THE EFFICIENCY OF PADDY, CORN AND SOYBEANS COMMODITIES IN GROBOGAN DISTRICT CENTRAL JAVA PROVINCES

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Abstract

Grobogan is one of the main agricultural district, especially for food crops in Central Java. Paddy, corn and soybeans are potential agricultural commodities of Grobogan. The demand of these commodities is quite large. However, the productivity of paddy, corn, and soybeans in Grobogan turned out to be below the target set by the Government of Grobogan . It is required a means of identifying inefficiencies in paddy, corn, and soybeans which causes the production is under the target achievement. This study has a purpose is to look at how the level of efficiency of the use of factors of production in rice farming, corn, and soybeans in Grobogan. With the evaluation of the efficiency of some agricultural commodities in Grobogan, it is expected to be a basis of policy formulation in order to improve the agricultural sector in general and the welfare of farmers in particular.Food crop commodities where consist of paddy, corn, and soybeans are inefficient. In the calculation of technical efficiency, allocative efficieny and economics efficiency, all of that commodities have not efficient. These result have a recommendation to the farmers and stakeholders that the using of production factors should be decreased. Because, and inefficient of these commodities caused by over allocated of production factors. And also, inefficient condition assumed makes the government target of food croop commodities production could not been fulfilled.

Keywords : food crops commodities, efficiency, Grobogan

INTRODUCTION

Agricultural sector in Indonesia gave a large contribution toward the Gross Domestic Product. This is evidenced with the contribution of agricultural sectors is the number two largest after industries sector. In fact, agricultural sector still concentrate in Java Island, especially for food crop commodities such as paddy, corn, and soybeans. So, the Java Island become the upholder of agricultural sector in Indonesia. And the Central Java Provinces is one of the main region in Java Island.

Grobogan District is a third largest area districts in Central Java Provinces. It is consist of 18 sub-district. With a big potential of agricultural land, that is makes Grobogan District to be a main food crop producers in the Provinces even nationally. Agricultural sector contributes more than 43% toward domestic GDP. (Central Statistics Bureau: 2013).

Paddy, corn, and soybeans is a superior product in Grobogan District. The consumers demand towards these product are rose dramatically every years. But, unfortunately the productivity of that commodities still lower that the government target.

The government target for paddy production that cultivated by the farmers is 10 tons per hectares, but the realization is no more than 6,33 tons per hectares. For the corn commodities, the government target is 5,5 tons per hectares, then the realization is 5,3 tons/ hectares. The same condition also happen to the soybeans commodity, the government target is 3 tons per hectares, unfortunately the realization is 2,5 tons per hectares. The low productivity cause the target is not fulfilled. This is the main problem for this research. Allegedly happen an inefficiency in food crops. Efficiency is a relationship between input and output. Whether the farmers use a proportional input for commoditiess. Because of the output below the target, that is caused by there was any problem with the using of production factors as an inputs. That is make this research focusing on the efficiency for the using of production factors.

Efficiency

the definition of efficiency can be separated by three interpretation: technical efficiency, allocative efficiency and economic efficiency. (Soekartawi: 2001). The using of production factor would be efficient technically if the inputs can results maximum outputs. In it would be efficient allocatively if the value of marginal product as same as the price of production factors. And it has been efficient economically if that farms commodities achieved technical efficiency and allovative efficiency in a same time.

RESEARCH METHODS

Sampling Methods

In the sampling method, to measure the efficiency for using of production factors in paddy, corn and soybeans commoditiess, there was used 90 samples. The samples is a farmers that cultivate neither various of commodities. 90 samples had been divide to a several area of research. 90 samples was picked because of some reason. First, the limitation of the researcher related to the time, cost and large area. Second, the farmers characters in Grobogan District are very homogenity. So, the using of large samples did not guarantee the information that compiled is better that small sample.

This research classified the samples by the agricultural aglomeration area of commodities. The classification refers to the subdistrict base agricultural production. The sub-district has been picked as a research location is a largest production of each commodities. The areas consist of:

1. For paddy commodities there was picked Godong subdstrict. This subdistrict is a largest area of paddy's commodities in the Grobogan District. The large of paddy's commodities are 12.904 hectares and resulting 85.027 tons of paddy's last year.

2. For corn commodities there was picked Geyer Subdistrict. Geyer subdistrict is the largest areas of corn's commodities with 23.247 corn field. And Geyer subdistrict produced 23.247 Tons in last harvest time.

3. And the last, Pulokulon subdistrict was picked as a research location of soybean commodities. That is the most famous major roducers of soybeans in the District even Provinces and Nationally. The commodities areas is 5.744 hectares and produces 16.038 Tons. Pulokulon subdistrict is the highest soybeans producers in Grobogan District.

