

Full Length Research Paper

The analysis of production function and farm marketing efficiency of pineapple (*Ananas comosus* L Merr) in South Sumatera Province, Indonesia

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This study was based on input and output obtained from 200 random samples of pineapple farm in South Sumatera Province. The major objective of the study is to analyze the input allocation of pineapple farm from six angles: cultivated area, seed, man power, chemical fertilizer (Urea, TSP, and KCL), manure, and insecticide. The result of Cobb Douglas production function approach indicated that, inputs had not been used optimally. Cultivated area, seed, man power, chemical fertilizer, manure, and insecticide should be increased. In the 8 input factors, cultivated area has the biggest influence on pineapple output. In aggregate, the condition of pineapple farm in this area has increasing returns to scale. From the marketing analysis, the farmers who sold their pineapple by using the shortest channel of distribution received more contribution than the other two kinds. Thus, by using the marketing efficiency analysis, the shortest channel of distribution is more efficient.

Key words: Pineapple farm, production function, marketing efficiency.

INTRODUCTION

In the face of global economic era and free trade, horticulture products especially fruits will face intense competition. High quality fruits with sufficient volume and continuous availability are the key in this competition. Pineapple (*Ananas comosus* L Merr) contributes 8% of the world fresh fruit production; Indonesia is the third fresh pineapple producing and processing country after Thailand and Philippines (Hadiati and Indriyani, 2008).

Based on Directorate General of Horticulture-Ministry of Agriculture data, the development of pineapple harvest in Indonesia in 2000 to 2011 increased with an average growth of 10.77% per year. Significant improvement

occurred in 2006, that is, 114.50%. Based on the cropping region, 2000 to 2011 harvest area outside Java is higher than outside Java with each of the growth being 18.81 and 9.17% per year. In 2011, pineapple's area harvest in Java is 2,289 ha, while outside Java is 9,506 ha.

The development of pineapple production in Indonesia from 2000 to 2011 showed a fluctuating pattern. The highest pineapple production occurred in 2011, that is, 124.90 ton/ha. Based on the region, in 2011, Java's pineapple has the highest productivity level compared to outside Java; the production of Java reached 158.55

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ton/ha, while that outside Java was only 114.86 tons/ha. Based on the data of the production of pineapple in 2011, pineapple production center in Indonesia was found in 5 provinces: North Sumatera (183,186 tons), South Sumatera (112,763 tons), Central Java (92,953 tons), Lampung (50,534 tons), and West Java (49,989 tons).

The development of pineapple as agricultural product in Indonesia has not received serious attention as reflected in the harvested area and fluctuating production. This is caused by a variety of reasons; some of them are undevelopment of the use of superior varieties, lack of optimal cultivation techniques, and lack of post-harvest handling by farmers. The available land in South Sumatera has also not been used optimally. The land which is available is 12,332 ha, but it is only 842 ha that is used. The rest of the available land is 11,490 ha. It has direct impact on pineapple production. The production in 2012 was 47,342 tons. In 2013, it was 57,887 tons, a decrease from the production in 2011, that is 112,763 tons (South Sumatera, 2014).

In reality, the purpose of agriculture development in Indonesia is to meet the food needs of the society, the needs of raw material in the country, to prevent migration of villagers to cities, reduce poverty of villagers, increase foreign exchange through export, expand employment opportunities, increase the income of the society, and support the distribution of development results.

Based on the purpose, pineapple as one of agricultural products needs more attention, either in terms of its quantity or marketing system. An increased product without a good support from the marketing system cannot last for long, and can reduce the motivation of farmers to increase their production. Therefore, efficient marketing activities will really affect farmers' passion to be more active in production in order to increase their income and well-being. This has an impact on the overall productivity results.

In narrowly cultivated areas, most of the farmers in Indonesia and pineapple farmers in South Sumatera, especially farmers weak in capital, when faced with urgent needs and having less information about the market often receive the price. The middlemen, who have the capital, provide temporary loans to the farmers, either in cash or kind. This situation indirectly makes the farmers bound to the traders concerned, that in the time of marketing, the farmers cannot determine their products' price freely. In this situation, the farmers will always get the smallest part of the price paid by the consumers, compared to the price that the brokers get as the marketing agent.

