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Technical Efficiency Of The Production Of Superior Wetland Paddy In Hulu Sungai Tengah Regency (Approachingof Agricultural Census Data 2013 - Survey of Rice Crop Business Households in 2014)

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Abstract*. Agricultural sector in South Kalimantan take an important part in economic development with extensive and fertile rice field potential and adequate human resources,especially in Hulu Sungai Tengah Regency. Hulu Sungai Tengah Regency is the third biggest number of farming households; 12.96 percent,it has no significant effect on Gross Domestic Product (GDP). Hulu Sungai Tengah has the fifth highest GDP in South Kalimantan with a percentage of 9.68 percent. Its productivity on paddy rice is still at 4-5 tons per hectare,whereas it should reach 6-8.5 tons per hectare. While the regional economic structure that the share of the food crop agriculture sector in the economy in Hulu Sungai Tengah Regency is still very large, and the productivity of superior rice varieties is quite potential so it is very unfortunate if the potential of the agricultural sector can notbe used optimally. Therefore, this research aims to describe the characteristics, analyse technical efficiency and the factors that influence production, and analyse the factors influencing the inefficiency of superior varieties of rice farming in the Hulu Sungai Tengah Regency. Frontier Analysis is used to answer the questions above. The research found that the production factors (harvested area, seeds, inorganic fertilizer and labor) have a positive effect on the production of superior rice varieties. The significant effect of production factors are extent of harvest and inorganic fertilizers. Factors that significantly influence the technical efficiency of superior rice varieties in wetland are the age and education of farmers.*
Keywords: *Technical Efficiency, Paddy Rice, Superior Rice Varieties.*

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I. Introduction

Indonesia's agricultural potential has been known for a long time, so called an agricultural country. The availability of natural resources in the form of climate, fertile land, availability of water, and also abundant human resources lead agriculture into important role in supporting economic development. This condition is also supported by the Indonesian territory which is crossed by the equator so as to create a tropical climate with high rainfall. The implication, it makes various types of plants thrive in Indonesia. At first agriculture was only in the form of planting, starting with the most primitive farming system; farming. With very minimal tillage, the productivity of the crops produced depends on soil fertility. The plants cultivated are food crops, such as rice, corn, and tubers (BPS, 2015).

The agricultural sector also takes important part in driving the economy in South Kalimantan. South Kalimantan has extensive rice fields (618,765 hectares) and is fertile and is supported by the availability of sufficient human resources. South Kalimantan becomes 10 largest rice-producing regions in Indonesia with rice production reaching 2.03 million tons of GKG, and paddy rice production takes part in 93 percent of it.

The share of the agricultural sector in the economy of South Kalimantan has decreased from 16.1 percent to 14.9 percent during 2010-2016, however the agricultural sector is still a mainstay of the economy in South Kalimantan. The agricultural sector is the second largest sector that contributes value added (Gross Regional Domestic Product - GRDP) in the economy of South Kalimantan. Almost all regencies in South Kalimantan have agricultural potential, especially food crops and other agricultural activities.

Based on the results of the 2013 Indonesian Agricultural Census there were 432,328 agricultural business households and most of them cultivated food crops (73.58 percent). Those data showed that 97.38 percent were recorded as cultivating rice. Farmers in south Kalimantan choose rice plants because it is the majority staple food in South Kalimantan. Besides, rice plants provide greater income than cultivating palawija (or secondary) crops. The household of farmers also cultivate rice crop because it is related to the condition of paddy fields that support the business.

Table1. Number of Food Crop Household in South Kalimantan, 2013

Subsector		Household
Crops		318.130
1.	Paddy	309.792
a.	Wetland paddy	275.391
b.	Dryland paddy	38.150
2.	Palawija/Secondary	29.791

Source : BPS- Statistics of South Kalimantan Province, 2015

From the point of view of the number of households in the rice farming business per regency, there are three regencies that have the most population, namely Banjar Regency which is 57,355 households, Barito Kuala Regency with 48,138 households and Hulu Sungai Tengah Regency as 40,153 households. Household distribution of rice farming business per regency can be seen in Figure 1.

