

## FISCAL STIMULUS ON THE AVAILABILITY OF LOCAL RICE IN ACEH PROVINCE, INDONESIA

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### Abstract

This study aims to analyze factors that influenced the availability of local rice and how the fiscal policy influenced it. The panel data were used from 2007 to 2013 in 21 districts which were selected based on the agricultural sector. An econometric model with an ordinary of least square was used with an estimator using common effect. The result of this study showed the ratio of fertilizer to the price of paddy and the interest rate gave negative influences on the production of paddy, on the other hand, the government expenditure and wages gave positive influences. So the fiscal policy gave positive influences on the availability of food with increasing of paddy production, the availability of local rice will also increase. The result of this study recommended that the government should be more focus to implement programs that support the availability of local rice. The programs must be improved starting from the farm level, distribution system, technology, and the empowerment of farmers as food producers. The government needs to allocate the effective and efficient budgets by eliminating/stopping corruptions, official travels, grants, and other unnecessary routine expenses. In addition, the government should also monitor the implementation of the budgets allocation, so that they will be used on time and in appropriate ways.

**Keywords:** fiscal stimulus, local rice, availability, production, panel data

## 1. INTRODUCTION

The availability of rice is an absolute requirement to achieve food security in Aceh Province and Indonesia generally. This is due to the rice is still a major source of food for the people of Aceh and Indonesia. Rice contributes the greatest energy (50.83 percent) in the body as well as the consumption of protein (39.90 percent), (BPS, 2015a). Besides, rice also contributes largest expenditure to poverty in Aceh, which is 39.89 percent in rural areas and 32.35 percent in urban areas (Serambi Indonesia, 14 September 2015). According to Maitra and Rao, (2015), food insecurity is often occur in the poor population, on the contrary, according to (Irz et al 2001: Anriquez, G. 2007: Fan, S & Zhang, X., 2008; De Janvry, A., & Sadoulet, E, 2010) development of the agriculture sector affect the reduction in the number of poor people, because lots of the poor live in the rural areas.

As a basic commodity, the government must give a great attention to increase the rice production. However, currently, Aceh is still importing rice from other regions with the reason to maintain the food stocks and to meet the needs of rice for the poor (raskin and rastra). The rice productivity in Aceh until 2015 was only able to reach 4.66 ton/ha. This level is still lower than the average of the national rice productivity that reaches 5.15 ton/ha (Figure 1).

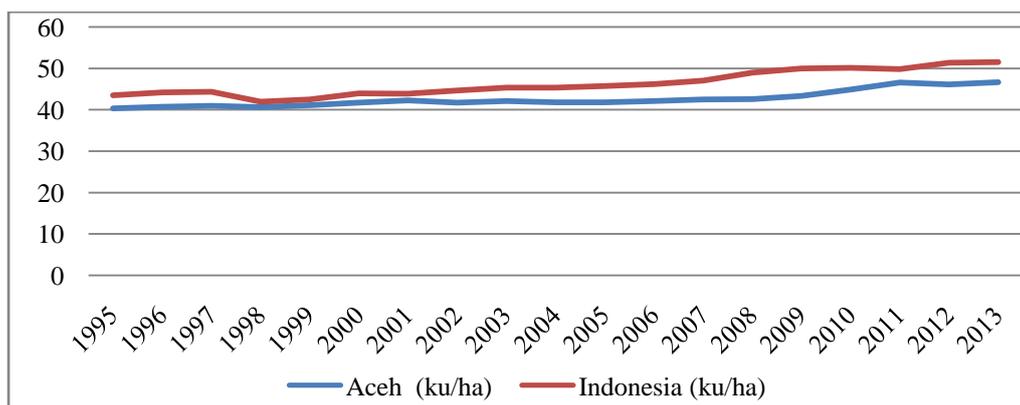


Figure 1. Average Productivity of Rice in Aceh and Indonesia  
source: <http://www.bps.go.id>.

