ANALYSIS OF THE EFFICIENCY OF JASMINE AGRICULTURAL CENTRE IN PEMALANG INDONESIA

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Abstract

Jasmine flower market opportunity is big enough, Indonesia alone could afford new fulfillment about 22% budget needs of the world market. Pemalang Regency is one of the areas of potential jasmine flowers producers in Indonesia in 2015 vast acres of jasmine harvest is about 5,116,800 meter and a total production of 6,289,999 kg (Department of Agriculture of Pemalang District, 2017). This research aims to analyze the efficiency of the agricultural budget and the efforts of its development. Stochastic Frontier Analysis (SFA) is used in measuring the efficiency of the agriculture budget. The results showed Jasmine farms in Pemalang yet efficient, both in the technical efficiency (TE), Allocation (AE) Efficiency and economic efficiency (EE) because the value of the average efficiency below 0.7. Jasmine farming in Pemalang is still in a phase of *increasing return to scale* the value of 1,142 so very potential to be developed.

Keywords: *Agricultural, Jasmine Flower, Efficiency, Stochastic Frontier Analysis (SFA)*

1. INTRODUCTION

In Indonesia the kind of Jasmine is frequently encountered types of White Jasmine (Jasminum sambac) and Gambir Jasmine (Jasminum officinale). Jasmine in Indonesia there is centers in Central Java province such as (Tegal District, Pemalang District, Pekalongan District, Batang District and Purbalingga District), while in East Java province such as (Bangkalan District and Pasuruan District). Jasmine's main production center avitta Central Java gave share amounyt 84.04%. Data production budget is during the period 2012 – 2016 found in table 1. Jasmine flower market opportunities at inside areas and abroad is big enough, but the production of jasmine flowers in Indonesia recently able to meet approximately 22% of the world market of Jasmine's necessity (Tarigan, 2017).

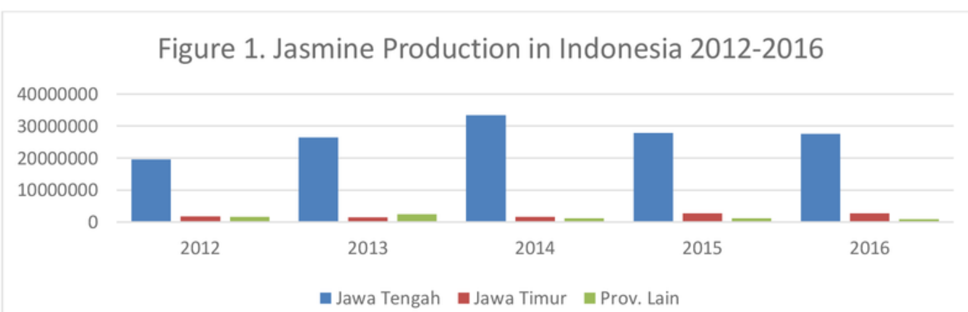

Figure 1. Jasmine Production in Indonesia 2012-2016

Source: Ministry of Agriculture 2017

Pemalang District is has an area of and a highest number of harvest, in 2015 the vast acres of jasmine harvest is amount 5,116,800 m^2 and a total production of 6,289,999 kg. If seen its productivity is 1.23 kg/m2. This decline in 2016 with an area of 4,480,574 m2 area of harvest and the amount of production 3,192,759 kg with productivity dropped to 0.71 kg/m2 (Department of agriculture of Pemalang District: 2017).

Agricultural productivity is affected the allocation and use of combination of inputs production. Bravo & Pinhero (1993) declared that variables that are most frequently used to research the efficiency of agriculture is farmers ' education and experience, contact with extensions, access to credit, and the size of agricultural land. In research Aboki (2013) stated that variable production inputs are used, among others, the size of the farm, the labor of the workers ' Charter, the family, and fertilizer.

In addition to being influenced by a combination of the use of inputs production, the level of efficiency of farming is also influenced by socio-economic characteristics of the farmers who come from themselves. Some of the socio-economic characteristic of farmers who became sources of inefficiency is age, experience of farming, household size, education levels, a membership group of farmers, extension services, access to credit and other (Anggraini et al.: 2017). Based on that data, this research aims to: (1) analyzing the level of technical efficiency, allocation and economical condition of jasmine agriculture, and agricultural economics (2). Identifying the socio economic factors influence on the agricultural technical inefficiency of jasmine agriculture.