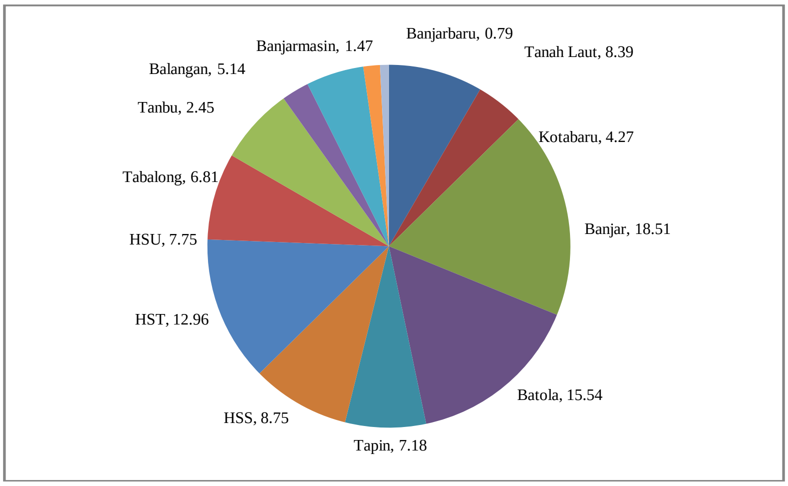
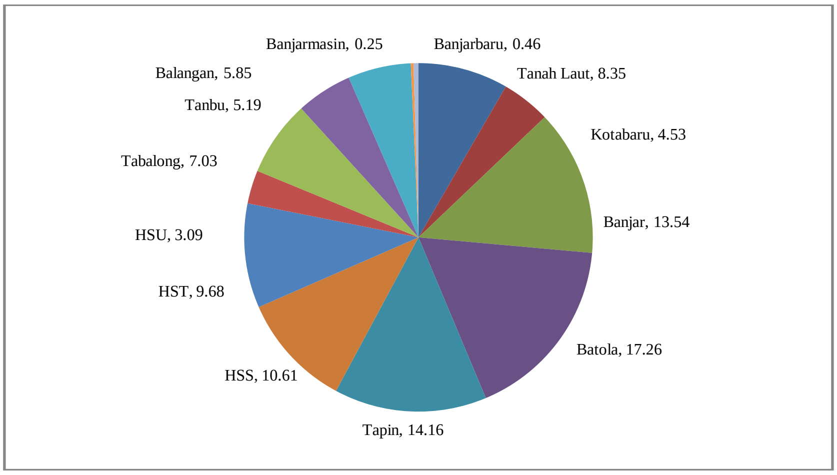


Figure 1. Percentage of household in the rice farming business of wetland paddy by regency, 2013

The size of the household population of food crop farming was not followed by the Gross Regional Domestic Product (GRDP) of the food crops produced. In 2013 the GRDP of Barito Kuala Regency had the largest contribution of 17.26 percent, followed by Tapin Regency at 14.16 percent, Banjar Regency at 13.54 percent, South Hulu Sungai Regency at 10.61 percent and the Central Hulu Sungai Regency at 9.68 percent. The contribution of GRDP of the food crops sub-sector per regency can be seen in Figure 2.



Gambar 2. Contribution of GRDP of Food Crop Subsector by Regency (percentage), 2013

The contribution of the agricultural sector in the Hulu Sungai Tengah Regency is very important because it includes the top three in supporting the economy. Which can be seen in the following table.

Table2. Gross Regional Domestic Product Distribution in Hulu Sungai Tengah Regency Based on Current Prices according to Business Fields 2013-2016 (percentage)

Business Field	2013	2014	2015	2016*
Agriculture, Forestry and fisheries	26,09	25,74	25,53	25,48
a. Food Crops	12,17	11,76	12,15	12,48
Processing industry	15,48	15,52	15,07	14,77
Government Administration, Defense and Mandatory Social Security	10,60	10,53	11,02	10,52
Others	35,66	36,45	36,23	36,75
Total	100	100	100	100

*Still Temporary
Source : BPS-Statistics of Kalimantan Selatan Province, 2017

The productivity of wetland paddy in Hulu Sungai Tengah regency in 2013 reached 4.9 tons per hectare and in 2014 reached 5.0 tons per hectare. However, the productivity potential of several superior varieties of lowland rice such as Ciherang, IR64, and Mekongga varieties should reach 6 - 8.5 tons per hectare (Suprihatno et.al, 2009).

