The Disparity of Farmers' Income from Converting Rubber Plants to Palm Oil and Its Implications for the Farmer's Welfare in Maur Baru Village, Mutarara Regency

Serly Novita Sari [1*], Fachrurrozie Sjarkowi [2], Dessy Adriani [3], Maryadi [4]

[1] *Student of Doktor Program in Agricultural science, Sriwijaya University, Indonesia*
[2,3,4] *Lecturer at Faculty of Agriculture, Sriwijaya University, Indonesia*
*Coresponding Author: Serly110989@gmail.com

ABSTRACT

The objectives of this study are to: calculate the income of farmers who do and do not convert rubber crops to oil palm starting from production, total production costs, receipts, and opinions so that the disparity in farmers' income comparison and analyzed the impact that consists of positive impact, no impact, or negative impact on the welfare of farmers after converting rubber plantations into oil palm as measured by Farmers' Exchange Rate (Farm Revenue) and Farmers' Exchange Rate (Household Revenues) on basic food and household expenditure and calculate basic prices using the complete costing method and selling price to find out Exchange Rates (Prices) Rubber and oil palm farmers for purchasing 1 kg of rice in Maur Baru Village, Rupit District, Muratara Regency. The research was conducted in Maur Baru Village, Rupit District of Muratara Regency. The method used in this study was the survey method. The sampling method used in this randomized uneven study with a sample of 21 farmers who did not convert plants (rubber farmers) and 21 farmers who converted (oil palm farmers). The results of the t-test analysis indicate that t-count 27,581> t-table 2,021, which means rejecting H0 or there is a significant difference in income between the income of farmers who convert crops (oil palm farmers) is more significant than farmers who do not convert crops (Rubber farmer) with the difference in the average income of IDR 8,925,519/ha/year. So that after the conversion of rubber plants into oil palm, when viewed on the Exchange Rate (Income), Farmers on essential food expenditure and household expenses have a positive or prosperous impact; it means that the income of farmers who convert crops (oil palm farmers) can meet household needs and provide residual income which can be saved. However, if you look at the Exchange Rate (Price) for the purchase of 1kg of rice for rubber farmers and oil palm farmers, the impact is harmful or not prosperous; it means that the prices obtained by rubber farmers and oil palm farmers have not been able to fulfill the purchase of 1kg.

Keywords: Plant Conversion, Rubber Plants, Oil Palm Plants, Level of Welfare, NTP.

INTRODUCTION

The potential and availability of land resources for agriculture are still quite extensive. Still, in the future, it is predicted that there will be competition for using one of them in the plantation sub-sector, especially the conversion of agricultural land (Hidayat, 2009). Changes in land use are a picture of changes in an area and part of regional development planning. These changes can affect changes in the socioeconomic conditions of the community (Ruswandi, 2005). According to Sjarkowi (2014), in an entirely hedonistic era, market forces that spur the conversion of agricultural land are challenging to control. However, it is also inappropriate if they are left without careful attention. Low and has a positive effect on the socio-economic conditions of the community. Syahza (2011) states that oil palm plantation activities have

positively or positively influenced the surrounding area. The benefits of oil palm plantation activities can be seen from the socio-economic conditions: 1) Improving people's welfare, 2) Expanding employment opportunities, 3) Contributing to regional development. The existence of these problems has pushed many rubber farmers to retreat and choose to convert their rubber plantations into palm oil because the rapid development of the oil palm commodity can improve the economy and welfare so that the consequences of crop conversion can reduce the negative impact into a positive impact that benefits the community.

The phenomenon currently happening in Maur Baru Village is land change, namely, farmers converting rubber plantations into oil palm land, which is caused because the income from rubber farming is felt to be no longer sufficient to meet the needs of their families. Based on this description, the researcher is interested in identifying the problems and factors that influence farmers' decisions to convert rubber plantations to oil palm, calculating the income statement of farmers who do not convert rubber plantations to oil palm, and analyzing whether there is a negative or positive impact. After converting rubber plants to oil palm so that the level of welfare of farmers can be seen and to find out how much rubber or oil palm farmers have to produce latex or FFB to buy 1 kg of rice in Maur Baru Village, Rupit District, Muratara Regency.

Calculating the national income of farmers who do not practice and convert rubber plantations into oil palm starting from production, total production costs, revenues, and income so that disparities in farmer income comparisons are obtained and analyze the impact, positive impact, no impact, or negative impact on welfare farmers after converting rubber plants into oil palm as measured by Farmers' Exchange Rates (Farming Income) and Farmers' Exchange Rates (Household Income) for groceries expenditure and production households and calculate the cost of goods using the method full *costing* and the selling price to determine the Exchange Rate (Price) of rubber and oil palm farmers for the purchase of 1 kg of rice in Maur Baru Village, Rupit District, Muratara Regency.

MATERIALS AND METHODS

Sample collection and preparation
Experimental variable and analytical procedures
Data Analysis

This research was conducted in Maur Baru Village, Rupit District, Muratara Regency. The research location was selected deliberately (Purposive Sampling), considering that Maur Baru Village is one of the villages whose livelihood is plantation crop farmers. What is happening now is that some of the rubber farmers in Maur Baru Village are converting their rubber plantations into oil palms. Field data collection was carried out in 2021 until completion. The sampling method used in this study needed to be more balanced stratified random (Disproportionate Random Sampling) because there is a large gap between the two populations used. The first layer samples are farmers who do not convert rubber plantations, with 560 rubber farmers, and the second layer samples are farmers who convert rubber plantations into oil palm, namely 35 oil palm farmers. So that the sample farmers took each 21 samples

The sampling technique uses convenience sampling, where the sample farmers taken are farmers who can be found. Based on the data above, it can be seen that the total population in this study amounted to 595 people, and the precision was set, or level significance of 15%; then, the sample size in this study was determined using the Slovin formula, which is as follows.