Lack of infrastructure and capital, minimum of irrigation facilities, low of technology, and farmers abilities, as well as farmers's small land ownership in rural areas are problems that lead to the low of rice productivity and lack of farmer's welfare. Based on the result of the agriculture cencus 2013, a number of 46.46 percent farming households including smallholders farmers with land area less than 0.5 hectares (BPS, 2013)

During the periode of 1993-2014, the rice field with irrigation was only 71.93 percent. It shows that the farmers were still vulnerable in facing crops failures due to unavailabelity of water. The availability of adequate irrigation facilities up to the tertiary line will increase the planting index (IP). During this time, the average IP in Aceh province was still between 1.3 - 1.5. For the productive land with good irrigation, the farmers supposed to plant five times in two years like farmers in Vietnam. Besides the technical issues such as expensive and carce fertilizer and seed still occur, so the farmers can not use fertilizer and seed at the time they are required. High cost of production, and low production caused the price of rice in Aceh and Indonesia is still relatively high in general.

Dawe et al (2015); Ilham (2006); Gregory and Coleman (2013) stated that high food price have led to the low level of food security and nutrition of society, mainly for the poor.

Arifin (2015) mentioned that the expensive price of rice as the basic commodity in Aceh is Rp. 10,280 per kilogram compared to the foreign price with the same quality which is US\$ 362/ton or around Rp. 5,430 per kilogram (for types of Thai 25% broken) or for a better quality which is US\$ 340,1, or around Rp. 5,100 (for a types of Vietnamese 5% broken) causing consumers feel heavy in fulfilling the food need. Meanwhile, on the other hand, the low price of paddy on the farmers level to be one of the causes of growing land conversion from farming to non-farming, as a result of some farmers were not interested in planting rice.

Ownership of farmland is associated to the income level, (Shete and Rutten, 2015). According to the agriculture census of 2013, smallholder farmers whose land area under 0.25 hectare have very low income which is under three million per year. Therefore, the government should pay attention to the smallholder farmers by creating new farm land or acquisition of unfunctioned productive land by certain parties.

The fiscal policy is one of the policies that can be used to encourage the agriculture productivity, such as the findings of Fan et al (2000). Since the fiscal decentralization was enacted in 2001, planning and the implementation of development has been becoming the local government authority. In this case the local government and the community are more aware of the potential and the advantages that can be developed to overcome the problems of developments. The fiscal decentralization opens the opportunity for the local government to raise revenues and expenditures. The revenues of Aceh increased very largely in 2008 until the end of 2013. Aceh became one of the rich province among the 33 provinces in Indonesia with the fifth highest income percapita in Indonesia, which is Rp. 5.5 million, while the average of national income per capita in other province was only Rp. 4.2 million, (Peccap, 2013). The increased revenues was derived from the central government transfers, mainly from the general allocation and the special autonomy funds.



Figure 2. Map of Aceh, Indonesia (Aceh = ■ )

A long with the increased revenues, Aceh government expenditure has increased very largely since 2008. The Aceh Government expenditure per capita was Rp. 5.9 million, much higher than the national average per capita expenditure was 4.5 million, (Peccap, 2013). Actually, this was an opportunity to develop agriculture sector into a reliable sector to increase the farmers income as the main actor.

However the rate of Gross Regional Domestic Product (GRDP) increase in the agriculture sector was relatively small, compared to the increase in the government revenue and expenditure. The small increase in GRDP from the agriculture sector, one of which was caused by the low productivity of agriculture in Aceh Province (Figure 3).

