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# Role of Youth in Organic Rice Commercialization in Boyolali

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## Abstract

Technological advancement requires farmers to be able to reach consumers and earn from their farming. Young generations, who are more adaptive to technological advancement, should be able to help contribute actively to increase the income of their parents who are farmers. This research aimed to find out the role of youth in the organic rice commercialization in Boyolali Regency and its effect on farmers' income. This descriptive research was carried out with the survey method and analyzed with two-stage least square. The results showed that there were four variables that influenced the organic rice commercialization, namely age, educational level, government program, and the role of youth as a liaison. In general, the role of youth in the organic rice commercialization in Boyolali Regency is very minimal. It was found that organic rice commercialization also affected the income of organic rice farmers in Boyolali Regency. Efforts are needed to attract youth to take an active role in the organic farmers' activities, for example by giving an example that organic rice farming can generate sufficient income for farmer families. Youth should be given freedom to cultivate land resources and manage capital, organic rice training, and rural agrarian reform.

**Keywords:** Youth, two stages least square, commercialization, income, organic rice

## I. INTRODUCTION

Technological advancement is inevitable in this life as technology will work according to science development. Every innovation is created to provide positive advantages for human life. Technology also provides many conveniences, as well as a new method of doing human activities [1]. One of the popular new methods in Indonesia due to the role of technology is online trading, including the trading of various agricultural commodities, one of which is organic rice.

Organic rice is a food produced by organic rice farming [2]. At present, selling and buying activities of organic rice are mostly carried out through the use of internet technology, especially social media and various other corporate sites. This is a new method of marketing organic agricultural products, which is able to produce a very large profit. For example, in Canada the annual total sales of organic products are estimated at 3.5 billion Canadian dollars, with around 54% of sales through online buying and selling activities [3]. In fact, that the rate of organic product online sales is inseparable from the

increase of consumer knowledge of organic products. Organic food consumers usually have a higher educational level [4] [5] and in seeking organic food sources they prefer to search on the internet because organic food products are very difficult to find in traditional markets. This condition also occurs in Indonesia, where organic rice consumers should look for organic rice information through the internet.

The organic rice consumers' behaviours must be followed by organic rice farmers in order to be able to benefit commercially. However, the real condition experienced by organic rice farmers in Indonesia is that most of them are overage and do not understand technology changes, making it difficult for them to follow changes in consumer behaviour. This condition is an obstacle in marketing organic rice in Indonesia. If the farmers want to get the maximum profit from their farming business, they need to sell their products commercially through the internet. The marketing activities of organic products through the internet can be carried out with the help of farmers' children who are generally younger with better knowledge of technology. Nunez et al. [6] found that

formal education can influence youth perceptions on organic farming, thus increasing their opportunity to help their parents in marketing and commercializing their organic rice. Every change that occurs in global and Indonesian societies can certainly involve young people as the main actors [7]. Naaf and White [8] classified young people into three perspectives, namely young people as generations, young people as transitions, and young people as cultural creators and consumers. This characteristic is expected to be able to create the culture of organic rice commercialization through the use of technology.

Based on above facts, this research aimed to find out the role of youth in organic rice commercialization in Boyolali Regency and its effect on farmers' income. The organic rice farmers in Boyolali Regency have applied the organic farming concept since the early 2000s. Current technological changes certainly require them to commercialize their organic rice through the internet. The role of youth and farmers' children in Boyolali Regency in marketing and commercializing their parents' organic products through the internet is interesting now that there appear young people who sell organic products. Mariyono's previous research on the agricultural product commercialization has also been carried out in 2019 [9], but it only analysed the factors that determine farmers' intention to commercialize vegetable-based agribusiness in rural areas and assessed the effects of commercialization on the farmers' incomes.

## II. METHODS

Chamberlin and Jayne [10] in their research stated that commercialization became the driving force in agriculture in rural economic development. Institutional and infrastructure constraints are the reason of many small farmers not to commercialize their farming (Chamberlin and Jayne, 2013). Another research showed that the driving force of agricultural commercialization includes population growth, technical change, increased market access, crop intensification, and technology utilization [11]. Based on the previous research, this descriptive research [12], in analysing the role of youth in the organic agriculture commercialization involved the variables of farmer's household characteristics, supporting facilities, and the role of youth in the regression equation to find out their effect on the organic rice farming commercialization. The sampling technique used was snow ball sampling. The data were collected using observation and interviews with a questionnaire guide. Mathematically, the variables that affect the organic rice commercialization can be seen in the following equation:

$$C = \alpha_0 + \sum_{i=1}^4 \beta_i K_i + \sum_{j=1}^4 \beta_j F_j + \sum_{k=1}^6 \beta_k M_k + \varepsilon_1 \quad (1)$$

$$I = \varphi_0 + \varphi_1 C + \sum_{i=1}^4 \delta_i K_i + \varepsilon_2 \quad (2)$$

