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Comparative Advantage Analysis of Cassava Farming in Pogalan Village, Trenggalek, Indonesia

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Abstract: Free trade in making cassava must have a comparative advantage in order to compete in domestic and international markets. However, the obstacle is the growth of the year, the population of Indonesia is increasing so that the production of cassava has not been able to meet national needs and cause more imports. Pogalan Village is one of the producers of cassava which has the potential to develop agriculture competitively. The objectives of this research are 1) To analyze the financial and economic benefits of cassava farming in Pogalan village, 2) To analyze comparative advantage of cassava in Pogalan village, 3) To analyze the sensitivity level of comparative advantage to inorganic fertilizer, cassava price increase and exchange rate. The analytical methods used are financial and economic analysis to analyze the feasibility of farming, Domestic Resource Cost Ratio (DRCR) to analyze comparative advantage and sensitivity analysis to analyze the sensitivity of comparative advantage. The result of the research shows that in Pogalan village has economic and financial feasibility with R/C Ratio of 2.85 and 1.26 respectively, meaning that cassava farming has financial and economic feasibility. Cassava cultivation in Pogalan village has a comparative advantage with DRCR 0.64, efficient if produced domestically. The first sensitivity assumption is that there is an inorganic fertilizer price increase of 10% and 20%, obtained respectively by DRCR 0.74 and 0.75. Second, there was an increase in the rupiah exchange rate against the US dollar by 5%, 10% and 20% obtained by DRCR respectively 0.67, 0.62 and 0.55. The second assumption is that agriculture deserves to be developed and the use of economically efficient resources. The suggestion is that in enhancing comparative advantage, farmers need to optimize intensive maintenance, resulting in higher productivity.
Keywords: Cassava, Farming, Competitiveness, Comparative Advantage, Domestic Resource Cost Ratio (DRCR), Sensitivity.

INTRODUCTION

The breakdown of the 2015 MEA (ASEAN Economic Community) agreement, Free Trade without any obstacle from the government demanding that goods in the country must have a high competitiveness so that foreign products are difficult to dominate the domestic market. Excellent products that are expected to compete with overseas products one of them is the agricultural sector. The agricultural sector is one of the main sectors in economic development especially in developing countries. This is indicated by the total population of Indonesia in the last census of 114,628,026 people in December 2017 of 38,973,033 people (34%) working in agriculture as main employment [1].

Cassava is one of the potential food crops to improve the economy of the community. The suitability of land characteristics makes cassava commodity easy to plant in Indonesia. Utilization of cassava not only lies in the tuber, but the leaves, stems and dregs. Data on Statistics Indonesia [1] shows that the productivity of cassava farming in Indonesia increases annually by 202.96 kwintal / hectare in 2011, 214.02 quintals/hectares in 2012, 224.60 quintals/hectares in 2013 and 233.81 quintals per hectares in 2014. The high cassava productivity in Indonesia, the rich carbohydrate content of cassava, and one of the raw materials for the processed industry make this commodity potential to enter the international market. Indonesia in 2016 produced 23,936,921 tons of cassava as the world's third largest producer of cassava after Nigeria and Thailand with total production of 53,228,000 tons and 23,936,921 tons respectively.

Cassava as one of food commodities has a role as a source of food, industrial raw materials, chemical industry, food and feed. Cassava is currently one of the potential commodities as an alternative energy source. The wider diversity

of cassava's role is increasingly required by Indonesia to increase cassava production. The increasing role of demand for cassava also tends to increase due to the increasing demand of human consumption.

Increased economic growth and population with all of its activities will have an impact on increasing energy demand in all sectors of energy users. The final energy consumption from 2012 is 3,794,922 terajoules increased by 2015 by 4,771,068 terajoules where the consumption of fuel oil is the largest final energy [1]. The increase in energy demand must be accompanied by a long-term, sustainable and environmentally friendly energy supply. Given that the energy, especially oil is a non-renewable natural resource, the resources will be exhausted, while the need for energy increases along with the increase of the population in Indonesia. This is an important issue for Indonesia with increasing population; the availability of energy is getting thinner but needs more and more. Great potential for Indonesia when doing cassava farming development in Indonesia to encourage domestic production which will provide added value for the country's economy.

