JURNAL SYNTAX IDEA
p–ISSN: 2723-4339 e-ISSN: 2548-1398
Vol. 5, No. 4, April 2023

EFFICIENCY ANALYSIS OF THE USE OF POTATO PRODUCTION INPUT IN NGADUMAN GETASAN DISTRICT SEMARANG REGENCY

Yohana Aprilia, Tinjung Mary Prihtanti
Fakultas Pertanian Dan Bisnis, Universitas Kristen Satya Wacana Salatiga
Email: 522018050@student.uksw.edu, tinjung.prihtanti@uksw.edu

Abstract

The right allocation of production inputs will provide benefits for farmers. Farmers cultivate potatoes with a different allocation of production inputs. The wrong understanding of the assumption that the more production inputs allocated, the higher the productivity of the crops cultivated, is the cause of the higher production costs incurred by farmers, causing inefficiency. The purpose of this study was to analyze the effect of the use of production inputs and the allocative efficiency of seeds, fertilizers Phonska, fertilizers Za, pesticides, and labor on the productivity level of potato farming. The research was conducted through interviews with 30 potato farmers as respondents who were selected through a purposive sampling technique. The data were analyzed using the Cobb-Douglas production function model and allocative efficiency analysis. The results showed that land area and labor had a significant positive effect on potato productivity, while seeds, fertilizers, and pesticides had no significant effect on potato productivity. In potato farming in Ngaduman, seeds, and labor production inputs are not allocatively efficient, while production inputs for fertilizers Phonska, fertilizers Za, and pesticide are allocatively inefficient.

Keywords: *Efficiency; Productivity; Potato.*

INTRODUCTION

Horticulture is one of the agricultural sub-sectors that has an important role in the development of the Indonesian economy. The important role of horticulture can be seen from the contribution of horticultural commodities to national GDP. In 2015 the horticulture sub-sector was able to contribute 1.51% to national GDP. In 2019, the contribution of the horticulture sub-sector experienced a considerable increase, which increased by 9.2% compared to 2018. Horticultural GDP contributed 16.03% to the GDP of the agricultural sector which reached Rp 1,489.5 trillion. In Central Java, one of the commodities that contribute to GDP growth is potatoes. Central Java itself is ranked 2nd in potato production with a harvest area of 16,452 Ha with a production of 294,015 tons. The development of production in Indonesia for the 2015-2019 period has increased every year, except in 2017 it decreased, but in 2018 it increased again quite significantly, and in 2019, potato production increased by 29.89 thousand tons compared to 2018.

How to cite: Yohana Aprilia, Tanjung Mary Prihtanti (2023) Efficiency Analysis of Use 0f Potato Production Input in Ngaduman Getasan District Semarang Regency, *(5) 4,* https://doi.org/10.36418/syntax-idea.v3i6.1227
E-ISSN: 2684-883X
Published by: Ridwan Institute

Table 1
Area of Harvest, Production, and Productivity of Potatoes in Central Java in 2015-1019

Year	Potato Harvest Area (ha)	Production (Ton)	Productivity (Ton/ha)
2015	16,215	212,173	13.1
2016	14,955	227,996	15.2
2017	15,579	241,180	15.5
2018	15,461	312,966	20.2
2019	16,452	320,209	19.5

Source: Directorate General of Horticulture (2019) and BPS (2019)

According to the Central Bureau of Statistics, 22.36% of national potato production comes from Central Java. Central Java is ranked second as the center of potato production in Indonesia after East Java. One of the potential areas for potato producers in Central Java is Ngaduman Hamlet, Getasan District, and Semarang Regency. Ngaduman is a mountainous area located at an altitude of 1800 meters above sea level so it fits the criteria for the location of horticultural plants. With environmental conditions that meet the criteria for growing requirements, potatoes produced in this region have good quality.

One of the potato-producing areas in Semarang Regency is in Getasan District, Ngaduman Hamlet. Potatoes cultivated in Dusun Ngaduman are potatoes of the Granola L variety. Granola potatoes are commonly used as vegetables with oval-shaped tubers and yellow flesh and skin. According to Setiadi (2001), Granola is a type of potato that is included in superior quality with adaptability, disease resistance, and productivity that can reach 30-35 tons/ha.

