

# TECHNICAL EFFICIENCY OF ORGANIC RICE IN SUMBERNGEPOH VILLAGE, LAWANG SUB DISTRICT, MALANG DISTRICT

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**Abstract:** Rice plants have a proportion of 6 percent or fifth in the world's classification of organic cereal crops (Research Institute of Organic Agriculture, 2017). The problem in organic rice farming is that production and productivity tend to be lower than those of non-organic rice. In addition to the transition from agriculture to organic farming, the factor of input use also has a big influence. This study aims to analyze the level of technical efficiency and the value of organic rice input. The census sample consisted of 45 organic rice farmers. The data used is data in the 2016-2017 rainy season. The data analysis method uses DEA analysis with the assumption of CRS Input. Based on the results of the analysis, farmers are not yet technically efficient because they have an average technical efficiency value of less than 1, which is 0.879. The number of technically efficient farmers with a TE value of 1 is 13 farmers, while the number of farmers who are inefficient is 32 farmers with a TE value of <1. There are slack values such as seeds 3.15 Kg/Ha, solid organic fertilizer 276.58 Kg/Ha, liquid organic fertilizer 1.07 L/Ha, green manure 505.10 Kg/Ha, vegetable pesticides 1.25 L/Ha, and 6.67 daily workers/ha. In addition, there are projected input values, namely seeds 28.66 Kg/Ha, solid organic fertilizer 2170.30 Kg/Ha, liquid organic fertilizer 10.23 L/Ha, green manure 7048.76 Kg/Ha, vegetable pesticides 9.61 L /Ha, and Labor 185.80 daily workers/Ha. Furthermore, the projected value of this input is a recommendation to farmers so that they can be technically efficient.

**Keywords:** *Organic, Rice, DEA, Technical efficiency, Agriculture*

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## INTRODUCTION

Organic farming is a way of farming that is good for the environment and has sustainability principles that pay attention to the preservation of soil, ecosystems and human health. Indonesia is one of the countries that implement organic agriculture (IFOAM - Organics International, 2005). Go Organic 2010 is a government program in developing Indonesian organic agriculture.

Based on the area of organic farming, Indonesia is in the top five categories in Asia and has an increasing trend every year. The expansion of the domestic organic food market is driven by increasing incomes, increasing education levels, changing demographic structures, and urbanization.

One of the plants cultivated with organic farming systems is rice.

Rice plants have a proportion of 6 percent or fifth in the classification of cereal crops in the world that are cultivated organically (Research Institute of Organic Agriculture, 2017). Organic rice can be said to be premium rice. Organic rice is packaged in plastic bags or sacks labeled organic rice and sold at a relatively higher price than ordinary rice (Sullivan, 2003).

However, the current constraint for rice cultivation is the availability of diminishing resources. Decreased production factors, deteriorating soil fertility, aging rice farmers, increased production costs, and post-harvest losses. In addition, rice can be contaminated with pesticide

residues from land used to grow rice. Most of the pesticides used on rice plants are insecticides (Elfman et al., 2011). Constraints to production and productivity of organic rice in addition to the transition from conventional agriculture to organic farming, input factors are also very influential. Input efficiency is a demand for farmers in order to produce optimal production. The concept of technical efficiency is the right choice to see how much the minimum input of farmers is in order to produce a certain output.

Sumberngepoh Village is one of the villages in Malang Regency that produces organic rice as a superior product. This village started to grow organic rice in 2007 with a total harvested area of 17 hectares. Organic rice in this village has also received organic certification from LESOS (Institute for Organic Seloleman Certification) in 2014.

In general, organic rice is a generic product, so that farmers cannot fully determine the selling price. It is evident that based on the results of a preliminary survey in Sumberngepoh Village that the selling price of organic grain is only a difference of IDR 100 per kilogram when compared to non-organic grain. The price of non-organic grain is IDR 4500 per kilogram and organic IDR 4600 per kilogram. In addition, from the aspect of production quantity, the productivity of organic rice is still low at an average of 5 tons per hectare so that the production produced is also relatively low. Therefore, the right decision for organic rice farmers in Sumberngepoh Village if they want to achieve production optimization is to minimize costs.