2. LITERATURE REVIEW

Coelli et al. (1998) stated that the production frontier function is a function that describes the maximum output which can be reached from every level of the use of inputs. If the farming is at the point in the functioning of the production frontier means that farming efficiency. Bashir et al. (2005) stated technical efficiency as the company's ability to generate maximum output given a set/combination of inputs and technology. The efficiency of allocation measure the success of the company in selecting optimal proportion in unit price, that is where the ratio of the marginal product for each pair of inputs is equal to the ratio of market price of output produced. Economic efficiency is combined with technical efficiency allocation. Anggraini (2017) stating if the production frontier function is known then it can be being estimated technical inefficiency through the comparison of the actual position relative to its frontier.

The measurement of the efficiency of the functions of the frontier is based on function Cobb Douglas. Debertin (1986) in Aligori (201[illegible]) described a Cobb-Douglas Function has practical advantages, namely: (1) the value of the marginal product is the first derivative of the total production, (2) Parameter estimation respectively describes elasticity the production of each of the input and the sum of the exponents is the *return to scale*. (3) The Cobb-Douglas production function can be estimated by using linear regression analysis with turning it into a linear form of the double log. (4) The Cobb-Douglas Production Fungi can easily add the free variable. The Cobb-Douglas function is linear so the translog functions required assumptions that must be met, namely: (1) the observation that no value is zero because the value of the log of zero values is not defined. (2) There is an assumption of no difference at each observation technology of production. (3) Each free variable is *perpect competition*. (4) The difference is location such as weather and climate factors is included in the factor error (*error term*).

Many study that discussing efficiency, especially in the agricultural sector. Ogundari & Ojo (2007) examined the efficiency of productive agricultural State of Oshun cassava in Nigeria shows the result that the average TE, EE and AE respectively 0, 903, 0,89 and 0.807. Research Anggraini et al. (2017) showed that the average technical, allocation, and their respective economic efficiency of 0.69; 0.71; and 0.47. This shows that the farmers of cassava in Central Lampung Regency not yet optimally allocate the use of input on the level of minimum cost. Aboki et al. (2013) examined the agriculture cassava in Taraba State, Nigeria, found the average efficiency of the technical, economic, and allocation is 0.887, 0.856 and 0.825, which means that a sample of farmers is relatively very efficient in allocating their limited resources with technical efficiency seems to be more significant than the allocation and economic efficiency. Bravo & Pinheiro (1993) analyzed the agriculture in developing countries, indicating that the technical efficiency (TE) average was 72%, while the average of allocation value and Economic Efficiency is 68% and 43%.

Belbase & Grabowski (1985) examined the farming of rice, maize, millet and wheat in Nepal of its findings is the average value of technical efficiency is 80%. Ali &Chaudry (1990) examined the efficiency of agriculture in Pakistan, his findings are average TE, EE and AE; 84%, 51%, and 61%. It is concluded that technical deficiency leads to loss of agricultural advantages of 40 to 50%, while the loss of profit due to inefficiency alokatif about 2%. Shapiro (1983) investigated the technical efficiency with sample peasant cotton Tanzania 37, using a linear decrease in *Cobb Douglas ProductionFunction* produces a level of technical efficiency on average 66%. Kalirajan (1990) used a *translog stochastic production frontier* of technical efficiency, average estimated 79%, with 64% of the lowest value and the highest 92%. Pinheiro (1992) examined the 60 farmers farmers located in the Dominican Republic Dajabon. He found that an average of EE and AE, TE is 31%, 70% and 44%. Akamin et al (2017) examined agriculture vegetable in Cameroon. The average value of technical efficiency is 67%, and showed the possibility of increased production significantly with the level of the input current.

3. RESEARCH METHODS

This research aims to observe at the level of efficiency of the agricultural budget in Ulujami one of Pemalang District. The number of respondents that were taken are as much as 5 key person of academics, businessmen, Government, community leaders (ABGC) and 33 farmers. Analysis of Stochastic Frontier is used to calculate the level of technical efficiency, allocation and economy of jasmine farmers.

a. Stochastic Frontier Analysis (SFA)

The variables that are used in the SFA equation are as follows:

Table 1 the variables in the Model of Stochastic Frontier Function

No	Variables	Parameter	Unit	Previous Research
1	Jasmine Production	Y	(kg)	
2	Land Area	X1	(m^2)	Pinhero (1992); Bravo & Pinhero (1993); Bashir et.al., (2005); Ogundari & Ojo (2007); Raphael (2008); Adewuyi et.al, (2013); Nkang & Ele (2014); Girei et.al, (2013); Ogunniyi (2013); Aboki et.al, (2013); Akamin et.al., (2017); Anggraini et.al, (2017).
3	Fertilizer	X2	(kg)	Aboki et.al, (2013); Aboki et.al, (2013); Alwarritzi & Chomei (2015); Anggraini et.al, (2017); Akamin et.al., (2017);
4	Pesticides	X3	(ml)	Alwarritzi & Chomei (2015);
5	The Number of Seeds	X4	(unit)	Raphael (2008); Girei et.al, (2013); Ogunniyi (2013); Nkang & Ele (2014); Alwarritzi & Chomei (2015); Anggraini et.al., (2017);

6	Employee	X5	(people)	Battese & Coelli (1992); Battese & Coelli (1995); Aboki et.al, (2013); Alwarritzi & Chomei (2015); Akamin et.al., (2017);
7	The Impact of Technical Inefficiency	(vi-ui)		
8	Inefficiency Effect	Ui		
9	Farmer's Age	Z1	(year)	Belbase & Grabowski (1985); Bravo & Pinhero (1993); Battese & Coelli (1995); Anggraini et.al., (2017);
10	Farming Experience	Z2	(year)	Belbase & Grabowski (1985); Bravo & Pinhero (1993); Battese & Coelli (1995); Anggraini et.al., (2017);
11	Families (The Number of Children)	Z3	(people, live)	Pinhero (1992); Aboki et.al, (2013); Anggraini et.al., (2017);
12	Education	Z4	(year)	Belbase & Grabowski (1985); Bravo & Pinhero (1993); Coelli & Battese (1996); Bashir et.al., (2005); Ortega et.al., (2005); Tanko & Jirgi (2008); Aboki et.al, (2013); Alwarritzi & Chomei (2015);
13	*Dummy* Irrigation (There is Irrogation= 1 and Rain=0)	D1		Battese & Coelli (1992); Battese & Coelli (1995); Anggraini et.al., (2017)
14	*dummy*Farmer Groups (Join= 1 and Didn't Participate=0)	D2		Pinhero (1992); Alwarritzi & Chomei (2015);
15	Cost	C		
16	Price	Pn		

Efficiency Technical and Inefficiency Technical

The model function of Stochastic Frontier of Jasmine's farmers is as follows:

$$LnY = \beta_0 + \beta_1 LnX_{1i} + \beta_2 LnX_{2i} + \beta_3 LnX_{3i} + \beta_4 LnX_{4i} + \beta_5 X_{5i} + (v_i - u_i) \dots \dots \dots \dots . (1)$$

Efficiency analysis technical can be measured by using formulation as follows (Coelli *et al.* 1998):

$$TE_i = exp\,(-E[u_i|\epsilon_0])\, i = 1,2,\dots,n \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (2)$$

TE_i = farmer efficiency in -I, $0 \le TE_i \le 1$

$exp\,(-E[u_i|\epsilon_0])$= wishing value (*mean*) from ui by requiring ϵi.

vi, is useful for calculating the size of the errors and other random factors such as the weather, and others, together with the effect of the combination of input variables are not defined in function of the production. The vi Variable is a random variable are free and are distributed identical normal (*independent-identically distributed* or i.i. d) with result is zero and a constant manifold, σ2 or N(μ i, σ2)).

The ui variables are assumed to be i.i.d. exponential random variables or half the normal (*halfnormal variables*). The ui variable, function aims to capture the effect of technical inefficiency. To determine the value of the parameter of the distribution (μ i) of technical inefficiency effects in this study used the formula as follow:

$$U_i = \delta_0 + \delta_1 Z_{1i} + \delta_2 Z_{2i} + \delta_3 Z_{3i} + \delta_4 Z_{4i} + \delta_5 D_1 + \delta_6 D_2 \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (3)$$

Allocation and Economical Eficiencies

Cost function dual (*dual cost function*) of the function is the production of a homogenous CobbDouglas derived first, before alokatif and economic efficiency measure (Debertin 1986).