Ngaduman Hamlet has been producing potatoes for decades, but the quality of the soil is still relatively good because the planting pattern system rotates following the season. And in general, farmers in Ngaduman Hamlet not only cultivate potatoes but there are also horticultural gardens that they cultivate. But this study focused on potato plants. In Ngaduman Hamlet, potatoes are a superior commodity. Seeing this situation, potato farming in this village needs to be developed efficiently in terms of the number and cost of production inputs to provide profits and increase income for farmers.

Anggraeni (2015) Efficiency in production is a measure of the comparison between output and input. The concept of efficiency was introduced by Michael Farrell by defining it as the ability of the organization of production to produce a certain product at a minimum cost level. Sampul (2018), Distinguished efficiency into three, namely engineering efficiency, allocative efficiency (price), and economic efficiency. The use of factors of production is said to be technically efficient if the factors of production used produce maximum production. Allocative efficiency is achieved if the addition of production inputs can maximize profits, namely equating the marginal product of each factor of production with its price while economic efficiency can be achieved if the agricultural business achieves both efficiency, namely technical efficiency and price efficiency.

Potato productivity is influenced by the use of production factors such as land area, seeds, fertilizers, pesticides, and labor. The use of production factors that are not technically efficient can cause production that is not optimal so increased production can be done with the use of more efficient production facts. Usersofthese factors of production are included in technical efficiency. Bantaika (2017) stated production inputs that affect the amount of corn production are seeds, fertilizers, pesticides, and labor. The amount of use of these production inputs depends on needs. Seeds are seen based on planting area, fertilizer based on soil conditions so that nutrients are fulfilled in corn growth, pesticides based on the amount or absence of grass nuisance plants around corn plants, and labor based on planting area and soil conditions (Indriyati & Mustadjab, 2016).

One of the problems faced by potato farmers, related to the problem of agricultural production efficiency, is the inefficient allocation of production inputs, which then causes not the maximum income obtained by farmers. This is due to the lack of understanding of farmers in terms of allocating production inputs to farms, sometimes farmers use less or excess production inputs so that potato production cannot achieve maximum results as expected by farmers. Reddy (2014) Mentioned that efficiency is to produce more products with the use of the same inputs (factors of production).

Some similar studies on the analysis of the efficiency of the use of potato farming production inputs include, Sinaga (2021) states that partially the variables of land area, fertilizers, and pesticides have a significant effect on potato production and simultaneously the variables of land area, labor, fertilizers, and pesticides have an influence on potato production. Marlinda (2020) states that production factors in the form of seeds, N elements, and labor have a positive and significant effect, while land area and K2O factors have a negative and significant influence on potato farming production.

Based on the background above, the formulation of the problem in this study is: 1) How does the use of production inputs affect the productivity of potato farming? 2 What is the efficient use of potato farm production inputs?

This study aims to (a) Analyze the effect of the use of production inputs on the productivity level of potato farming in Ngaduman, Getasan District, Semarang Regency. (b) Analyzing the level of efficiency of using potato farming production inputs in Ngaduman, Getasan District, Semarang Regency. The benefits of this research are (a) This research is expected to be useful as material and input consideration in making policies in optimizing the use of production inputs to achieve an efficient cultivation business. (b) D can provide input in optimizing the use of production inputs to reduce production costs to obtain maximum income.

RESEARCH METHODS

This study used a type of quantitative descriptive research. Where this study has a large population but is easy to analyze using statistical formulas and computers. Quantitative descriptive research is research conducted by researching research samples

to obtain the required data and then analyzing using statistical methods used and interpreting in the form of information (Bungin, 2013). The research activity was carried out in Ngaduman Hamlet, Header Village, Getasan District, Semarang Regency. The determination of the location of the study was carried out by purposive sampling with the consideration that Ngaduman Hamlet is one of the areas with a harvest area of around 20 Ha. This study was conducted from February to March 2022.