The data collection method used in this study is primary data and data seconds. Primary data were obtained from direct observations and interviews by asking farmers who did and did not

Eur. Chem. Bull. **2023**,*12* (issue 8), 6206-6223

6207

convert rubber plantations into oil palm using questionnaires prepared such as the farmer's age, land area, and others. While secondary data is data obtained from literature studies, institutions, or agencies, such as BPS Muratara, monographs, and journals related to research in Maur Baru Village, Rupit District, Muratara Regency. As for knowing the income disparity, that is comparing the income of farmers who do not convert rubber plantations and farmers who convert oil palm plantations with the help of applications *SPSS v.20* using the Two-Means Test and the two-variable Test. If the conclusion accepts H0, it means that there is no difference in variance between populations, meaning that the variances of the two populations are the same, then solving the problem uses distribution t-student (Hanafiah, 2003), namely as follows:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{Sp\sqrt{(\frac{1}{n_1}) + (\frac{1}{n_2})}}$$

On the other hand, when minus H0, it means that there are differences in variance between the populations, and solving the problem using distribution t-student as follows:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{Sp\sqrt{(\frac{1}{n_1}) + (\frac{1}{n_2})}}$$

Where:
  T :Test statistics
  $\bar{x}_1$:Average income of farmers who do not convert crops
  $\bar{x}_2$:Average income of farmers who convert crops
  m_1 :The estimated value of income does not convert crops
  m_2 :The estimated value of the income of farmers who convert crops
  n_1 :The number of samples of farmers did not convert rubber plants
  n_2 :The number of samples of farmers who convert rubber plants
  S_1^2 :Standard deviation of farmer's income not converting crops
  S_2^2 :Standard deviation of income of farmers who convert crops
  Sp :The combined estimated value for the population standard deviation

The hypothesis tested:
Ho: μ_1 $= \mu_2$ $(\geq)$
Ho: μ_1 $_< \mu_2$
α $= 0.05$

The farmer's decision method is as follows:
t count $\leq$ t table : accept Ho, meaning that there is no difference between farmers who do not convert rubber plantations and farmers who convert rubber plantations into oil palm.
t count $>$ t table   : reject Ho, meaning that there is a difference in the income of farmers who do not convert rubber plantations and farmers who convert rubber plantations into oil palm.

Then to answer the impact caused by the positive impact, no impact or negative impact after the conversion of rubber plantations to oil palm, it is necessary to compare farm income and total income of farmers who do not convert rubber plantations and income of farmers who convert rubber plantations to oil palm to expenditure groceries and household expenses using the concept of the Farmer's Income Exchange Rate (NTPP) for total expenditure. According to Simatupang et al. (2007), the concept of Farmer Household Income Exchange Rate (NTPRP) is the ratio between income and expenses. The formula according to Sjarkowi (2018), is as follows.

1) Exchange Rate (Farming Income) of Farmers to Expenditures, namely:

$$NTPu = \frac{NRu}{E}$$

2) Exchange Rate (Total Household Income) of Farmers against Expenditure ie.

$$NTPt = \frac{NRt}{E}$$

Information:

 NTP_u :Exchange Rate Farmer Farming Income

 NTP_t :Exchange Value of Total Income of Farmer Households

 NR_u *:Net Revenue* (Net Income) Farming

 NR_t *:Net Revenue* (Net Income) Household

 E   :Farmer Expenditure (Small Food/Household)

With the Rules, namely as follows.

- Has a positive impact: If the Farmer's Exchange Rate (Income) > 1, it can be said that they are prosperous, meaning that they are prosperous in meeting basic needs/household needs and providing residual income that can be saved.
- No impact: If the Farmer's Exchange Rate (Income) = 1, it can be said that Prosperous Enough means that it is only able to meet basic needs/household needs and does not provide residual income for savings.
- Negative impact: If the Farmer's Exchange Rate (Income) is <1 then it is not yet said to be prosperous, meaning that the farmer has not been able to meet basic food/household needs and cannot provide residual income for savings.

Next, calculate the Farmer's Exchange Rate (Price) for the Purchase of 1kg of rice. First calculate the cost of rubber and palm oil using the method Full Costing by using the formula:

Hp per kg $= \frac{Total\ cost\ (Rp)}{Production\ result(kg)}$

After obtaining the cost of rubber and the cost of palm oil, then calculate the Farmer's Exchange Rate (Price) for the purchase of 1 kg of rice. The formula according to Sjarkowi (2018), is as follows:

1) Exchange Value (Principal Price) of Farmers for the Purchase of 1kg of Rice

$$NTPhp = \frac{Hp}{HBb}$$

Information:

   NTP_{hp} : Farmer's Tree Price Exchange Value

   H_p : Basic Price

   HB_b : Rate-Rata Rice Purchase Price

2) Farmers' Exchange Value (Selling Price) for the Purchase of 1kg of Rice

$$NTPhj = \frac{Hj}{HBb}$$

Information:

   NTP_{hj} : Farmer's Selling Price Exchange Value

   H_j : Selling price

   HB_b : Rate-Rata Rice Purchase Price

With the Rules, namely as follows:

- Has a positive impact: If the Farmer's Exchange Rate (Price) is > 1, it can be said to be prosperous, meaning that the price obtained by farmers in their farming business can buy1 kg/rice and give the rest of the money to buy other needs.
- There is no impact: If the Farmer's Exchange Rate (Price) = 1, it can be said to be Prosperous Enough, meaning that the price obtained by farmers in their farming business is only able to buy1 kg/rice and don't give the rest of the money to buy other needs.
- Has a negative impact: If the Farmer's Exchange Rate (Price) is < 1 then it is not yet said to be prosperous, meaning that the price that farmers get in their farming business is not able to buy1 kg/rice and don't give the rest of the money to buy other needs.

RESULT AND DISCUSSION

Based on the results of farming income, this research was conducted to see the difference in income between sample farmers who did not convert to rubber plantations and sample farmers who converted rubber plantations to oil palms. More details can be seen in Table 1. As follows.

Table 1. Differences in Farmer's Income

No	Description	rubber farmers	oil palm sample farmers
1.	Revenue (IDR/ha/year)	11,393,600	21,682,286
2.	Total Production Cost (IDR/ha/year)	2,074,258	3,437,425
3.	Income (IDR /ha/year)	9,319,342	18,244,861

Source: Data Primer (Data processed)

Based on Table 1. Shows that the average income of oil palm farmers is greater than that of rubber farmers, with a difference of IDR 18,244,861/ha/year.

Then the calculation for a comparison of income between sample farmers who did not convert crops (rubber farmers) and sample farmers who converted crops (oil palm farmers) in 2018 using the SPSS V.20 program through the process independent *Sample T-Test* by using computer IBM SPSS v.20.00. From the statistical test results, the F value is 16.345 with a significant value of 0.000 <0.05, meaning Reject H0 both layers are present in the population differently.

Then a t-test of two independent samples was carried out, namely the middle two-value test, which aims to see the average comparison of the two independent samples. The test t-independent sample test results show is t-count of 9.963 with a pdf of 40 with a significant level of 0.000. Market table at df 40 with a value of $\alpha = 0.05$, namely 2.021. So it can be concluded t-count 9,963 > t table 2.021, namely reject H0. This means there is a difference in income between farmers who convert rubber plantations to oil palm and farmers who do not convert rubber plantations.