The assumptions used are the form of production functions of the cobb-douglas by using two inputs as follows:

$$Y = \beta_0 X_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5} \quad \text{...(4)}$$

$$C = P_1X_1 + P_2X_2 + P_3X_3 + P_4X_4 + P_5X_5 \quad \text{...(5)}$$

Cost function dual forms can be derived using assumptions of cost minimization with the constraints of the output Y = Y_0.To obtain the cost function dual *expansion path* value must be obtained (an expansion of business scale) that can be retrieved through the function langrange as follows:

$$L = P_1X_1 + P_2X_2 + P_3X_3 + P_4X_4 + P_5X_5 + \lambda\,(Y - \beta_0 X_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5}) \quad \text{..................(6)}$$

To get the value of X_1, X_2, X_3, X_4, dan X_5 *expansion path* functional *langrange* lowered into *first-order condition* as follows:

$$\frac{dL}{dX_1} = P_1 - \lambda\,\beta_0\beta_1 X_1^{(\beta_1-1)} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5} = 0 \quad \text{....................................(7)}$$

$$\frac{dL}{dX_2} = P_2 - \lambda\,\beta_0\beta_2 X_1^{\beta_1} X_2^{(\beta_2-1)} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5} = 0 \quad \text{....................................(8)}$$

$$\frac{dL}{dX_3} = P_3 - \lambda\,\beta_0\beta_3 X_1^{\beta_1} X_2^{\beta_2} X_3^{(\beta_3-1)} X_4^{\beta_4} X_5^{\beta_5} = 0 \quad \text{....................................(9)}$$

$$\frac{dL}{dX_4} = P_4 - \lambda\,\beta_0\beta_4 X_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{(\beta_4-1)} X_5^{\beta_5} = 0 \quad \text{....................................(10)}$$

$$\frac{dL}{dX_5} = P_5 - \lambda\,\beta_0\beta_5 X_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{(\beta_5-5)} = 0 \quad \text{....................................(11)}$$

$$\frac{dL}{d\lambda} = Y - \beta_0 X_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5} = 0 \quad \text{...(12)}$$

From equation (7) (8) (9) (10) (11) obtained the value of X_1, X_2, X_3, X_4, and X_5*expansion path* such as:

$$X_1\frac{P_1}{\beta_1} = X_2\frac{P_2}{\beta_2} = X_3\frac{P_3}{\beta_3} = X_4\frac{P_4}{\beta_4} = X_5\frac{P_5}{\beta_5} \quad \text{...(13)}$$

After that, the equation (13) is substituted into the equation (12), yielding the equation X_1, X_2, X_3, X_4, and X_5. To get *dualfrontier* then the equation X_1, X_2, X_3, X_4, and X_5 are substitued cost into the (5) equations is:

$$C^* = P_1\left(\frac{Y}{\beta_0\left(\frac{P_1}{\beta_1}\right)^{\beta_2+\beta_3+\beta_4+\beta_5}\left(\frac{\beta_2}{P_2}\right)^{\beta_2}\left(\frac{\beta_3}{P_3}\right)^{\beta_3}\left(\frac{\beta_4}{P_4}\right)^{\beta_4}\left(\frac{\beta_5}{P_5}\right)^{\beta_5}}\right)^{\frac{1}{\beta_1+\beta_2+\beta_3+\beta_4+\beta_5}} +$$

$$P_2\left(\frac{Y}{\beta_0\left(\frac{P_2}{\beta_2}\right)^{\beta_1+\beta_3+\beta_4+\beta_5}\left(\frac{\beta_1}{P_1}\right)^{\beta_1}\left(\frac{\beta_3}{P_3}\right)^{\beta_3}\left(\frac{\beta_4}{P_4}\right)^{\beta_4}\left(\frac{\beta_5}{P_5}\right)^{\beta_5}}\right)^{\frac{1}{\beta_1+\beta_2+\beta_3+\beta_4+\beta_5}} +$$

$$P_3\left(\frac{Y}{\beta_0\left(\frac{P_3}{\beta_3}\right)^{\beta_1+\beta_2+\beta_4+\beta_5}\left(\frac{\beta_1}{P_1}\right)^{\beta_1}\left(\frac{\beta_2}{P_2}\right)^{\beta_2}\left(\frac{\beta_4}{P_4}\right)^{\beta_4}\left(\frac{\beta_5}{P_5}\right)^{\beta_5}}\right)^{\frac{1}{\beta_1+\beta_2+\beta_3+\beta_4+\beta_5}} +$$