The opportunity to increase the share of the food crop agriculture sector in the economy of Hulu Sungai Tengah Regency is still very large and the productivity of high-yield rice in high-yielding varieties is quite potential so that the potential can be used optimally.

Therefore, research was conducted with the aim of (1) describing the rice farmers characteristics of superior varieties, (2) analyzing the technical efficiency of agricultural crops of paddy fields of superior varieties and factors that influence production, and also(3) analyzing the factors that influence the inefficiency of superior rice paddy farming in Hulu Sungai Tengah.

II. Methods

Time and Place

The time reference used in this study is from November 2017 to July 2018 and the place of research is Hulu Sungai Tengah Regency.

DataTypes and Sources

The data used in this study is secondary data from the 2013 Agricultural Census - Rice Household Business Survey in 2014. The data used are the rice subsector data in the Hulu Sungai Tengah Regency.

Data Analysis

Descriptive

Descriptive analysis is a simple but powerful analysis method to explain the relationship of some variables. Descriptive analysis is used in this research to describe the characteristics of superior varieties of wetland paddy plants in the Hulu Sungai Tengah Regency.

Efficiency Analysis (Frontier Cobb Douglas)

The Cobb-Douglas production function is a function that involves two or more variables. The first variable is called the dependent variable or the variable described (Y) and the other is called the independent variable or the explained variable (X) (Soekartawi, 2002). According to Gujarati (2015), the Cobb-Douglas function can be written as follows:

$Y = \beta_0 X_1^{\beta 1} X_2^{\beta 2} e^u$ .... (1)

Where :

Y = output, X_1= input of manpower, X_2= capital input, u = stochastic disturbance factor, e = the basis of natural logarithms.

It is clear that the relationship between the two inputs and outputs is non-linear. However, if we transform this model into logarithms, we get:

$\ln\ Y = \ln \beta_0 + \beta_1 \ln(X_1) + \beta_2 \ln(X_2) + u$ ......(2)

$\ln\ Y = \beta_0 + \beta_1 \ln(X_1) + \beta_2 \ln(X_2) + u$

Where$\beta_0 = \ln \beta_0$

The characteristics of the Cobb Douglas production function are as follows:

a. β_1 is the output elasticity (partial) of labor input which measures the percentage change in output, in other words every 1 percent change in labor input, while assuming constant capital input.
b. β_2B is the output elasticity (partial) of capital input that measures the percentage change in output, in other words every 1 percent change in capital input, while assuming constant labor input.
c. Addition (β_1 + β_2) describes returns to scale, which is the output response caused by a proportional change in the input. If the sum is 1, it is known as constants return to scale; that is, by increasing the input 2 times so that the output will double to twice. If the sum of the results is less than 1, it is known as decreasing return to scale, that is, the multiplication of output is less than the multiplication of inputs. If the sum is greater than 1, it is known as increasing return to scale, ie the multiplication of output will be more than the multiplication of inputs.

The Cobb-Douglas function is always logged and the function is changed to a linear function. There are several requirements:

a. There is no observation value that is zero, because the logarithm of zero is an infinite number.
b. In the production function, it is necessary to assume that there are no technological differences in each observation. If the Cobb-Douglas function is used as a model in an observation and if an analysis is needed that requires more than one model, then the difference in the model lies in the intercept and not on the slope of the model.
c. Every X variables is a perfect competition.
d. Location differences (in production functions) such as climate are already included in the error factor.

Although this form of function is relatively easy to convert into a simple linear form, but with regard to the inherent assumptions, the Cobb-Douglas form has several limitations including: production elasticity is constant, input substitution elasticity is perfectly elastic, cross price elasticity for all factors in relation to the prices of other inputs have the same magnitude and direction, and the price elasticity of input demand for output prices is always elastic.

The production function is the physical relationship between factors of production and production. The functions of Cobb and Douglas, or better known as the Cobb Douglas production function over time are also used for various purposes, including estimating the marginal productivity of each input used in the production process; estimate the rate of return to scale (RTS) and estimate technical efficiency through the Cobb Douglas frontier production function.

Frontier production function is a production function that is used to measure how the actual production of the frontier position, or in other words that the frontier function is the relationship between production and production factors where the position lies in the isoquant line produce certain output).