The difference in the income of rubber farmers and the income of oil palm farmers as seen from the meaning of National Nationalistic statistically is significantly different, while if viewed from a physical perspective, National Bernas Ergonomics productivity with eggplant, i.e., 13 years, the production of oil palm farming is higher by 1400 kg/ha/moon at selling price IDR 1400 with revenues of IDR 1,960,000/ha/month, while in rubber farming production it is only 240 kg/ha/moon with a selling price of IDR 5,000 with revenues of IDR 1,200,000/month. So if you look at the pithy disparity from the farmer's side, oil palm farmers can save more than rubber farmers. So oil palm farming is more profitable than rubber farming.

The Impact on Welfare Levels as measured by Using Farmers' Exchange Rates on Farmers' Income

The impact in question is a result of the conversion of rubber plantations to oil palm, has a positive (+) or negative (-) impact or no impact on the level of welfare as measured using the Farmer's Exchange Rate.

Farming Income

Farming income comes from work as a rubber farmer and oil palm farmer in the form of money (IDR/Kg/month). Farming income is divided into 2, namely:

1) Example Farmer Farming Income

Eur. Chem. Bull. **2023**,*12 (issue 8), 6206-6223*

6210

The sample farmer's farming income, namely the amount of the difference in the amount of money remaining after receiving the farming results, can be seen more clearly in Table 2, as follows.

Table 2. Example Farmer Farming Income

No	Description	Income (IDR/kg/month)
1.	Rubber Farmers	970,805
2.	Palm Oil Farmers	1,541,771
Difference (IDR/kg/month)		570,966

Source: Primary Data (Processed Data)

Based on Table 2. Shows that the average income of oil palm sample smallholders is IDR 1,541,771/kg/month, greater than the average income of rubber farmers, which is IDR 970,805/kg/month. So that the difference in the average farm income of the sample farmers is IDR 570.966/kg/month.

2) Example Farmer Household Farming Income

The sample farmer household business is the farming activities carried out by the sample farmer family (wife, children), so the farmer household farming income is the amount of the difference in the amount of money left after receiving the results of the farming deducted by production costs in the cultivated area owned by the farmer family, for more clarity can be seen in Table 3 namely as follows.

Table 3. Example Farmer Household Farming Income

No	Description	Farming Income (IDR/kg/month)
1.	Rubber Farming (Rubber Example Farmers)	201,494
2.	Rubber Farming (Palm Oil Example Farmers)	717,435
	different	515,940

Source: Primary Data (data processed)

Based on Table 3. Shows that the average household income of oil palm farmer households is IDR 717.435/kg/month is greater than the average household income of rubber farmers, namely IDR 201,494/kg/month, with the difference in the average income of sample farmer farming households, namely IDR The difference is 515,940/kg/month due to farming oil palm sample farmer households having more land area than rubber sample farmer households.

3) Total Income of Farming Household Farmers

The total farming income of the sample farmers is the sum of all the farming income of the sample farmers and the income of the sample farmer households so that the total income of the sample farmer households is obtained. For more details, this can be seen in Table 4. Total Farmer Income Examples are as follows.

Table 4. Total Farming Income Example Farmers

No	Description	Farming Income (IDR/kg/month)
1.	Rubber Farmers	1,172,300
2.	Palm Oil Farmers	2,259,206
Difference		1,086,906

Source: Primary Data (Processed Data)

Based on Table 4. Shows that the average household income of oil palm farmers is IDR 2,259,206/lb/month, more significant than the average total income of rubber farmers, IDR 1,172,300/lb/month. The difference in the average total income of the sample farmer's household farming is IDR 1,086,906/kg/month.

Non-Farm Income

Non-farming income is obtained from the farmer's side job besides farming; more details can be seen in the table 5. Household Side Work Apart from Farming Farmers Example ie

Table 5. Farmer Household Side Occupation Example

No	Type of work	X1	X̄1	X2	X̄2	Salary (month)
1.	civil servant	0	0	8	1,133,333	1.500.000 – 3.500.000
2.	collectors	0	0	2	452,381	3.500.000 – 6.000.000
3.	Trader	2	60,000	3	166,667	450.000 – 2.000.000
4.	Laborer	0	0	6	519,048	600.000 – 2.500.000
5.	Honor	0	0	3	130,952	500.000 – 1.500.000
6.	Village Equipment	1	142,857	2	142,857	1.000.000 – 3.000.000
7.	Self-employed	0	0	2	142,857	3.000.000
	Amount	3	202,857	27	2,688,095	0

Source: Rubber Farmers and Oil Palm Farmers in Maur Baru Village, 2018

Based on Table 5 It is known that the average non-farming household income of oil palm farmers is IDR 2,688,095/month compared to rubber farmers' average non-farming household income, IDR 202,857/month.

Total Household Income

Total Household Income is the income obtained from all work, both from farming and other work. More details can be seen in Table 6. That is

Table 6. Average Total Household Income

Total Revenue	rubber farmers	oil palm sample farmers
1. Farming Income (IDR/Kg/month)	1,172,300	2,259,206
2. Non-Farm Income (IDR/month)	202,857	2,688,095
3. Total Household Income (IDR/month)	1,375,157	4,947,301

Source: Primary Data (Processed Data)

Based on Table 6. Shows that the average household income of oil palm farmers is greater than that of rubber farmers, with a difference of IDR 3,572,144/month.

Farmers' Production

1) Production of Staple Foods

Essential food expenditure is the number of costs farmers bear to finance family needs to be measured in IDR/month, covering 9 basic needs, including rice, meat, vegetables, and others. For more details, this can be seen in Table 7. As follows.

Table 8. Average Grocery Expenditures

No	Description	Rubber Farmers	Palm Oil Farmers

		Cost (IDR/month)	Cost (IDR/month)
1.	Rice	207,952	246,190
2.	Meat (Chicken/Fish)	229,190	262,000
3.	Chicken eggs	37,619	35,619
4.	Vegetables and Fruits	64,524	77,905
5.	Milk	15,714	34,286
6.	Sugar	21,143	22,286
7.	Cooking oil	58,857	60,571
8.	LPG	70,190	79,619
9.	Iodized Salt	5,524	5,619
	Total	710,714	824,095

Source: Primary Data (Processed Data)

Based on Table 8. Shows that the average total cost of groceries for oil palm farmers is more significant, namely IDR 824,095/month, compared to the average total cost for rubber farmers IDR 710.714/month.

