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COMPETITIVENESS SENSITIVITY OF OIL PALM FARMING ON SUBOPTIMAL LAND AT MUSI RAWAS RESIDENCE

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Abstract. *Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palm, primarily the African oil palm Elaeis guineensis. Oil palm is one of the agriculture commodities that can increase farmer's income, provide raw material on the manufacturing industry which can create added value. The expansion of oil palm farming in Indonesia has shifted the use of mineral land to suboptimal land which is currently available in many places in Indonesia. Generally, this research aims to analyze the competitiveness sensitivity of oil palm farming on suboptimal land. Specifically, this research wants to analyze the sensitivity of input-output changing and to analyze the impact of government policy on input-output when facing fluctuation price. To reach the goal of this research we used Policy Analysis Matrix (PAM). The result of this research shows that partially the declining of price, declining of output volume and increasing input price PCR (Private Cost Ratio) and DRCR (Domestic Resources Cost Ratio) value < 1, which means that the oil palm farming on suboptimal land has the competitiveness and the absence of government policy on determining input price nor output price on oil palm farming in at suboptimal land. While simultaneously shows that the fluctuation of input and output price causes the value of PCR dan DRCR > 1 with PCR value 1,12 and DRCR value 1,04, it means that oil palm farming on suboptimal land at Musi Rawas Residence not feasible and has no competitiveness. It means that government policy is needed to protect input prices in oil palm farming on suboptimal land. Therefore the oil palm farming on suboptimal land will also need government support and guidance, especially on oil palm farming technology.*
Keywords: *sensitivity, competitiveness, suboptimal land, oil palm*

1. Introduction

Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of the oil palm, primarily the African oil palm Elaeis guineensis (Reeves & Weihrauch, 1979). The demand for palm oil in the whole world is the highest compared with other substitutions such as soybeans oil, corn oil, and sunflower oil (Sunarko, 2007)

Oil palm is one of the agriculture commodities that can increase farmer's income, and also provide raw material on the manufacturing industry which can create added value. The growth of oil palm farming in Indonesia has opened up many job vacancies and overcome poverty. The expansion of oil palm farming in Indonesia has shifted the use of mineral land to suboptimal land which is currently available in many places in Indonesia

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One of the oil palm farming in suboptimal land can be found at Pagar Ayu Village Musi Rawas Residences. According to (Asrtrini, 2013), The Competitive advantage of Indonesian CPO Competitiveness as measured by the Trade Specialization Index (ISPs) have an average value of 0.9989 with a value close to +1 and it's showed that Indonesian exports are at a stage of maturation, so that Indonesian palm oil products are very competitive to compete in the international market.

Oil palm farming just like other agricultural commodities mostly sensitive to fluctuation price. As we know that the price fluctuation will influence the farmers' profit. This fluctuation can happen both on input price nor output price. The sensitivity research on oil palm farming at Bumi Mulya Village Muko-muko Residence showed that the increasing and the decreasing of input-output price were very sensitive to oil palm farming (Aprizal et al., 2015). According to (Asrtrini, 2013) It's interesting to analyze the competitiveness of this oil palm farming, describe its sensitivity on input-output changing, and analyze the impact of government policy on input-output when facing fluctuation price on oil palm farming at suboptimal land.

The other variable that can also influence the farmer's profit is production volume (Suryatiyah, 2015). Volume production of oil palm farming at suboptimal land usually lower than optimal land. Some factors that influence are water management on suboptimal land. It was flooding during the wet season and over drained during the dry season (Holidi et al., 2019; Aminudin et al., 2016). In this research three variables (input price, output price, and production volume) are analyzed to describe the competitiveness sensitivity of oil palm farming at suboptimal land.

2. Methods

This research held in Pagar Ayu Village Megang Sakti Subdistrict Musi Rawas Residence. The location chose purposively at this village most of oil palm farming cultivated at suboptimal land. The research held from April until August 2019. It was the case study method, in which respondents have chosen purposively with oil palm farmers at suboptimal land as criteria (Sugiyono, 2017). By this method, 31 farmers have chosen to be respondences to this research.