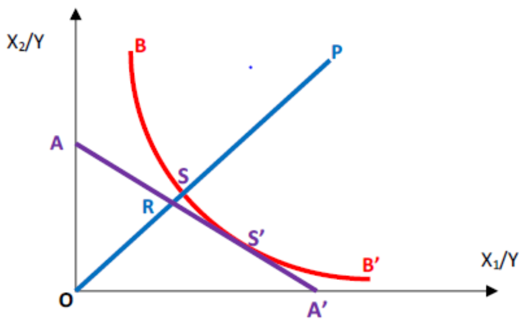


Figure 3. Graph of Production Functions

The BB' curve and the AA' curve show the isoquant curve and the isocost curve. Suppose the farm tested for its efficiency is at point P. Technical efficiency is indicated by the distance between SP which is the amount of input that can be reduced without reducing the amount of output. Reducing these inputs is usually concentrated with the ratio of SP / OP in order to obtain technically efficient production. OS / OP ratio is used to calculate technical efficiency. Because it is on the isoquant curve, point S is a technically efficient point.

According to Nicholson (1995) economic efficiency is intended to explain a situation where resources are allocated optimally. Efficiency in production is how to allocate certain inputs to be able to produce a product or more. what must be considered in this case is that the level of technical exchange (rate of technical substitution, RTS) inputs must be the same.

The connection with this paper is efficiency in farming which is usually called technical efficiency. According to Saptana (2012) technical efficiency (TE) is the ability of a farmer to obtain maximum output from the use of a combination of inputs. Technical efficiency (TE) relates to the ability of farmers to produce on the frontier isoquan curve. It can also be interpreted as the ability of farmers to produce at a certain level of output by using minimum input at a particular technology level. Achieving technical efficiency up to the frontier is very important as a source of food production productivity growth. Allocative efficiency is the ability of farmers to use inputs in optimal proportions at fixed prices for production factors and production technology. Farmers engaged in food farming must choose the minimum level of input use where factor and technology prices remain. For high allocative efficiency, it is necessary to support the policy of input subsidies and output prices that provide incentives for farmers to optimize input use. Economic efficiency is the ability of farmers to produce to produce a predetermined quantity of output. Farmers who have high economic efficiency operate close to the frontier production function and expantion path. For farmers the most important thing is achieving high economic efficiency because it will determine their welfare.

The estimated value of technical efficiency in this study uses a stochastic approach through the stochastic production frontier. The stochastic frontier production function was first introduced by Farell in 1957 by utilizing the Cobb Douglas production function, later developed by Aigner, Lovell and Schmidt, and Meeusen and van der Broek. Suppose the producer has a production function$f_i(\mathbf{X}_i, \boldsymbol{\beta})$. When there is no efficiency, the i-company will produce as much as$Y_i = f(\mathbf{X}_i, \boldsymbol{\beta})$ ....(3)

Frontier stochastic analysis assumes that every majority of companies produce at a position less than what is written in equation (3), and has a degree of efficiency of$\boldsymbol{\xi}_i$, so that the production function becomes

$Y_i = f(\mathbf{X}_i, \boldsymbol{\beta})\boldsymbol{\xi}_i$ ....(4)

$\boldsymbol{\xi}_i$has a value in the interval (0,1].If$\boldsymbol{\xi}_i$= 1, the company reaches the optimal production level, while if$\boldsymbol{\xi}_i$< 1, then the company has not been able to produce output optimally, because the output produced is assumed to be positive$(Y_i > 0)$, the degree of technical efficiency is assumed to be positive$(\xi_i > 0)$. Because it is assumed that there is also random shock, then equation (4) becomes:

$Y_i = f(\mathbf{X}_i, \boldsymbol{\beta})\boldsymbol{\xi}_i \exp(v_i)$ ....(5)

By giving a natural logarithm on both sides of equation (5), it becomes:

$\ln(Y_i) = \ln\{f(\mathbf{X}_i, \boldsymbol{\beta})\} + \ln(\boldsymbol{\xi}_i) + v_i$ ....(6)

Assuming there are k inputs; then the linear production function in the log and$u_i = -\ln(\boldsymbol{\xi}_i)$, so the equation (6) becomes

$\ln(Y_i) = \beta_0 + \sum_{j=1}^{k} \beta_j \ln(X_{ji}) + v_i - u_i$ .... (7)

Since$u_i$is subtracted from ln (Y_i), and$u_i \geq 0$, then$0 < \xi_i \leq 1$. Where $v_i$is assumed to have a distribution of$N(0, \sigma_v)$, while$u_i$will determine the basic model of the production function of the frontier that is formed. Calculation of efficiency in this study uses a normal approach.