Household Production

Farmer Household Expenses are the number of expenses borne by sample farmers to finance family needs as measured in IDR/month, including:

1. Food Costs

The cost of food expenditure includes the cost of basic needs. More details can be seen in Table 9, namely as follows.

Table 9. Food Costs

No	Component	Food Costs	
		Rubber Farmers (IDR/month)	Palm Oil Farmers (IDR/month)
1.	Rice	207,952	246,190
2.	Chicken meat	53,952	74,381
3.	Fish	175,238	187,619
4.	Egg	37,619	35,619
5.	Nuts	60,667	59,133
6.	Milk powder	27,143	34,286
7.	Sugar	21,143	22,286
8.	Cooking oil	58,857	60,571
9.	Vegetables	54,286	59,810
10.	Fruits	10,238	18,095
11.	Other Carbohydrates	12,762	14,857
12.	Tea Or Coffee	22,905	22,286
13.	Herbs	76,905	81,429
	Total	819,667	916,562

Source: Primary Data (Processed Data)

Based on Table 9. Shows that the average total food cost of oil palm farmers is more significant, namely IDR916,562/month, compared to the average total food cost of rubber farmers, which is IDR819,667/month.

2. Non-Food Costs

Non-food expenditure is the amount that rubber and oil palm farmers incur for non-food consumption, including meeting education, health, electricity bills, and other costs. This can be seen more clearly in Table 10, namely as follows.

Table 10. Total Cost of Non-Food

No	Component	Non-Food Costs	
		Rubber Farmers (IDR/month)	**Palm Oil Farmers (IDR/month)**
1.	Education	320,380	336,667
2.	Health	107,810	99,190
3.	Electricity bills	100,333	103,429
4.	Other needs	82,619	84,524
	Total	611,143	623,809

Source: Primary Data (Processed Data)

Canis is known in Table 10. The average non-food costs incurred by farmers, for example, oil palm IDR 623.809/month, is greater than the rubber farmers of IDR 611,143/month.

3. Total Household Expenditures
The total cost of a farmer's household is the amount incurred by the farmer by adding up the total cost of food and the total cost of non-food. The following is the average total cost of sample farmer households in Maur Baru Village, Rupit District, Muratara Regency, as seen in Table 11.

Table 11. Total Cost of Non-Food

No	Component	Non-Food Costs	
		Rubber Farmers (IDR/month)	**Palm Oil Farmers (IDR/month)**
1.	Education	320,380	336,667
2.	Health	107,810	99,190
3.	Electricity bills	100,333	103,429
4.	Other needs	82,619	84,524
	Total	611,143	623,809

Source: Primary Data (Processed Data)

Based on Table 11. Shows that the average total household costs incurred by oil palm farmers are more significant, namely IDR 1,540,371/month, compared to the average total household costs incurred by rubber farmers, IDR 1,430,809/month. For a few, food production is the highest cost incurred by rubber farmers and oil palm sample farmers.

Level of Welfare as measured by Farmers Exchange Value
NTP is the Farmer's Exchange Rate of income and ability to meet their needs. Decision rules must be agreed upon. The decision rule is as follows.
- If NTP < 1, it means that the NTP is negative or the farmer is not prosperous; thus, the farmer's income cannot meet their needs.
- If NTP = 1, it means that NTP breaks even or the farmers are pretty prosperous. Thus, the farmers' income is only enough to meet their needs.
- If NTP > 1, it means that the FTP is positive or the farmers are prosperous. Thus, the farmers' income can meet their needs and provide residual income that can be saved.

Exchange Value (Business Income) of Farmers

The Farmer's Exchange Rate (Farming Income) is the NTP with the sample farmer's farming income and the amount obtained in the farmer's farming activities ((IDR/Kg/month)). The following is the Farmer's Exchange Rate (farming income) divided 2 namely:

1) Exchange Rate (Farming Income) of Farmers against the Cost of Spending on Staple Foods

The Farmer Exchange Rate, by calculating the average farm income, is then divided by the average total cost of necessities incurred by farmers so that the NTP for essential food expenditure is obtained. More details can be seen in Table 12. The Farmer's Exchange Rate for essential food expenditure is as follows.

Table 12. The Relationship of Farmers' Exchange Rates (Farming Income) to Food Expenditure

No	The relationship of NTP to groceries expenditures	Rubber farmer	Oil palm farmers
1.	Farming Income (IDR/month)	970,805	1,541,771
2.	Groceries (IDR/month)	710,238	833,048
3.	Difference (IDR/month)	260,567	708,723
4.	NTP	1.37	1.85
	Description	prosperous	prosperous

Source: Primary Data (Processed Data)

Based on Table 12. shows that the Farmer's Exchange Rate (Farming Income) for groceries expenditure to the rubber sample farmer is 1.37> 1.00, or a positive NTP means that the rubber sample farmer has prospered in meeting basic food needs and provides residual income that can be saved. Whereas for the oil palm sample farmer, the Farmer's Exchange Rate (Farming Income) for essential food expenditure is 1.85 > 1.00, or a Positive NTP means that the oil palm sample farmer has prospered in meeting basic food needs and provides residual income that can be saved. So if you look at the difference in farming income less essential food expenditures obtained between oil palm farmers and rubber farmers, oil palm farmers can save as much as IDR 708.723/month while the rubber farmers could only save as much as .723/month IDR 260.567/month.

2) Exchange Rate (Farm Income) of Farmers against Household Expenditures

Farmers' Terms of Trade (NTP), by calculating the average farm income, is then divided by the average total household expenses that farmers incur so that the NTP is obtained for household expenditure; more details can be seen in   Table 13. The Farmer's Exchange Rate for household expenditure is as follows.

Table 13. The Relationship of NTP to Household Expenditure

No	The Relationship of NTP to Household Expenditure	Rubber Farmer	oil palm sample farmers
1.	Farming Income (IDR/month)	970,805	1,541,771
2.	Household Expenditures(IDR/month)	1,430,809	1,540,371
3.	Difference (IDR/month)	-460,004	1,399
4.	NTP	0.68	1.00
	Information	Not Prosperous	Not Prosperous

Source: Primary Data (data processed)

Based on Table 13. The Farmer's Exchange Rate (Farming Income) to Household expenditure on rubber farmers is 0.68 <1.00. Negative NTP means that rubber farmers are not prosperous or cannot meet household needs and cannot provide residual income that can be saved. In the example of oil palm farmers, the Exchange Rate (Income Farming) Farmers to household expenditure, namely 1.00 = 1.00 or NTP. This even means that the oil palm farmers are relatively prosperous or can only meet household needs and provide minimal residual income for savings. So if you look at the difference from farming income minus household expenses, it is obtained between oil palm farmers and rubber farmers that oil palm farmers can only save IDR 1,399/month while the income of rubber farmers experiences a deficit of – IDR 460 .004/mo.

