupaten Banyumas, rice is one of the main and leading commodities. BPS data shows that in the last ten years, the average production of rice in Kabupaten Banyumas is quite a lot, amounting to 372,944.63 tons/year with an average land area of 66,626.77 ha [5]. However, organic rice cultivation is still rarely practiced. Some farmers in Banyumas Regency still consider organic farming systems as an innovation, so many farmers prefer conventional rice cultivation. This problem is caused by several factors including farmers' limited knowledge of organic rice cultivation systems, limited farming input factors, and lack of encouragement and support from both the government/relevant agencies and farmer groups.

Generally, the decision to adopt an innovation is influenced by various factors, including the adopter's perception of the nature of the innovation [25]. Examples of innovation properties are the complexity of using innovations and the benefits felt after applying innovations. Both examples of the nature of innovation determine the perception of adopters, which will ultimately have an impact on the behavior of adopters to accept or reject future adoptions. Farmers who have a positive perception of an innovation are likely to continue adopting the innovation until they are willing to pay more to be able to adopt the innovation. Likewise, farmers who have a positive perception of organic farming systems, it is likely that they will also be willing to continue adopting organic farming systems for their farms in the future. Moreover, the trend or tendency to consume organic agricultural products is increasing. This will further encourage farmers to carry out organic rice cultivation. Therefore, this study was conducted to know how farmers perceive the organic rice cultivation system and determine the socio-economic conditions of farmers who are willing to continue to adopt the organic rice cultivation system in the Banyumas Regency.

2. Methods

The research was conducted from March to July 2023 in Banyumas Regency, Central Java. Determination of the research location was carried out using a purposive sampling method. Purposive sampling is a sampling method with certain considerations by the research objectives [9]. The locations in this study were Kedung Banteng, Cilongok, Watu Agung, and Sumpiuh sub-districts. The selection of the four sub-districts was with the consideration that some farmers in these locations had already cultivated rice organically. The population in this study was 41 respondents because the number of farmers who have done organic rice cultivation in Banyumas Regency is 41 farmers. The sampling technique was carried out with a census, where the entire population was sampled. If the population in a study is less than 100 people, then the sample in the study is the entire population [3]. The data obtained from this research are primary data and secondary data. Primary data collection is done by direct interviews with respondents using a questionnaire. Secondary data is obtained from literature, previous research, and other supporting documents from related agencies.

The first objective in this study, farmers' perceptions toward organic rice cultivation, was analyzed using five perception variables according to Roger, namely relative advantage, compatibility, complexity, trialability, and observability [26]. Then, each of these perception variables is measured based on indicators and criteria as in Table 2. Furthermore, scoring of these criteria is carried out using a Likert scale. The scale range used in this study is based on

Syikhristani as in Table 1 [28]. Meanwhile, the second objective in this study, namely the distribution of confirmation to adopt/stop adopting organic rice cultivation, was analyzed with Crosstab using Microsoft Excel.

Table 1. Interpretation Scale Range for Each Category

Answer Range Criteria	Scale Range
Not at All Satisfied	1.00 – 1,79
Slightly Satisfied	1.80 – 2.59
Moderately Satisfied	2.60 – 3.39
Very Satisfied	3.40 – 4.19
Completely Satisfied	4.20 – 5.00

Source: Syikhristani (2018).

Table 2. Indicator of Farmer Perception Level

Variabel	Indicator
Relative Advantage	Economic Prestige
Compatibility	Compatibility of organic rice cultivation with environmental conditions Compatibility of organic rice cultivation with farmers' values and beliefs Compatibility of organic rice cultivation with farmers' habits in fertilizing Compatibility of organic rice cultivation with farmers' needs and expectations
Complexity	Application complexity Difficulty in obtaining supporting facilities for organic rice cultivation
Trialability	In accordance with the farmer's cultivation capabilities Easy to apply Individually
Observability	Rice production obtained after implementing organic rice cultivation The soil becomes more fertile and plants are resistant to disease attacks

Source: Primary Data Processed (2023).