The involvement of the middlemen, if associated with the farmers' skill, actually has a big enough meaning. Moreover, when reviewed in terms of economics which is shown by the function of the traders concerned, collecting pineapple from small quantity to bigger quantity becomes more efficient in its marketing. But the number of the middlemen level involved makes a product distribution

channel become longer and it affects the marketing cost of that product (Kotler, 2005). It is known that high or low marketing cost of a product will affect the price of the product that is marketed either at producers' or consumers' level.

Therefore, in an effort to increase the farmers' income, at least, the development of this pineapple's farm must follow not only on how to improve the production, but also on how to market to obtain reasonable profit. So, a research is needed to review the average result from the development of pineapple program in South Sumatera which is closely related with the effort to increase the net income of the farmers as the center point of agriculture development. Research on production and marketing should create the opportunity to increase the farmers' income, so they can be motivated to increase the yield and level of farm production.

MATERIALS AND METHODS

This research was conducted in March 2015 to December 2015 in South Sumatera Province, which is one of the biggest pineapple producers in Indonesia. South Sumatera has an area of 8,701,742 km². Agricultural sector has an important role in South Sumatera's economy. This sector was in third position as the sector that gave the highest contribution for the economy besides mining and manufacturing. The contribution from agricultural sector for Gross Regional Domestic Product was 17.28%. The scope of agriculture activities in this province covers several kinds of activities. In order to have detail data, agriculture is classified into some sub sectors which are food crops, estates, forestry, animal husbandry, and fishery. South Sumatera has a variety of horticulture crops such as vegetables and fruits. In 2013, there were 23 commodities of vegetables grown in different areas of regencies. The production of fruits in South Sumatera in 2013 was about 109,131 tons for banana, 57,887 tons for pineapple, and 17,934 tons for siam orange.

Pineapple farm prospect

One of the identified commodities with a great business potential to achieve the goals of the development of Indonesia agribusiness is pineapple (Astoko, 2014). Harvested area of pineapple in Indonesia is 165,690 ha or 25.24% of the national fruit harvest target (657,000 ha). In the last few years, harvested area of pineapple plants was ranked first of 13 types of commercial fruits which are cultivated in Indonesia (TFSC, 2007). In line with this, the market demand of pineapple in the country tends to increase more. In line with the population growth, the society's income is good, due to the increasing awareness of the population about the nutritional value of fruits. Pineapple, besides being consumed fresh, it can also be processed into variety of food products and drinks. Also the waste or by product of the fruits peel and pineapple leaves can be used for food production, paper, and textiles (The Ministry of Agriculture, 2007).

Pineapple is a proven commodity which has good enough market opportunity domestically and abroad. This time, Indonesia has been able to shift the competitors, especially Asian countries; the countries that have become Indonesia export destinations are USA, the European Union, the Middle East, and Latin America. Based on Statistics Center Agency (SCA) data, the volume of pineapple export, either fresh or canned fruit from January to October 2011

reached 161,386 tons or 173.89 million US\$. Total production of pineapple in Indonesia reached 1.5 million tons in 2011; 90% is a kind of queen pineapple and the rest 10% is smooth cayenne. In a total of pineapple export (divided into fresh pineapple and processed pineapple), the biggest export in fresh pineapple was addressed to Malaysia with a share of 74%, while Japan had 24.54%. Meanwhile, the countries with the biggest share of processed pineapple are United States of America (22.62%), Netherlands (15.19%), Singapore (13.94%), German (13.86%) and Spain (10.58%). The average volume export to United States of America since 1999 to 2005 is 562,054 tons and is relatively stable every year. But, export to Netherlands, Singapore, German and Spain continues to increase.

