The Potential for Developing Organic and Non-Organic Rice in Bantul District, Special Region of Yogyakarta

1st Eni Istiyanti
Departement of Agribusiness
Faculty of Agriculture
Universitas Muhammadiyah Yogyakarta
Yogyakarta
eniistiyanti@umy.ac.id

2th Retno Wulandari
Departement of Agribusiness
Faculty of Agriculture
Universitas Muhammadiyah Yogyakarta Yogyakarta
wulandari_fp@yahoo.com

***Abstract*— Rising awareness toward the effects of chemical substance on public health and environment has led to the initiation and the development of organic farming system. This research aimed at analyzing the financial feasibility and technical efficiency of the development of organic and non-organic rice farming. The paper was conducted in Imogiri Sub-district, Bantul District, which was purposively selected. The research utilized survey with 50 respondents which were selected using the method of simple random sampling. The analysis technique applied was descriptive and quantitative, using Cobb Douglass stochastic frontier production function. The result of the research visualizes that organic rice possesses higher level of income and profit than non-organic rice does. Financially, organic rice is feasible for further development with R/C value reaching 1.81 (>1). Furthermore, technically, organic rice shows promising efficiency with efficiency index reaching > 0.7. Finally, the paper suggests that the development of organic rice in Bantul District shall be continued since it provides not only financial benefit but also environmental benefit.**

Keywords*— development, financial feasibility, organic rice, technical efficiency

I. INTRODUCTION

The use of chemical input affects soil fertility, biodiversity and the spread of pests and plant diseases. In addition, the use of chemical input also leads to chemical pollution on agricultural products which may have negative effects on human health [1]. Rising awareness toward the effects of chemical substance on public health and environment has led to the initiation and the development of environmentally friendly and sustainable organic farming system. The system is laid down on harmonic interaction between earth, plant, mankind and environment and the use of organic materials for public health and soil fertility.

Organic farming system is one of alternative nature friendly and sustainable farming systems [2]. In terms of environmental health, the implementation of organic farming system brings up several benefits such as that the land is easy to cultivate and it does not the environment. The efficiency of the improvement in soil quality and environmental condition as positive effects brought up by the implementation of organic farming system can be maximized [3] The use of organic fertilizer as an effort to reduce the use of an-organic fertilizer has the capability to produce equal rate of growth and equal number of crops [1].

Rice is one of the crops that is being reoriented toward organic farming system. It is essential since rice is the main dish of the majority of the people of Indonesia. Compared to non-organic rice, organic rice contains lower chemical residues, offers more fluffy sensation and lasts longer in storage, and offers higher price in market [4]. Also the organic rice farming income is higher than non-organic rice, as happened in the sub-district, Sambi Boyolali district [5] and Perbaungan sub-district, Serdang Bedagai District [6]. Some studies also show that organic rice farming is technically efficient, as happened in Sragen [7] and Tanggamus districts [8]

Rice production in Bantul District in during the period of 2012-2016 fell by 3%, and productivity decreased by 2.8% [9] The government has launched a program to improve food security through organic farming, which focuses on organic rice commodities. One strategic issue that is of concern to the government in agricultural and forestry development is the interest of farmers in the use of organic fertilizer is still low and the need to increase organic farming towards sustainable agriculture [10]. Although the advantages of organic rice compared to non-organic rice are clear, there is a tendency for organic rice production to decline in line with the decline in rice production in Bantul District. Based on the above exposition, there is a number of questions to answer. Do farmers really find organic and non-organic rice farming to be beneficiary? Is production of organic and non-organic rice technically efficient? Ultimately, this research aimed at analyzing the financial feasibility and technical efficiency of the organic and non-organic rice farming

II. METHODS

The research was conducted in Imogiri Sub-district, Bantul District, taking advantage of survey method. There were 50 respondents, 25 of them were organic rice farmers and the other 25 respondents were non-organic rice farmers. They were selected using the method of simple random sampling. Related to the data, the primary data were collected from Forum Group Discussions (FGD), questionnaire-based interviews and observations. Meanwhile, the secondary data were from documentations.