3. Results And Discussion

3.1. The Characteristics of Respondents

Respondents in this study were farmers who cultivate organic rice in Banyumas Regency. The results showed that most respondents in this study had an age range between 30-40 years and 51-60 years, each totaling 29.27%. This age range is the productive age category. Age is an important factor affecting employee productivity [14],[29]. This indicates that farmers who are in the productive age range will also have high productivity. Farmers who are in the productive age range have thoughts that are open to new technologies and innovations so that they have a great opportunity to be more successful and successful in their farms [19]. In terms of education level, the

majority of respondents in this study fell into the low education category. This is because the majority of respondents only graduated from elementary school, followed by 39.02% and 36.59% who graduated from high school respectively. Education affects the mindset, so the higher the education, farmers will tend to have an open mindset, especially in the willingness to apply new technologies and innovations in managing their farms so that they have a greater chance of prosperity [15],[23]. As for the number of family dependents, most respondents have a family of 3-4 people, around 73.13%. The average respondent also has a narrow land area of less than 0.5 ha as much as 82.92% with most of the land owned by respondents being rented (58.54%). Land size is a consideration for farmers, especially in the decision to conduct organic rice cultivation. Facts in the field show that farmers who have narrow land tend to refuse to cultivate rice organically. This is because narrow land will result in little production and low income. If farmers cultivate organic rice on narrow land in the first 4 seasons, the income they will get is much less than inorganic rice cultivation.

Table 3. The Characteristics of Respondents

No.	Description	Percentage (%)
1.	Age (years)	
	- 30-40	29.27
	- 41-50	21.95
	- 51-60	29.27
	- >61	19.51
2.	Education	
	- Not an Elementary Graduate	2.44
	- Elementary School	39.02
	- Junior High School	19.51
	- Senior High School	36.59
	- Undergraduate	2.44
3.	Family size (people)	
	- ≤2	17.07
	- 3-4	73.17
	- 5-6	9.76
4.	Land ownership Status	
	- Own rice fields	39.02
	- Rent rice fields	58.54
	- Rent & Own rice fields	2.44
5.	Land ownership (ha)	
	- <0,50	82.92
	- 0,50-1	7.32
	- >1	9.76

Source: Primary Data Processed (2023).

3.2. Farmers Perception towards Organic Rice Cultivation

Rogers states that farmers' perceptions of the characteristics of innovation can be seen from five indicators such as relative advantage, compatibility, complexity, trialability, and observability [26]. The relative advantage indicator in this study is measured in economic terms, namely the income obtained after organic rice cultivation and prestige or social status after applying organic rice cultivation innovations. Table 4 shows that 53.66% of the distribution of farmers' perceptions of the relative advantage of organic rice cultivation is in the moderately satisfied category. Field conditions show that the costs incurred by farmers for organic rice cultivation are more efficient because the prices of input factors such as organic fertilizers and pesticides are cheaper when compared to chemical fertilizers and pesticides. But for the income earned by farmers, there has been no significant increase. This is because the majority of farmers in this study are still not 2 years into implementing organic rice cultivation. The use of organic fertilizers in organic food crop cultivation will be seen to produce profitable production if it has been used for 1.5 years [25]. Relative advantage indicators have a significant influence on farmers' decisions to adopt innovations [4],[21]. This is because the benefits that farmers will get after implementing the adoption of innovation is the main consideration of farmers in adopting an innovation.

The majority of respondents in this study expressed very satisfied mainly in the indicator of perceived compatibility with organic rice cultivation. The organic rice cultivation system has many advantages when compared to non-organic rice cultivation. Starting from higher selling prices, a wider market share, and maintaining soil fertility and nutrients [12],[20]. Farmers believe that organic rice cultivation is by social values in the community. For example, organic rice cultivation is more environmentally friendly, can improve soil fertility, and is believed to be able to produce healthy food products. Furthermore, the way of organic rice cultivation is the same as farmers' habits in conducting non-organic rice cultivation, the difference is that the input factors used come from non-chemical materials. In this study, most farmers stated that the implementation of organic rice cultivation is quite easy to do. Farmers' perceptions are influenced by the level of suitability of innovation/technology [10]. For example, the use of superior seeds will cause farmers' perceptions of these seeds to be good.