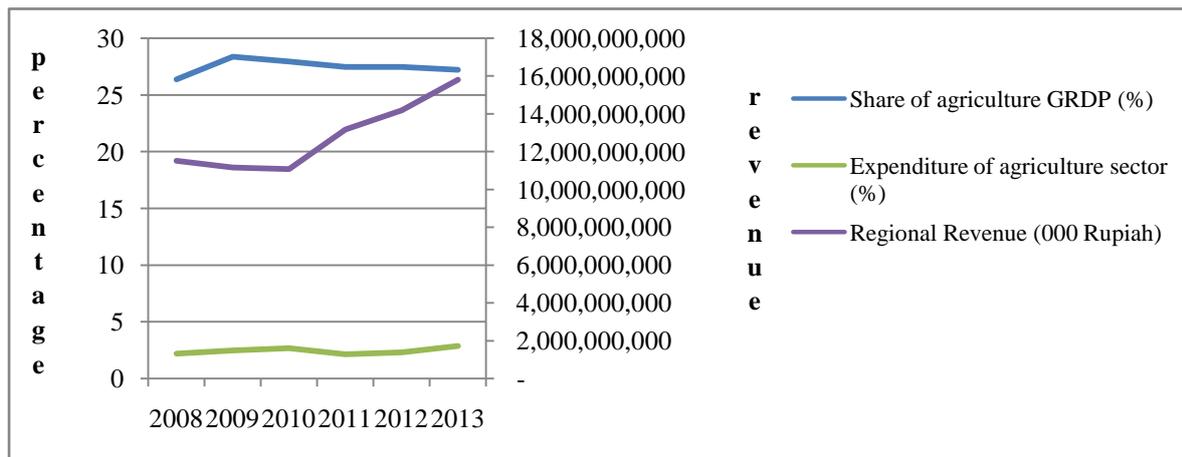


Figure 3. Regional Revenue and Expenditure, as well as the Agriculture Sector Contribution to Gross Regional Domestic Product ( GRDP).

The average growth of the Aceh Domestic Revenue (PAD) has been relatively low at only 10 percent since 2009, whereas the national average was at 19 percent. Other regions with the highest annual revenue growth were East Kalimantan at 30.7 percent, Lampung was at 29.5 percent, and South Kalimantan was 29.4 percent (Ministry of Finance in Pecapp 2013).

The government has conducted some efforts such as land rehabilitation, provision of agricultural infrastructure, and strengthening the agricultural institutions. Increasing access to infrastructure in a group of community will determine an increase in income and access of the mentioned group of community, such as the result of study conducted by Fan at al (2003). The programs of this government policy are useful to stabilize the food prices, to increase the farmers’s income and the production level, as well as to improve the food security in the agricultural sector. Based on the mentioned background above, the purpose of this study is to analyze how big the influence of fiscal policy on the availability of local rice in Aceh Province.

## 2. LITERATURE REVIEW

Randall (1987) stated that the production function is influenced by capital, labor, and other resources. In this study the capital can be distinguished into the farmer and the government capital in form of the government expenditure, while another resource is fertilizer. Thus, the function can be described as follows:

$$Q = f(C_g, C_p, L, F) \tag{1}$$

Where Q is production, C<sub>p</sub> is farmer capital, C<sub>g</sub> is government expenditure in food-crop sub-sector, L is labor, F is fertilizer.

The farmer capital influenced by the interest rate (Ir), whereas the government capital is the government expenditure which is an autonomous variable. If the farmers assumed in a rational condition and want to maximize the profit, so to achieve the production with the maximum profit can be used unconstrained maximization. The profit function can be formulated as follow (Hartono, 2002 ; Henderson and Quandt, 1980 ; Lau dan Yutopaulus, 1972 ; Henderson and Quandt, 1980 ; Jehle dan Reny, 1998 ; Chiang. A, and Wainwright. K, 2006):

$$\Pi = TR - TC \tag{2}$$

$$\Pi = PqQ - (Ir.Cp + W.L + Pf.F) \quad (3)$$

$$\Pi = Pq.f ( Cg, Cp, L, F) - (Ir.Cp + W.L + Pf.F) \quad (4)$$

If it is assumed that the production function is Cobb Douglas production, the equation 4 can be written as follow:

$$\pi = Pq a Cg Cp^\alpha L^\beta F^\gamma - Ir. Cp - w. L - Pf. F \quad (5)$$

If the necessary condition of FOC to maximize the profit, the partial derivation is equal to zero (0), then partially equation 5 can be derived as follow:

$$\frac{\partial \pi}{\partial Cp} = PqaCg\alpha Cp^{\alpha-1} L^\beta F^\gamma - Ir = 0 \quad (6)$$

$$\frac{\partial \pi}{\partial L} = PqaCgCp^\alpha \beta L^{\beta-1} F^\gamma - W = 0 \quad (7)$$

$$\frac{\partial \pi}{\partial F} = PqaCgCp^\alpha L^\beta \gamma F^{\gamma-1} - Pf = 0 \quad (8)$$