Pogalan village is one of the areas of cassava producers in Trenggalek Regency that has the potential to develop cassava. Pogalan village has an average of 209 hectares of people's forest area or 47.85% of the total area of Pogalan Village that can be utilized by the community for the cultivation of certain commodities. This proves that Pogalan Village has great resources to always develop cassava farming. The potential is a challenge for Indonesia to continue to produce superior and competitive cassava commodities to meet the needs of the domestic market, so that imports for cassava commodities can be reduced. The strategy that can be pursued is to look at the comparative advantage of cassava farming by analyzing the use of domestic resources in the cassava farming. If the resource used has been efficient then it will be able to meet the demand in the country and the fulfillment of such demand will have a positive impact on the life of cassava farmers in Indonesia.

The objectives of this research are 1) To analyze the financial and economic benefits of cassava farming in Pogalan village, 2) to analyze the comparative advantage of cassava in Pogalan village and 3) to analyze the level of sensitivity of domestic cassava competitiveness to the effect of change of input price of inorganic fertilizer and exchange rate.

RESEARCH METHODS

The research was conducted in Pogalan Village, Pogalan District, and Trenggalek Regency. Determination of the location of this study carried out purposive sampling is the determination of the research location intentionally to achieve the objectives in the study. Consideration of Pogalan Village selection because it is one of the biggest cassava producing villages and home industry center and biggest souvenir hawker center in Trenggalek Regency based on cassava. Respondents are cassava farmers who live in Pogalan Village. Determination of respondents is using probability sampling method with simple random technique. Pogalan village has a number of farmers who cultivate cassava commodities as much as 205 farmers. Determination of respondents in this study using the formula determination of respondents by Parel, *et al*. [2]:

$$n = \frac{NZ^2S^2}{Nd^2 + Z^2S^2}$$

Where:
n = respondent size
N = population size
d = maximum tolerable error of 10%
Z = Z value at certain confidence level 90%
s^2 = the variance value of the sample

The number of respondents can be calculated if the measurement of variance value (s^2) of the respondent has been done. The initial population of the study (n) was conducted on 45 cassava farmers in Pogalan Village. The value of variance is measured by the value of each sample, used the formula put forward by Parel, *et al.* [2]:

$$s^2 = \frac{n\sum X^2 - (\sum X)^2}{n(n-1)}$$

Where:
n = small population
X = the value of each respondent is seen from the area of land owned by farmers'

Based on the above calculation, the value of variance (s^2) of the sample is 0.168, and then the number of samples that can be used for minimal research is 37 cassava farmers in Pogalan Village. Here is analysis tools used are:

Analysis of Financial and Economic Benefits

To obtain the desired profit level, the farmer should calculate all cost elements and then determine the cost of the product. Production cost is the cost incurred to obtain the factors of production that will be used to produce the goods sold production. Can be written with the following formula [3]:

$$TC = FC + VC$$

Description

TC = Total cost of cassava farming (IDR)
FC = Fixed cost of cassava farming (IDR)
VC = Variable cost of cassava farming (IDR)

The acceptance of cassava farming is the multiplication of the production output obtained at the selling price; this statement can be written as follows:

$$TR = Y. PY$$

Description

TR = Total revenue of cassava farming (IDR)
Y = Production output in a cassava farm (Kg)
PY = Price of cassava (IDR)

Farm income is the difference between acceptance and all costs so that it can be written by the formula:

$$\pi = TR - TC$$

Description

π = Profit of cassava farming (IDR)
TR = Total revenue of cassava farming (IDR)
TC = Total cost of cassava farming (IDR)

The calculation of economic profit is equal to the financial gain, the difference lies in the applied price. If the economic analysis, the price used is the price of shadow, while for the financial analysis used is the real price in society today.

Components Allocation of Domestic Cost and Foreign Cost

The inputs used in the production process of cassava farming research are separated into allocating costs into domestic and foreign cost components.

Table-1: Allocation of costs into domestic and foreign costs of cassava farming

Production Inputs	Domestic Cost (%)	Foreign Cost (%)
Depreciation Tools	100	0
Seed	100	0
Urea	0	100
Ponska Fertilizer	0	100
ZA Fertilizer	0	100
Organic Fertilizer	100	0
Perticide	100	0
Labor	100	0
Commerce	100	0

Source: Statistic of Indonesia, 2016

Determination of Shadow Prices

Input Shadow Price

(1) Price Shadow Non-Tradeable Input (Domestic)

Table-2: Price Shadow Non-Tradeable Input

Shadow Price	Description
Depreciation Tools	The social price equals the private price
Seed	The social price equals the private price
Organic Fertilizer	The social price equals the private price
Pesticide	The diversity of pesticide brands then the social price of pesticides is equal to the private price
Labor	Each farmer's wage rate is different

(2) Shadow Price Input Tradable (Foreign)

Table-3: Shadow Price Tradeable Input

Shadow Price	Description
Urea	FOB Price (IDR) + VAT and Income Tax + merchant fees
Ponska Fertilizer	CIF Price (IDR) + VAT and Income Tax + administration fee
ZA Fertilizer	Fertilizer ZA FOB Price (IDR) + VAT + trading cost

Price Shadow Output

The calculation of the price of the shadow is to use the border price (border price), that is for export commodities used price FOB price (free on board) and for imported commodities used CIF price [4].