Complexity is the level of difficulty or complexity of an innovation to be implemented by adopters. Table 4 shows that the majority of respondents, 56.10%, stated that the level of complexity of organic rice cultivation is not difficult and quite easy to do. The application of organic rice cultivation does not require complicated stages. Organic rice cultivation has a uniform pattern with non-organic rice cultivation. Starting from seed preparation, nursery, tillage, transplanting, irrigation, weeding, fertilization, pest and disease control, harvesting, and post-harvesting. The thing that distinguishes organic and non-organic rice cultivation is the input materials used. In the organic farming system, the materials used are safer because they come from nature, while non-organic rice cultivation uses chemicals to speed up the harvest process in cultivated plants [2]. The ease of implementing an innovation is a top priority for farmers in the decision to adopt the innovation [30],[31].

The triability indicator can be seen from the ease of an innovation to be practiced directly individually. Farmers will be willing to adopt an innovation if the innovation can be tried on a small scale and can provide good results [7]. The results showed that farmers' perceptions of the triability of organic rice cultivation were in the very satisfied category. This is indicated by the information in Table 4 that as many as 43.90% of farmers think that organic rice cultivation is easy to try. Farmers in this study stated that

implementing organic rice cultivation for the first time is quite easy for individuals because the cultivation method is almost similar to the inorganic rice cultivation method, the only difference is the input materials used. The observability variable is measured by looking at the benefits of the results obtained by farmers after implementing organic rice cultivation in real terms. The results showed that farmers' perceptions of the observability of organic rice cultivation for their farms were categorized as visible. This is because as many as 56.10% of respondents in this study stated that the tangible benefits of organic rice cultivation were very satisfying. Some farmers who have cultivated organic rice stated that after cultivating organic rice and reducing chemical fertilizers, their land looked more fertile. The rice produced is also of good quality and rice plants are not easily attacked by disease.

Table 4. Percentage of Farmers Perception of Organic Rice Cultivation

Category	Percentage (%)				
	Relative Advantage	**Compatibility**	**Complexity**	**Trialability**	**Observability**
Not at All Satisfied	7.32	-	-	4.88	2.44
Slightly Satisfied	9.76	4.88	-	12.20	4.88
Moderately Satisfied	53.66	9.76	31.71	24.39	12.19
Very Satisfied	26.83	65.85	56.10	43.90	56.10
Completely Satisfied	2.44	19.51	12.19	14.63	24.39
Total	100.00	100.00	100.00	100.00	100.00

Source: Primary Data Processed (2023).

3.3. Distribution of Confirmation to Continue/Stop Adopting Organic Rice Cultivation

The results showed that most respondents, 85.37%, confirmed to continue adopting organic rice cultivation in the future. 34.15% of the distribution of farmers to continue to adopt organic rice cultivation are farmers with elementary school education, followed by farmers who have senior high school education as much as 31.71%. The higher the formal educational background of farmers, the lower the chance to stop adopting an innovation or technology [25]. Farmers' responses will tend to accept or adopt an innovation along with the increasing level of education taken. Furthermore, several previous studies show that there is a significant positive relationship between formal education and the adoption of innovation in paddy rice cultivation [8],[11],[27],[32]. One of the factors determining the adoption of agricultural technology is the education factor [1],[18]. Generally, the level of education will affect the mindset of farmers, so that the higher the education of farmers, the more open and fast in adopting an innovation.