In this study, two data sources were used, namely primary data and secondary data. Primary data are obtained from interviews, observations, and documentation, while secondary data are obtained from secondary sources that are not directly involved in the research but also support the research. Secondary data is used as supporting data. The sampling technique used in this study is a non-probability sampling technique with purposive sampling techniques. Only farmers who have criteria set by their researchers have the opportunity to be selected as their research samples.

Based on this theory, the purposive sampling technique is the selection of samples based on certain characteristics that have been determined by researchers as listed in the research limits. The number of samples to be studied is as many as 30 farmers who have potato farming. The determination of the number of samples is based on the minimum requirements of respondents that must be met to use statistical regression analysis (Sugiyono, 2013).

The first objective of data analysis techniques is to use Cobb-Douglas production function analysis to determine the influence between production inputs and production outputs. The Cobb-Douglas Production Function assumes that the number of parameters is equal to one, $\alpha + \beta = 1$ so this production function is Homogeneous Linear or of degree one. The characteristic of the Cobb-Douglas production function is that the parameters of α and β which are the elasticity of output to each input are fixed (Chisasa & Makina, 2013).

Soekartawi (2002), states that the Cobb-Douglas production function is an equation involving two or more variables, where the dependent variable is called the dependent variable (Y) and the free one is called the independent variable that explains (X), mathematically the Cobb-Douglas equation can be written as follows:

Y=aX1β1, aX2β2, aX3β3, …., aXnβn

To facilitate estimation of the above equation, it is converted into multiple linear forms by logging the equation into the following equation:

Ln Yi = Ln a + b1 Ln X1 +b2 Ln X2 +b3 Ln X3 +b4 Ln X4 +b5 Ln X5 +V

where,

Y = Potato productivity (Kg/Ha)

X1 = Seed (Kg/Ha)

X2 = Phonska fertilizer (Kg/Ha)

X3 = Fertilizer Za (Kg/Ha)

X4 = Pesticides (Liter/Ha)

X5 = Workforce (HOK/Ha)

a,b = Approximate magnitude

V = Error (disturbance tern)

To calculate the level of efficiency in the use of potato farm production inputs, a comparison is made between the value of the marginal product of the i-th production input (NPMxi) and the price of the i-th production input (Pxi). Here are the steps of data analysis for the second goal:

Marginal Product (PM), The formula that can be used in finding the marginal of the i-th production input (PMXi) is as follows:

$$PMXi = \frac{bY}{Xi}$$

Information:

b: Regression coefficient of production inputs to-i

Y: Potato productivity

Xi: Production Inputs

Marginal Product Value

$$NPMxi = PMxi.PY$$

Information:

PMXi = Marginal Product Inputs Production to-i

Py = Potato Price

Production Input Efficiency Index

The efficiency of the use of production inputs can be determined by comparing the value of the NPM of Xi's production inputs with the price of Xi's production factors. The formula that can be used is as follows:

$$Ef = \frac{N \cdot P \cdot M}{P.xi} = 1$$

Information:

Ef = Production Input Efficiency Index Xi

NPMxi = Marginal production value Xi

Pxi = Production Input Price Xi

According to Soekartawi (2002), To determine the level of efficiency of using production inputs in a farm, it can be seen from the efficiency index, namely if: (a) $\frac{N.P.Mx}{P.xi} < 1$ This means that the use of production inputs is inefficient and it is necessary to reduce the use of these production inputs. (b) $\frac{N.P.Mx}{P.xi} > 1$ means that the use of production inputs has not been efficient and needs to increase the use of these production inputs.

RESULTS AND DISCUSSION

A. The State of Potato Farming Business

The large land area makes Ngaduman one of the potato-producing areas in the Getasan District so the majority of the population works as farmers. All farmers cultivate potatoes with a monoculture system, which is a planting pattern that only grows potato plants in one area, for the reason that this planting pattern can minimize easily pests and diseases.