Cobb Douglas production function

The effort of increasing the pineapple farm productivity in rural areas of South Sumatera is the utilization of cultivated area which is relatively still small. Chavas (2008) said that the small agriculture area is less economical in production process. In line with this, the labor in the village does not work optimally in managing their farming, because the land that is available for cultivation is too small compared to the labor. As a result, the productivity of labor on average is also low. In terms of the availability of land that is relatively small, the intensification result becomes less comparable with the cost paid and the number of laborers who participated in the production process. The next effect in growing larger number of labor can be classified as visible and invisible underemployment in agriculture sector which is often referred to as disguised unemployment.

In classical economic theory, land is one of the natural resources components which dominantly act as obstacle to output and lead to a marginal decline in labor and capital. It must be admitted that the problem of business capital is a dilemma for the farmers, especially in the research area. The effect of the limitation of capital, is that, many available land cannot be utilized optimally; also, the utilization of the means of production by the farmer is often not in accordance with the one recommended by agriculture extension. The capital function is not only a production factor, but also plays a role in improving the capacity to adopt the technology (Ashari, 2009).

There are many factors that cause low productivity in agriculture sector in developing countries. The most important of all is the lack of agriculture infrastructure. Also farming methods used are traditionally, modern facilities are rarely used, the level of education and farmers' knowledge are low, there are some socio-cultural factors which decrease the farmers' motivation to increase production, and the farmers do not have the means to buy their own necessary agriculture inputs (Todaro and Smith, 2003).

One of the technologies used for production in farming is production function. According to Rasmussen (2013), the production function showed the relation between physical production results and production factors. It is useful as the basic framework for understanding the problem of utilizing the production factors including production process.

In analyzing the production function, there are so many forms of mathematical equations which can be used, but basically there is no singular function of the production function which can reveal the characteristic of the agriculture production appropriately (Echevarria, 1998). The phenomenon is abstracted into the production function model with regard to the assumptions that restrict the model prediction. The production form and magnitude of the parameters coefficient vary by the production factor and specific environment from every production center. However, Cobb Douglas's production function is more specific to be used to predict the function of agriculture production. The advantage of this function is the ranking of the function as well as the elasticity of production from the production factors that are used (Biddle, 2010).

Yuan (2011) used the Cobb Douglas's function model in studying the level of rationality and the efficiency of the uses of agriculture resources in Hebei Province-North China. The independent variables included in this model are cultivated area, effective irrigation area, chemical fertilizer usage, agriculture machinery power, rural electricity consumption, and manpower. From this research, it was found out that the effective irrigation area had the highest influence on agriculture output. Before that, Ionita and Andrei (2010) also used Cobb Douglas's production function in analyzing input-output of agriculture in Rumania. The independent variables included in this model are the capital in agriculture and work force employed in agriculture. The research result showed that the capital in agriculture has dominant influence on agricultural outputs.

Marketing efficiency

In order to increase the farmers' income, besides the needs of increased production, the efficiency of the relevant commodity marketing should also receive an attention, because inefficient marketing system will cause them to receive small profits. This analysis is important, because generally, the agricultural product marketing in Indonesia is the weakest part in the chain of the economy or in the flow of goods. That statement means that the efficiency in this sector is still low, so the possibility to enhance it is still big (Mubyarto, 1995).

The efficiency concept can be divided into two: efficiency economic or the efficiency of the price and technical efficiency or operational efficiency (Norwood and Lusk, 2007). The economic efficiency concerns the operation of the aspects of the services and the marketing cost which consists of the purchase, sales, and price formation. The technical efficiency is related to the reduction of input expenses to produce a number of goods and services, and whether the physically distributed goods has been conducted well.

In agricultural product marketing, the formation price that occurs in each of the market agents is different, where the marketing margin in each of the agent is bigger with an increase in the marketing channel that has been through, besides the change in demand and supply in every level (Abassian et al., 2012). Many levels of marketing organization involved in the process of distribution of the goods from the producer to the consumer indicated the length of the marketing distribution. The length of marketing distribution of a product makes the marketing cost bigger and the profit accumulated value will become bigger. Situations like this will affect the price of a product either at producers' level or consumers' level; and at the end it will affect the amount of the marketing margin.