The first derivative condition shows that the value of the marginal product for each factors (Pq . f '(i)) must be equal to the price of its input factor or marginal physical (MPP) is equal to the ratio of the input price variable with the product price. Further, by substituting the three of the above equations obtained values of L\*, Cp\* dan F\* as follow:

$$F^* = \alpha a Cg P f^{1-\alpha} \left( \frac{W^{(\beta+\gamma)} \beta^\beta}{Pq \alpha^{(1+\beta+\gamma)} Ir^\beta} \right)^{1/(\alpha-\beta+\gamma-1)} \quad (9)$$

$$L^* = \left( \frac{a Cg W^{(1+\beta+\gamma)} \beta^\beta}{Pq \alpha^{(1+\beta+\gamma)} Ir^\beta P f^\gamma} \right)^{1/(\alpha-\beta+\gamma-1)} \quad (10)$$

$$Cp^* = \frac{a Cg Ir}{\beta \left( \frac{W^{(1+\beta+\gamma)} \beta^\beta}{Pq \alpha^{(1+\beta+\gamma)} Ir^\beta P f} \right)^{1/(\alpha-\beta+\gamma-1)}} \quad (11)$$

The level of input used is the optimum input. Thus at the time Qg\* is a function of L\* Cp\* F\*, then get:

$$Qg^* = (a Pq Cg \alpha^{(1+\beta+\gamma)^3} W^{\gamma-1} Ir^{1-\beta} P f^{1-\alpha})^{1/(\alpha-\beta+\gamma-1)} \quad (12)$$

Thus, it's known that the best output of the farmers at the maximum profit is influenced by Ir (interest rate), W (labour cost), Pf (fertilizer price), and Pq (output price)

The rice production is highly determined by the willingness of farmers as producers to plant the rice. If the farmers are rational, so they always determine the amount of the input used and the amount of the best production in doing the production as to give the maximum profit. The combination of using the best input and output to achieve maximum profit is discribed with the isoquant and isoprofit curve as follow:

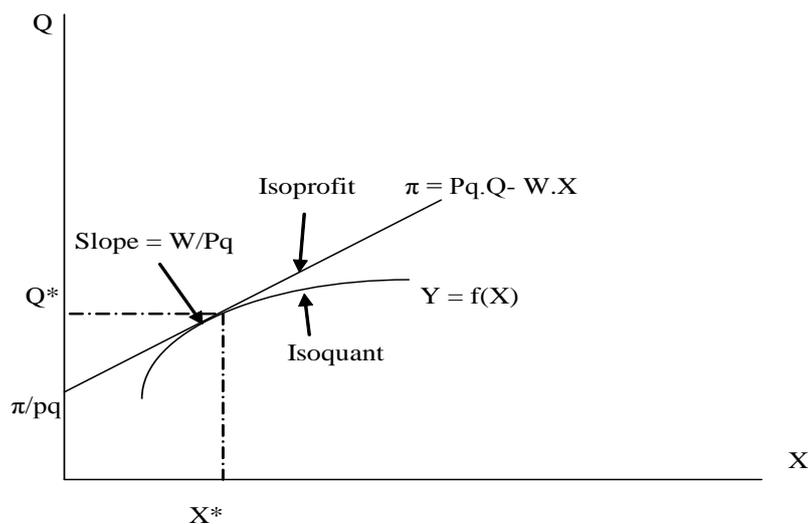


Figure 4. The Curve of Production Level and the Use of the Optimum Input to Generate the Maximum Profit (Hartono, 2002).

The rice production is highly determined by the willingness of farmers as producers to plant the rice. If the farmers are rational, so they always determine the amount of the input used and the amount of the best production in doing the production as to maximize their profit.

Policies to increase the rice production continuously run. It's starting from the intensification up to the extensification by increasing the area of potential rice planting. The program is done as an effort to increase the stability of production and the national price of rice as well as to increase the small farmers' income in the countryside. In this study, the discussed fiscal policy focussed on the subsidy of fertilizer and the government expenditure on the food crops sub-sector. The subsidy of fertilizer is expected will help farmers to increase the rice production because the production cost is low, as the research result Fan et al (2008). So the government expenditure either to improve infrastructure, to finance training, to counsel, and to create new land, is expected to increase the production as the result of Fan et al (2004)

### 3. METHODOLOGY

This research examined the impact of the fiscal policy in the government expenditure in food crops sub-sector and subsidy (with the price of subsidized urea fertilizer) to the production of local rice in Aceh Province. The data used in this research were secondary data, in form of panel data during the period of 2007 – 2013 in 21 districts. The analyzing model uses in this research is an econometric model with a single equation (Ordinary Least Square).