One of the most widely cultivated varieties is the Granola potato. Faster growth, ease in the planting process, large tubers produced, and a relatively fast harvest time of about 90-120 days after planting (HST) are the reasons many farmers cultivate granola potatoes. Most of the land used as a land for potato cultivation is their land so farmers act as full entrepreneurs on the land they own. The average farmer has a potato planting area ranging from 1000 m2 – 3000 m2. After harvesting, farmers are usually visited directly by middlemen to their respective homes to be picked up for their crops. The determination of potato prices has become the property of the middlemen completely. Price variations depend on the size of potato tubers. The price of potatoes in general is around Rp 10,000.

B. Use of Labor

The labor used in farming in Ngaduman comes entirely from labor in the family. Almost all of the respondent farmers in this study had their own cultivated land. At certain times using labor from outside the family. Labor costs already have standards according to the work done. Land processing, planting, fertilization, pest control, and harvesting are charged IDR 60,000/day.

C. Normality Test

The results of the normality test of potato farming in Ngaduman can be seen in the following table.

Table 2
Normality Test Results

	Statistic		Sig
Unstandardized Residual Valid N	0,135	…	0,172

Source: Primary data processing, 2023

The normality test is one of the classic assumption tests used to determine whether the regression model used is normally distributed or not. From the results of the classical assumption test to test residual normality, namely using the *Kolmogorov-Smirnov One Sample* (K-S) test, the magnitude of the significant value of 0.172 which is more than alpha (0.05), the results show that the residuals are normally distributed.

D. Autocorrelation Test

Based on table 4.5., it can be seen that the table value used in this study uses an alpha value of 5% with the number of samples (n) of 30 people and the number of independent variables as many as 5 variables. so it can be concluded that the Durbin *Watson* (DW) value lies between dU < d < 4-dU. Where the dU value is 1.832 and the dL value is 1.901 and the DW value is 2.168. Then the result is 1.832 < 1.901 < 2.168. These results showed that in this study there were no symptoms of autocorrelation.

Table 3
Autocorrelation Test Results

du < d < 4 – du	Information
1,832 < 2,163 < 2,168	No decision

Model	R	R Square	Adjusted R Square	Std. An error in the Estimate	Durbin-Watson
1	.757[a]	.573	.484	.2777	2.163

Source: Primary data processing, 2023

E. Multicollinearity Test

The following is the result of the analysis of the potato farming multicollinearity test presented in table 4 The multicollinearity test is one of the classic assumption tests used to determine the regression model used contains the problem of multicollinearity or not, namely whether or not there is a relationship between the independent variables studied. In this case, using the value of Tolerance and Variance Inflation Factor (VIF) from the regression test results.

Table 4
Multicollinearity Test Results

Variable	Tolerance	VIF	Information
Ln_Benih	0,267	3,746	Free
Ln_Phonska	0,295	3,385	Free
Ln_Za	0,668	1,497	Free
Ln_Pestisida	0,688	1,454	Free
Ln_TK	0,678	1,475	Free

Source: Primary Data processed, 2023

Based on the results of the analysis as in the table, it can be seen that potato farming in the research village does not contain multicollinearity problems. This is shown in the *Tolerance* value which shows that all values > 0.10 and all VIF values < 10.

F. Heteroscedasticity Test

The heteroscedasticity test is a classical assumption test used to determine the variance of nuisance variables whose values are not the same. In this case to find out the problem of heteroscedasticity is done with the *Glejser Test*. Based on the results of the analysis of potato farming in the village, the study showed that the data used in data processing did not contain heteroscedasticity problems. In potato farming, the significance value of all independent variables, namely Ln_benih, Ln_pupuk Phonska, Ln_pupuk Za, Ln_pestisida, and Ln_TK is greater than 0.05. The following is a table of heteroscedasticity test results in potato farming in the research village.