Rit (2014) said that, the marketing system is considered efficient if it can divide the margin of a whole price paid by the last consumer to all the agents involved in the production activity and commodity marketing. Tomek and Kaiser (2014) define marketing margin as: (1) the difference between the price paid by the consumer with the price received by the producer, and (2) the collection of the retribution received by the marketing agent, as a result of demand and supply. Moreover, they declare that the efficient marketing system is when the price paid by the consumer and the number of the products offered by the farmers will not affect the marketing margin. The margin percentage for each level of the institution is constant. If this situation occurs, it means that the farmers as the producers, the middlemen, and the consumers are in a perfectly competitive market structure.

Research sample

In this research, the sample unit, besides the pineapple farmers and middlemen involved in the marketing activity, consists of

Table 1. The definition of variable operationalization.

Variable	Definition	Unit of measurement
Production (Y)	Production per farm size in 2013-2014 growing season	Quintal
Cultivated area (X ₁)	The land area planted with pineapple in monoculture	Hectar
Seed (X ₂)	The number of seeds used in every hectar of planted area	The number of seeds
Man power (X ₃)	The number of hours per day	Male = 8 h, Female = 0.75 h
Urea fertilizer (X ₄)	The number of urea fertilizer	Kilogram
Tsp fertilizer (X ₅)	The number of TSP fertilizer	Kilogram
Kcl fertilizer (X ₆)	The number of KCL fertilizer	Kilogram
Manure (X ₇)	The number of manure	Kilogram
Insecticide (X ₈)	The number of insecticide	Litre
Price per unit of variable X (P _X)	Average price of inputs	IDR
Price per unit of variable Y (P _Y)	Average price of outputs	IDR

Table 2. The definition of marketing variable.

Variable	Definition	Unit of measurement
Marketing margin	The number of margin obtained in every traders, counted by the difference between selling price and purchase price after minusing the amount of marketing cost	IDR
Price	Traders buying price of pineapple from farmers	IDR
The volume of goods	The amount of pineapple sold by farmers or traders in one transaction	unit
Marketing cost	The cost paid by every traders in selling their products	IDR
Marketing profit	The retribution obtained by every traders	IDR
The farmers's share	The share received for farmers from the price paid by consumers	IDR
Channel of distribution	The number of distribution channel involved in the process of delivery of goods	The number of channel distributions

traders collectors in village, district, local big traders collector, and traders outside the region. The retailers are not used as the unit of analysis, because the retailer role is more assumed by the trader collector at village level.

To obtain the data that can represent the situation of pineapple agriculture in South Sumatera, the stratified cluster sampling is needed. First, South Sumatera Province is divided into district classes. Then, the district with pineapple planting area are more than 500 ha is defined as the unit of sampling primer, and from that sampling unit, primer is taken entirely. The number of sample farmers is determined randomly, that is, 200 farmers who are the number of samples in every district according to the proportional allocation.

In marketing, the first thing is to observe the existing marketing channels. Then, note every pineapple distribution from the farmers as producers to the last customers, either at the price level, marketing cost paid, and profit level received by each of the middlemen involved.

Operationalization of variables

The concept of basic relation in production process is shown by algebraic relation, which is a production function. In certain cases, economic theory gives the indication of the dependent variable (Y)

which is influenced by the independent variable (X_i). The operational definition from the independent variable and dependent variable is shown in Table 1. Meanwhile, the measurement of marketing variable is shown in Table 2.

Analysis method

Analysis method which is used to suspect production factor affects the development of pineapple production in South Sumatera using Cobb Douglas's production function. Systematically, that function is as follows:

$$Y = \alpha \sum_{i=1}^8 X_i^{\beta_i} e^u$$

The linear form from the equation is:

$$\ln Y = \ln \alpha + \sum_{i=1}^8 \beta_i \ln X_i + \ln u$$

Based on the assumptions used to obtain a good prediction, the value of e^u is zero; so the marginal product (MP_{X_i}) and elasticity of production are considered as follows:

Table 3. The parameter estimation of the production function of pineapple farm in South Sumatera.