Production function models for paddy, corn and soybeans commoditiess with frontier stochastic production approach

The models that used in this research is a production function models with frontier stochastic production approach with 8 variables. The mathematic models

in production function of paddy,corn and sotybeans commodities can be visualized on the formulas below:

Paddy commodities:

$LnY = b_0 + b_1LnX_1 + b_2LnX_2 + b_3LnX_3 + b_4LnX_4 + b_5LnX_5 + b_6LnX_6 + b_7LnX_7 + b_8LnX_8\ (V_1 - U_1)$

Corn commodities:

$LnY = b_0 + b_1LnX_1 + b_2LnX_2 + b_3LnX_3 + b_4LnX_4 + b_5LnX_5 + b_6LnX_6 + b_7LnX_7 + b_8LnX_8\ (V_1 - U_1)$

Soybean commodities:

$LnY = b_0 + b_1LnX_1 + b_2LnX_2 + b_3LnX_3 + b_4LnX_4 + b_5LnX_5 + b_6LnX_6 + b_7LnX_7 + b_8LnX_8\ (V_1 - U_1)$

Table 1 The definition of each variables

No	Variables	Code	Definition	Measurement Scale
Paddy, Corn, Soybeans Commoditiess				
1	Dependent	Y	Production	Rp, Kg
2	Independent	X_1	Large Areas	Rp, Hectares
		X_2	Seeds	Rp, Kg
		X_3	UREA fertilizers	Rp, Kg
		X_4	TSP fertilizers	Rp, Kg
		X_5	Phonska fertilizers	Rp, Kg
		X_6	Labour	Rp, Work hours
		X_7	Insecticide type 1 (regent)	Rp, Litres
		X_8	Insecticide type 2 (saprodap)	Rp, Litres
		b_0	Intercept	
		b_1-b_8	Regression coefficients	

RESULT AND DISCUSSION

The Efficiency of Paddy, Corn and Soybeans Commodities

According to the quantitative analysis result. The cultivations of paddy, corn and soybeans still not efficient, despite technical, allocative and economics efficiency. In which, corn commodities efficiency is the lowest of all. An inefficiency in the using of production factors describe the real condition of agricultural sector. There was a big problem in a food crops cultivation in Grobogan District.

Technical efficiency of Paddy, Corn and Soybeans Commodities

Technical efficiency means the relationship between the using of production factors and outputs that produced. According to the quantitative analysis with frontier 4.1 software, there was a result that all of food crop commodities in Grobogan District still inefficient. Because the technical efficiencies result are less than 1. Technical efficiencies value of paddy's commodity is 0,8789. While, the technical efficieny of corn's commodity is 0,7634. Corn's efficiencies value is lower than paddy's commodity. Refers on that result, there was any information that the using of production factors in paddy and corn commodities are have not optimal yet. So, there must be optimize again to increase the efficiencies level in both commodities.

Obviously, the soybeans cultivation also inefficient same with the other food crop commodities. According to the quantitative analysis, soybeans efficiency level is 0,9619. It still less than 1 so the result is inefficient. However, if the technical efficiencies result compiled one commodities with the others. Soybeans commodities still more efficient than paddy and corn commodities. And corn cultivation is the most inefficient rather than the other food crop commodities cultivation.

The farmers of food crop commodities such as paddy, corn and soybeans could not optimize for the using of production factors. So they can not achieve efficient level and it has not full employment. The using of production factors such as fertilizer, seeds, and insecticides is over using. It is causing production activities were not optimal and finally harvest failed potentially happened. The over using of production factors will decrease the land quality. Lack of knowledge for the farmers suppose to be a reasons. They do not know how much they have to spent the fertilizers and seeds for their field. They have a philosoply, "more is better". If they fertile more, seeds more, the harvest will be more than their expectation. But, their philosophy is not really true. In reality, if they spent more production factors, the result is different. Farmers can not achieve a more output because of lack land quality. The ingredients of soil were decrease due to over cultivation. And it could not change by the using of more artificial fertilizer to recover the soil ingredients that disappear.

Due to the less quality of land and high expectation of harvest. Farmers exploitate their field to achieve the output more than. They disperse more fertilizers to increase the soil quality. So that is why they are use UREA, TSP, and Phonska Fertilizers. A various of fertilizers can increase the productivity. The farmers also cultivated a seeds rapidly just for arise the productivity. during the cultivation, they also spread more insecticide to decrease diseases impacts in the plants. All of that activities needs a labours. The farmers spend more labour to fertile rapidly. The cultivation process also more complicated, it needs more labour.

However, the using of production factors could not make the harvest increasingly. That is beyond the farmers expectations. Agricultural field should not been exploitated to improve the productivity. over exploitation and over fertilization will make the land quality decrease slightly. In the other side, farmers spent more production factors without knowledge. They only use a feeling to finds best compotition of fertilizers to fertile their plants. Whereas, there must be any ideal comparation between production factors and land area to resulting an optimal output. That is need an agricultural knowledge. Farmers could not rely on their felt. lack of education and base knowledge is the main problems of it.