Table 5
Heteroscedasticity Test Results

Variable	t	Sig.
Ln_seed	1,876	0,073
Ln_phonska	-0,880	0,388
Ln_Za	-1,529	0,139
Ln_pestisida	0,028	0,978
Ln_TK	0,163	0,872

Source: Primary data processing, 2023

G. Results of Analysis of the Production Function of Potato Farming

The results of the analysis of the Cobb-Douglas production function between production inputs, namely land area, seeds, shrimp fertilizer, phonska fertilizer, Za fertilizer, pesticides, and labor can be seen in the following table:

Table 6
Results of Cobb-Douglas Production Function Analysis of Potato Farming

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Information
	B	Std. Error	Beta			
(Constant)	6,107	3,538		1,726	0,097	
Seed Area (Ln_X_1)	0,051	0,181	0,072	0,280	0,782	Have a positive and significant relationship
Phonska (Ln_X_2)	0,414	0,146	0,694	2,825	0,009	Have a positive and insignificant relationship
Za (Ln_X_3)	-0,870	0,317	-0,383	-2,345	0,028	Has a negative and insignificant relationship
Pesticides (Ln_X_4)	-0,316	0,295	-0,172	-1,072	0,295	Has a negative and insignificant relationship
Kindergarten (Ln_X_5)	0,007	0,092	0,012	0,072	0,943	Have a positive and significant relationship

Source: Primary data processing, 2023

Based on the results of linear regression analysis as in table 6, it can be known that the equation model of the production function of potato farming is as follows:

$$Ln\ Y = Ln\ 6{,}107 + 0{,}051 Ln\_X_1 + 0{,}414\ Ln\_X_2 + (-\ 0{,}870)\ Ln\_X_3 + (-0{,}316)\ Ln\_X_4 + 0{,}007\ Ln\_X_5$$

The results of the analysis of the Cobb-Douglas production function show that not all independent variables in the study have a real and significant effect on potato productivity.

Based on the production function equation model, it can be explained as follows: a) The constant value of potato farming is 6.107 which means that the production inputs allocated in potato farming will increase potato production by 6.107 units. b) Coefficient X1 (Seed) with value 0,051 which means when the value of X1 increases 1 kg per m2, then the production of cultivated potatoes will increase by 0,051. c) Coefficient X2 (Fertilizer Phonska) with value 0,414 which means that when adding X2 by 1 kg per m2, the production of cultivated potatoes will increase

by 0.414. d) Coefficient X3 (Fertilizer Za) with value -0,870 which means that when adding X2 by 1 kg per m2, the production of cultivated potatoes will decrease by 0.870. e) Coefficient X4 (Pesticides) with value -0,316 which means at the time of addition of X2 of 1 kg per m2, then the production of cultivated potatoes will decrease by -0,316. f) The coefficient of X5 (labor) with a value of 0.007 means that when the value of X5 increases by 1 HOK per m2, the productivity of cultivated potatoes will increase by 0.007 units.

H. The Effect of Seeds on Potato Farm Productivity

Following the results of linear regression, the regression coefficient value of the seed variable (Ln_X1) is 0.051 with a calculated value of 0.280 < table 2.063 and a significance level of 0.782 > 0.05. Thus, it can be concluded that H1 is rejected, meaning that the seed variable (Ln_X2) has no real effect on the level of potato productivity (Ln_Y). The majority of potato seeds cultivated by farmers in Ngaduman use granola seeds and a small part use grand seeds. There is almost no real difference between these two types of seeds, the farmer just plants as he sees fit and sees the majority who are around. Both types of seeds are equally easy to cultivate and the results obtained are also following the criteria.

Following the results of linear regression, the regression coefficient value of the seed variable (Ln_X1) is 0.051 with a calculated value of 0.280 < table 2.063 and a significance level of 0.782 > 0.05. Thus, it can be concluded that H1 is rejected, meaning that the seed variable (Ln_X2) has no real effect on the level of potato productivity (Ln_Y). The majority of potato seeds cultivated by farmers in Ngaduman use granola seeds and a small part use grand seeds. There is almost no real difference between these two types of seeds, the farmer just plants as he sees fit and sees the majority who are around. Both types of seeds are equally easy to cultivate and the results obtained are also following the criteria.