S/N	Variable	Parameter	Coefficient	t _{cal}
1	Intercept	lnα	4.2158	-
2	Cultivated area	β ₁	0.3175***	2.6046
3	Seed	β ₂	0.2094**	2.3205
4	Man power	β ₃	0.0846	1.6583
5	Urea fertilizer	β ₄	0.2163***	3.2162
6	Tsp fertilizer	β ₅	0.2012***	2.4913
7	Kcl fertilizer	β ₆	0.2145**	3.1202
8	Manure	β ₇	0.0492 ^{ns}	-
9	Insectiside	β ₈	0.1461**	2.2683
		n	150	-
		R ²	0.9274	-
		F	36.4235	-

***Significant at 0.01, **significant at 0.05, ns: no significant.

$$\begin{aligned}
 MP_{Xi} &= \frac{dY}{dXi} = \alpha \beta_i X_i^{\beta_i - 1} \\
 &= \alpha \beta_i \frac{X_i^{\beta_i}}{X_i} \\
 &= \beta_i \frac{Y}{X_i} \\
 E_{Y, Xi} &= \frac{dY}{dXi} \times \frac{Xi}{Y} \\
 &= \beta_i \frac{Y}{X_i} \times \frac{Xi}{Y} \\
 &= \beta_i
 \end{aligned}$$

The sum of the regression coefficients (elasticity) in Cobb Douglas's production function can automatically indicate the returns to scale (Kilmer and Armnbruster, 1984). If $\sum \beta_i > 1$ then production

function is in increasing returns to scale phase. Constant returns to scale phase is if $\sum \beta_i = 1$, and decreasing returns to scale is if $\sum \beta_i < 1$. The criteria for the determination of efficiency level can be done by comparing the marginal product value from every production factor (MPV_{xi}) with the price per unit of production factor (P_{xi})

In marketing analysis, that is, by studying the relation between the price received by the farmers with the retail price, the cost and the profit of marketing institution, effort to increase market share received by the farmers as producers with the formula can be analyzed:

$$M = \sum P_{ci} - P_{fi}$$

M = marketing margin

P_{ci} = the price in the level of consumers per unit to i

P_{fi} = the price in the level of farmers per unit to i

$$\frac{MPV_{xi}}{P_{xi}} \begin{cases} =1: \text{the utilization of production function is efficient} \\ >1: \text{the utilization of production function is not efficient (should be increased)} \\ <1: \text{the utilization of production function is not efficient (should be reduced)} \end{cases}$$

The large number of the farmers' part can be known with the formula:

$$F_s = \frac{P_f}{P_c} \quad \text{or} \quad F_s = \frac{P_c - M}{P_c} = 1 - \frac{M}{P_c}$$

where F_s is the share received by farmers, P_f is the price at the level of farmers, and P_c is the price at the level of consumers.

Next, in order to measure the efficiency level of marketing, the concept of Shepherd (1982) is used, that is, the comparison between the amount of sales and marketing cost. If the result of the

measurement is high, it means that the marketing activity is efficient. Otherwise, if the result of the measurement is low, it means that the marketing activity is not efficient.

RESULTS

Coefficient estimation of production function

The estimation of production function of pineapple farm in South Sumatera Province is shown in Table 3.

Table 4. Marginal product value and price per unit of production factors.

S/N	Variable	β_i	MPV_{xi}/P_{xi}
1	Cultivated area (ha)	0.3175	4.6982
2	Seed (number of units)	0.2094	3.8263
3	Man power (working hours)	0.0846	1.0531
4	Urea fertilizer (kg)	0.2163	6.9485
5	TSP fertilizer (kg)	0.2012	9.3876
6	KCL fertilizer (kg)	0.2145	8.5967
7	Manure (kg)	0.0492	3.8563
8	Insecticide (L)	0.1461	4.2918

Marginal product value and price per unit of production factors

The result of the analysis about the efficiency of the production factor in pineapple farm in South Sumatera is shown in Table 4.