Price Shadow Money Exchange Rate

The shadow price of the exchange rate is the price of local money in relation to foreign currency that occurs in the market value of money in perfect competitive conditions.

Domestic Resource Cost Analysis

DRC is one of the indicators to know the comparative advantage of a commodity through a domestic resource approach that can be saved to produce one unit of foreign exchange. Here is the formula according to Pearson, *et al*. [5], DRC namely:

$$DRC = \frac{\sum fs_j . Vs + E_j}{V_j - m_j - r_j}$$

Description

DRC_j = cost of domestic resources used in cassava farming
fs_j = number of input factors of non tradable production in cassava farming
Vs = real unit price of non-tradeable input production factor (IDR)
v_j = total output value of cassava production world market price (US $)
m_j = total value of inputs imported and used in cassava farming
r_j = value of receipt of owner of foreign input used in cassava farming (IDR)

Indicators for comparative advantage are known, the next step is to look at the level of efficiency or comparative advantage. According to Pearson *et al.* [5] states that the coefficient Domestic Resource Cost (DRC) measures the level of efficiency or comparative advantage. The following formula DRCR according to DRCR formula that is:

$$DRCR = \frac{DRC}{SER}$$

Description
DRCR = Ratio of Domestic Resources of cassava farming
DRC = Domestic Resources Cost of cassava farming
SER = Shadow price of Exchange Rate

DRCR is a measure to see the comparative advantage of a cassava farm. The following is a requirement of comparative superiority of cassava farming:

- DRCR> 1, then it is said that the activity of cassava farming does not have comparative advantage which means economically the activity of cassava farming is not efficient in the use of available resources and does not save foreign exchange state
- DRCR = 1, then it is said that the activities of cassava farming are at the balance point. Can not obtain or save the country's foreign exchange through domestic product.
- DRCR <1, then it is said that uni timber farming activities have a comparative advantage which means economically the activity of cassava farming is efficient in the use of available resources and saves the country's foreign exchange.

Sensitivity Analysis

Sensitivity analysis is done to see how the result of analysis of an economic activity when there is change to input and output. The changes included in this study are the first assumption, the increase of input production price in the form of inorganic fertilizer by 10% and 20% by assuming that other factors have not changed. This percentage is made due to the frequent occurrence of scarcity of fertilizer that occurs due to limited government supplies.

The second assumption is that there is an increase in the exchange rate between the exchange rate of the rupiah against the US dollar by 5%, 10% and 20% by assuming other factors are not changed. Sensitivity analysis used to test the feasibility of farming if there is a change in input output.

RESULTS AND DISCUSSION

Determination of Shadow Prices

Price Shadow Input Non Treadable

- **Cassava Seeds**

Seedlings are cuttings of cassava stems cut from previous cultivation, so the determination of the price of shadow seeds of cassava farming in Pogalan Village can be approached with the actual price or price set in the market that is 1.000,00 IDR/cassava cuttings stem.

- **Labor**

Labor in farmers' cassava farming in Pogalan Village requires energy in the family and outside the family. Manpower taken from the neighborhood around the village causes the price of shadow labor can be approached with the actual price or price set in the market of labor in the family costs to be incurred that is as much as 15,000 IDR/labor while for labor outside the family costs which must be spent as much as 25,000 IDR/labor.

- **Organic Fertilizer**

Organic fertilizers used by farmers come from animal livestock owned by the farmers themselves. Organic fertilizers that can be independently produced in determining the price of the shadow can be approached by the actual price or the price set in the market is 1,000 IDR/kilogram of manure.

Shadow Price Input Treadable

Depreciation of Tools

Agricultural equipment used by farmers of respondents in cassava cultivation is hoe and sickle. Depreciation value is obtained from the conversion of CIF price into rupiah exchange rate divided by (1 + import duty) and then

divided again by its economic age. The excise duty stipulated for goods of the type used for agriculture by the Customs Directorate is 5% [6].