Base on that condition. Farmers needs to supervise by the extensions and academision. Their knowledge must be increase. Applied science should be taught with an informal education approach. Besides to ensure for the farmers to change their traditional cultivation methods. Because it makes inefficient condition.

Allocative Efficiency of Paddy, Corn, and Soybean Commodities

Allocative efficiency represents the marginal productivity value or net profit margin (NPM) of each inputs as a variables compared with the price of inputs is same with 1. It is means explain how the producers can be optimize their provision. According to the NPM result for each variables, there was a result that paddy, corn and soybeans cultivations have not efficient allocatively.

The table below will show the result, where every NPM value of each variables is more than 1. It means all of production factors in food crop cultivation are inefficient. An average values of NPM is 1,08 for paddy's commodity. While, for corn's commodity the NPM average is 0,674. In the other case, the NPM values of soybeans commodities is 1,7343. Refers on these calculation, the NPM result

shows that farmers in Grobogan District still could not maximize their provision were obtained. It could be happen because they have not achieve allocative efficiencies indicator, theusing of production factors still not efficient allocatively.

Table 2 Allocative Efficiency of Paddy, Corn, and Soybeans Commodities

No.	Variabel	NPM (paddy)	NPM (corn)	NPM (soybeans)
1	Land area	-256,405	-20,82	2,83
2	Seeds	56,48	3,21	-4,03
3	Urea fertilizer	3,84	3,69	6,08
4	TSP fertilizer	27,85	8,28	-13,03
5	Phonska fertilizer	4,56	-19,28	5,01
6	Labour	-14,64	22,62	2,17
7	Insecticides type 1	-75,26	33,66	-111,42
8	Insecticides type 2	266,131	-35,686	126,265
Allocative efficiencies		**1,08**	**0,674**	**1,7343**

Sources: Primary data

There are any several hypothesis that make soybeans commodity are less efficient allocatively than paddy and corn commodities. First, the farmers in soybeans paid their production factors are more expensive than the other farmers that cultivate paddy and corn commodities especially in the insecticides and fertilizers. That is make their total cost is higher. Second, the profits that resulted from soybeans commodities is less than paddy and corn commodities. That is make the soybeans farmers could not achieve a better provision.

Economic Efficiency of Paddy, Corn and Soybeans Commodities

Economics efficiency is the multiply of technical and allocative efficiency. Economics efficiency level represents efficiencies condition comprehensively. Herewith the table of economics efficiency below:

Table 3 Economics Efficiency of Paddy, Corn, and Soybeans Commodities

Commodities	Efficiencies Level
Paddy	0,94
Corn	0,513
Soybeans	1,66

Sources: Primary Data

The economics efficiency from paddy commodity is 0,94. This result indicates that paddy commodity still not efficient, these result still in line with technical and allocative efficiencies level toward paddy commodity. So, if the

farmers wanna be efficient economically, they have to decrease the using of production factors to achieve efficient condition.

Describing from the previous result. Economic efficiencies level of corn commodities is 0,513. These result also indicates and in line with the technical and allocative efficiency measurement. Corn commodity have not efficient economically. The corn farmers also should be decreasing their allocation of production factors, because the efficiency level is less than 1.

Soybeans commodity also had a same condition. The economics efficiency level is 1,66. This result represents that soybeans commodity still inefficient economically. And still in line with the result of technical efficieny. The farmers must increase their production factor allocation in the cultivation process because the efficiencies level is more than 1.

Refers on the analysis. The economics efficiency of soybeans commodity is the lowest than paddy and corn commodities. That condition indicates that, although soybeans farmers is the most efficient in technical efficiency. Where the farmers allocate better ingredients of production factors in the cultivation process. But, the soybeans farmers could not maximize their profit. That is why in economic efficiency estimates, their efficiency is the lowest than the other commodities.

CONCLUSION

Food crop commodities where consist of paddy, corn, and soybeans are inefficient. In the calculation of technical efficiency, allocative efficieny and economics efficiency, all of that commodities have not efficient. That is represents with the technical efficiencies rate of paddy is 0,8789; corn 0,7634; and soybeans 0,9619. While for the allocative efficiencies of paddy is 1,08; corn is 0,674; and soybeans is 1,7343. The economics efficiency of paddy is 0,94; corn is 0,513; and soybeans is 1,66.

These result have a recommendation to the farmers and stakeholders that the using of production factors should be decreased. Because, and inefficient of these commodities caused by over allocated of production factors. And also, inefficient condition assumed makes the government target of food croop commodities production could not been fulfilled.

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