Minimising cost is done by minimizing fixed costs and variable costs. If it is assumed that fixed costs are given because they do not have a direct effect on production results, then the variable cost component is the one that has the most important role to be minimized. The inputs used by organic rice farmers in Sumberngepoh village are seeds, solid organic fertilizer, liquid organic fertilizer, vegetable pesticides, and labor. Economically, the allocation of input use in production activities can be calculated using the concept of technical efficiency. Based on this, the researcher conducted a study to determine the technical efficiency of organic rice in Sumberngepoh Village, Lawang Sub-District, Malang District.

## RESEARCH METHODS

The census sample in this research was 45 farmers consisting of 15 farmers in the "Sumber Makmur I" group and 30 farmers in the "Sumber Makmur II" group. They are members of the "Sumber Mulyo" Gapoktan (farmers group) in Sumberngepoh Village, Lawang Sub District, Malang District, East Java Province. The research

was conducted from November 2016 to February 2017.

DEA is a non-parametric approach to evaluate the relative efficiency of using inputs to outputs. In this study, DEA aims to minimize production costs by comparing the technical efficiency values of each Decision Making Unit (DMU) of organic rice farmers. The following are some of the managerial values of DEA, including: 1) DEA analyzes the relative efficiency of each DMU against the other DMUs in the sample. This efficiency value looks at the efficient and inefficient DMUs; 2) The technical efficiency value range is zero to one. If a DMU has perfect efficiency (efficiency=1), then it is necessary to transfer management to a less efficient DMU (efficiency<1). It is necessary to transfer management to DMUs that are less efficient (efficiency <1) in order to be efficient. 3) DMUs that are less efficient (efficiency <1) will have input slack values that are able to provide information on how much resources can be saved.

The technical efficiency in the DEA method uses a linear programming basis whose objective function is the ratio of the output of each DMU to the input of each DMU. Each DMU will lead to the use of a weight group that will produce the best objective value for each DMU (Cooper et al., 2002). Mathematically it can be formulated as follows:

$$\begin{aligned} \sum_r^s = 1U_{rk}Y_{rk} &\leq i, i = 1 \dots \dots \dots n \\ \sum_i^m = 1V_{ik}X_{ik} & \\ U_{rk} \geq 0; r = 1, \dots \dots \dots s & \\ V_{ik} \geq 0; r = 1, \dots \dots \dots m & \end{aligned}$$

Notes:

- m = Total inputs used (seeds, solid organic fertilizers, liquid organic fertilizers, green manures, vegetable pesticides, labor)
- s = Total DMU analyzed
- $Y_{rk}$  = Total output of organic rice produced by DMU (organic rice production)
- $X_{ik}$  = Total input of organic rice used by DMU (seed, solid organic fertilizer, liquid organic fertilizer, green manure, vegetable pesticide, labor)
- $V_{ik}$  = Weight of organic rice output produced by each DMU
- $U_{rk}$  = Decision variable

The DEA used in this study is the CCR model with the assumption of CRS (Costant Return to Scale). The CRS assumption requires a DMU to be able to increase or decrease the input and output variables linearly. The CRS assumption is more appropriate when all DMUs are working at an optimal scale. Because the DEA approach used is minimizing cost, mathematically the CRS model can be formulated as follows (Farrell, 1957):

$$\begin{aligned} & \text{Min}_{\theta, \lambda} \theta \\ & st - y_i + Y\lambda \geq 0, \\ & \theta x_i - X\lambda \geq 0, \\ & \lambda \geq 0 \end{aligned}$$

Notes:

N = Time period

$\lambda$  = N x 1 vector constant

$x_i$  = i-th DMU (N x 1) vector non negative input

$y_i$  = i-th DMU (N x 1) vector non negative output

$\theta$  = The efficiency value of the i-th DMU in the interval  $0 \leq \theta \leq 1$ , where the value of 1 is a technically efficient unit and is in the frontier

$N1'\lambda$  = Convexity Constraint

The data collected from each DMU is processed using DEAP 2.1 software. The output shows the relative efficiency level of each DMU to other respondents. The DEA method has the possibility of a technical efficiency value of 1 in DMU as the object of research. The potential increase in the use of inputs and outputs can be used as a reference to determine the source of inefficiency (Endri, 2017).