Marketing margin analysis

The spread margin on the third marketing distribution channel found in pineapple marketing in South Sumatera showed variation among all the distribution channels.

DISCUSSION

In Table 3, we can see that, partially the production factor of cultivated area, seed, manpower, chemical fertilizers (Urea TSP and KCL) significantly influence the pineapple production at 95% level. Even though positive, the variable of the manure has no effect on the pineapple production. This is due to inappropriate use of manure by some farmers; so it is not suitable with the recommended size. Meanwhile the determination coefficient ($R^2 = 0.9274$) showed that the capability of independent variable to explain the diversity that occurs in the dependent variable is 93%.

As the value of the coefficient of Cobb Douglas's rank function is an elasticity value of the production factors involved partially, then the result estimation of the coefficients rank function can be used to explain the effect of each production factors on pineapple production result in South Sumatera. From the production elasticity of the cultivated area (0.3175), an additional cultivated area of 100% will increase the production by 31.75%. Production elasticity of seed and man power of 0.2094 and 0.0846 means that an additional seed and man power of 100% will increase the production by 20.94 and 8.46%. Urea fertilizer, TSP and KCL's production response of 0.2163, 0.2012, and 0.2145 mean that additional urea fertilizer, TSP and KCL of 100% will increase the production by 21.63, 20.12 and 21.45%. The

manure did not affect the production, but the value is still positive. The elasticity of the insecticide production factor of 0.1461 shows that an additional 100% of that production factor will increase the production by 14.61%.

According to the Cobb Douglas production function, if the number of the regression coefficients result is summed may indicate the returns to scale conditions. The estimation result of the production function in Table 3 showed that the number of the function coefficients is bigger than 1.2076. Therefore, it can be concluded that the scale of pineapple farm condition in South Sumatera region has increasing returns to scale condition. It means that, the enhancement of the used production at 100% will increase the production by 120.76%.

The allocation levels of factors of production in pineapple farm in South Sumatera are close by the economic efficiency approach. The magnitude of the ratio between the marginal product value from each of the production factor (MPV_{xi}) with price per unit of production factors (P_{xi}) may give an indication of the needs for the addition or subtraction of the use of the production factors concerned (Darko and Gilbert, 2013). Efficiency analysis of the use of production factors is not only connected with the farming production activity in a certain period which is not affected by the previous period. Therefore, this approach shows that the production process is a closed system. That assumptions provide the limits that every variable which is used in the process of production purchased at the start of the production activity and sold at the time of production period ended; so the time element has no effect on the price variation.

In Table 4 the use of the cultivated area production factor, seeds, man power, chemical fertilizers (Urea, TSP and KCL), manure, and insecticide is at optimal level. It shows the ratio value is bigger than 1. The bigger profit can be achieved by increasing the use of production factors. The addition of land area for pineapples farm in South Sumatera will increase the number of production for the farmers, and until now, there are many land which has not been used economically (South Sumatera in Figure 2014). This result is in line with the research of Blank et al. (2009) who state that larger cultivated areas will have significant effect to the welfare of the farmers

Table 5. The spread of marketing margin on three distribution channels.

Description	Marketing channels (%)		
	First	Second	Third
The margin of traders in village			
Profit margin	2.46	-	3.54
Cost margin	2.62	-	3.26
The margin of traders in district			
Profit margin	3.25	2.84	-
Cost margin	3.06	3.62	-
The margin of local wholesalers			
Profit margin	1.86	2.52	4.61
Cost margin	5.16	4.95	5.73
The margin of traders in outside region			
Profit margin	2.89	2.96	-
Cost margin	2.76	2.81	-
Farmers share			
Amount of profit margin	75.94	80.30	82.86
Amount of cost margin	10.46	8.32	8.15
	13.60	11.38	8.99

compared to narrow cultivated areas.

