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Development of Hybrid Corn for Support Food Security in Nusa Tenggara Barat Province, Indonesia

Eni Istiyanti^a*, Triwara Buddhi Satyarini^a, Vera Wabianty^a

^aDepartment of Agribusiness, Universitas Muhammadiyah Yogyakarta
Jl. Brawijaya Tamantirto Kasihan Bantul 55183 Daerah Istimewa Yogyakarta,
Indonesia.

*Corresponding author. Tel: +628 122 729 471,
eniistiyanti@umy.ac.id (Eni Istiyanti)

Abstract

The productivity of corn in the Province of Nusa Tenggara Barat, is higher than the productivity of national corn, but high productivity is not accompanied by favorable prices. The purpose of the study was to analyze the costs, income, profits and feasibility of corn farming in Dompu Regency, Nusa Tenggara Barat Province. The study was conducted using survey methods with as many as 42 corn farmers who were members of the "Sub Mekar Selalu" farmer group in Manggalewa District, Dompu Regency. The results showed that on an area of 1.87 ha it needed a total cost of Rp19,273,343, - producing corn as much as 14,409 kg. The income earned is Rp18,548,718, - and profits of Rp14,933,617, -. Corn farming in Dompu NTB Regency is feasible to be developed with R/C 1.77 (> 1) and land productivity of Rp.9,594,894/ha (> land rent).

Keywords: corn, development, feasibility, income, land productivity

1. Introduction

Food crops are one part of the agricultural sector and become a staple crop that is expected to be able to meet food needs in Indonesia (Sitanggang, 2016). Corn is one of the non-rice food plants which acts as a supporting food commodity and the main food supplement because in certain conditions it can act as a substitution of rice. Indonesian corn production has not been able to meet demand so that the government imports. In 2018, the import of Indonesian corn reached 730,981 tons used for the food, beverage, while imports for animal feed amounted to 300,000 tons.

Indonesia's corn production centers are the provinces of East Java, Central Java, Lampung, NTB, South Sulawesi, North Sumatra, and Central Sulawesi. As one of the production centers, Nusa Tenggara Barat (NTB) accounts for 6.9% of national corn production. Corn has become a prime crop in NTB because the cultivation method is easy and the natural conditions are in accordance with the requirements for growing corn plants.

The productivity of corn in NTB increases every year and is always higher than the national corn productivity. However, there is no change in the welfare of the community because high productivity is not accompanied by favorable prices. (BPS NTB, 2016). The purpose of the study was to analyze the cost, income and feasibility of hybrid corn farming in Dompu Regency, Nusa Tenggara Barat Province.

2. Research methods

The research location was determined purposively based on Dompu's consideration as one of the regency in Nusa Tenggara Barat with agricultural land for corn farming exceeding the target and being one of the main centers of corn production which ranked 10th in Indonesia. The study was conducted using survey methods with as many as 42 corn farmers who were members of the "Sub Mekar Selalu" farmer group in Manggalewa District, Dompu Regency. Quantitative analysis technique is to

determine the amount of production costs consisting of explicit and implicit costs, income and profits and feasibility analysis with R/C and land productivity (Soekartawi, 2016), mathematically written as follows:

$$TC = TEC + TIC$$

$$TR = Q P$$

$$NR = TR - TEC$$

$$\pi = TR - TC$$

$$R/C = TR/TC$$

$$\text{Land Productivity} = (\text{NR} - \text{Implicit costs other than own land rent}) / \text{land area}$$

Information: TC = Total Cost

TEC = Total Explicit Cost

TIC = Total Implicit Cost

TR = Total Revenue

NR = Net Revenue

Q = Quantity of Product

P = Price of Product

π = Profit

3. Results and discussion

The average land area used for corn farming in Dompu Regency is 1.87 ha with a production of 14,409 kg so that the production per hectare is 7,705 kg. Corn production in Dompu Regency is higher than corn production in Bone Regency, South Sulawesi, which is 58.8 quintals/ha for paddy fields and 45.3 quintals/ha for dry land (Tahir & Suddin, 2017).

Table 1. Analysis of Hybrid Corn Farming in Dompu Regency, NTB, 2017

Descriptions	Amount
Production (kg)	14,409
Total Revenue (Rp)	34,206,960
Explicit Cost (Rp)	15,658,299
Implicit Cost (Rp)	3,615,044
Income (Rp)	18,548,718
Profit (Rp)	14,933,617
R/C	1.77
Land Productivity (Rp/ha)	9,594,894

The price of corn in Dompu Regency is quite low, which is around Rp 1,700 - Rp.3,000 per kg so that the revenue of Rp 34,206,960 is obtained. The income of corn farming is Rp 18,548,718 per 1.87 ha or Rp 9,919,100 per hectare. This income is greater than the income of Hybrid Corn in Muna Regency, Southeast Sulawesi Province, which is Rp. 8,596,000 in one planting season (Suharno & Rusdin, 2017).