## RESULTS AND DISCUSSION

### Distribution of Organic Rice Farming Inputs in Sumbergepoh Village

The inputs for organic rice farming in this study are seeds, solid organic fertilizer, liquid organic fertilizer, green manure, vegetable pesticides, and labor. The data used is input data in the 2017 rainy season (MP).

#### 1. Seeds

There are 3 types of organic rice seed varieties used by farmers in Sumbergepoh Village in 2017 can be seen in Table 1 as follow.

Table 1. Organic Rice Seed Varieties

No	Seed Varieties	Total farmers (person)	%
1	IR 64	10	22,22
2	Ciherang	13	28,89
3	Pandanwangi	22	48,89
<b>Total</b>		<b>45</b>	<b>100</b>

Source: Primary data, 2017 (processed)

In detail, the quantity of use of organic rice seeds in Sumbergepoh Village can be seen in Table 2 below.

Table 2. Organic Rice Seed Quantity

Quantity (Kg/Ha)	Total farmers (person)	%	Sources (person)	
			Make	Buy
20-30	20	44,44	12	8
31-40	21	46,67	7	14
41-50	1	2,22	0	1
>50	3	6,67	0	3
<b>Total</b>	<b>45</b>	<b>100</b>	<b>19</b>	<b>26</b>
<b>Average</b>	<b>36,14</b>			
<b>Minimum Value</b>		<b>20</b>		
<b>Maximum Value</b>		<b>100</b>		

Source: Primary data, 2017 (processed)

Farmers buy seeds at a price of IDR 5,000 per kg for all varieties of seeds. This price is relatively cheap because farmer groups in Sumbergepoh Village receive subsidies from the government. In addition, some farmers also make their own seeds from the previous season's broodstock.

#### 2. Solid Organic Fertilizer

Solid organic fertilizer used by farmers comes from a mixture of composted/fermented manure, straw, and rice bran. Solid organic fertilizer was used as basic fertilizer 3 times in 1 growing season, 3 days before planting, after weeding I (25 DAP), and after weeding II (35 DAP). The following is the use of solid organic fertilizer for organic rice farmers in Sumbergepoh Village, which can be seen in Table 3.

Table 3. Organic Rice Solid Organic Fertilizer Quantity

Quantity (Kg/Ha)	Total farmers (person)	%	Sources (person)	
			Make	Buy
0-1.000	4	8,89	0	4
1.001-2.000	7	15,6	4	3
2.001-3.000	13	18,89	7	6
3.001-4.000	20	44,44	14	6
>4.000	1	2,22	1	0
<b>Total</b>	<b>45</b>	<b>100</b>	<b>26</b>	<b>19</b>
<b>Average</b>	<b>2.819,26</b>			
<b>Minimum Value</b>		<b>400</b>		
<b>Maximum Value</b>		<b>4.400</b>		

Source: Primary data, 2017 (processed)

Farmers who make solid organic fertilizers themselves use ingredients in the form of 600 Kg cow dung, 400 Kg straw, 200 Kg bran, 1 Kg molasses, and 1 Liter EM4. All ingredients are mixed and then fermented for 21 days. Every single recipe will produce 1000 Kg of ready-to-use solid organic fertilizer. Farmers can also buy compost at a price of IDR 600 per Kilogram at JPPPO (Organic Fertilizer Farmers Network).

#### 3. Liquid Organic Fertilizer

In one growing season, liquid organic fertilizer was used 6 times, namely at the age of 10 DAP, 20 DAP, 30 DAP, 40 DAP, 50 DAP, and 60 DAP. The following is the quantity of liquid organic fertilizer used by organic rice farmers in the 2017 rainy season, which can be seen in Table 4.