The first goal is to understand the financial feasibility based on the indicators of R-C ratio, land productivity, workforce productivity and capital productivity The second goal is to analyze technical efficiency using stochastic frontier production functions as developed by [11]. Frontier stochastic production functions take the form of Cobb-Douglass that is transformed into natural logarithm linearity. Below is how it is written mathematically:

$$Ln\ Y = Ln\alpha + \beta 1LnX1 + \beta 2LnX2 + \beta 3LnX3 + \beta 4LnX4 + \beta 5LnX5 + \beta 6LnX6 + \beta 7LnX7 + \beta 8Ln\ X8 + \beta 9LnX9 + (vi - ui) \quad (1)$$

Description:

Y = Rice production (kg)
α = Constant
β1– β9 = Estimated parameters
X1 = Land (m2)
X2 = Seed (kg)
X3 = Manure (kg)
X4 = TSP fertilizer (kg)
X5 = Phonska fertilizer (kg)
X6 = Urea fertilizer (kg)
X7 = Organic pesticide (kg)
X8 = Family workforce (workday)
X9 = Non-family workforce (workday)
(vi-ui) = error term (inefficiency effects in the model)

The formula used to measure technical efficiency:

$$TEi = Yi / Yi^* = E[\exp(-Ui/\varepsilon i)] \quad (2)$$

Description:

TEi= Farmers technical efficiency against i, with the range from 0 to 1
Yi = Output generated by farmers against i
i = 1, 2, 3,...25

Farming is categorized as technically efficient if the value of TE> 0.7

III. RESULTS AND DISCUSSION

A. Respondents Characteristics.

Table 1. The Characteristics of organic and non-organic rice farmers

Description	Organic		Non-organic	
	Amount (persons)	Percentage (%)	Amount (persons)	Percentage (%)
Age (years):				
45 – 54	5	20.00	4	16.00
55–64	11	44.00	6	24.00
>64	9	33.00	15	60.00
Education:				
No schooling	2	8.00	1	4.00
Elementary school	11	44.00	15	60.00
Junior high school	7	28.00	4	16.00
Senior high school	5	20.00	3	12.00
S1	0	0.00	2	8.00
Experience (years)				
4 – 19	21	84.00	6	24.00
20 – 35	4	16.00	6	24.00
>35	0	0.00	13	52.00
Land Area (m^2)				
100 – 3,400	21	84.00	21	84.00
3,401 – 6,700	4	16.00	2	8.00
>6,700	0	0.00	2	8.00

The majority of organic and non-organic rice farmers in Bantul District are under 64 years old which fell under the category of productive age. Farmers in that age group have stronger bodies and find no real challenges in doing farming activities. Generally, non-organic farmers (65.8 years old) are older than the organic farmers (60.7 years old). Most of non-organic farmers are more inclined to think that their farming system is heritage since it has been going down from generation to generation. They are quite reluctant to try new technologies. This is in agreement with the research of [12] which states that older farmers tend to follow existing customs and are hesitant in adapting new technologies.

In total, the number of organic rice farmers with higher education is higher than is the non-organic rice farmers. This shows that education level affected technology adaptation. As described by [13], farmers with higher education are more in line to be more open toward new technologies.

All organic rice farmers have less than 21 years of farming experience and an average of 13.2 years. In this research and they have mastered almost every skill and know-hows in organic rice farming. This is in agreement with [14] which states that experience influences farmers' skills in improving production result. With respect to farming area, the areas that are used for rice farming in Imogiri Sub-district, Bantul District, are either private property or property with sharecropping agreement. Land for organic rice farming (2,050 m^2) is smaller than non-organic rice (2,354 m2). As a result, by planting organic rice farmers with smaller farms can maximize the output. This is in line with [15] that states that the production of organic rice in Tasikmalaya District is higher (6.054 ton/ha) than the production of conventional rice (4.67 ton/ha).

B. Production Costs

Production costs on rice farming consist of explicit and implicit costs. Explicit cost is the actual cost incurred during the production process include the cost of buying seeds, fertilizers and pesticides, paying wages for non-family workforce and tax. Implicit cost is the cost that is not actually incurred but still taken into account include the cost of family workforce, own land rent and capital interest.