Exchange Value (Household Income) of Farmers
Farmer Exchange Rate (Household Income) is the Farmer's Exchange Rate with the total income of the sample farmer with the amount obtained in the farming and non-farming activities of the sample farmer's household (IDR/month). The following is the Farmer's Exchange Rate (Household Income) divided 2 namely:
1) Exchange Value (Household Income) of Farmers to Groceries Expenditure
Farmer Exchange Rate (NTP) by calculating the average household income earned by sample farmers and sample farmer families in conducting rubber farming and non-farming (other work) is then divided by the average total cost of necessities incurred by farmers to obtain the NTP of expenditure groceries, for more details can be seen in Table 14. The Farmer's Exchange Rate with the Average Farmer Household Income for the Example of Basic Food Expenditure is as follows.

Table 14. The Relationship between Farmers' Exchange Rates (Household Income) and Basic Food Expenditure

No	The Relationship of NTP to Groceries Expenditures	Rubber Farmer	Oil Palm Farmer
1.	Household Income (IDR/month)	1,375,157	4,947,301
2.	Groceries (IDR/month)	710,238	833,048
3.	Difference (IDR/month)	664,919	4,114,253
4.	NTP	1.94	5.94
	Description	Prosperous	Prosperous

Source: Primary Data (data processed)

Based on Table 14. shows that the Farmer's Exchange Rate (Household Income) for groceries expenditure to the rubber sample farmer is 1.94 > 1.00, or a positive NTP means that the rubber sample farmer is prosperous and able to meet basic food needs and provide residual income that can be saved. Whereas for the oil palm sample farmer, the Farmer's Exchange Rate (Household Income) for essential food expenditure is 65.94 > 1.00, or a Positive NTP means that the oil palm sample farmer is prosperous and able to meet basic food needs and provides residual income that can be saved. So if you look at the difference in household income minus household expenditure, it is obtained between oil palm farmers and rubber farmers that oil palm farmers can save IDR 4,188,063/month while rubber farmers can only save IDR 664.919/month.
2) Exchange Value (Household Income) of Farmers to Household Production
Farmer Terms of Trade (NTP) by calculating the average household income earned by sample farmers and sample farmer families in conducting rubber farming and non-farming (other work) is then divided by the average total household costs incurred by farmers to obtain the

NTP of household expenditure, for more details can be seen in Table 15. The Farmer's Exchange Rate against Household Expenditure is as follows.

Table 15. Relationship of Exchange Rates (Household Income) of Farmers to Household Expenditures

No	The Relationship of NTP to Household Expenditure	Rubber Farmer	Oil Palm Farmer
1.	Household Income (IDR/month)	1,375,157	4,947,301
2.	Household Expenditures (IDR/month)	1,430,809	1,540,371
3.	Difference (IDR/month)	-55,653	3,406,930
4.	NTP value	0.96	3.21
	Description	Not Prosperous	Prosperous

Source: Primary Data (Processed Data)

Based on Table 15. Shows that the Exchange Rate (Household Income) of Farmers to Household expenditure on rubber farmers is 0.96 <1.00 or Negative NTP means that rubber farmers are not prosperous, cannot meet household needs, and do not provide residual income that can be saved. Meanwhile, for the oil palm sample farmer, the Farmer's Exchange Rate (Household Income) to Household Expenditure was 3.21> 1.00 or a Positive FTT, meaning that the oil palm sample farmer was prosperous and able to meet household needs and provided residual income that could be saved. So if you look at the difference in household income less household expenditure, it is found between the oil palm farmers and the rubber farmers that the oil palm farmers can save IDRIDR 55.653/month.

Thus the rubber farming income and household income of rubber farmers are not able to meet household needs or are not prosperous, and rubber farmers can save if they only meet basic needs. In the example of oil palm farmers, farm income and household income can meet household needs and groceries and provide the remaining savings so that the impact after the conversion of rubber plants to oil palm is measured by the Exchange Rate (Income). Farmers have a positive impact, meaning that farmers who convert rubber plantations into oil palms are prosperous and can meet basic food needs or household needs and provide residual income that can be saved.

Basic Price
The introductory price is the cost that farmers must sacrifice to produce products in units (kg). There are 2 commodities in this research, namely.
1) Cost of Rubber
The introductory price is the cost farmers must sacrifice to produce latex/rubber in rubber farming with a unit (kg). The following Table 16. The average cost of rubber is as follows.

Table 16. Farmers' Basic Prices of Rubber Plants

Description	Score
Arable Area (Ha)	1,32
Production cost (IDR/kg/month)	223,871
Rubber production yield (kg/lb/month)	240
Basic price of rubber (IDR/kg)	935
Selling price (IDR/kg)	5,043
Difference (IDR/kg)	4,108

Source: Primary Data (Processed Data)

Based on Table 16, the cost price for rubber is IDR 935/kg, and the average rubber selling price is IDR 5,043/kg, with an average land area of 1.32 hectares. So that the average difference (profit) between the selling price and the introductory price is IDR 4,108/kg.

2) Palm Tree Price

The cost price is the cost farmers must sacrifice to produce FFB e-farming oil palm by unit (kg). The following table 17. Average Cost of Palm Oil i.e

Table 17. Farmer's Basic Price of Oil Palm Plants

Description	Score
Arable Area (Ha)	1,05
Production cost (IDR/kg/month)	293,920
Palm Oil Yield (kg/lg)	1,387
Basic Price of Palm Oil (IDR/kg)	212
Selling Price (IDR/kg)	1,336
Difference (IDR/kg)	1,124

Source: Primary Data (Processed Data)

Based on Table 17. The cost price for palm oil is equal to 212/kg, and the average selling price of palm oil is IDR 1,336/kg with an average land area of 1.05 hectares. So that the average difference (profit) between the selling price and the introductory price is IDR 1,124/kg.