C is the commercialization level According to FAO [13], commercialization is divided into three categories. First, farmers are said to be subsistence if the excess production sold is under 25% of total production. Farmers are called transitional farmers if they are able to sell excess production by 25-50%, and farmers are called commercial farmers if they able to sell more than 50%. K is a vector of farmer household characteristics. The characteristics of farmer households consist of farmer's age (year), land area (ha), farming experience (year), and educational level (year). F is a vector of supporting facilities consisting of training program, government program, use of smartphone-based cellular phones, and seedling technology variables. The value of the supporting facility variable is 1 if the farmers have the facility and 0 if they don't. M is a vector of the role of youth in farming which consists of the variables of the role of youth as initiators, facilitators, motivators, liaisons, organizers, and analysts. The roles were used to adapt youth to the role of agricultural extension workers [14]. Score 1 was given if young people, who are children of organic rice farmers or those aged 16-30 years, play a role in the organic rice commercialization; Score 0 was given if there were no roles of youth at all. I is a vector of farmers' incomes.  $\alpha$ ,  $\beta$ ,  $\varphi$  and  $\delta$  are estimated coefficients and  $\varepsilon_i$  is a residual that includes other factors outside the scope of the independent variables used for this analysis.

The model was estimated using two-stage least square with instrumental variables to overcome heteroscedasticity. Multicollinearity between independent variables was examined using a correlation matrix. The linear model was used to test the marginal effects and relationship between independent variables (autocorrelation) in the model. The statistical parameter significance was tested at error rates of 1%, 5%, and 10%.

## III. RESULTS AND DISCUSSION

Table 1 shows the model of estimation of factors that influence the organic rice commercialization in Boyolali Regency. Overall based on the F test, the model equation is significant at 90% of the degree of confidence with  $R^2$  of 65.5%. These results also show that there are 34.5% of other factors not included in the equation model. The other factors are such as business, agro-ecological, and organizational and government policies in the model. There was no multicollinearity in the model indicated by a low correlation value between independent variables.

Table 1. Regression Results of Factors Affecting Commercialization

Variables	Coefficients		t-value
	Actual	Standardized	
Constant	148.519		
Age	-0.729	-0.632	-2.211**
Land area	-4.787	-0.136	-0,362ns
Farming experience	-2.102	-0.601	-1,746ns
Educational level	-5.272	-1.195	-3,637***
Training program	-2.034	-0.068	-0,222ns
Government program	-11.616	-0.414	-1,971*
Smartphone use	6.269	0.221	0,884ns
Seedling technology	-2.429	-0.073	-0,411ns
Initiator role	0.153	0.005	0,021ns
Facilitator role	-7.578	-0.254	-1,020ns
Motivator role	20.772	0.369	1,389ns
Liaison role	37.043	0.658	2,948***
Organizer role	12.079	0.154	0,461ns
Analyst role	43.460	0.772	1,320ns
R <sup>2</sup>			0.655
F-test			2,037*

Note: \*real at 90% of degree of confidence, \*\*real at 95% of degree of confidence, real\*\*\* at 99% of degree of confidence level, ns not significant

Based on the estimation model, there are four variables that influence the organic rice commercialization, namely age, educational level, government program, and the role of youth as a liaison. In the farmer group where the research was conducted, the farmers were asked about the role of children as their village youth in organic rice farming activities. Among the variables that have significant influence, age, educational level, government programs have a negative impact on commercialization. For farmers that were getting older, they might use the organic rice yield for household consumption needs rather than pursuing profits. Formal education has a negative effect because it encourages farmers to get jobs besides doing organic rice business. This is in line with the findings of Mariyono [9] and Azam and Musarrat [15]. In the respondent farmer group, some sample farmers have side jobs other than farming, such as civil servants, teachers, and factory workers. Government programs have a negative effect on commercialization because government programs are mostly aimed at meeting consumption needs and increasing organic rice production, not helping to market organic rice produced by farmers.

The role of youth as a liaison has a positive effect on organic rice farming. Youth or children of organic rice farmers

in Boyolali Regency were active in connecting farmers with traders even though most only connect them to small traders. There were only a few children who helped connect farmers with consumers directly through online buying and selling activities. These activities are very beneficial for the commercialization and increase in income of organic farmers. The role of youth as a liaison was also shown by the youth in the farmer group by delivering their parents' organic rice yields to the village collectors and small traders in the districts. Based on analysis results, it is also concluded that the role of youth in the organic rice commercialization in Boyolali District is very minimal, and this may also happen throughout Indonesia. This is very unfortunate because young people should be able to give ideas about organic rice marketing because they are more familiar with the use of technology that is developing at this time (the role of initiator and facilitator). Youth should also be able to motivate farmers to get better income (the role of motivator), to be useful for capacity building, and to analyse each marketing problem for farmer groups around them (the role of organizer and analyst). However, this does not occur as evidenced by the insignificant analysis results as shown in table one.