Inorganic Fertilizer

Inorganic fertilizers used by farmers are Urea, Ponska and ZA fertilizers. The shadow price of urea fertilizer and ZA fertilizer uses the price of FOB because its export value is greater than its import value with FOB value of US $ 0.32 per kilogram and US $ 0.33 per kilogram respectively. The shadow price of Ponska fertilizer uses the price of CIF because its import value is higher than its export value with CIF value of US $ 0.45 per kilogram. After the value FOB and CIF then the next step is to multiply the value FOB and CIF with the shadow exchange rate or Shadow Exchange Rate (SER). The known multiplication product for the FOB value for urea and ZA fertilizer is added to the trading cost from the producer to the farmer while for the CIF value is added to the trading cost from the import port to the consumer. So we get the price of shadow for urea fertilizer for 3,618.96 IDR per kilogram, Phonska fertilizer 5,931.35 IDR per kilogram and ZA fertilizer amounted 3,742.99 IDR per kilogram.

Pesticides

Pesticides used by farmers of respondents are of type insecticides, fungicides, and herbicides with various trademarks. The determination of the price of the shadow is approximated by the actual or prevailing price of the market due to the diversity of trademarks used by the farmers of the respondents. The farmer's average cost for one hectare in one planting season is 31,429.00 IDR per liter for insecticide, 960,000.00 IDR per liter for functionalisation and 555,238.00 IDR per liter for herbicide.

Shadow Price of Output

Cassava is a commodity traded in the world by Indonesia, but traded is a processed form of cassava ie chips instead of fresh cassava. Determination of the price of shadow if the traded form of the processed it must be converted first so that the volume obtained is no longer the volume for the chips but will be the volume of fresh cassava. The comparison earned to produce 1 kilogram chips required 3 kilograms of fresh cassava. According to BPS Imports Export Data [7], we get the price of fresh cassava shadow through FOB value approach from chips. The FOB price is then multiplied by the shadow exchange rate and then the product multiplied by the cost of the manufacturer's trade to the export port. So, the price of shadow of cassava output at farmer’s level is 605.03 IDR per kilogram.

Price Shadow of Rupiah Exchange Rate

Determination of shadow price of rupiah exchange rate is using the middle rate of BI. The farmers' farming is from January to September 2017, so the median exchange rate applied in the research is the average rate in May 2017 of 12.403,00 IDR/US $ [7].

Financial and Economic Analysis

According to Soekartawi [3], to see how far a farm can fulfill its financial obligations and remain within favorable limits and how the allocation of resources is managed optimally to still gain the most profit is through financial and economic considerations. Here is a breakdown of the financial and economic costs of cassava farming in Pogalan Village.

Based on Table 4, the total production of 43,585 kilograms in the financial analysis obtained total production output of 54,539,786.00 IDR per hectare, while for economic analysis using the shadow price of 26,370,101 IDR per hectare. As for the cost of production respectively for financial and economic analysis are 19,111,348.00 IDR and 20,895,773 IDR. After the receipt of farmers and the total cost of production then to know the advantage is by reducing the results of both, so obtained a big financial gain for cassava farming is 35,428,439.00 IDR per hectare while the profit of cassava farming for economic analysis is 5,474,328.00 IDR per hectare. The feasibility of a farm can be viewed from the large R/C Rationya value. Farming is said to be feasible to develop the farm if it has an R/C Ratio value of more than 1. R/C Ratio can be known from the average distribution of income obtained by farmers of respondents with the total average cost of production. The calculation of R/C Ratio obtained for the financial profit of cassava farming is 2.85. As for the economic benefits of cassava farming is 1.26. Based on the calculation, the value of R/C Ratio of cassava farming in Pogalan Village is more than 1 so it is considered to have financial and economic feasibility while still paying attention to the cost efficiency used during the production process of cassava farming takes place at the research location.