I. Effect of Phonska Fertilizer on Potato Farming

Fertilization plays an important role in efforts to increase the yield of potato plants. Fertilization recommendations should be made more rational and balanced based on the ability of the soil to provide nutrients and plant needs for nutrients. Potatoes are one of the crops that are very responsive to fertilizer absorption, so if underestimated fertilization the soil will become a pivot that will cause decreased production. Good fertilization is fertilization that meets the right 4 i.e., right type, right dose, on time, and the right way. Following the results of linear regression analysis, the regression coefficient value of the fertilizer variable (Ln_X2) is 0.414 with a calculated value of 2.825 > table 2.063 and a significance level of 0.009 < 0.05. Thus, it can be concluded that H2 is accepted, which means that the phonska variable has a real effect on the level of potato productivity.

J. The Effect of Pesticides on the Productivity of Potato Farming

Following the results of linear regression analysis, the regression coefficient value of the pesticide variable (Ln_X4) is -0.316 with a calculated value of -1.072 < table 2.063 and a significance level of 0.295 > 0.05. Thus, H4 is rejected, which means that pesticide variables have no real effect on potato productivity levels (Ln_Y).

The pesticides used in ketang farming are the fungicides Zambro and Cabrio Top. The application of this fungicide is quite easy, Zambro farmers usually just dissolve 100 – 150 mL of Zambro liquid into 15 liters of water, then directly applied to potato plants. The use of Zambro on potato plants yitu to reduce late blight. While Cabrio Top is a systemic fungicide that is protective and a plant growth regulator in the form of granules that will be dissolved into water. Cabrio Top is applied to potato plants to strengthen the leaves. Farmers use 1 gram of Cabrio Top for 1 liter of water.

For 1 ha of land farmers usually spend 3–5 liters of each herbicide. Weeding is usually done gradually according to the treatment, namely 7 hst, 14 hits, 21 hits, and until the next harvest. This research is in line with Anggriyani (2022), stated that partially variable pesticides do not affect corn production in real Sumenep Regency, which means that the more pesticides are given, the more corn production will decrease.

K. The Effect of Labor on the Productivity of Potato Farming

The use of labor is a factor that must be met for the continuity of potato farming. Labor involvement starts from the time of tillage, seeding, fertilizing, pest control, and harvesting. The labor used is entirely from outside the family. Following the results of linear regression analysis, the value of the regression coefficient of the labor variable (Ln_X5) is 0.007 with a calculated value of 0.072 < table 2.063 and a significance level of 0.943 > 0.05. Thus, H5 is rejected, which means that the labor variable has no real effect on potato productivity. The use of labor that is almost entirely family members and not paid is one of the factors that makes labor has no real effect on potato productivity in Ngaduman.

L. Allocative Efficiency of Using Seed Production Inputs for Potato Farming

In seed production factors, the ratio between the marginal product value (NPM) of seed production factors and the average seed price per hectare is smaller than one (0.417<1). This shows that allocative the average use of seed production factors of 1209 kg/ha on potato fields is relatively inefficient. The utilization of these production inputs must be optimized to achieve allocative efficiency. The use of seeds in potato farming needs to be reduced so that it can get maximum productivity because excessive use of seeds with a limited land area will only interfere with the growth of potato seeds.

Plant growth will not be optimal because the limited land area planted with too many seeds, will only make seeds that cannot grow will damage the condition of the soil. Farmers generally assume that if the number of potato seeds planted is increased, production will also increase. Excessive use of seeds will make potato farming inefficient allocative because many seeds cannot grow optimally so they cannot produce output properly and cause waste of production costs.

M. Allocative Efficiency of the Use of Fertilizer Production Inputs Phonska Potato Farm

In the phonska fertilizer production factor, the ratio of marginal product value (NPM) to costs incurred is more than one (2.26 > 1). A ratio of more than one shows that allocative the allocation of phonska fertilizer use of 276 kg/ha is not optimal so it is relatively inefficient. The lack of use of doses for phonska fertilizer can adversely affect plant growth. Plants will be slower in growth due to the lack of nutrients obtained. Untimely and proper use of fertilizers will be able to reduce production. Untimely use will cause the fertilizer to disappear due to excess water or due to drought, and excessive use results in a decrease in soil pH and the soil becomes dense (infertile) thus inhibiting root development. The recommended amount of fertilizer is 500 – 600 kg/ha of corn land.