Table 2. The cost of organic and non-organic rice farming in Bantul District per 2,200 m^2

Description	Organic rice (Rp)	Non-organic rice (Rp)
Explicit Cost		
1. Seed	76,613	131,191
2. Organic fertilizers	284,416	42,552
3. Chemical fertilizers	203,409	527,560
4. Organic pesticide	41,193	8,381
5. Chemical herbiside	9,460	1,980
6. Non-family workforce	2,088,196	1,901,418
7. Equipment depreciation	33,849	25,816
8. Tax	29,173	7,688
Total Explicit Cost	2,766,310	2,656,265
Implicit Cost		
1. Own land rent	764,200	695,933
2. Family workforce	553,460	546,500
3. Own capital interest	92,118	88,454
Total Implicit Cost	1,409,778	1,330,889
Total Cost	4,176,688	3,987,887

Organic rice farming requires higher explicit and implicit cost than do non-organic rice farming. In organic farming, the additional costs come from extra works primarily put into nurturing and irrigation. Without any use of chemical pesticide, organic rice requires more intensive efforts in controlling pests and plant diseases. Farmers use organic pesticides in the form betel leaves to inhibit the growth of insects and fungi [16]. Most organic rice farmers clean weeds manually, but there are some farmers who still use chemical herbicides. Organic rice farmers use organic fertilizer in the form of manure and liquid organic fertilizer, but still use chemical fertilizers such as Urea, TSP, dan Phonska in small amounts.

C. Financial Feasibility

The financial feasibility can be measured using indicators R-C ratio (R/C), land productivity, workforce productivity and capital productivity. Farming is said to be feasible if R/C > 1, land productivity > land rent, labor productivity > workforce wages and capital productivity > savings interest.

Table 3. The income, profit and feasibility of organic and non organic rice farming in Bantul District per 2.200 m^2

Description	Organic rice	Non-organic rice
Production (kg)	760	742
Revenue (Rp)	8,609,923	6,848,557
Income (Rp)	4,773,832	4,192,292
Profit (Rp)	3,364,654	2,861,405
R/C	1.81	1.72
Land Productivity (Rp/m^2)	1,876	1,619
Workforce productivity (Rp/workday)	485,141	438,880
Capital Productivity (%)	124,94	111,05

Table 3. show that organic rice farming generate higher production, income and profit than do non-organic rice farming per 2,200 m2. The cost organic rice farming require higher cost, but it generate higher income since organic rice products sold higher in the market. Organic rice product is Rp 9,926 and non-organic rice is Rp 9,224. This is in accordance with [5]. Both researchers find that organic farmers in Catur Village, Sambi Sub-district, Boyolali, generate as much as Rp51,112,221/ha. On the other hand, non-organic farmers generate lower with only Rp40,827,628/ha. Similar thing also happen in Lubuk Bayas Village, Perbaungan Sub-district, Serdang Bedagai District, in which organic farmers receive higher income than non-organic farmers [6].

Based on the feasibility analysis, organic and non-organic rice farming in Bantul District is feasible to develop because land productivity is greater than land rent, workforce productivity is greater than workforce wages and capital productivity is greater than savings interest. Nevertheless the value of land productivity, workforce productivity and capital productivity of organic rice is greater than non-organic rice. The value of R/C of organic rice is 1.81 and non-organic rice is 1.72, which means that every Rp 1,000, - costs incurred for organic rice will be a profit of Rp 810, while non-organic rice every Rp 1,000, - costs incurred to produce a profit of Rp 720, -.

D. Production Function

This research used stochastic frontier as production functions and parameter estimates as elasticity of production. Moreover, the dependent variable in the production functions is the organic and non-organic rice production. The independent variables for organic are area land, seed, manure, TSP, phonska, urea fertilizer, organic pesticide, and workforce. In contrast, the independent variables for non-organic rice are area land, seed, manure, TSP, phonska, urea, Za fertilizer, chemical pesticide and workforce. Here workforce include both family and non-family member of workers involved the process of land management, planting, nursing, harvesting and post-harvest works.