The function form used in this study is Stochastic Frontier Cobb-Douglas. This form is chosen because it is simple and can be made in the form of a linear function. The Cobb-Douglass Production Function is able to describe the return to scale whether it is increasing, fixed or decreasing. Calculation of efficiency in rice farming households utilizes the Cobb Douglas frontier production function equation as in equation (7). In the first stage, parameter (β) in equation (7) is estimated using a Frontier 4.1 computer package. While in the next stage, the Maximum Likelihood Estimation technique is used to identify the determinants of the technical efficiency of rice production in the Hulu Sungai Tengah Regency. The model used to calculate technical efficiency by adopting equation (5) is as follows:

$$\ln(Y_i) = \beta_0 + \beta_1 \ln(X_1) + \beta_2 \ln(X_2) + \beta_3 \ln(X_3) + \beta_4 \ln(X_4) + (v_i - u_i) \quad (8)$$

Notes :

Variables

Y_i	:	Paddy production (kg)
X_1	:	Harvest Area (m^2)
X_2	:	Use of seeds (kg)
X_3	:	Use of inorganic fertilizers (kg)
X_4	:	Total manpower (HOK)
$v_i - u_i$	:	Error term (u_i) technical inefficiency effects in the model

Technical efficiency methods were developed by Battese and Coelli (1998). Technical efficiency analysis can be measured using the following formula:

$TE_i = \frac{Yi}{Yi*}$..(9)

Notes :

TE_i	=	Technical efficiency achieved by i-observation
Y_i	=	the actual output of wetland paddy crops in the form of dry harvested grain (kg)
Y_i *	=	output limit (potential) of wetland paddy fields in the form of dry harvested grain (kg)

Where TEi is the i-farmer technical efficiency, namely $0 \leq TEi \leq 1$. The value of technical efficiency is inversely related to technical inefficiency and is only used for functions that have a certain number of outputs and inputs (cross section data). Efficiency is divided into 3 classes by division:

1. Low efficiency class (eff $\leq$ 0,33)
2. Middle efficiency class (0,34 < eff < 0,66)
3. High efficiency class (0,67 < eff < 1)

The efficiency effect model used in this study refers to the effect effect model developed by Battese and Coelli (1998). The u_i variable used to measure the effect of technical inefficiency is assumed to be free and its distribution is normal with N (μ_{it}, σ2).

The effects of technical inefficiency are stated as follows:

$\mu_{it} = \delta_0 + \delta_1 Z_1 + \delta_2 Z_2$ ....(10)

Notes:

μ_{it} = technical inefficiency effects of paddy

Z_1 = age (years)

Z_2 = education

(dummy; 0 = < SMP and 1 = ≥ SMP)

The estimation of production function parameters and inefficiency functions is carried out simultaneously with the frontier program to make the parameters consistent. Testing of stochastic frontier parameters and technical inefficiency effects are carried out in two steps. The first step is estimating parameters using the OLS method. The second step is estimating all parameters β_0, β_j, varianceof $u_i$and v_i using the Maximum Likelihood (MLE) method.

The Frontier program will provide an estimated value of variance in the form of parameterization as follows:

$\sigma^2 = \sigma_v^2 + \sigma_u^2$.. (11)

$\gamma = \frac{\sigma_u^2}{\sigma_v^2 + \sigma_u^2}$ .... (12)

The parameter of this variance can find the value of γ, therefore $0 \leq \gamma \leq 1$. The parameter value γ is the contribution of technical efficiency in the total residual effect.

III. Result And Discussion

Farmer characteristics

Age Group

Table3. Percentage of Wetland Paddy Farmers of superior varieties by Age and Sex Groups

Age Group (Years)	Men (%)	Women (%)	Total (%)
21-30	8,1	0,0	7,1
31-40	27,9	9,2	25,4
41-50	32,2	40,1	33,3
51-60	20,4	25,2	21,0
61-70	10,4	22,6	12,0
71-80	1,0	2,9	1,2
Total	100	100	100

Source: (SOUT2014, treated)

`It can be seen from the table that most farmers are still in the productive age group, namely from the age of 31 to 60 years. But it can also be seen that half of the farmers are dominated at the age of over 40 years, as many as 67.5 percent. This indicates that young people dislike work in the rice farming sector because the production process depends on natural conditions and takes a long time to get the results. The percentage of male farmers is greater in the younger age group compared to females where 88 percent of female farmers are in the older age group, namely 41 to 70 years. With this reflection, an effort is needed to attract new farmers with a younger or more productive age.