Based on the derivative model obtained on the equation (12) and found that paddy production is influenced by the paddy, fertilizer, and labor prices, interest rate, and government expenditure. Operationally, the equation is as follow:

$$Qg_t^* = c_0 + c_1 Cg + c_2 W_t + c_3 Ir_t + c_4 Pf_t + c_5 Pq_t \quad (13)$$

Adjustment:

$$Qg_t - Qg_{t-1} = \lambda (g^* - Qg_{t-1}) \quad (14)$$

$$Qg_t = \lambda Qg_t^* - \lambda Qg_{t-1} + Qg_{t-1} \quad (15)$$

$$Qg_t = \lambda Qg_t^* + (1 - \lambda) Qg_{t-1} \quad (16)$$

By substituting equation 13 into equation 15, it is obtained:

$$Qg_t = \lambda c_0 + \lambda c_1 Cg + \lambda c_2 W_t + \lambda c_3 Ir_t + \lambda c_4 Pf_t + \lambda c_5 Pq_t + (1 - \lambda) Qg_{t-1} \quad (17)$$

$$Qg_t = \theta_0 + \theta_1 Cg + \theta_2 W_t + \theta_3 Ir_t + \theta_4 Pf_t + \theta_5 Pq_t + \theta_6 Qg_{t-1} \quad (18)$$

where :

$$\lambda c_0 = \theta_0; \lambda c_1 = \theta_1; \lambda c_2 = \theta_2; \lambda c_3 = \theta_3; \lambda c_4 = \theta_4; (1 - \lambda) = \theta_5$$

for the purpose of the estimation model, then equation 18 can be written by including error term as follow:

$$Qg_t = \theta_0 + \theta_1 Cg + \theta_2 W_t + \theta_3 Ir_t + \theta_4 Pf_t + \theta_5 Pq_t + \theta_6 Qg_{t-1} + e \quad (19)$$

Where:

$W_t$  = Wage of labor at the agriculture sector

$Ir_t$  = Interest rate

$Pf_t$  = Price of fertilizer

$Pq_t$  = Price of paddy

$Qg_t^*$  = Desired paddy production

$Qg_t$  = Paddy Production year t

$Cg_t$  = Government expenditure

$Qg_{t-1}$  = Last year paddy production

From the total paddy production can be obtained the total rice production by multiplying paddy to rice is 62.74 percent (Departement of agriculture and Food-Crops, 2014).

#### 4. RESULT AND DISCUSSION

Rice production on the regional level is one indicator to look at food security on the macro level interm of the availability of food. During the period of 2007-2013, the rice production in Aceh province was unstable, even in the certain years showed a decrease due to the natural phenomenon such as global warming, as mentioned by (Baldos and Thomas, 2014 ; Mushtaq 2016). The instability of production is also due to a decrease of paddy field area in Aceh province.

In 2013, there was a decrease area of paddy crops in some districts like in Simeulu, Aceh Singkil, Bener Meriah, Aceh Besar ( as the centre of rice production), Gayo Lues, Lhokseumawe, and Subulussalam. Whereas during the period of 2007-2013 a decreased of paddy field occurred in Aceh Singkil, Pidie, Aceh Tengah, Bener Meriah, Banda Aceh, Sabang, Gayo Lues, and Subulussalam. It was due to the conversion of agriculture land to non-agriculture increasingly.

It is worried that if the government does not regulate the policy of land conversion well, so the area of rice field will more decrease. That's why the government should provide new rice field to increase the rice production and to provide the employment opportunities in Aceh Province.