$$P_4\left(\frac{Y}{\beta_0\left(\frac{P_4}{\beta_4}\right)^{\beta_1+\beta_2+\beta_3+\beta_5}\left(\frac{\beta_1}{P_1}\right)^{\beta_1}\left(\frac{\beta_2}{P_2}\right)^{\beta_2}\left(\frac{\beta_3}{P_3}\right)^{\beta_3}\left(\frac{\beta_5}{P_5}\right)^{\beta_5}}\right)^{\frac{1}{\beta_1+\beta_2+\beta_3+\beta_4+\beta_5}} +$$

$$P_5\left(\frac{Y}{\beta_0\left(\frac{P_5}{\beta_5}\right)^{\beta_1+\beta_2+\beta_3+\beta_4}\left(\frac{\beta_1}{P_1}\right)^{\beta_1}\left(\frac{\beta_2}{P_2}\right)^{\beta_2}\left(\frac{\beta_3}{P_3}\right)^{\beta_3}\left(\frac{\beta_4}{P_4}\right)^{\beta_4}}\right)^{\frac{1}{\beta_1+\beta_2+\beta_3+\beta_4+\beta_5}} \quad (14)$$

According to Jondrow *et al.* (1982), Economic Efficiency (EE) can be observed as follows:

$$EE = \frac{C^*}{C} = \frac{E(C_i|u_i=0,Y_i,P_i)}{E(C_i|u_i,Y_i,P_i)} = E\left[exp.\frac{u_i}{\varepsilon}\right] \quad (15)$$

Economic efficiency (EE) is a combination between technical efficiency and efficiency of allocation, so that allocation efficiency (AE) can be obtained by the equation:

$$AE = \frac{EE}{TE} \quad (16)$$

Where EA is value0≤ EA ≤1 and EE is value0≤ EE ≤1.

4. DISCUSSION

Rural area Agribusiness Centers of Jasmine becomes one focus of rural area-based development in Pemalang District. In the plan of Spatial and territorial (RTRW) Central Java Regency of Pemalang, during the period 2009-2029 into one of the territories the development was focused on the agricultural sector. Rural area Center for Jasmine Agribusiness located in Ulujami with deliniation areas includes 7 villages such as: Mojo Village, Kertosari, Ketapang, Limbangan, Kaliprau, Blendung and Tasikrejo. The construction of the rural area of agribusiness Centers of Jasmine is based on the mutual agreement between the community and its TKPKP core team which in this case represented by the seven heads of villages.

Table 3 the Group Farmers and the Land Area of Jasmine in Pemalang

No	Districts	Villages	Farmer Groups	Land Areas
1	Ulujami	Samong	Subur Makmur	37.2
		Tasikrejo	Sri Rejeki 1	37.1
			Randurejo	39.7
		Kaliprau	Dasar Utama	47.2
			Melati Jaya	24.8
			Dasar Usaha	41
		Kertosari	Mekar Sari 1	12.6
			Mekar Sari 2	25
		Blendung	Tunas Jaya	47.6
			Sri Rejeki	14.21
		Ketapang	Baru Muncul	31
		Limbangan	Bangun Tani	43.2
		Mojo	Margorejo	39.3
		Pesantren	Karya Tani	28.3
2	Petarukan	Nyamplungsari	Sekar Wangi	23.2
3	Taman	Asemdoyong	Melati Jaya	42.41
Total				533.83

The respondents of this study consist of five Key person and 33 Jasmine Farmers in Pemalang described in table 4 below:

Table 4 Respondents Data

No	Respondents	Amount	Status	
1	Key person	5	Agricultural Institution of Pemalang District (1) Jasmine Agricultural Extension Officers in Ulujami District (2) Department of Cooperatives and Small Medium Enterprises in Pemalang District, Academician (1)	Development of Jasmine Agribusiness Centre
2	Respondents	33	Jasmine Farmers in Ulujami District	Efficiency Analysis (Stochastic Frontier) & SWOT Analysis

Stochastic Frontier Analysis Efficiency Jasmine Farmers
Production Function Prediction

In table 5 the value of Return to Scale (RTS) Jasmine Farmers in the method of *Maximum Likelihood* worth 1,142 where those values showed in conditions of *increasing return to scale*. The test statistic F yields F-hit > F-table so Ho denied means that the number of these parameters significantly affect towards production. The value of the RTS in *Maximum Likelihood* is lower than the value of the RTS in *Ordinary Least Square* method, this value is related to the optimization of the use of production inputs that are affected by the effects of in-efficiency tends to be not profitable against the production.