Sensitivity Analysis

Agriculture commodity has been very sensitive to the changing factors, such as price, cost, and production volume. To know how far the changes on that factor can influence the farming profit, we have to analyze it with sensitivity analysis (Gittinger, 1986) This

sensitivity analysis means to analyze the result of economic activity changes when input and output change (Nitisemito & Burhan, 2004)

The variables observed in this research are 1). The declining price of oil palm; 2). Declining production volume; 3). Increasing input price; and 4) composite condition when declining price, declining production volume, and increasing input price happen simultaneously. According to (Sugiyono, 2016) there is some technique in collecting data, such as interviews, questionnaires, observation, or the composite of these three methods. To find the answer to the research problem we use the composite of collecting data methods from all relevant sources.

To reach the goal of this research we used Policy Analysis Matrix (PAM) to identify the economic efficiency and the influence of government intervention on oil palm farming systematically and simultaneously (Ningsih et al., 2016)

Table 1. PAM

Statement	Cost			
	Revenue	*InputTradable*	*Input Non-Tradable*	Profit
Private Price	A	B	C	D=A-B-C
Social Price	E	F	G	H= E-F-G
Policy Price	I=A-E	J=B–F	K=C–G	L=D-H=I-J-K

Source: (Monke & Pearson, 1989)

Keterangan :

A = Revenue On Private Price
B = Tradable Input Cost On Private Price
C = Nontradable Cost On Private Price
D = Profit On Private Price
E = Revenue On Social Price
F = Tradable Input Cost On Social Price
G = Nontradablecost On Social Price
H = Profit On Social Price
I = Output Transfer
J = Input Transfer;
K = Transfer Factor;
L = Net Transfer

Competitiveness Analysis

Profit analysis

Private Profitability (PP), when D=A-(B+C)(Competitiveness indicators)

If D>0, means that the profit above normal, conversely.

Social Profitability (SP), when H=E–(F+G)(Comparative advantage indicators)

If H>0, comparative advantage and policy efficiency, conversely.

PCR and DR

Private Cost Ratio (PCR)=C/(A–B)

If PCR<1, the production system more competitive, conversely.

Domestic Resources Cost Ratio (DRCR)=G/(E–F)

If DRCR<1, It has a comparative advantage, conversely.

The Impact of Government Policy

The policy on output

Output Transfer (OT): I=A–E

If OT>0, there are transfer from consumer to producer, conversely.

Nominal Protection Coefficient on Output (NPCO)=A/E.

If NPCO>1, more protection from the government on output, conversely.

The Policy on Input

Input Transfer (IT): J=B–F

If IT>0, there are transfer from consumer to producer regarding tradeable input, conversely.

Nominal Protection Coefficient on Tradable Input (NPCI)=B/F.

If NPCI<1, more protection from the government on input, conversely.

Transfer Factor (TF): K=C–G

If TF>0, there are transfer from consumer to producer regarding nontradeable input, conversely.

Input-Output Policy

Effective Protection Coefficient (EPC)=(A–B)/(E–F)

Net Transfer (NT): L=D–H

Profitability Coefficient (PC)=D/H

Subsidy Ratio to Producer (SRP)=L/E

3. Results and Discussion

Sensitivity Analysis

Sensitivity analysis is one of the analysis technique to examine the changes in economical behavior systematically if there are variables change on planning (Ningsih et al., 2015) (Haryanto et al., 2019). This analysis wants to examine whether the business still feasible to run at a certain price or if there are changes in input or output variables (Irfan, 2006) In this research sensitivity analysis using some simulation, namely 9.5% declining

price of oil palm; 5% declining volume of oil palm production; 8.36% increasing on tradable and nontradable input price; and the combination of all variable simultaneously.

The sensitivity of Profit on Declining of Oil Palm Price

These last 10 years the price of oil palm fluctuation consider high. The price of *Crude Palm Oil* (CPO) has serious depression during this last year. With 9.5% declining price assumption we can see the influence on profit as seen as Tabel 2:

Tabel 2. PAM for declining output price 9.5%

Statement	Revenue	Input		Profit
		Tradable	Non-Tradable	
Private Price	23,882,190	6,574,500	14,843,200	2,464,490
Social Price	26,192,673	6,476,500	17,825,063	1,891,110
Price Policy	(2,310,483)	98,000	(2,981,863)	573,380

Sensitivity analysis according to the table above shows that even the output price declining 9.5% of the oil palm farming on sub-optimal land at Musi Rawas Residence gain profit Rp2.464.490,- on private price and Rp1.891.110,- on social price. It means that oil palm farming still feasible to run.