Overall, during the periode 2007-2013, the rice production in Aceh decreased 4.93 percent, while the area of rice field was only increase 0.44 percent. The decrease of rice production during that period due to crops-failure in Pidie district (as one of the centre of rice production in Aceh Province) in 2013 and the decrease of rice production in Subulussalam (figure 5)

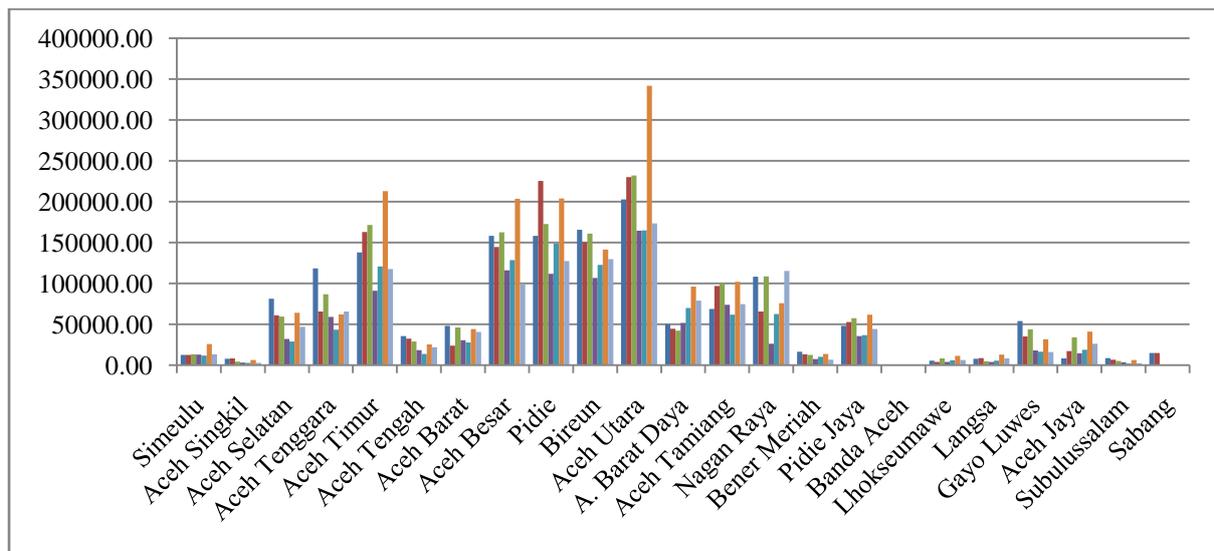


Figure 5. Local Rice Production In Aceh Province, Year 2007-2013  
 Source: Department of Agriculture (2008-2014)

The rice production was also decrease in some districts like Aceh Besar, Pidie, Aceh Timur, Aceh Barat, Aceh Tamiang in 2010. Therefore, efforts to increase the production and productivity should get the full attention from the government, so that the food security can be realized.

Lack of technology, lack of access to the capital, and small ownership of land are obstacles that lead to the low productivity and income of the farmers. Based on the result of agricultural cencuss in 2013, there was 46.6 percent of the agricultural household including the smallholder farmers in Aceh. The number of the farmers household with and without land ownership less than 0.5 hectare are big enough as shown by (Figure 6)

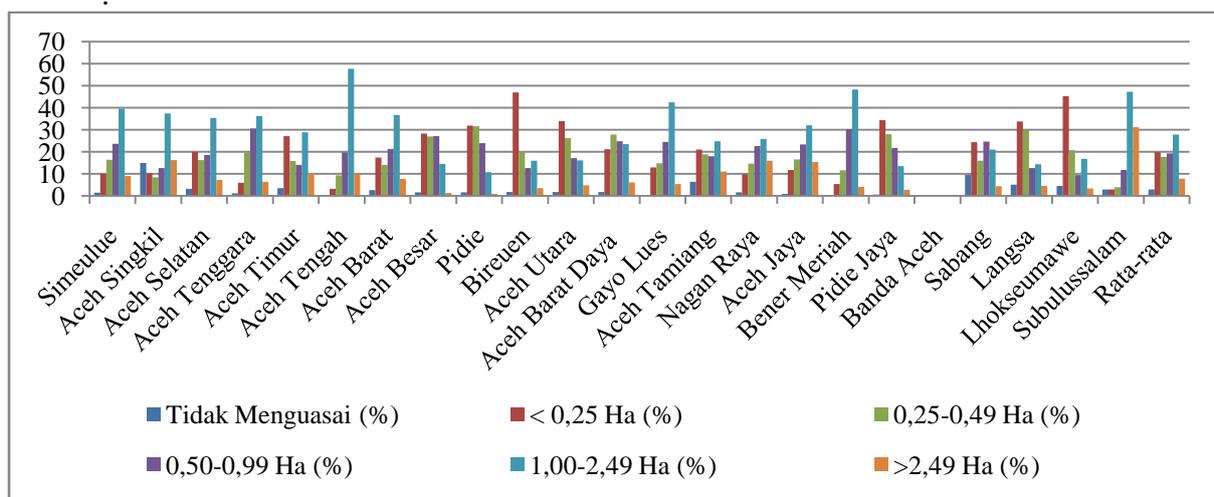


Figure 6. Percentage of Farmers Household According to the Wide Land Ownership  
 Source: BPS (2014)