N. Allocative Efficiency of Use of Fertilizer Production Inputs Za Potato Farming

Based on the results of the analysis, it can be seen that the ratio between the marginal product value (NPM) of the Za fertilizer production factor and the cost price incurred is more than one (4.01 > 1). This shows that allocative of the average use of pesticide production factors of 445 kg/ha is not allocatively efficient. Farmers who do not know the use of effective doses for crops with existing land area result in a careless application based on estimates and this has an impact on the use of fertilizers that are not optimal and production is not optimal. In addition, the inefficient use of fertilizer due to the high price of fertilizer is on average around Rp 2,316 / kg - Rp 2,928 / kg or higher than the highest retail price (HET) of fertilizer Rp 2,300 / kg. The results of this study are in line with the results of the study Yusuf (2020) which shows that the use of fertilizer production inputs is no longer efficient in sugarcane farming in East Java.

O. Allocative Efficiency of Using Pesticide Production Inputs in Potato Farming

Based on the results of the analysis, it can be seen that the ratio between the marginal product value (NPM) of pesticide production factors and the cost price incurred is more than one (1.58 > 1). This shows that allocative the average use of pesticide production factors of 6.46 liters/ha is allocatively inefficient. The inefficient use of pesticides is because farmers do not know the most effective dose for spraying so their use is still very little.

In addition, farmers in measuring the use of pesticides generally guess by using pesticide bottle caps, and in general, farmers, mix pesticides based on friends' experiences and do not pay attention to the recommended dosage size, and do not even read the packaging label. According to Gressel (2013) that the right dose of pesticide will be able to control the target weeds, but if the dose is too high it can poison and damage cultivated plants.

P. Allocative Efficiency of the Use of Potato Farm Labor Production Inputs

Based on the results of the analysis, it can be known the ratio between the marginal product value (NPM) for labor production factors with a price per HOK of less than one (0.008 < 1). An efficiency value smaller than one is an indicator that the use of labor production factors is inefficient so it is necessary to reduce their use. The excessive use of labor affects the cost of farming incurred. The results of the analysis of farm costs show that the labor costs incurred by potato farmers are quite large from the total production costs, which is 75% of the total production costs, which means that for farmers to get maximum income can be done by reducing the number of workers.

According to Wahyuningsih (2018) states that the excess number of workers does not have an impact on production results but has an impact on the profits received by farmers, the higher the number of workers, the higher the cost of farming which will cause farmers' income to decrease. The results of this study are in line with the results of the study Rundengan (2013) which shows that the use of labor production inputs is no longer efficient in corn farming in Minahasa Regency.

CONCLUSION

Based on the results of research conducted in Ngaduman, Getasan District, it can be concluded that: (a) In potato farming in Ngaduman, Getasan District, the production inputs of Phonska Fertilizer (X2) and Za Fertilizer (X3) have a real positive effect on productivity at the 95% confidence stage, while the production inputs of Seeds (X1), Pesticides (X4), and Labor (X5) have no real effect on potato productivity. (b) In potato farming in Ngaduman, Getasan District, the production inputs of land area (X1), seeds (X2), fertilizers (X3), and labor (X5) are not allocatively efficient, while pesticide production inputs (X4) are not allocatively efficient.

BIBLIOGRAPHY

Anggraeni, Lusia Shinta, & Martoatmodjo, Soebari. (2015). Pengaruh Produktivitas, Efisiensi, Kepuasan Kerja Terhadap Perputaran Karyawan Bagian Marketing. *Jurnal Ilmu Dan Riset Manajemen (JIRM)*, *4*(5).Google Scholar

Anggriyani, Wiwit, Sari, Yunita, & Oktarina, Yetty. (2022). Determinant Analysis of Corn Production in Lengkiti District, Ogan Komering Ulu Regency. *AJARCDE (Asian Journal of Applied Research for Community Development and*