This research supported by other research about Competitive and Comparative Advantage of Oil Palm at Suboptimal Land in Kabupaten Musi Rawas (Ningsih, 2018) which state that the reason why output (oil palm) price taken by farmers lower than the exact price, is because of indirect selling on oil palm market. The farmers used to sell TBS through intermediate seller rather than factory (Ningsih et al., 2019)

The sensitivity of Profit on Declining of Oil Palm Production

Besides output price, other variables that can influence the farming profit are production volume (Ningsih, 2018) By a 5% declining in production volume, the influence on profit can be seen in Table 3.

Tabel 3. PAM for the declining volume production

Statement	Revenue	Input		Profit
		Tradable	Non-Tradable	
Private Price	26,389,160	6,574,500	14,843,200	4,971,460
Social Price	28,942,180	6,476,500	17,825,063	4,640,617
Price Policy	(2,553,020)	98,000	(2,981,863)	330,843

Declining production volume as much as 5% made oil palm farming still profitable and feasible to run, with Profitability Private(PP) Rp4,971,460.- and Social Profitability (SP) Rp4,640,617.-

The sensitivity of Profit on Increasing Input Price

The changes in input price on this research assumed according to inflation. Inflation in Indonesia during these last 5 years shows that the highest inflation (8.36%) happen in December 2014 In Table 4 we can see the result of sensitivity analysis.

Tabel 4. PAM for increasing input price

Statement	Revenue	Input		Profit
		Tradable	Non-Tradable	
Private Price	26,389,160	6,574,500	16,084,092	3,730,568
Social Price	28,942,180	6,476,500	19,315,238	3,150,442
Price Policy	(2,553,020)	98,000	(3,231,147)	580,127

From this table we can see that even the nontradeable input price rising 8.36%, the oil palm farming is still profitable and feasible to run.

The sensitivity of Profit on Declining Output Price, Declining Output Volume Production and Increasing Input Price

In this condition, we assume that the output price and the output volume production decline and the input price also increase at the same time. If this truly happens we can see the impact on profit as shown in Table 5.

Tabel 5. PAM for combining condition

Statement	Revenue	Input		Profit
		Tradable	Non-Tradable	
Private Price	22,688,080	6,574,500	16,084,092	29,489
Social Price	24,883,039	6,476,500	19,315,238	(908,699)
Price Policy	(2,194,959)	98,000	(3,231,147)	938,188

According to Table 5, the Privat Profitability (PP) on this condition only reaches the number of Rp29,489 Social Profitability (SP) on the other hand show negative value and oil palm farming has lost as much as Rp908,699 As a competitiveness indicator, PP value on this research more than zero (O). This value shows that oil palm farming on suboptimal land in this research gives profit above normal, and this commodity able to the expanse. But the negative value on SP value as one of comparative advantage indicator, indicate that this commodity can not compete without government intervention (Monke & Pearson, 1989)

Competitiveness Sensitivity

The indicator of competitiveness can be seen in Table 6. According to the table Private Cost Ratiovalue at 0.86, 0.75 dan 0.81 shows that PCR < 1, means that the oil palm farming has competitiveness. While at 4th condition the Privat Cost Ratio (PCR) ≥ 1, means 1.05 which means that it has no competitiveness anymore (Hermayanti, 2013) In another hand, the Domestic Resources Cost Ratio (DRCR) of the oil palm farming on 1st, 2nd, and 3rd condition shows the value at 0.90 ; 0.79 ; and 0.86. It means that oil palm farming has a

comparative advantage. While at 4th condition the value of DRCR ≥ 1 means that oil palm farming has no comparative advantage.

Tabel 6. Competitiveness Indicator

No	Statement	Declining Output Price 9.5% (1st Condition)	Declining Production 5% (2nd Condition)	Increasing Input Price 8.36 % (3rd Condition)	Gabungan (4th Condition)
1	*Private Cost Ratio(PCR)*	0.86	0.75	0.81	1.00
2	*Domestic Resource Cost Ratio (DRCR)*	0.90	0.79	0.86	1.05

The Impact of Government Policy On Oil Palm Farming

The impact of government policy on oil palm farming can be seen on this indicator (Table 7) below.