Based on Table 4, farmer's liquid organic fertilizer uses natural ingredients. For 1 liquid organic fertilizer recipe, it can produce 15 liters of broodstock for 1 growing season. The materials needed are 1 Kg paitan leaves, 1 Kg bay leaf, and 1 Kg peanut cob which are all mashed, mixed and added with 1 liter of coconut water, and 15 liters of water. The last step is to carry out the fermentation process for 15 days.

Table 4. Organic Rice Liquid Organic Fertilizer Quantity

Quantity (Kg/Ha)	Total farmers (person)	%	Sources (person)	
			Make	Buy
0-5	2	4,44	2	0
6-10	15	33,33	13	2
11-15	10	22,22	8	2
16-20	18	40,00	17	1
<b>Total</b>	<b>45</b>	<b>100</b>	<b>40</b>	<b>5</b>
<b>Average</b>	<b>13,01</b>			
<b>Minimum Value</b>		<b>4</b>		
<b>Maximum Value</b>		<b>20</b>		

Source: Primary data, 2017 (processed)

#### 4. Green Manure

Farmers use green manure by utilizing rice straw. Not only can it be used for organic rice plants, green manure can also be used for animal feed. Details of green manure used by farmers in Sumberngepoh village can be seen in Table 5.

Table 5. Organic Rice Green Manure Quantity

Quantity (Kg/Ha)	Total farmers (person)	%	Sources (person)	
			Make	Buy
0-4.000	4	8,89	4	0
4.001-8.000	16	35,56	16	0
8.001-12.000	21	46,67	21	0
>12.000	4	8,89	4	0
<b>Total</b>	<b>45</b>	<b>100</b>	<b>45</b>	<b>0</b>
<b>Average</b>	<b>8.525,7</b>			
<b>Minimum Value</b>		<b>600</b>		
<b>Maximum Value</b>		<b>14.000</b>		

Source: Primary data, 2017 (processed)

The materials needed for the manufacture of green manure are rice straw and mole. Rice straw is sprayed first with moles that have been mixed with water evenly, then the fermentation process is carried out for approximately 1 week. Green manure that has been well fermented will be dark brown in color, and ready to be spread on land where organic rice will be planted.

#### 5. Vegetable Pesticides

Organic rice farmers use botanical pesticides to control pests such as walang sangit and leaf borer. All organic rice farmers are able to make vegetable pesticides independently by utilizing natural ingredients such as soursop leaves, garlic, and ringer leaves. In detail, organic rice farmers in Sumberngepoh Village using vegetable pesticides can be seen in Table 6.

Table 6. Organic Rice Vegetable Pesticide Quantity

Quantity (Kg/Ha)	Total farmers (person)	%	Sources (person)	
			Make	Buy
0-5	1	2,22	1	0
6-10	16	35,56	16	0
11-15	19	42,22	19	0
16-20	9	20,00	9	0
<b>Total</b>	<b>45</b>	<b>100</b>	<b>45</b>	<b>0</b>
<b>Average</b>	<b>12,57</b>			
<b>Minimum Value</b>		<b>4</b>		
<b>Maximum Value</b>		<b>20</b>		

Source: Primary data, 2017 (processed)

#### 6. Labor

The workforce includes land management, seeding, planting, fertilizing, weeding, irrigation and harvesting activities. Labor in the family comes from family members and is not paid. Meanwhile, workers outside the family are people who are willing to work and are paid. In general, the wages of organic rice workers in Sumberngepoh Village are Rp. 40,000 for men, while for women it is Rp. 25,000. Working hours are carried out for 4 hours, starting at 07.00-11.00.

During one growing season, the daily range of working people is 167,50 – 279,00 per hectare consisting of men and women. Male workers carry out land management, seeding, fertilizing, weeding, pesticide spraying, and harvesting activities. Meanwhile, female workers carry out planting and weeding activities. In detail, the number of organic rice workers in Sumberngepoh Village can be seen in Table 7.