Table 4. Factors affecting to the production of organic and non-organic rice in Bantul District

Variable	Organic rice		Non-organic rice	
	Coefficient	T-value	Coefficient	T-value
Constant	2,952**	2,757	2,867***	3,933
Land	-0,104ns	-0,736	0,077ns	0,378
Seed	0,186ns	1,326	-0,149ns	-1,747
Manure	0,195ns	1,585	-0,054*	-2,006
TSP fertilizer	-0,009ns	-0,321	-0,035*	-2,028
Phonska fertilizer	0,033ns	1,256	0,026ns	0,858
Urea fertilizer	0,022ns	0,482	-0,024ns	-1,393
Za fertilizer			-0,009ns	-0,285
Organic Pesticida	-0,013ns	-0,414		
Chemical Pesticida			-0,068***	-3,240
Family workforce	0,108ns	0,988	0,216 ns	1,662
Non-family workforce	0,816***	3,895	1,009***	4,347
Sigma square	0,092	3,872	0,019	1,719
Gamma	0,022	0,306	0,289	0,626

Description: ns = non significant
*= significant at α 10%
**= significant at α 5%
***= significant at α 1%

The results of the analysis show that on organic rice farming the log likelihood MLE (- 4.788) value is greater than OLS log-likelihood (-6.098). Likewise in the non-organic rice the log likelihood MLE (15.579) is greater than OLS log (9.076) both on organic and non-organic rice farming the production function with the MLE method is better and in accordance with conditions in the field. The sigma-square value of organic rice was 0.092 while the sigma-square of non-organic rice was 0.019 and both were of relatively small value. This shows that the term error of organic and non-organic rice inefficiencies is normally distributed [17]. In statistics, the gamma value for organic rice 0.022 and non-organic rice of 0.289 were not different with 0. It means to say, the variation of production in organic rice and non-

organic farming were not occur due to inefficiency but due to other factors such as pest, plant diseases and weather.

In organic rice farming, only the production factor of non-family workforce has a significant effect on production with a regression coefficient of 0.816 means that if the non-family workforce is increased by 1%, ceteris paribus, organic rice will increase by 0.816%. This shows that non family workforce for cultivate land, plant and harvest. This situation is similar to [7] study, labor has a significant effect on organic rice production in Sragen with a positive regression coefficient.

Factors of production of manure, TSP fertilizer, and chemical pesticides have negative effects on non-organic rice production which means that if the use are added it will reduce of production. The use of chemical pesticides in non-organic rice farming is already excessive. The same situation occurs in rice farming in Yogyakarta [18]. Factors of production of non family workforce have a positive effect with regression coefficient 1,009, it can be interpreted if workforce is added by 1%, ceteris paribus, non-organic rice production will increase 1,009%. Manure is used by organic and non-organic rice farmers, but it has no effect on rice production. The proper use of manure on rice plants can increase production as stated by [19], that giving 5 tons of manure/ha of manure to rice plants can increase dry grain yield by 10%.

E. Technical Efficiency

To analyze technical efficiency using the stochastic frontier production functions. Farming is said to be efficient if the technical efficiency index value is greater than 0.7 [11] The average technical efficiency index of 0.919 organic rice is greater than 0.867 non-organic rice, which means that organic and non-organic rice farming in Bantul District is efficient. Nevertheless there are still 8% of organic rice farmers and 20% of non-organic rice farmers who have not been efficient.