The result of the research by looking at the effect of some variables, shows that the significant factors affect the paddy production are the government expenditure, interest rate, and lag paddy production. The interest rate negatively affect the paddy production, whereas, the goverment expenditure, wages, and the paddy production lag affect positively. The ratio of fertilizer price and the paddy price affect negatively to the paddy production, but the effect is not significant.

Tabel 1. Factors Affecting the Paddy Production in Aceh Province

Variable	Parameter estimate	T Value	Prob > t	Elasticity	
				Short-term	Long-term
Intercept	41679.88	0.95	0.3432		
Cg (The expenditure of food sector)	1.491311	3.07***	0.0026	0.28	0.31
W (wages)	3.619203	13.41***	0.0001	1.07	1,21
Ir (interest rate)	-962.289	-2.29**	0.0237	-0.90	-1.02
rPfPq (ratio of fertilizer price to the paddy price)	-1495.84	-0.26	0.7986	-0.07	-0.08
LQg (the paddy production lag)	0.110201	2.01**	0.0470	0.11	
F hit	62.13		0.0001		
R – Square	0.72				

Note :

\*\*\* = significant at  $\alpha = 0.01$

\*\* = significant at  $\alpha = 0.05$

rPfPq increase when: (Pf increase, Pq fixed or if Pf fixed, Pq decrease)

The government expenditure has the positive and significant impact on the paddy production. In every increase of the government expenditure one million will increase the paddy production 1.49 tons. This is in accordance with the result of the research by Gaiha et al (2012), with a regression the coefficient score 0.699 who found that that the development expenditure of agricultural sector is a stimulus to increase production. If the agricultural development fund increased, then many programs can be implemented to increase the paddy production and the production of other commodities. The improvement of the rural infrastructures such as irrigation and rural roads are also related to the increase of agricultural productivity. (Zhang and Fan, 2004). It shows that the government have to increase its expenditure to increase the production in the agricultural sector. Moreover, the average government expenditure in the agricultural sector during the period of 1994-2013 was only 3.65 percent, (BPS, 1993-2013). When it was compared with the total of rural population who generally are farmers and live in poverty, and the big potency of agricultural sector, whereas the expenditure of the agricultural sector is relatively small. The percentage of government expenditure for each economic sectors should be based on each potency of those sectors.

From the point of elasticity value review, the increase in the paddy production is not responsive to the government's expenditure because the elasticity value is less than one. It means every one percent increase in the government expenditure, the paddy production will increase 0.28 percent in the short term and 0.31 persen in the long term. The paddy production is not resnponsive to the goverment expenditure because the government

expenditure was not used in inappropriate ways as it should be, including either misappropriation, or delay in the realization of grants distributions as needed by the farmers. It's often found the infrastructure of production aids like seeds, distributed not in the planting season, while paddy should be planted in accordance with its planting schedule. It caused the disbursement budget become not absorbed. The financial abused is often happen, like what happen in Pidie district when mass crop failure, or in the case of rice-field provided in Aceh Tengah, and some other cases.

Further, the wages variable has positive and signifikan affect to the increase of production. This is due to the increase of wages are insentive for farmers and make their working productivity is increased, thus the paddy production is increase as well. It's different from the government expenditure, The wages increased are elastic to the increase of paddy production. This is due to the increase of wages has a direct impact to the farmers' income, compare to the government expenditure which has indirect impat to the farmers' income.

In every one percent increase in wages of agricultural sector, the paddy production will increase 1.07 percent. It's different from the result of Mailena's research (2013) who found that increase in wages will decrease rice production in Mada, Malaysia with the elasticity score -0.972.