Level of Education

In Indonesia, farmers are identical with low education and this can be seen from the figure which shows that 67.5 percent of farmers in North Hulu Sungai Regency have educationlevel in elementary or not graduating from elementary school. This has an impact on the low level of knowledge which will hamper farmers in carrying out their farming.

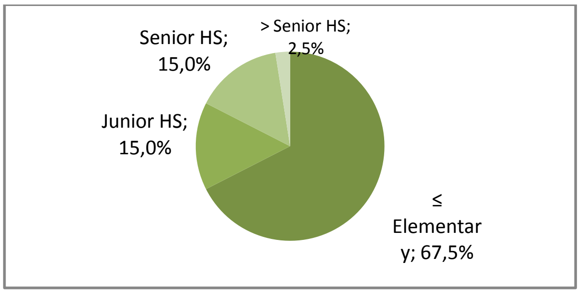


Figure4.Percentage Farmers of Wetland Paddy for Superior Varieties by the education that was completed
Source: (SOUT2014, treated)

` Education for farming is not only obtained through formal education but can be done through non-formal or informal education. Several ways to get knowledge about farming such as agricultural counseling, integrated crop management field school, integrated pest management field school, and through the farmer groups. These activities also cannot be separated from government programs.

Effect of Production Factors on Production

Table4. Regression Parameter Estimation

Parameter	Coefficient	Standard-error	t-ratio
β_0	0,08921	0,3013	0,2961
β_1	0,86889	0,0548	15,8535*
β_2	0,01841	0,0475	0,3873
β_3	0,01354	0,0072	1,8740*
β_4	0,03648	0,0427	0,8545
Sigma-squared	0,22704	0,0261	8,6980
gamma	0,94893	0,0206	46,1005

mu is restricted to be zero
eta is restricted to be zero
log likelihood function = -38,92926
LR test of the one-sided error = 34,69169
Notes: * α = 5% (1,645)
Source: (SOUT2014, Treated)

The gamma value obtained is equal to 0.94893 and has a significant effect on $\alpha = 0.05$. These results indicate that 94.89 percent of the variation of superior wetland paddy production among farmers is caused by technical inefficiencies. Sigma-squared value of 0.22704 and significant at $\alpha = 0.05$ means that the amount of wetland paddy production of superior varieties produced by farmers in Hulu Sungai Tengah Regency has the same variation. Judging from the LR value (generalized likelihood ratio) of the function of this model is 34.69169 which is compared to the distribution table χ_2(5%,db=1) which is 3.841 so that the larger results mean that the stochastic frontier production function can explain the existence of efficiency and inefficiency technical farmers in the production process.

Table 1 is the result of processing parameter estimates, showing that all variables have an influence, especially harvested area and use of inorganic fertilizers. This is similar to previous studies by Kurniawan (2012) which states that fertilizer variables have a positive influence on rice production on tidal land. In addition, it is also similar to the study of Suharyanto et.al (2011) which states that land variables have a positive influence on the production of lowland rice with integrated crop management that is equal to 0.87671.

Variables that have a significant effect are harvested area with the meaning that every 1 percent of increasement in harvested area will potentially increase the production of superior varieties of rice by 0.87 percent. This makes us have to pay more attention to agricultural lands that are largely switched functions.

Variable use of inorganic fertilizer means that every 1 percent increase will potentially increase the production of superior varieties of wetland rice by 0.01 percent. So inorganic fertilizer is one of the factors determining the success of farming. Subsidized fertilizer is enough to help farmers in reducing production costs. However, farmers should not only be assisted with subsidized fertilizers but also must be able to learn to apply technology in the context of efficient use of fertilizer production factors.

Wahid (2003) said that efforts to improve the efficiency of fertilizer use can be done by planting high-yielding varieties that are responsive to giving and improving crop cultivation methods, which include regulating crop density, proper irrigation of the dosage, method and time of fertilizing and source of fertilizing.