Table 7. Organic Rice Labor Quantity

Daily Working People	Total farmers (person)	%
160-210	19	42,22
211-260	22	48,89
>260	4	8,89
<b>Total</b>	<b>45</b>	<b>100</b>
<b>Average</b>	<b>217,70</b>	
<b>Minimum Value</b>		<b>167,50</b>
<b>Maximum Value</b>		<b>279,00</b>

Source: Primary data, 2017 (processed)

#### Distribution of Organic Rice Farming Output in Sumberngepoh Village

The output of organic rice farming is the result of organic rice production in the form of dry paddy rice in one growing season. Within a year, organic rice can be planted 3 times, namely in the rainy season usually in November-February, dry season I in March-June, and dry season II (MK II) in July-October. In detail, organic rice production in Sumberngepoh Village in the 2016-2017 rainy season can be seen in Table 8.

Table 8. Sumbergepoh Village Organic Rice Production in 2017

Production (Kg/Ha)	Total farmers (person)	%
2.000-4.000	6	13,33
4.001-6.000	30	66,67
6.001-8.000	9	20,00
<b>Total</b>	<b>45</b>	<b>100</b>
<b>Average</b>	<b>5.326,52</b>	
<b>Minimum Value</b>		<b>2.400,00</b>
<b>Maximum Value</b>		<b>8.000,00</b>

Source: Primary data, 2017 (processed)

**Technical Efficiency Analysis of Organic Rice in Sumbergepoh Village**

a. Distribution of Organic Rice Technical Efficiency

Technical efficiency analysis used in this research is the Data Envelopment Analysis (DEA) approach with the assumption of Constant Return to Scale (CRS) which is input-oriented. In detail, the results of the analysis of the technical efficiency of organic rice in Sumbergepoh Village can be seen in Table 9.

Table 9. Distribution of Organic Rice Technical Efficiency in Sumbergepoh Village

CRS Technical Efficiency Value	Total farmers (person)	%
<0,50	0	0
0,51-0,60	0	0
0,61-0,70	4	8,89
0,71-0,80	10	22,22
0,81-0,90	10	22,22
0,91-1,00	21	46,67
<b>Total</b>	<b>45</b>	<b>100</b>
<b>Average</b>	<b>0,88</b>	
<b>Minimum Efficiency Value</b>	<b>0,62</b>	
<b>Maximum Efficiency Value</b>	<b>1,00</b>	
<b>Total Efficient Farmers*</b>	<b>13</b>	<b>28,89</b>
<b>Total Inefficient Farmers*</b>	<b>32</b>	<b>71,11</b>

Source: Primary data, 2017 (processed)

\* Farmers are efficient if the TE CRS = 1.00

Farmers are inefficient if the TE CRS 0,00<TE

The results showed that the average technical efficiency value of organic rice farmers was 0.88, or in other words, inefficient farmers. A total of 45 organic rice farmers, 28.89% or 13 farmers are technically efficient, while the remaining 71.11% or 32 farmers are technically inefficient.

Technical efficiency value of the respondent farmers is in the range of 0.62-1.00. The range of efficiency values between 0.91-1.00 is the highest, which is 46.67% or 21 farmers. This shows that the majority of organic rice farmers in this village are able to get the full efficiency value (TE=1.00) if

there is an improvement in the use of production inputs efficiently with reference to efficient farmers.

**Peers Analysis of Organic Rice**

Peer analysis is able to provide information: 1) how many efficient farmers become a reference (peer) for inefficient farmers. The greater the peer count value indicates that the farmer is the most used as a reference compared to other farmers; 2) Peer analysis is able to provide information for inefficient farmers to refer to efficient farmers without changing the output produced. The condition for farmers who are used as peers is efficient farmers. In this study, the total number of efficient farmers is 13 farmers, so that the resulting peers are 13 farmers. In detail, the farmers who are used as peers can be seen in Table 10.

Table 10. Distribution of Peers Organic Paddy Farmers in Sumbergepoh Village

DMU Efisien	Peers	Peer Count
31	31	28
5	5	13
29	29	10
1	1	9
26	26	9
24	24	7
28	28	4
21	21	2
32	32	2
13	13	1
15	15	1
30	30	0
38	38	0

Source: Primary data, 2017 (processed)

Based on Table 10, farmer number 31 is the most reference farmer for inefficient farmers, as many as 28 farmers out of a total of 32 inefficient organic rice farmers. He is the chairman of the farmer group "Sumber Mulyo" who has 15 years of experience in handling group operations. Farmer number 5 is in second place with a peer count of 13, and farmer number 29 is third with a peer count of 10. Although these three farmers have the largest peer count, the use of inputs and outputs produced is different. This is because each farmer has a different situation, condition, and level of estimation in combining the use of production inputs.