The positive affect of wages in this research proves that wages are the most important factor that determine the desire of farmers to produce. That's why if the income is not reasonable, the paddy scarcity will happen because the farmers are not interested to produce, plus with increasing land conversion from agriculture to non-agriculture and limited of production facilities owned by farmers. for those reasons, the goverment should continously implement programs to improve the farmers' welfare.

There is no significant influence of the fertilizer price ratio to price of paddy and the paddy production indicates that rice-farming is not merely a profit oriented business, but it is generally more to fulfill the need of the basic food. Although the selling price of paddy decreased, farmers will plant the rice, although in a smaller acreage.

The interest rate has negative and significant effect to the paddy production. if the interest rate increased, the farmers's willingness to invest will decrease and the production of paddy will also decrease. The significant influence of the interest rate shows that the farmers' capital determines the level of production. Most of the farmers are generally having obstacle with the capital. Low capital plus with the infrastructure limitation, knowledge, and skills of farmers caused low of production.

However, if it is looked at the elasticity value, the influence of an increase in the interest rate is nor elastic to the response of paddy production in the sort term. The response of production to the interest rate tends to be more elastic in the long term term. Therefore, to increase investment in various sectors including agricultural sector, the goverment should be wiser in setting the interest rate especially the investment interest rate and working capital for small scale business. To assist farmers in facing capital obstacle, the goverment can provide soft loan with low interest rate to the farmers, like KUR (Credit for People Business), KUK (Small Business Loan), KKP ( Food Security Loan), KKPE ( Food Security and Energy loan) and other form of soft loans. The distribution of those loans should be monitored as well as possible to avoid abuses.

The ratio of fertilizer price to the price of paddy is negative, but it is not significant to the paddy production. There are two things cause an increase in the ratio of fertilizer price to the price of paddy namely increase in fertilizer price (the paddy price is constant), or a decrease in paddy price (fertilizer price is constant). It shows if there is an increase fertilizer price or decrease in paddy price, the paddy production will decrease because the fertilizer price is cost for farmers, whereas the paddy price is an incentive for farmers. So if the

fertilizer price is up, while the other factors are constant, the production costs will increase, so the farmers will reduce the use of other inputs that resulted decrease in paddy production. While if there is a decrease in the paddy price with other factors are constant, then farmers are not interested in producing more paddy. This result of the research is the same with Siregar (1999), Kumar et al (2010), and Mailena et al (2013). Therefore the government should maintain the stabilization of the inputs price and the price of paddy to protect farmers as producers when the prices fall, and on the contrary, to protect consumers when the prices are high.

## 5. CONCLUSION

The fiscal stimulus, either in the government expenditure, or fertilizer subsidy had positive effect to the increase of paddy production as well as labor wages in the agricultural sector. With the increase in the paddy production, the availability of local rice will also increase. Whereas the variable of interest rate and the ratio of fertilizer price to the paddy price negatively affected to the paddy production. It showed the fertilizer subsidy and the government expenditure could increase the paddy production, while increase in the price of fertilizer could increase the rice production in Aceh province. Increase in government expenditure could increase the paddy production, while increase in fertilizer price would reduce the paddy production which has an impact on the availability of the local rice.

The increase in the availability of rice should be started from the producer's side. The empowerment of farmers as rice producers should be on the government's top priority besides improving infrastructure. Other than that, the improvement of the system and resources of trainers/companions, and training as well as cooperation with universities need to be done in applying technology and the newest innovation in an effort to increase the production and the farmers's empowerment. It is also necessary to create new land especially for the smallholder farmers.

Fiscal policy in form of the government expenditure need to be increased to increase the availability of rice. While the fiscal policy in form of fertilizer subsidy needs to be maintained regarding the fertilizer is an important input for sustainability of the rice-farming activities. The government needs to increase the availability of fiscal mainly for the development expenditure by allocating the budgets effectively and efficiently through by reducing corruption, official travel, grants and other ineffective routine expenses, other than that, it is necessary to have good financial management so that the realization of the budget use can be applied in time and right on target. Delays in the realization and use of APBA fund (Aceh Budget) and APBN (National Budget) as occurring this time causes the development process to be obstructed. Therefore, the government is also expected to be more focused and consistent to implement program in improving the food security and poverty alleviation.

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