Farmer Exchange Value (Price).
Exchange Value (Price) of Example Farmers against the Purchase of 1kg of Rice
The sample farmer's exchange rate (price) for the purchase of 1 kg of rice means how much the rubber price and palm oil price the sample farmer gets when buying 1kg of rice with an average monthly price (November) in Maur Baru Village so that they can find out whether the selling price obtained by farmers in Maur Baru Village can buy1 kg rice as well as being able to find out how much the farmer has to produce latex/FFB to buy1 kg rice. Following NTP prices are divided into 3, namely:
1) NTP Tree Price Against the purchase of 1 kg of rice
The Farmer's Exchange Rate (NTP) cost of goods is calculated the cost of goods using the method of full costing and then divided by the average price of rice in Maur Baru Village so that the NTP of the introductory price for the purchase of 1 kg of rice is obtained, for more details can be seen in Table 18. NTP Cost of Purchasing 1 kg Rice is as follows.

Table 18. NTP Cost of Purchase of 1kg of rice

No	Component	Cost of goods sold (IDR)	Rice Prices (IDR)	NTP
1.	Rubber Farmers	935	11,000	0.08
2.	Palm Oil Farmers	219	11,000	0.02
	Difference (IDR)	715	11,000	0.07

Source: Primary Data (data processed)

Based on Table 18. shows that NTP base price rubber farmers, namely 0.08 <1, meaning they are not prosperous or with an introductory price of IDR 935/kg rubber farmers cannot buy 1 kg rice up to buy 1/kg. Rubber farmers have to produce 12 kg of latex. In oil palm farmers' NTP,

the base price obtained is 0.02 <1, meaning it is not prosperous or has an introductory price of IDR 219/month. Oil palm farmers cannot afford to buy 1 kg of rice, so to get 1 kg of rice, palm farmers must produce 50 kg of FFB. Therefore NTP prices of rubber trees are higher in comparison NTP base price of oil palm farmers with a difference of 0.07, and oil palm farmers have to produce more FFB than rubber farmers.

2) NTP Selling Price Against the purchase of 1 kg of rice

Farmers' Terms of Trade (NTP) selling price, namely the average selling price obtained by farmers from selling farm products, then divided by the average price of rice in Maur Baru Village so that the NTP of the selling price for the purchase of 1 kg of rice is obtained. For more details, this can be seen in Table 19. NTP selling price to purchase 1 kg rice, ie

Table 19. NTP Selling Price against Purchase of 1kg of rice

No	Component	Cost of goods sold (IDR)	Rice Prices (IDR)	NTP
1.	Rubber Farmers	5,043	11,000	0.5
2.	Palm Oil Farmers	1,387	11,000	0.1
	Difference (IDR)	3,656	11,000	0.3

Source: Primary Data (Processed Data)

Based on Table 19. shows that NTP the sale price of rubber farmers, namely 0.46 <1, meaning they are not prosperous or with a selling price of IDR 5,043/kg, rubber farmers cannot afford to buy1 kg rice up to buy1 kg rice rubber farmers have to produce2 kg latex. Whereas in oil palm farmers, NTP sale price obtained. Namely, 0.13 <1 means that they are not prosperous or with a selling price of IDR 1,387/kg, oil palm farmers cannot afford to buy 1 kg rice, so to get 1 kg rice for oil palm, farmers must produce 8 kg of FFB. Therefore the NTP selling price of rubber is more significant in comparison to the NTP selling price of oil palm farmers with a difference of 0.33, and oil palm farmers have to produce more FFB than rubber farmers.

3) NTP Difference between Cost of Goods and Selling Price

Farmers' Terms of Trade (NTP) Price, which is the difference between the average cost price and the selling price obtained by farmers from selling farm products, is then divided by the average price of rice in Maur Baru Village to obtain the NTP price for purchasing 1 kg of rice, for more clarity can be seen in Table 20. NTP price against the purchase of 1 kg rice is as follows.

Table 20. NTP Price against Purchase of 1kg of Rice

No	Component	difference (IDR)	Rice Prices (IDR)	NTP
1.	Rubber Farmers	4,108	11,000	0.4
2.	Palm Oil Farmers	1,124	11,000	0.1
	difference (IDR)	2,992	11,000	0.3

Source: Primary Data (Processed Data)

Based on Table 21. Shows that the prices of rubber farmers, namely 0.37 <1, meaning they are not prosperous or for IDR 4,108/kg, rubber farmers cannot afford to buy1 kg rice, so to get1 kg rubber rice, farmers have to produce 3 kg of latex. Whereas in oil palm farmers, NTP prices obtained, namely 0.10 <1, means that they are not prosperous or for IDR 1.1124/kg, oil palm farmers cannot afford to buy1 kg rice up to buy1 kg rice oil palm farmers have to produce10 kg TBS Thus NTP prices Rubber is more significant in comparison NTP process oil palm

farmers with a difference of 0.27 and oil palm farmers have to produce more FFB than rubber farmers.

Purchasing Prices of Rice, Selling Prices of Rubber and Palm Oil in South Sumatra, 2011-2018

The selling price is the amount of money farmers get in selling farm production (IDR/kg/year), while the purchase price of rice is the cost farmers incur to meet food needs (IDR /kg/year). Following are the average buying prices for rice and selling prices for rubber and palm oil in South Sumatra for 2018-2019, namely as follows.

1) Rice purchase price

The purchase price of rice is the value in units (kg) set in every transaction between consumers and traders. More details can be seen in Figure 4.1. The average price of South Sumatra Rice from 2011 to 2018 is as follows.
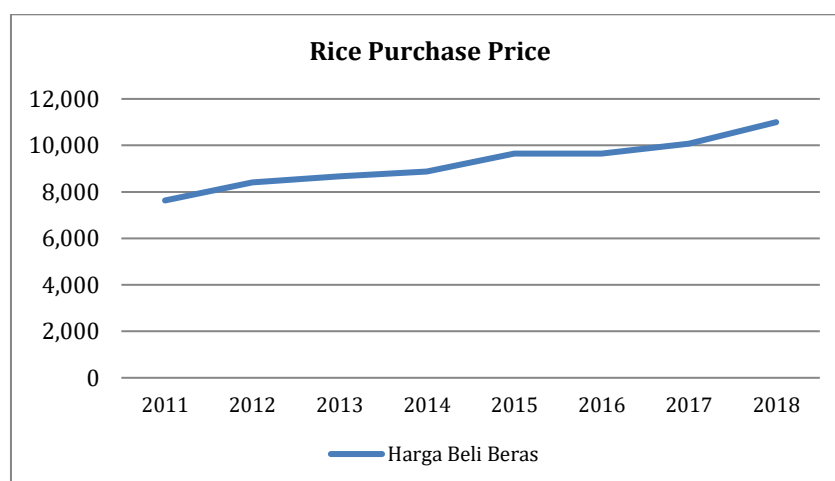