Table 5 Budget agricultural production Function Prediction

	OLS			MLE		
Variables	Coef	Std. Error	t-Stat	Coef	Std. Error	t-Stat
Intersep	-0.305	0.809	-0.377	1.229	0.757	1.625*
Land Area	0.475	0.138	3.453***	0.390	0.111	3.508***
Fertilizer	0.203	0.106	1.914**	0.146	0.083	1.764**
Pesticide	0.035	0.066	0.533	0.049	0.053	0.932
Seeds	0.098	0.112	0.874	0.059	0.089	0.665
Employment	0.697	0.196	3.556***	0.497	0.147	3.382***
Return to Scale	1.509			1.142		
Log likelihood	-26.964			-19.801		
R-squared	0.794					
F-statistic	20.776					

*) significance taraf 10% **) significance taraf 5% ***) significance taraf 1%

The parameters of stochastic frontier production functionsare alleged agriculture budget in table 5 show significant positive land against the variable production of jasmine with a coefficient of 0.39. These results are in accordance with research Aboki et.al., (2013) in agriculture cassava amounted to 5.24%. Bashir & Iqbal (2005) stated that a significant land area at the 10% level, Akamin et.al., (2017) stated that vegetable farm in researching Santa Cameroon land area significant influential coefficient of 0269%.

Variable fertilizer in stochastic frontier production function alleged significant positive coefficient is 0146%. This is in accordance with Aboki et.al (2013) examined agriculture cassava in Nigeria that the increase of 1% fertilizer use will improve cassava production of 5.22%. Alwarritzi et.al., (2015) researched aspects of agricultural land of Palm in Indonesia significantly positive effect amounting to 0.17%. Variable Labor significantly positive towards the production of jasmine in Pemalang District amount 0497% and Aboki et.al (2013) examined agriculture cassava in Nigeria that rising 1% usage of Labor will increase production of cassava 3.32%. Battese & Coelli (1995) examined the stochastic frontier production function in rice farming in India in the data panel shows that the the variable labor significant positive effect towards agricultural production amounted to 0.85%.

Pesticides and seeds are insignificant variables in the stochastic frontier production functions. It is found in the research Alwarritzi et.al., (2015) found that the herbicide does not significantly to agricultural plantations productivity in Indonesia.

Technical Efficiency Analysis

Table 6 shows that the average value of agricultural technical efficiency of jasmine in Pemalang District amount 0659, this value shows less efficient because of the below 0.70 (Coelli & Battese: 1998). The average value of technical efficiency research Akamin et.al. (2017) was in line with vegetable farm in Cameroon 0.67, Shapiro (1983) cotton farming in Tanzania with an average rating of 0.66. The highest technical efficiency Values of 1 and technical efficiency the lowest is of 0.292. Jasmine farmers with technical efficiency rating lowest in Pemalang District opportunities increase production budget of 70.8%.

Table 6 Technical Efficiency Result, Allocation Efficiency and Economical Efficiency

Interval	Technical Efficiency		Allocation Efficiency		Economical Efficiency	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
0.01-0.10	0	0%	1	3%	1	3%
0.11-0.20	0	0%	1	3%	8	24%
0.21-0.30	1	3%	7	21%	17	52%
0.31-0.40	7	21%	11	33%	7	21%
0.41-0.50	3	9%	6	18%	0	0%
0.51-0.60	4	12%	1	3%	0	0%
0.61-0.70	3	9%	1	3%	0	0%
0.71-0.80	5	15%	1	3%	0	0%
0.81-0.90	2	6%	3	9%	0	0%
0.91-1.00	8	24%	1	3%	0	0%
Total	33	100%	33	100%	33	100%
Amount		0.658754		0.436519		0.250186
Maximum		1		0.922756		0.346517
Minimum		0.292205		0.027465		0.027465

Source of Inefficiency Technique

Analysis of the factors affecting the level of technical efficiency of jasmine farmers using a model of inefficiency effects production function *stochasticfrontier.* Based on Equation 3 then produced the influence of variables inefficiencies in table 7 below.