Table5. Agricultural Efficiency Class of Superior Wetland Paddy Fields in Hulu Sungai Tengah Regency

Technical class of efficiency	Mean of technical efficiency	Population percentage
Low	0,275017	0,3
Medium	0,537503	36,7
High	0,819647	63,0
Total	0,714717	100

Source: (SOUT2014, treated)

Table 5 shows that most of the superior varieties of wetland paddy farming in Hulu Sungai Tengah Regency are in a high level of efficiency class. The average efficiency of high-yield wetland paddy farmers in Hulu Sungai Tengah Regency is in the high efficiency class. The efficiency value of 0.71 shows that there are still opportunities for farmers to increase their production by around 29 percent by implementing better technology management.

Prayoga (2010) said that differences in the level of technical efficiency achieved by farmers indicate different levels of mastery and application of technology. Internal factors such as business experience, age, and education as well as external factors such as counseling participation, lead to differences in mastery of technology of each farmer. The difference is also caused by the way of using production inputs and the ability to obtain production inputs. The number of family members of productive age who can be involved as unpaid labor also affects farming. The level of efficiency of farmers can be increased by utilizing mechanization in carrying out their farming business.

Factors Affecting Technical Inefficiency

Table6. Regression Parameter Estimation

Variable	Unstandard. Coef		Stand. Coef	t	Sig
	β	Std. Error	β		
(Constant)	0,248	0,004		55,24	0,000
Age	0,001	0,000	0,072	12,01	0,000
Education	-0,038	0,002	-0,111	-18,48	0,000

Source: (SOUT2014, treated)

Each coefficient of the independent variable is statistically significant. The impact of each variable can be explained as follows:

a. Impact of the farmer age

The parameter estimation results indicate that the impact of the farmer's age on technical inefficiency is 0.072 meaning that with the increasing age of the farmer, the inefficiency of the farmer in his farm will increase, or the efficiency will decrease. This result is in line with the research of Kusnadi et.al (2011) which states that increasing age will increase inefficiency.

The reality of the field should further spur the regeneration of farming from parents to their younger children, or create new farmers. The obstacle that occurs is that many farmer children do not want to become farmers because the results are relatively insufficient, and farmers do not want their children to be farmers by providing better educational facilities than themselves.

Table 4 shows that the age of farmers is predominantly aged 40 years and over. Farming, especially wetland paddy, is less attractive to young people because of the long production process. In addition, most farmers also still rely on human power so that the increasing age of farmers is affecting their productivity.

This should bring interference from the government to increase the interest of young people in farming efforts by means of promotion, incentives, assistance, as well as non-formal education in farming.

b. Education

Parameter estimation results show that the impact of farmers'education on technical inefficiency is 0.111, which means that if farmers' education is more or equal to junior high school, the inefficiency of farmers in their farming efforts will decrease by 0.111 or it can be said that their efficiency increases. This is because farmers with higher education will make farmers easier to adopt new technologies and absorb the latest information related to farming.

This research is in line with Nadiar (2017) which states that education has a negative effect on technical inefficiency. The higher the education of farmers, the higher the ability of farmers to be able to apply new technology. Farmer education in farming can still be improved through non-formal education such as counseling, field schools, as well as other activities related to farming.

IV. Conclusion And Policy Recommendation

Conclusion

1. 67.5 percent of farmers of superior varieties of wetland rice in Hulu Sungai Tengah Regency are more than 40 years and over, and are less educated than elementary school.
2. From the results of the analysis of the influence of production factors on the production of high-yield rice, it was found that harvested area, seeds, use of inorganic fertilizers and labor had a positive effect on the extent of harvest and use of inorganic fertilizers had a significant effect. The technical efficiency of high-yielding wetland paddy in Hulu Sungai Tengah Regency was 0.71.
3. Factors that significantly influence the technical inefficiency of high-yielding wetland paddy are the age and education of farmers. Where increasing age will add to the farmers' inefficiency and higher education will have a negative influence on inefficiency.

Policy Recommendation

The suggestion that can be given based on the results of this study is to promote non-formal education related to food crop cultivation, either from agencies or related institutions in the form of counseling or field schools so that they can cover more farms and can attract more young farmers.

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