Forecasting farmers based on previous season's farming experience is also a separate consideration in making decisions on the size of the use of production inputs to produce a certain number of outputs. Comparison of these three farmers in detail can be seen in Table 11 below.

Table 11. Comparison of Peers Organic Rice Farmers

Description	DMU		
	31	5	29
Production (Kg/Ha)	7.860	6.000	4.000
Seed (Kg/Ha)	30	35	40
Solid Organic Fertilizer (Ltr/Ha)	3.500	3.200	1.200
Liquid Fertilizer (Ltr/Ha)	18	7	4
Green Manure (Kg/Ha)	10.000	8.000	600
Pesticides (Ltr/Ha)	15	10	4
Labor (DWP/ha)	237,5	211,5	188,75

Source: Primary data, 2017 (processed)

In general, if look at the amount of use of all types of production inputs, then the quantity of production inputs for farmer number 31 is always higher compared to farmers number 5 and 29. This condition becomes logical considering that production is also higher. However, there is one input, namely seeds, which are not linear with the general amount of production.

If viewed from the DEA analysis, it will not be a problem, especially for farmer number 29. Considering that production activities are combining all types of inputs. The efficiency of each farmer has a TE value of CRS = 1.00 even though the level is different.

Based on the results of data analysis shows that the total organic rice farmers in Sumbergepoh Village who are inefficient are 32 farmers. If these farmers want to be technically efficient, they can modify the use of inputs by referring to peer farmers with a range of 1 to 5 different farmers. More details on the comparison between inefficient farmers and peer farmers can be seen in Table 12 below.

Table 12. Comparison of Inefficient Farmers with Peers Organic Rice Farmers in Sumbergepoh Village

Efficient DMU	Peers					Peer Count
2	32	24	29	26		0
3	1	5	31			0
4	5	31	26			0
6	31	28	5	29		0
7	31	24	5			0
8	29	5	24	31	26	0
9	1	31				0
10	1	5	31			0
11	24	31				0
12	31	5	1			0
14	1	31				0
16	28	5	31	29		0
17	15	29				0
18	24	5	1	31		0

Efficient DMU	Peers					Peer Count
19	24	5	31			0
20	1	31	24	5	26	0
22	5	31	26			0
23	1	31	5			0
25	32	29	26			0
27	26	29				0
33	21	29	31	26		0
34	31					0
35	28	29	31			0
36	31					0
37	28	31				0
39	31					0
40	31					0
41	31					0
42	29	21	26	31		0
43	31					0
44	31					0
45	1	13	31			0

Source: Primary data, 2017 (processed)

Based on Table 12, farmer number 8 and 20 are farmers with the largest peer level, which is 5 peers. This means that if farmer number 8 wants to be efficient, he must refer to farmer number 29, 5, 24, 31, and or 26 by reducing the number of inputs to the same amount of output. In detail the illustration of farmer number 8 can be seen in Table 13 below.

Table 13. Result of Technical Efficiency Analysis of Farmers Number 8

Description	Original Value	Slack	Projected Value
Production (Kg/Ha)	4.000	4.000	4.000
Seed (Kg/Ha)	28	-6.648	21.352
Solid Organic Fertilizer (Ltr/Ha)	2.000	-474.876	1.525.124
Liquid Fertilizer (Ltr/Ha)	8	-1.900	6.100
Green Manure (Kg/Ha)	8.000	-1.899.502	6.100.498
Pesticides (Ltr/Ha)	10	-2.592	7.408
Labor (DWP/ha)	185,5	-44.045	141.455

Source: Primary data, 2017 (processed)

\*Projected value based on farmer no 29, 5, 24, 31 and 26.