Table 7 Technical Inefficiency Effects Prediction

Variables		Coef	Std. Error	t-Stat
Ages		0.016	0.007	2.315***
Experiences		0.022	0.008	2.805***
The Number of Children		-0.098	0.049	-2.025**
Education		0.001	0.032	0.018
Irrigation Utilization		-0.536	0.212	-2.532***
Group Forming		-0.069	0.111	-0.620
sigma-squared	0.193859	0.055186	3.512815	
log likelihood function	-1.98E+01			
LR test of the one-sided error	0.14325687E+02			

*) significance taraf 10% **) significance taraf 5% ***) significance taraf 1%

Table 7 shows the influence of variables inefficiency agriculture budget in Pemalang District. The results show that the variable in-age efficiency and experience a positive and significant effect of 2,315 and 2,805. This shows that the more we get it will be increasing in-efficiency, thus lowering productivity in the agriculture budget in Pemalang District. This is in contrast to the supposed, that the growing age then the experience will increase and productivity increases. These results are in line with research Battese & Coelli (1995) stated that marked the age coefficient is positive, indicating that older farmers are more inefficient than the younger ones.

Variable size of family and irrigation utilization showed significant marked negative with -2,025 and -2,532, meaning that the larger the size of the family then lowers inefficiency and boosted agricultural production, because of the size of the extra budget the family will help in the process of implementation of the land until the budget harvest, so it will be more efficient and increase productivity. These results are consistent with research from the Aboki et.al., (2013) and Anggraini et.al., (2017) that can reduce family size variable in-technical efficiency. While the use of irrigation using the pumps can be more efficient than if without AIDS irrigation. This is in line with Battese & Coelli (1995) stated that the proportion of irrigated land showed a positive relationship with total value of production.

Variables of education and participation in the Group of farmers are showed result that was not significant, but in a sign of education shows a nearly zero coefficient, meaning that in agriculture education budget has no impact. Participation in the Group of farmers while not significant but marked negative, so could be said to be able to reduce inefficiency, which means that by following a group of farmers then farmers will be more organized and can mutually sharing knowledge to increase the productivity of the jasmine agriculture budget.

Allocation and Economical Efficiencies Analysis

The value of efficiency and economic efficiency of farmers allocation in Pemalang District budget shown in table 6, the inefficiency of farming is generally assumed to be increased with the rise in the cost of production (Aligori: 2013). Based on cost function *dual frontier* then generated value efficiency allocation of Jasmine farmer average 0436, 0923 highest and lowest is 0.027. Jasmine farmers with the lowest efficiency can get input prices are low, so it can do the savings amounting to 93% (1-0.027/0.436).

As for the value of economic efficiency, there is no budget that achieves the efficiency of farmers economically, because of the tendency of the economical efficiency of all values below the 0.7 (average: 0.25, high: 0.346 and low 0.0274. By not reaching the economical efficiency, then the maximum benefit it brings farmers are not achieved. Jasmine farmers with the lowest efficiency rating can be increased 89% (1-0.0274/0.25) and improved quality of management, use of inputs, and the cost of inputs.

5. CONCLUSIONS

Based on the results and discussion of research it can be concluded that:

1. The efforts of Farmers in the Regency of Pemalang Jasmine yet efficient, both in the technical efficiency (TE), Allocation Efficiency (AE), and economic efficiency (EE) because the value of the average efficiency below 0.7
2. The agricultural budget in Pemalang District is still in a phase of *Increasing Return To Scale* the value of 1,142
3. Variable land area, fertilizer and labor allegedly positive significant effect against the budget, while agricultural productivity variable pesticides and seeds are not significantly to agricultural productivity of jasmine but have a positive direction
4. Family size and significant reduces in-irrigation efficiency, while these factors ages and significant work experience in-efficiency, enlarge. Education and the participation of farmer groups are insignificant against the effects of in-efficiency.

Suggestions

1. Strengthening of the Office of intercultural communication/officials related policies in the area of development plan of the central budget in Pemalang District. In order for making no overlap going forward.
2. A parallel Development between the construction of irrigation for waterworks, levees in anticipation of flood and the opening of new land.
3. Managerial training and mentoring to jasmine farmers, so it can be more efficient in the production of jasmine.
4. The existence of the role of academics to create a tool that could make the jasmine flowers are more durable, because usually only hold one day.
5. Training of processed product of jasmine flowers, such as perfumes, essential oils, ronce etc for *value added*, and to anticipate threats turn the plant material from the mix of jasmine to essence

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