Table 5. The distribution of technical efficiency level of organic and non-organic rice farming in Bantul District

Category	Organic rice		Non-organic rice	
	Amount (persons)	Percentage (%)	Amount (persons)	Percentage (%)
0.000-0.100	0	0	0	0
0.101-0.200	0	0	0	0
0.201-0.300	0	0	0	0
0.301-0.400	0	0	0	0
0.401-0.500	0	0	0	0
0.501-0.600	0	0	1	4
0.601-0.700	2	8	4	16
0.701-0.800	0	0	2	8
0.801-0.900	5	20	3	12
0.901-1.000	18	72	15	60
Mean Technical Efficiency	0.919		0.867	
Total Respondents	25.00		25.00	
Minimal value	0.654		0.584	
Maximal value	0.994		0.991	

The efficiency index value of organic rice farming in Bantul is higher than that of organic rice farming in Sragen Distric namely 0.7 [17], higher than organic rice farming in Tasikmalaya District at 0.86 [15], greater from paddy farming Integrated Crop Management program in Riau Regency amount to 0.87 [20], higher than rice farming in West Java Province 0.742 [21], Bantul Regency Special Region of Yogyakarta at 0.71 [22]. This level of technical efficiency is also higher than the technical efficiency of rice farming in several countries such as Vietnam at 0.816 [23], Cambodia at 0.786 [24], Pakistan at 0.91 [25] and Nigeria at 0.63 [26].

The high technical efficiency index of organic rice in Bantul District is inseparable from various efforts from the government on rice farming, such as the existence of SOP-GAP (Standard Operational Procedure-Good Agriculture Practice) of organic rice. According to [27] the majority of organic rice farmers have applied land use, seeds, fertilizers, pesticides, tools, land processing, planting, fertilizing, irrigation, pest control, harvesting and post-harvest according to procedure-good operating standards agriculture practice (SOP-GAP) organic rice farming.

The analysis of stochastic frontier production function was to know the level of technical efficiency, it could also determine factors that affect inefficiency. In organic rice farming, all variables, namely age, farming experience, education, and land status there are no factors that significantly affect technical inefficiency even though there are 8% of farmers who are not efficient (Table 6.)

Table 6. Factors contributing to organic and non-organic rice technical inefficiency

Variable	Organic rice		Non-organic rice	
	Coefficient	T-value	Coefficient	T-value
Constant	-0.355^{ns}	-0.379	-2.018***	3.525
Age	0.009^{ns}	0.878	-0.023***	-2.557
Experience	-0.025^{ns}	-0.744	-0.017**	-1.824
Education	0.131^{ns}	0.747	-0.092^{ns}	-1.020
Land status	-0.243^{ns}	-1.042	0.421***	2.125

Description: ns = non-significant
*** = significant at α = 1%
** = significant at α = 5%

In non-organic rice farming, the age of farmers influences technical inefficiencies with a coefficient value of -0,023 which can be interpreted as the age of the farmer, the lower the level of inefficiency, in other words, non-organic rice farming is more efficient. This situation is different from [28], age has an effect on technical inefficiencies with positive coefficients, which means that older people are increasingly inefficient in their farming because farmers whose physical age is declining.

Farming experience has an effect on technical inefficiency with a negative value coefficient which can be interpreted that non-organic rice farmers with longer farming experience, the decreasing inefficiencies in other words increase technical efficiency. This situation is different from organic rice farming in Tasikmalaya that experiences has a

positive effect on technical inefficiencies, meaning that more experienced farmers are increase inefficiencies [15]

The level of education has no effect on technical inefficiencies with negative coefficients, meaning that the higher the education is the higher tendency is for farming to be carried out, the lower the level of is inefficiency. This is in line with [20] education influences the technical inefficiencies of rice farming integrated crop programs with negative coefficients. Although several studies describe that education have influential contribution toward technical inefficiency with positive coefficient [15].

The status of the land has an effect on technical inefficiencies and has a positive value, meaning that the status of own land can increase inefficiency. In other words, it can reduce technical efficiency compared to non-owner land (rent or profit sharing). This is different from the research of [28] that states the status of land has an effect on technical inefficiencies with negative coefficients that can be interpreted as the land status of the owner will reduce its inefficiency.

IV. CONCLUSION

Despite the fact that organic rice farming requires higher production cost, organic rice farming generates higher income and profit than the non-organic rice farming. The development of organic and non-organic rice farming in Bantul District is promising with R/C >1, land productivity > land rental, workforce productivity > workforce wages and capital productivity > interest. However, potential organic rice farming has more potential to be developed.