Besides that, buying other production factors, for example the use of chemical fertilizers (Urea, TSP and KCL), manure and insecticide become very important. But the problem is lack of capital, making the farmers unable to fund that production factor. This would make the developments of pineapple farms in the areas of research become difficult.

The research is in line with the invention of Ionita and Andrei (2010) who said that the availability of capital in agriculture is the most important thing. Yao and Alles (2006) also said that the theoretical rules are to get enough resources to fund a business activity in order to increase operational performance and profit at a specific time. Capital is the main drive in developing an enterprise. Capital can: (1) assist farmers in overcoming the limitations of capital with relatively small interest, and (2) reduce the dependence of the farmers on middlemen and money lenders (Ashari, 2009).

From three existing marketing channels in Table 5, it is shown that the percentage of the farmers' share is smallest is in the marketing distribution in the first type. Next is in the marketing channels, which are the spread of margin, either profits or cost margin. The spread is uneven. The biggest profits margin is obtained by the traders collectors at district level, while the biggest margin cost is obtained at local wholesaler level. This situation is same with the type of the second marketing, but here the biggest profits margin is obtained by the traders outside the regions. If we compare it with the

marketing distribution in the third type, the percentage of the farmers' part which is received on this second marketing channel is still small. The spread of this third type of marketing margins also varies. The biggest profits and costs margin in this channel are found in the local wholesalers.

According to Mubyarto (1995), the marketing system could be said to be efficient if in delivering the result of the production from the farmers to the customers (end users), it is implemented with the lowest cost and equitable share from the overall price paid by the consumer to all parties involved in the marketing activity. According to Penson et al. (2015), the magnitude of profits margin taken by the middlemen and the low parts taken by the farmers reflect the marketing system that is not efficient.

Regarding the magnitude part received by the farmer from the price paid by the last consumer, the situation of the spread margin and the large amount of profits margin in the third channel of pineapple distribution in South Sumatera, the third marketing channel is more efficient than the first and the second marketing channel. On the third marketing channel, the farmers obtained the biggest part from the price paid by the consumer, compared to the first and second channels. It is because the third marketing channel between the farmers as the producers with the last consumer is relatively closer. Therefore, the selling price which is the absolute acceptance of farmers becomes larger. This thing is appropriate with the invention of Setyowati (2008), who researched on the

milk marketing in Boyolali, Central Java. She said that the shorter marketing channel will give the bigger profits for the farmers as the producers. Asogwa and Okwoche (2012) also emphasize that the need for the establishment of farmer's cooperative in marketing their product in order to reduce the role of the middlemen in deciding the price of agricultural products in market.

Conclusion

The variance analysis conducted on a model production function of Cobb Douglas provides the significant ratio value. It means that the pineapple farm in South Sumatera simultaneously is affected by the production factor: cultivated area, seed, man power, chemical fertilizers (Urea, TSP and KCL), manure and insecticide. The production factor which has the dominant influence is the cultivated area. Every increase and decrease from the production factors will cause a change in the number of overall pineapple production results. Pineapple farming scale conditions in South Sumatera are increasing returns to scale. It means that the number of the result can be improved if the production factors used are maximum.

The process of delivering the pineapples from farmers as producers to the hand of consumers consists of three types of marketing channels, each of which is different. A longer marketing channel will give the farmers relatively smaller value compared to the shorter marketing channel. The shorter marketing channel is more efficient and profitable because it provides bigger income for the farmers in marketing their products.

Bigger profits can be achieved with increased use of all the factors of production. To increase the use of other production facilities, government's aid in terms of capital assistance is really expected. Generally, the capital of the pineapple farmers in this region is still low; they need help.

In marketing, there is need to reduce magnitude of the marketing margins as one of the effort to create an efficient marketing system. This can be done by reducing the gains and marketing spending of every middlemen involved. It is necessary to establish a cooperative that can act an agency liaison between the farmers and the consumers.

Conflict of Interests

The author have not declared any conflict of interests.

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