Figure 1. The Average Buying Price of Rice in South Sumatra 2011-2018

Figure 1. Shows that the purchase price of rice has increased every year due to the minimal stock of rice in the market caused by supply from the main area (Java Island) as a rice producer, which has decreased production every year so that to meet the needs of the Indonesian population the government imports. In addition, according to an agricultural observer from the Indonesian Political Economy Association, Khudori (2018) said that a significant increase in rice prices was seen from the aspects of production and implementation of distribution in the field, namely production factors that were influenced by weather conditions, the rice harvest period should have started from February to May. However, due to rain late 1 month to 1.5 months, the planting period becomes backward, resulting in a shortage of stock price, which the government seems to need more time to anticipate. In addition, recently, the distribution of Raskin has stopped, so people experiencing poverty have switched markets, which has resulted in an increasing demand for non-Raskin rice. Given this, the government should make improvements to the administration of domestic and foreign rice trade; then, the government also needs to seriously audit warehouses and distribution so that the points of the rice price game can be seen and the government as an instrument that plays a role must strengthen the Bulog institution so that it becomes a government instrument in its role as controlling the purchase price of rice.

2) Rubber Selling Price

The selling price of rubber is the amount of money that farmers get in selling agricultural products in the form of latex from 2011 to 2018. This can be seen in Figure 2. The average selling price of rubber in South Sumatra from 2011-2018 is as follows.
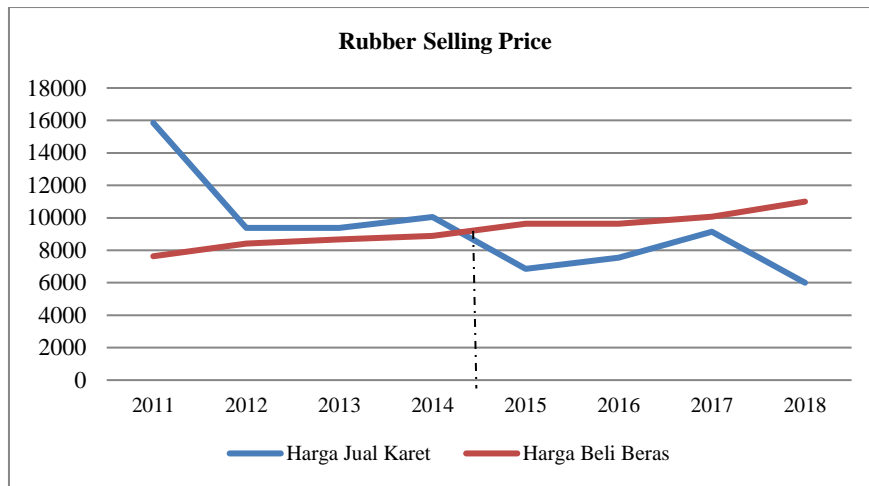
Eur. Chem. Bull. 2023,12 (issue 8), 6206-6223

6220

Figure 2. Average Selling Price of Rubber in South Sumatra 2011-2018

Can be seen in Figure 2. The selling price of rubber fluctuates continuously every year, which results in farmers needing help balancing the needs of the economy. Meanwhile, the purchase price of rice from 2011 to 2018 has increased so that the intersection point is obtained, which states that 1 kg of rubber latex can buy 1 kg of rice at the selling price of rubber between the end of 2014 and 2015.

The selling price of rubber from 2011 to 2018 experienced quite sharp fluctuations, which resulted in a decrease in rubber prices at the farm level. This thing happens because the global market determines the selling price of rubber obtained by farmers in Indonesia. Then the existing regulations have not been in favor of the welfare of rubber farmers regarding tax quotations. For example, farmers with a Taxpayer Number (NPWP) will be quoted a tax of 0.25%, while those who do not have an NPWP will be subject to a tax of 0.5%.

Therefore, the government should encourage the downstream of domestic rubber so that the selling price at the farmer level does not fluctuate continuously. Furthermore, the existence of rubber export restrictions is imposed by major producing countries such as Thailand, Vietnam, and Malaysia. These countries dominate Southeast Asia's natural rubber production, with a total collective production of 75% of the world's total natural rubber production.

3) Selling Price of Palm Oil

The selling price of oil palm is the amount of money farmers get from selling their FFB production from 2011 to 2018. This can be seen in Figure 3. The average selling price of South Sumatra palm oil in 2011-2018 is as follows.
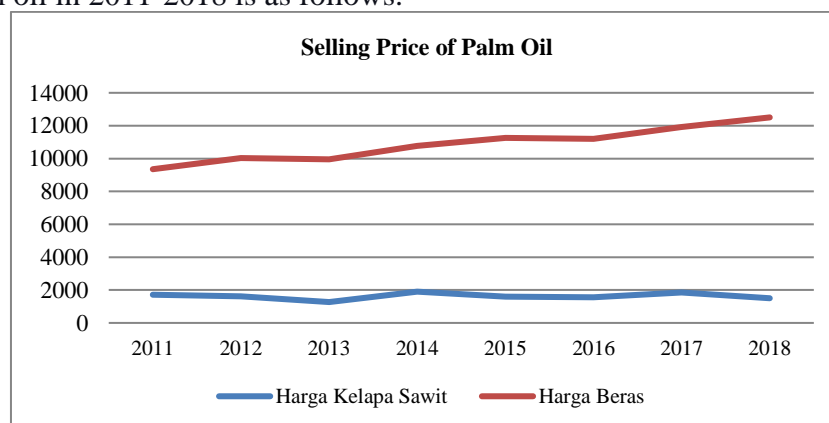

Figure 3. Average Selling Price of Palm Oil in South Sumatra 2011-2018

*Eur. Chem. Bull. **2023**,12 (issue 8), 6206-6223*

6221

It can be seen in Figure 3. That the selling price of palm oil and the buying price of rice are pretty far apart. So the selling price1 of kg palm oil has not been able to get 1 kg rice, but if you look at the selling price of palm oil that palm farmers get every year, it is pretty stable and does not experience sharp fluctuations. It can be seen in the figure that the selling price of palm oil is relatively stable due to conditions and regulations in Palm Oil Producing Countries, with Indonesia being the second largest CPO country in the world. It has an impact on the price of palm oil. For example, policies related to oil exports and an increase in the export commodity of palm oil have driven the selling price of palm oil higher. Furthermore, weather conditions can cause the selling price of palm oil to increase because the dry or rainy seasons do not have a dominant effect on oil palm plantations, so the selling price of palm oil can be stable.