Tabel 7. Indicators on government policy impact

No	Statement	Declining Output Price 9.5% (1st Condition)	Declining Production 5% (2nd Condition)	Increasing Input Price 8.36 % (3rd Condition)	Gabungan (4th Condition)
1	*Output Transfer (OT)*	(2,310,483)	(2,553,020)	(2,553,020)	(2,194,959)
2	*Nominal Protection Coefficient On Output(NPCO)*	0.912	0.912	0.912	0.912
3	*Input Transfer (IT)*	98,000	98,000	98,000.	98,000.
4	*Nominal Protection Coefficient on Tradable Input (NPCI)*	1.015	1.015	1.015	1.015
5	*Transfer Factor (TF)*	(2,981,863)	(2,981,863)	(3,231,147)	(3,231,147)
6	*Effective Protection Coefficient (EPC)*	0.878	0.882	0.882	0.875
7	*Nett Transfer (NT)*	573,380	330,843	580,127	938,188
8	*Profitability Coefficient)PC*	1.303	1.071	1.184	-0.033
9	*Subsidy Ratio to Producer*	0.021	0.011	0.020	0.038

From the table above we can see that the value of Output Transfer (OT) in all conditions is negative. The private price of oil palm lower than the social price. It means that the government's policy on trade gave more profit to consumers, and made farmers as producers lost their opportunity to gain profit.

NPCO value 0.912 or ≤ 1 happens in all conditions, shows the disincentive policy which means that farmers receive a lower price of output than he has to. This might happens

because farmers have chosen to sell their output through a wholesaler. By that farmers has received different price lower than the price he should receive when he sold it directly to factory (Jawari, Muani, And Radian 2017)

Government Policy Impact on Input

IT value describes government policy in the form of subsidy on *input tradable*. The positive IT value shows that the social price of foreign input, such as fertilizer and herbicide, lower than the private price they have to pay. And so the farmers have to pay for foreign input more expensive.

TF value shows the government's intervention on input nontradable. A negative value on TF means that there is a negative subside on input nontradable. In this research, the difference between private price and social price happens because there are different value on man power's wages, where wages on private price is lower than its social price. NPCI value for farmers as much as 1.015 (or NPCI ≥ 1) which means that no protective policy on input tradable (Ningsih et al., 2019)

Government Policy Impact on Input – Output

The EPC value in all conditions less than 1 (EPC< 1). This condition describes how far government policy can protect domestic products effectively. This value means that there was no government policy applied to the input-output price of oil palm farming. The same value also found at (Jawari, Muani, And Radian 2017) who said that EPC < 1 means that simultaneously there was no policy that protects oil palm price and also no subsidy on input price.

On the other hand, NT values are positive (NT> 1) which means that there is an addition to farmers' surplus because of private profit that is higher than social profit. While PC ratio use to see the impact of policy on private and social profit. PC ratio on this sensitivity analysis shows that positive value in the 1st, 2nd, and 3rd conditions means that there is government policy on giving incentives for the customer. But in 4th condition, a negative value means that there is no government policy on giving incentives for the customer.

The other indicator is SRP. SRP value more than zero shows that generally government policy has cause oil palm farming smaller production costs than its opportunity cost. This result supported by (Aprizal et al., 2015) who said that generally, government policy such as market distortion can give a positive impact on the producer. In this case, oil palm farmers on production pay lower than the opportunity cost.

4. Conclusions

The result of this research shows that partially the declining of price, declining of output volume and increasing input price PCR and DRCR value < 1, which means that the oil palm farming on suboptimal land has the competitiveness and the absence of government policy on determining input price nor output price on oil palm farming in at suboptimal land. While simultaneously shows that the fluctuation of input and output price causes the value of PCR dan DRCR > 1 with PCR value 1.12 and DRCR value 1.04, it means that oil palm farming on suboptimal land at Musi Rawas Residence not feasible and has no competitiveness. This value shows that oil palm farming on suboptimal land needs government policy to protect input prices. Besides increasing the production of oil palm farming on suboptimal land government must share the education regarding oil palm farming technology specifically on suboptimal land.

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