In terms of technicality, organic and non-organic rice farming are under the category of efficient with efficiency index value > 0.7. The organic rice farming has a higher technical efficiency index than non-organic rice. On organic rice farming all the internal factors of the farmer have no effect on technical inefficiency while on non-organic rice farming the age of the farmer, land status and farming experience affect the level of technical inefficiency.

Bearing in that organic rice farming costs higher than does the non-organic one, the stakeholders have to provide subvention in the form of production facilities and continuous supervision. In this way, farmers will be encouraged to improve their efforts in organic rice farming.

ACKNOWLEDGMENT

The research presented in this paper was part of a research grant under the Unggulan Program Studi research schemes and thank you to LP3M Universitas Muhammadiyah Yogyakarta for facilitating funding for this research.

REFERENCES

[1] A. P. Lestari, "Pengembangan Pertanian Berkelanjutan Melalui Subtitusi Pupuk Anorganik Dengan Pupuk Organik," *J. Agron. Vol.13 No.1,* vol. 13, no. 1, pp. 38–44, 2009.

[2] M. Vassalos, C. R. Dillon, and P. Karanikolas, "Farm-Decision Making in A Multifuncional Context : The Case of Conventional and Organic Farming in Kerkini Distric, Greece," in *The Role of Knowledge, Innovation and Human Capital in Multifuncional Agricultural Rural Development*, 2009.

[3] T. M. Prihtanti, S. Hardyastuti, S. Hartono, and Irham, "Multifungsi Sistem Usahatani Padi Organik dan Anorganik," *J. AGRIFOR*, vol. XII, no. 1, pp. 11–21, 2013.

[4] A. Andoko, *Budidaya Padi Secara Organik) Jakarta: Penebar Swadaya*. Jakarta: Penebar Swadaya, 2005.

[5] M. S. Andalas and Sudrajat., "Analisis Komparatif Sistem Pertanian Padi Organik dan Anorganik di Desa Catur Kecamatan Sambi Kabupaten Boyolali," *Bumi Indones.*, vol. 7, no. 1, pp. 1–10, 2018.

[6] S. V. Br. Butar-butar, Salmiah, and M. Roem, "Analisis Finansial Usahatani Padi Organik, Kasus : Desa Lubuk Bayas Kecamatan Perbaungan Kabupaten Serdang Badagai," *J. Soc. Econ. Agric. Agribus.*, vol. 4, no. 4, pp. 1–19, 2015.

[7] A. Prayoga, "Produktivitas dan Efisiensi Teknis Usahatani Padi Organik Lahan sawah," *Agro Econ. J.*, vol. 28, no. 1, pp. 1–19, 2010.

[8] K. Murniati, J. H. Mulyo, Irham, and S. Hartono, "Efisiensi Teknis Usaha Tani Padi Organik Lahan Sawah Tadah Hujan di Kabupaten Tanggamus Provinsi Lampung," *J. Penelit. Pertan. Terap.*, vol. 14, no. 1, pp. 31–38, 2014.

[9] Departemen Pertanian DIY, *Statistik Tanaman Pangan*. Daerah Istimewa Togyakarta: Badan Pusat Statistik, 2017.

[10] Dinas PertanianTanaman Pangan and Perikanan dan Kelautan Kabupaten Bantul, *Laporan Kinerja Dinas Pertanian dan Kehutanan 2016*. Kabupaten Bantul, 2017.

[11] T. Coelli, D. S. P. Rao, and G. E. Battese, *An Introduction to Efficiency and Productivity Analysis.* Boston: Kluwer Academic Analysis., 1989.

[12] N. Kusumawati, L. A. Sasongko, and R. Prabowo, "Preferensi Petani terhadap Sistem Tanam Padi jajar Legowo," *MEDIAGRO*, vol. 11, no. 1, pp. 75–91, 2015.

[13] R. Sanjaya, *Faktor yang Mempengaruhi Adopsi Inovasi Petani*. Surabaya: Angkasa Jaya, 2015.

[14] N. K. Sandiani, "Analisis Komparatif Pendapatan Usahatani Padi Sawah Sistem Tanam Jajar Legowo 2 : 1 Dan 4 : 1 Di Desa Puntari Makmur Kecamatan Witaponda," vol. 2, no. 2, pp. 199–204, 2014.