Table two shows the effect of agricultural commercialization on organic rice farmers' incomes. There is no multicollinearity detected in the model. Overall based on the F test, the model equation is significant at 99% of the degree of confidence with R<sup>2</sup> of 53.6%. The estimation model shows that the increase of 1% in commercialization increases the income by 130,275 Rupiah. Organic rice is considered a high-value plant [16]. A research by Mariyono [17] shows that high-value intensive farming produces positive income.

Table 2. Regression Results of Factors Affecting Farmer Income

Variables	Coefficients		t-value
	Actual	Standardized	
Constant	15704.698		
Commercialization	130.275	0.299	1.906*
Age	-156.481	-0.311	-1,584ns
Land area	10327.535	0.674	3,695** *
Farming experience	-501.513	-0.329	-1.874*
Educational Levels	-1033.952	-0.538	-2.525**
R <sup>2</sup>			0.536
F-test			5,536** *

Note: \*real at 90% of degree of confidence, \*\*real at 95% of degree of confidence, real\*\*\* at 99% of degree of confidence level, ns not significant

The partial effect test results using t-test show that commercialization, land area, farming experience, and educational level have a significant effect on the organic rice farmers' incomes. Meanwhile, farmers' age does not significantly influence their incomes. The coefficient value of the land area variable with a positive value of 130.275 shows that the decrease of the land area will increase the farmer's income by 130.275 per unit of planted land. Land area is the main important factor in farming production activities. It affects the number of plants that can be planted by farmers in the area. The greater the land area is, the greater the number of plants is planted so that the organic rice production is also getting bigger. The amount of production will determine the organic rice farmers' incomes. This fact is consistent with the findings of Zikrina et al., [18] which show organic rice productivity has a positive effect on farmers' incomes.

The coefficient values of farming experience and educational level variables are negative at -501,513 and -1033,952, respectively. This shows that the increase in the experience and level of formal education will reduce farmers' income from organic rice farming. Farming experience is related to the habits of organic farmers in marketing their organic rice. The experienced farmers at the research location had previous negative experience in commercial farming, which causes them to reduce their intensity in farming activities. The negative experience was the decrease and fluctuation of dry rice prices during harvest time. This experience makes the farmers have a kind of trauma to cultivate organic rice on a large scale resulting in reducing the potential income that farmers may receive. It is very difficult for experienced farmers to change their cultivation method based on new innovations. For example, the respondent farmers in Boyolali Regency did not apply microbacteria to help make organic fertilizer from animal waste, but chose to wait for the waste to dry on its own so that it could then be used as fertilizer. This finding is consistent with that of Azam and Musarrat [15] demonstrating the negative impact of experience on farmers' decisions to access innovation for better farming productivity. Another research shows that experience positively influences adoption of agricultural technology [19]. Formal education has a negative effect on the organic rice farmers' incomes because the farmers who have higher formal education prefer to work in other sectors which, according to them, provide a fixed salary every month. At the research location, some farmers also work as civil servants, teachers, and factory workers. This also indicates that the planting of organic rice by some farmers is only used as a side job although this condition can be justified because they have

spare time to do organic rice business. This spare time should be maximized to take a good care of organic rice so that production can be maximized. However, the farmers prefer to work in other sectors to earn additional income. Higher education should be able to increase farmers' income. Educated farmers will be able to develop and improve new innovations related to organic rice farming. Some researches also produce similar conclusions related to the role of education to increase the farmer's income as carried out by [15]. Age variable does not significantly influence the organic rice farmer's income. Increasing age will reduce the farmers' ability to cultivate organic rice farming as their ability has begun to diminish and their willingness to produce more is aimed at meeting their household consumption.

#### IV. CONCLUSION

The organic rice farmers in Boyolali Regency are those who have transformed towards commercial farmers. There are four significant variables that influence the organic rice commercialization, namely age, educational level, government program, and the role of youth as a liaison. The role of the youth as a liaison was also shown by the youth in the farmer group by delivering the organic rice from their parents directly to the village collectors and small traders in the district. There were only a few children who helped connect farmers with consumers directly through online buying and selling activities. In general, the role of youth in the organic rice commercialization in Boyolali Regency is very minimal. It was found that organic rice commercialization also affected the income of organic rice farmers in Boyolali Regency. Other factors that influence farmers' incomes in addition to commercialization are land area, farming experience, and educational level. Efforts are needed to attract youth to take an active role in organic rice farming business activities through computerization in the administration of quality control systems for organic rice production processes and maximizing the role of youth in marketing organic rice with an online system.

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