Empowerment), *6*(2), 79–85. Google Scholar

Bantaika, Yuliana. (2017). Faktor-Faktor yang Mempengaruhi Produksi Usahatani Jagung di Desa Tesi Ayofanu, Kecamatan Kie, Kabupaten Timor Tengah Selatan. *Agrimor*, *2*(01), 10–11. Google Scholar

Bungin, Burhan. (2013). *Metodologi Penelitian Sosial & ekonomi: Format-format kuantitatif dan Kualitatif untuk studi sosiologi, kebijakan publik, komunikasi, manajemen, dan pemasaran*. Google Scholar

Chisasa, Joseph, & Makina, Daniel. (2013). Bank credit and agricultural output in South Africa: A Cobb-Douglas empirical analysis. *International Business & Economics Research Journal (IBER)*, *12*(4), 387–398. Google Scholar

Gressel, Jonathan. (2013). Biotechnologies for directly generating crops resistant to parasites. *Parasitic Orobanchaceae: Parasitic Mechanisms and Control Strategies*, 433–458. Google Scholar

Indriyati, Indriyati, & Mustadjab, Moch Muslich. (2016). Tingkat ketersediaan faktor-faktor produksi di tingkat petani dan pengaruhnya terhadap produksi dan pendapatan pada usahatani jagung (Zea mays l.)(kasus di desa Ngrancang, kecamatan Tambakrejo, kabupaten Bojonegoro). *HABITAT*, *27*(2), 94–102. Google Scholar

Marlinda, Patrisia Aryanti. (2020). *Analisis Efisiensi Teknis Penggunaan Faktor-Faktor*. Google Scholar

Reddy, E. LOKANADHA, & Reddy, D. RADHAKRISHNA. (2014). Resource use efficiency of input factors with reference to farm Size in groundnut cultivation in Nellore district of Andhra Pradesh. *International Journal of Economics, Commerce and Research (IJECR)*, *4*(2), 1–10. Google Scholar

Rundengan, Meiske Lusye, Fanani, Zaenal, Subagiyo, Ifar, & Elly, Femy Hidadjah. (2013). Integrated Farming System Model in South Minahasa Regency-North Sulawesi. *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*, *5*(6), 1–7. Google Scholar

Sampul, Foto, Desain, Karyati Layout, Saputra, Pristiangga Dwi, & Mustiko, Eko Aji. (2018). *EKONOMI PRODUKSI PERTANIAN*. Google Scholar

Setiadi, Surya Fitri. (2001). Kentang Varietas dan Pembudidayaan. *Penebar Swadaya. Jakarta*. Google Scholar

Sinaga, Roeskani, Purba, Linda Reni Suriani, & Ginting, Wasida. (2021). Analisis Kelayakan Dan Faktor-Faktor Yang Mempengaruhi Pendapatan Usahatani Kentang:(Studi Kasus Di Nagori Gajah, Kecamatan Berastagi, Kabupaten Tanah Karo). *Jurnal Agrilink: Kajian Agribisnis Dan Rumpun Ilmu Sosiologi Pertanian (Edisi Elektronik)*, *3*(2), 115–128. Google Scholar

Soekartawi. (2002). Analisis usahatani. *Universitas Indonesia Press*. Google Scholar

Sugiyono, Dr. (2013). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D*. Google Scholar

Wahyuningsih, Ari, Setiyawan, Bambang Mulyatno, & Kristanto, B. A. (2018). Efisiensi Ekonomi Penggunaan Faktor-Faktor Produksi, Pendapatan Usahatani Jagung Hibrida Dan Jagung Lokal Di Kecamatan Kemusuk, Kabupaten Boyolali. *Agrisocionomics: Jurnal Sosial Ekonomi Pertanian*. https://doi.org/10.14710/agrisocionomics.v2i1.2672 Google Scholar

Yusuf, Muhammad Taufik, Jamhari, Jamhari, & Irham, Irham. (2020). Technical Efficiency of State-Owned Sugarcane Production in East Java. *Agro Ekonomi*, *31*(1), 1–15. Google Scholar