[15] N. Machmuddin, N. Kusnadi, and Syaukat, "Analisis Efisiensi Ekonomi Usahatani Padi Organik dan Konvensional di Kabupaten Tasikmalaya," *Forum Agribisnis*, vol. 6, no. 2, pp. 145–161, 2016.

[16] W. S. Siamtuti, R. Aftiarani, Z. K. Wardhani, and I. V. Hartoko, "Potensi Daun Sirih (Piper betle , L) Dalam Pembuatan Insektisida Nabati yang Ramah Lingkungan," 1994.

[17] L. Gultom, R. Winandi, and S. Jahroh, "Analisis Efisiensi Teknis Usahatani Padi Semi Organik di Kecamatan Cigombong, Bogor," *J. Inform. Pertan.*, vol. XXIII, no. 1, pp. 7–18, 2014.

[18] Triyono, J. H. Mulyo, Masyhuri, and Jamhari, "Environmental and Farmer's Managerial Characteristic Effect toward Production and Technical Efficiency on Rice Farm in Yogyakarta, Indonesia," *GSTF J. Agric. Eng.*, vol. 3, no. 1, pp. 1–9, 2017.

[19] G. R. Pratiwi and Sumarno, "Pengaruh Pupuk Kandang dan Kesesuaian Varietas-Musim Tanam terhadap Hasil Padi Sawah," pp. 177–187, 2014.

[20] H. Bahasoan, "Analisis Efisiensi Usahatani Padi Sawah pada Program Pengelolaan Tanaman Terpadu di Kabupaten Buru," *J. Agribisnis*, vol. 7, no. 2, pp. 211–233, 2013.

[21] N. Tinaprilla, N. Kusnadi, B. Sanim, and D. B. Hakim, "Analisis Efisiensi Teknis Usahatani Padi di Jawa Barat, Indonesia," vol. 7, no. 1, pp. 15–34, 2013.

[22] E. Istiyanti, L. Rahayu, and Sriyadi, "Efficiency of organic rice farming in Bantul Regency Special Region of," *Int. Food Res. J.*, vol. 25, no. 2, pp. 173–180, 2018.

[23] H. V. Khai and M. Yabe, "Technical Efficiency Analysis of Rice Production in Vietnam," *ISSAAS*, vol. 17, no. 1, pp. 135–146, 2011.

[24] S. Kea, H. Li, and L. Pich, "Technical Efficiency and Determinant of Rice Production in Cambodia," *J. Econ.*, vol. 4, no. 22, pp. 1–17, 2016.

[25] Abedullah, S. Kousier, and K. Mustaq, "Analysis of Technical Efficiency of Rice Production in Punjab (Pakistan), Implication for Future Invesment Strategies.," *Pak. Econ. Soc. Rev.*, vol. 45, no. 2, pp. 231–244, 2007.

[26] F. A. . Kadiri, C. C. Eze, J. S. Orebiyi, J. I. Lemchi, D. O. Ohajianya, and I. U. Nwaiwu, "Technical Efficiency in Paddy Rice Production in Niger Delta Region of Nigeria," *Agric. Res.*, vol. 2, no. 2, pp. 33–43, 2014.

[27] Sriyadi, E. Istiyanti, and F. R. Fivintari, "Evaluasi penerapan Standard Operating Procedure-Good Agricultural Practice (SOP-GAP) pada Usahatani Padi Organik di Kabupaten Bantul," *Agraris*, vol. 1, no. 2, pp. 78–84, 2015.

[28] N. Kusnadi, N. Tinaprilla, S. H. Susilowati, and A. Purwoto, "Analisis Efisiensi Di Beberapa Sentra Produksi Padi Di Indonesia," *J. Agro Ekon.*, vol. 29, no. 1, pp. 25–48, 2011.

[29] Hassan M, Anwar MA, Rafique Z, Saeed A. The Impact of Organizational Structure on Employees' Creativity: A Sector Based Study. Iiste Journal. 2014;4(8).