Feasibility of corn farming is measured by the R/C indicator and land productivity. The R/C value of 1.77

which can be interpreted as 1 rupiah of costs incurred will result in revenues of 1.77 rupiah, which means that the profit is 0.77 rupiah, so corn farming is worth developing. This R/C value is greater than the value of R/C of corn farming in upland fields in Bone South Sulawesi Regency that is equal to 1.72 (Tahir & Suddin 2017) and greater than the R/C in hybrid corn farming in East Lombok Regency which is equal to 1, 22 (Ahmadi, 2016). Corn farming in Dompu regency is feasible because land productivity is Rp 9,594,894/ha greater than land rent of Rp 2,000,000/ha /year which means land is better for corn farming than rent

4. Conclusion

Production, income and profits of corn farming in Dompu regency Nusa Tenggara Barat are higher than other regions in Indonesia. The hybrid corn farming is feasible to be developed with R/C > 1 and land productivity > land rent. The price of corn received by farmers is still low, therefore it is necessary to intervene from the government to control the price of corn in Dompu regency so that farmers' income increases.

Acknowledgments

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Efficiency Analysis of Rice Farming In The Suburban Area of Bantul District

Triyono^a and Eni Istiyanti^a

^aDepartment of Agribisnis, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia.

*Corresponding author. Tel: +62 274 387 656, Fax: +62 274 387 646
triyono@umy.ac.id (Triyono)

Abstract

This research aims to determine the factors that affect the rice production and the efficiency of rice farming in suburban area. The location is in the Sub-District of Sewon, Banguntapan and Kasihan. Each sub-district was taken one village by using simple random sampling. Similarly, each village was taken one farmer group. The samples were taken by using simple random sampling and obtained 30 respondents farmers, each farmer group 10 respondents. The data were collected by using a questionnaire for interviewing. Then the data were analyzed by using production function. The result show that the factors significantly influence rice production are land, seed, labors, liquid pesticide and solid pesticide. While the labors are efficient, on the other hands field, seed, liquid pesticide and solid pesticide has not been efficient in its use.

Keywords

Efficiency, Production, Farm, Rice, Suburban.

1. Introduction

According to Bantul Regency statistics there are around 49% or half of the people of Bantul who depend on agriculture for their livelihoods. The number of people in Bantul has a livelihood as a farmer because it is supported by a large amount of land. There are 210.94 km² (41.62%) flat and sloping areas which are fertile agricultural areas (Statistics of Bantul Regency, 2012). While the harvested area fluctuated from 2009 to 2013 it means that the harvested area is affected by uncertain geographical conditions. On the other hand, the growth of the industrial, service and property sectors in the era of economic growth also had a negative impact and pressure on the agricultural sector, especially rice fields. Conflict of use and use of land is a dilemma because the opportunity to expand the land area is very limited. The transfer of uncontrolled functions of agricultural land if not addressed can be a serious problem, among others, can threaten food security. The land area that is getting narrower, especially in the suburbs, will certainly result in lower rice production in the area. This encourages farmers to manage land more intensively by utilizing the technology and

production factors they have in order to increase the productivity and efficiency of rice farming.

Many studies have been conducted to increase agricultural production through increasing farming efficiency based on existing resources and technology. As an alternative to increasing production output, efforts can be made through increasing technical efficiency. Technical efficiency means producing by using resources more efficiently (Sharma and Leung, 2000). In his study conducted in 2007, Bravo-Ureta et al. using data published between 1979 and 2005 167 efficiency studies were obtained. The most analyzed commodities are rice, followed by dairy farming, and overall farming. In the study horticultural studies were relatively limited to only about 2 percent of the overall study. Bozoglu and Ceyhan (2007) assessed the technical efficiency of vegetable production in Turkey using the SFA approach. Furthermore, Abedullah et al. (2007) used the production function of the stochastic frontier to determine strategies for increasing rice production in the Punjab. The results of the analysis showed that pesticides did not significantly influence rice productivity, while fertilizers had a negative

impact on productivity due to improper N, K and K nutrient composition. Meuya et al. (2008) conducted a study aimed at estimating the level of technical efficiency of 233 corn farmers in Tanzania. Various studies above have not yet studied the efficiency that is relevant to land in peri-urban areas. Therefore this paper will discuss the study of the price efficiency of rice farming in the suburban area.

2. Method

The regional sampling was determined by purposive sampling, namely Sewon, Banguntapan and Kasihan Subdistricts because the three sub-districts were geographically directly adjacent to the Yogyakarta city area and in the region the economy developed services, industry and trade sectors which could suppress agricultural existence. Each sub-district was taken one village by using simple random sampling. Each village is taken one farmer group. The samples were taken by simple random sampling and obtained 30 respondents farmers, each farmer group 10 respondents. The data were collected by using a questionnaire for interviewing.