Farmer Exchange Value (Price) Against 1kg Purchase of 1kg Rice
Farmer Exchange Rate (NTP) price, namely the average selling price from 2011 to 2018 obtained by farmers from selling farm products, then divided by the average purchase price of rice from 2011 to 2018 so that the NTP of the selling price for the purchase of 1 kg of rice is obtained. More details can be seen in Table 21. The NTP selling price for 1 kg of rice in South Sumatra in 2011-2018 is as follows.

Table 21. NTP (Selling Price) Against the Purchase of 1kg of South Sumatra Rice 2011-2018

No	Component	Selling Price (IDR/kg/year)	Rice Purchase Price (IDR/kg/year)	NTP
1.	Rubber Farmers	9,276	9,244	1.00
2.	Palm Oil Farmers	1,629	9,244	0.18
	difference (IDR)	715	11,000	0.83

Source: Data Seconds (Data processed)

Based on Table 21. shows that NTP selling price rubber farmers, namely 1.00 = 1.00 or NTP Break Even, meaning that the rubber farmers are relatively prosperous or can only afford1 kg rice and have not provided residual income for savings, while for oil palm farmers NTP selling price obtained is $0.18 < 1$ or negative NTP meaning that the oil palm farmers are not prosperous or with an average selling price of IDR at 1,629/kg, the oil palm farmers cannot afford to buy 1 kg of rice, so to get 1 kg rice for oil palm farmers must produce 5 kg of FFB. So the NTP prices for rubber are more significant than the NTP sale price for oil palm farmers with a difference of 0.83, and oil palm farmers have to produce more FFB than rubber farmers.
If before, farmers still used the system transaction barter to get1 kg of rice farmers only needed to produce1 kg latex/TBS, But now to get1 kg of rice, rubber farmers and oil palm farmers must produce > 1kg so that the Farmer Exchange Rate (Price) for 1kg of rice purchases in Maur Baru Village in November 2018 with the average purchase price of rice, selling price of rubber and palm oil, NTP selling price the results obtained are the same, namely <1, meaning that the farmers are not prosperous or the prices obtained by rubber farmers and oil palm farmers have not been able to fulfill the purchase of 1 kg of rice from rubber farmers and oil palm sample farmers. However, when viewed from the Exchange Rate (Price) Farmers Per year with the average buying price of rice, the selling price of rubber, and the selling price of South Sumatra palm oil from 2011 to 2018 NTP sale price of rubber Against purchase of 1 kg rice = 1 means that the rubber farmers are relatively prosperous or NTP break even, in comparison NTP sale price palm oil to the purchase of 1 kg of rice < 1 means that the oil palm farmers are not prosperous or negative NTP so to get1 kg rice rubber farmers only need to produce1 kg rubber while oil palm farmers have to produce5 kg FFB. Thus, from NTP prices, Rubber farmers are more prosperous than oil palm farmers.

Eur. Chem. Bull. **2023,***12* (issue 8), 6206-6223

6222

4. CONCLUSION

Based on the results of the research that has been done in the field, data processing, and discussion carried out, it can be concluded from this study as that The results of the analysis show that there is a significant difference in income; the income of farmers who convert crops (oil palm farmers) is more significant than farmers who do not convert crops (rubber farmers), with an average difference in farm income of IDR 8,925,519/ha/year. So that after the conversion of rubber plants to oil palm, if you look at the Exchange Rate (Farming Income) of Farmers and the Exchange Rates (Household Income) of Farmers, the expenditure of necessities and household expenses has a positive or prosperous impact, meaning that the income of farmers who convert crops (oil palm farmers) can meet household needs and provide residual income that can be saved. However, consider the exchange rate (price) for purchasing 1 kg of rice for rubber and oil palm farmers. In that case, it has a negative impact or is not prosperous, meaning that the prices obtained by rubber and oil palm farmers have yet to meet the purchase of 1 kg.

REFERENCES

Badan Pusat Statistik. 2014. *Luas Tanaman Perkebunan Menurut Provinsi dan Jenis Tanaman 2012-2014.* Jakarta.

Badan Pusat Statistika Kabupaten Musi Rawas. 2018. *Musi Rawas Utara Dalam Angka 2017*. Sumatera Selatan: BPS Muratara.

Dinas Perkebunan Provinsi Sumatra Selatan.2018. *Rencana Stategis 2013-2018*. Sumatra Selatan.

Hidayat, A. 2009. Sumber Lahan Indonesia: Potensi, Permasalahan, Dan Strategi Pemanfaatan. *Jurnal Sumberdaya Lahan*, 3(2):107-117.

Indriwati, Henny. Dkk, 2016. *Analisis Faktor Yang Mempengaruhi Alih Fungsi Lahan Karet Menjadi Kelapa Sawit Pada Anggota KUD Langgeng Kecamatan Logas Kabupaten Kuantan Singin*g. Pekan Baru: Universitas Riau.

Kencana, Agung. 2018. *Analisis Manfaat Ekonomi Konversi Lahan Pertanian Karet Menjaddi Lahan Pertanian Tumpang Sari Cabai Dan Lada Bagi Petani Di Desa Karang Lantang Kecamatan Muara Jaya Kabupaten Ogan Ilir*. Skripsi. Indralaya: Universitas Sriwijaya.

Muslim, Chairul. 2017. Nilai Tukar Petani Komoditas Perkebunan. *Jurnal Pertanian*, 32 (2):142-148.

Ruswandi, A. 2005. *Dampak Konversi Lahan Pertanian. Terhadap Perubahan Kesejahteraan Petani Dan Perkembangan Wilayah.* Tesis. Bogor: Institut Pertanian Bogor.

Sjarkowi, F. 2018. *Pengolahan Usahatani Vs 'Agribinisni'*. Palembang: Baladad Graffiti Press.

Sjarkowi, F. 2014. *Agroekosistem Lahan Basah Lestari*. Palembang: Baldad Grafiti Press.

Subandi, M.2017.Budidaya *Tanaman Perkebunan*. Bandung: Perpustakaan Nasional.

Syakir, M., dkk.2010. *Budidaya dan Pasca Panen Karet*. Bogor*:* Pusat Penelitian dan Pengembangan Perkebunan. Jawa Barat.

Syahza, A.2011. Percepatan Ekonomi Pedesaan Melaui Pembangunan Perkebunan Kelapa Sawit. *Jurnal Ekonomi Pembangunan*.

Wahyudi, Firman ACH.2014. *Analisis Ekonomi Dan Resiko Konversi Tanaman Karet Menjadi Kelapa Sawit Di Kecamatan Pemayung Kabupaten Batang Hari Jambi*. Tesis. Bogor: Institut Pertanian Bogor.