The distribution of confirmation to continue organic rice cultivation in terms of land ownership shows that most respondents (85.37%) will continue to adopt organic rice cultivation with an average land area of <0.5 ha (73.17). The larger the land area owned by respondents, the higher the level of adoption of farmer innovations. Previous research showed that there was a significant positive relationship between land area owned and the adoption of innovation in paddy rice cultivation [8],[24]. However, it is different from the results of this study. Where the more extensive the land, the level of continued adoption of organic rice cultivation decreases. This is due to several factors including the more extensive land owned, the greater the risk that will be faced by farmers in adopting technology for their land, then in this study, most respondents (82.92%) have

a land area of <0.5 ha. As for the socio-economic characteristics of farmers with land ownership status, it shows that farmers who own leased land are willing to continue adopting organic rice farming systems. Facts in the field show that farmers who own leased land tend to be more ambitious so that farming is run more profitably because the cost of land rental is quite expensive. This causes farmers to be more open to innovations that are considered capable of bringing profits.

In terms of age, the distribution of confirmation to continue adopting/stop adopting organic rice cultivation shows that the younger the age of farmers, the higher the response to continue adopting organic rice cultivation. Table 5 shows that most of the respondents who are willing to continue adopting organic rice cultivation systems are farmers with age categories of 30-40 years (26.83%) and 51-60 years (26.83%). The age range is included in the category of productive age range. Some previous research shows that farmers of productive age are much more likely to adopt innovations/technologies than farmers of non-productive age [32]. Furthermore, there is a significant positive relationship between the age of farmers and the adoption of innovation in paddy rice cultivation [17],[22]. As for the characteristics of respondents seen from the number of family dependents, it shows that as many as 63.41% of respondents are willing to continue to adopt the organic rice cultivation system having several family dependents of 3-4 people. The number of family dependents affects the innovation adoption process [6]. The number of family dependents shows the number of people whose lives are borne by the head of the family. The greater the number of family dependents, of course, the more needs and costs that must be incurred. This causes farmers to be reluctant to adopt innovations because they are afraid of the risk/failure of their farms if they apply innovations, while farmers have many family dependents who must be financed.

Table 5. Distribution of Confirmation to Continue/Stop Adopting Organic Rice Cultivation

No.	Description	Percentage (%)		
		Keep receiving	**Stop receiving**	**Total**
1.	Education			
	- Not an Elementary Graduate	0.00	2.44	2.44
	- Elementary School	34.15	4.88	39.02
	- Junior High School	17.07	2.43	23.75
	- Senior High School	31.71	4.88	25.00
	- Undergraduate	2.44	0.00	2.44
	Total	**85.37**	**14.63**	**100.00**
2.	Land ownership (ha)			
	- <0.50	73.17	4.88	78.05
	- 0.50-1	7.32	4.88	12.19
	- >1	4.88	4.88	9.76
	Total	**85.37**	**14.64**	**100.00**
3.	Land ownership status			
	- Own rice fields	39.02	0.00	39.02
	- Rent rice fields	43.90	14.64	58.54
	- Rent & own rice fields	2.44	0.00	2.44
	Total	**85.37**	**14.64**	**100.00**
4.	Age (years)			
	- 30-40	26.83	2.44	29.27
	- 41-50	19.51	2.44	21.95
	- 51-60	26.83	2.44	29.27

	- >61	12.19	7.32	19.51
	Total	**85.36**	**14.64**	**100.00**
5.	Family size (people)			
	- ≤2	12.19	4.88	17.07
	- 3-4	63.41	9.76	73.17
	- 5-6	9.76	0.00	9.76
	Total	**85.36**	**14.64**	**100.00**

Source: Primary Data Processed (2023).

4. Conclusion

Analysis of farmers' perceptions of organic rice cultivation in Banyumas Regency shows that when viewed from the aspect of relative advantage in the moderately satisfied category. Then for indicators of compatibility, trialability, complexity, and observability in the moderately satisfied category for organic rice cultivation systems. Organic rice cultivation has the same cultivation pattern as non-organic rice, only the input materials make the difference. Organic rice cultivation systems use input materials that come from nature and are environmentally friendly, while non-organic cultivation uses input materials derived from chemicals. Respondents who confirmed that they will continue to adopt organic rice cultivation systems in the future have characteristics such as 1) having an elementary school education; 2) having land ownership area <0.5 ha; 3) having rented rice fields ownership status; 4) having an age between 30-40 and 51-60 years, and 5) having 3-4 family members.

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