We analyzed using the Cobb-Dougllass type production function model approach, which is a function or equation involving two or more variables, where one variable is called the independent variable (Y) and the other is called the dependent variable (X) (Soekartawi 1990). Mathematically the Cobb-Dougllass function can be written in the form of equations:

$$Y = aX_1^{b_1} X_2^{b_2} \dots X_{12}^{b_{12}} D^d e^u$$

Information:

Y = Production (kg)

a = Constanta

b_i = Coeffisien that will be assumed (i= 1, 2, 3, 4, 5, 6)

e = natural logarithm, e = 2,718

u = error/disturbance term

X₁ = land (m²)

X₂ = seed (kg)

X₃ = Urea fertilizer (kg)

X₄ = Phonska fertilizer (kg)

X₅ = TSP fertilizer (kg)

X₆ = ZA fertilizer (kg)

X₇ = KCL fertilizer (kg)

X₈ = Manure fertilizer (kg)

X₉ = Organic fertilizer (kg)

X₁₀ = Labor (day)

X₁₁ = Liquid pesticed (ml)

X₁₂ = Solid pesticide (g)

D = season, D = 1 if the rainy season, D = 0 if the dry season

We use the function of the logarithmic equation to estimate the equation. Mathematically the function can be written as follows:

$$\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + \dots + b_{12} \ln X_{12} + dD$$

The model testing used in this study is the coefficient of determination (R²), F test and t test.

To find out the level of efficiency of the use of a production factor can be done by calculating a value that shows the ratio between NPM (Value of Marginal Product) and input price (P_x) or can be written in the form of $NPM_x / P_x = k$.

With,

$NPM_{xi} / P_{xi} = 1$, meaning that the use of input is efficient

$NPM_{xi} / P_{xi} > 1$, meaning that the use of input is not efficient, to achieve efficient input, it needs to be added.

$NPM_{xi} / P_{xi} < 1$, meaning that the use of input is not efficient, to achieve efficient input, it needs to be reduced.

3. Results and discussion

Table 1. Rice Production Factors

Variabels	Coefficient	t-calc
land (X ₁)	0,366	2,500
Seed(X ₂)	0,442	3,084
Urea fertilizer (X ₃)	0,016	0,324
Phonska fertilizer (X ₄)	-0,018	-0,457
TSP fertilizer (X ₅)	-0,051	-1,351
Za fertilizer (X ₆)	-0,210	-0,428
KCL fertilizer (X ₇)	-0,055	-1,103
Manure fertilizer (X ₈)	0,015	,269
Organic fertilizer (X ₉)	-0,038	-1,152
Labor (X ₁₀)	0,271	1,687
Liquid pesticide (X ₁₁)	0,224	1,924
Solid pesticide (X ₁₂)	0,891	2,468
Season (D ₁₃)	-0,199	-1,133
Constanta	230674	
R ²	0,734	
Adj. R	0,658	
F _{statistik}	3,58	
N	60	

Information:

***: significant at an error rate of 1%

**: significant at an error rate of 5%

*: significant at an error rate of 10%

Partially the factors of production have a significant effect on the production of paddy rice in peri urban areas, namely land, seeds, labor, liquid pesticides and solids. The land owned by the farmer is located in the peri-urban area so that it is prone to land conversion to non-agriculture. If this happens, it will affect rice production. Seed factors have a significant effect on rice production in urban peri areas. labor production factors significantly influence rice production. the use of liquid and solid pesticides for rice cultivation affects rice production.

In calculating efficiency analysis, only production factors have a significant effect on organic rice production. Production factors that have a significant effect on rice production are land, seeds, labor, liquid and solid pesticides. The level of efficiency of the use of production factors can be seen in table 2.

Table 2. Effisiensi of Production Factors

Variabel	Efficiency	t calc	t tabel
Lahan	5,42	-2,11	2,00
Benih	24,36	-2,86	
Tenaga Kerja	2,50	-1,15	
Pestisida Cair	957,40	-2,23	
Pestisida Padat	23641,94	-2,47	

Table 2 shows that the use of rice farming production factors is not efficient so that the factors of land production, seeds, labor and pesticides need to be added. Factors of land cannot be added because they are in suburban areas prone to land conversion. The use of seeds and labor can still be increased until the optimal usage limit. In addition, the use of pesticides must continue to pay

attention to the environment so that pollution does not occur.

5. Conclusion

It is important to determine factor production on rice farm in suburban area. The factors significantly influence rice production are land, seed, labors, liquid pesticide and solid pesticide. While the labors are efficient, on the other hands field, seed, liquid pesticide and solid pesticide has not been efficient in its use. For increasing efficiency, we need to increas seed and contoll using pestiside.

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