Based on Table 13, farmer number 8 is an inefficient farmer with an organic rice production level of 4000 Kg per hectare. If farmer number 8 wants to be efficient without reducing the amount of

output, then the farmer must reduce the number of inputs relatively by referring to peer farmer number 29, 5, 24, 31, and 26. These results indicate that there is an excess use of production inputs, such as seeds of 6,648 kg per Hectare; solid organic fertilizer of 474,876 Kg per hectare; liquid organic fertilizer of 1900 liters per hectare; green manure of 1899,502 Kg per hectare; pesticide of 2,592 liters per hectare; and a workforce of 44,045 daily workers.

Likewise, farmer number 20, in order to be efficient, can refer to farmer number 1, 31, 24, 5, and or 26. Unlike the case with farmer number 34, 36, 39, 40, 41, 43, and 44 who only have one the choice of peer farmers is farmer number 31. This means that if these seven farmers want to be efficient, then they must allocate the use of production inputs based on farmer standard number 31. This also applies to other inefficient farmers.

**Comparison of Original Value, Radial Movement, Slack, and Projected Value of Organic Rice in Sumbergepoh Village**

Technical efficiency with DEA analysis is able to provide information on how much to reduce the use of inputs so that the DMU becomes efficient. There are 4 main components analyzed, namely original value, radial movement, slack, and projected value.

DEA analysis is able to produce original value, radial movement, slack, and projected value for each farmer and their inputs. However, to give a general idea, in this discussion, the value used is the average value of 6 production inputs, namely seeds, solid organic fertilizers, liquid organic fertilizers, green fertilizers, vegetable pesticides, and labor. In detail can be seen in Table 14 below.

Table 14. Comparison of Original Value, Radial Movement, Slack, and Projected Value

Average value	Original Value	Radial Movement	Slack	Projected Value
Seed (Kg/Ha)	36,14	4,33	3,15	28,66
Solid Organic Fertilizer (Ltr/Ha)	2.819,26	304,22	276,58	2.170,30
Liquid Fertilizer (Ltr/Ha)	13,01	1,72	1,07	10,23
Green Manure (Kg/Ha)	8.525,70	227,54	505,10	7.048,76
Pesticides (Ltr/Ha)	12,57	1,71	1,25	9,61
Labor (DWP/ha)	217,70	25,23	6,67	185,80

Source: Primary data, 2017 (processed)

Based on Table 14 above, farmers can be said to be efficient with only the original value minus the radial movement. The respective input values are: 1) Seed 31.81 Kg; 2) Solid organic fertilizer 2,515.04 Kg; 3) 11.29 L liquid organic fertilizer; 4) Green manure 8,298.16 Kg; 5) Vegetable pesticides 10.86 L; 6) The workforce is 192.47 daily working people. However, if farmers want to be more efficient, they must subtract the original value from radial movement and slack, so that it will produce projected value input. The magnitude of the input projected value of each input is: 1) Seed 28.66 Kg; 2) Solid organic fertilizer 2170.30 Kg; 3) Liquid organic fertilizer 10.23 L; 4) Green manure 7048.76 Kg; 5) Vegetable pesticides 9.61 L; 6) Labor 185.80 daily working people.

**CONCLUSION**

Based on the results of the study, it can be concluded that the level of technical efficiency of organic rice farming and the projected input value is divided into two parts. The first part is that organic rice farmers in Sumbergepoh Village are not yet technically efficient as indicated by the average technical efficiency value of 0.879. To improve the technical efficiency of organic rice farmers in Sumbergepoh Village, it is necessary to improve the use of production inputs. The use of these production inputs is equal to the input value projected and generated in the study. The input values are 28.66 kg of seeds, 2170.30 kg of solid organic fertilizer, 10.23 L of liquid organic fertilizer, 7048.76 kg of green manure, 9.61 L of vegetable pesticides, and 185.80 HOK for labor.

The second part is that there are 13 organic rice farmers who are technically efficient (ET value = 1) and 32 farmers who are not technically efficient (ET value <1), so that researchers can provide suggestions that persuasive action is needed from related parties such as agricultural offices, universities, and farmer group leaders to increase farmer participation in participating in field school activities. Farmer group control activities also need to be increased more intensely in order to quickly and precisely address various problems in the field.

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