Table-4: Financial and Economics Analysis of Cassava Farming in Pogalan Village, Pogalan Sub-district, Trenggalek Regency

Description	Unit	Total Unit	Financial Cost	Economic Cost
Total Production Output	Kg	43,585	54,539,786	26,370,101
Production Cost				
a. Fix Cost				
1) Depreciation Tools	IDR		63,550	60,232
b. Variable Cost				
1) Seed	Kg	9,743	9,743,127	9,743,127
2) Fertilizers				
a) Organic	Kg	196	196,273	196,273
b) Urea	Kg	185	357,143	796,951
c) Ponska	Kg	248	594,196	1,469,598
d) ZA	Kg	173	281,663	770,723
3) Pesticide				
a) Insecticide	Liter	2	31,429	31,429
b) Fungiside	Liter	17	960,000	960,000
c) Herbiside	Liter	6	555,238	555,238
4) Labor				
a) Labor in the family	Day	127	1,905,000	1,905,000
b) Labor outside the family	Day	145	3,6025,000	3,625,000
5) Etc			978,696	978,696
Total Variable Cost	IDR		19,047,798	20,835,541
Total Production Cost	IDR		19,111,348	20,895,773
Profit	IDR		35,428,439	5,474,328

Comparative Advantage Analysis

Comparative advantage is one of the indicators to know the competitiveness of cassava commodity in the research location. The analysis used in this study is the analysis of Domestic Resource Cost (DRC). Domestic Resource Cost (DRC) serves to determine the efficiency of resources used in cassava farming in the study sites. The following is a calculation of the comparative advantage analysis of cassava in Pogalan Village.

Table-5: Analysis of Cassava Comparative Advantage in Pogalan Village

Description	Component	Price
Non-Tradable Input (IDR)	fsj x Vs	16,886,738
Tradable Input (IDR)	(mj x rj)	250
Production Output (Cassava) (US$)	Vj	2,126.12
Domestic Resource Cost (DRC)	DRCj = $\frac{\sum_{s=1}^{m} f_{sj} x\, v_s}{v_j - m_j - r_j}$	7,942.51
Shadow Exchange Rate (IDR)	SER	12,403.00
Domestic Resource Cost Ratio (DRCR)	DRCR=$\frac{DRC}{SER}$	0.64

Domestic Resource Cost (DRC) can be determined through the division between the average total non-tradeable input value and the difference in the average total output price of cassava production with the total average of the input price tradeable. Calculation of Domestic Resource Cost (DRC) is obtained result that is equal to 7,942.51 IDR. The

calculation of Domestic Resource Cost Ratio (DRCR) is obtained from the difference between the predetermined Domestic Resource Cost (DRC) divided by the known Shadow Exchange Rate (SER) value of 12,403.00 IDR. Then get the value of Domestic Resource Cost Ratio (DRCR) that is equal to 0.64. The value of Domestic Resource Cost Ratio (DRCR) is approaching 0, hence its comparative advantage is higher [8]. So the cassava farming in Pogalan village has a comparative advantage or feasible to keep developing. That is, cassava farming in Pogalan Village has been efficient if done development, so it will be able to reduce imports and improve the welfare of Indonesian farmers.

Sensitivity Analysis

There are two assumptions made based on the phenomenon that often occurs in cassava farming in Pogalan Village. The first assumption is the change of input price of cassava production in the form of inorganic fertilizer in percentage increase of 10% and 20% by assuming that other factors have not changed. While the second assumption is that there is a change in the exchange rate between the exchange rate of the rupiah against the US dollar at a percentage increase of 5%, 10% and 20% by assuming other factors have not changed.

Impact of Input Price Increase

Farmers use manure taken from their own livestock while for inorganic fertilizers used includes urea fertilizer, Phonska fertilizer and Za fertilizer. The fertilizer is bought by farmers from subsidies made by the government. The assumption is made because the fertilizer subsidy traded by the government is often late, so farmers have to buy non-subsidized fertilizer. The increase of fertilizer price from subsidized fertilizer to non-subsidized fertilizer is ranged from 10% to 20%. If this happens, the farmers' production costs will also increase. This sensitivity analysis serves to see the sensitivity of comparative advantage of cassava farming in Pogalan Village to the increase of input production price in the form of inorganic fertilizer. Here is a table of sensitivity calculation results of comparative advantages of cassava farming in Pogalan Village.

Table-6: Comparative Advantages of Cassava Farming When Experiencing Price Increase Input Production in the form of Inorganic Fertilizer by 10% and 20%

Description	Value		
	Normal	Increased 10%	Increased 20%
Non-Tradable Input (IDR)	16,886,738	16,886,738	16,886,738
Tradable Input (IDR)	250	287.25	309.64
Production Output (Cassava) (US$)	2,126.12	2,126.12	2,126.12
Domestic Resource Cost (DRC)	7,942.51	9.183.21	9.296.41
Shadow Exchange Rate (IDR)	12,403.00	12,403.00	12,403.00
Domestic Resource Cost Ratio (DRCR)	0.64	0.74	0.75

Based on the Table 6, it is known that in the condition of the increase of organic fertilizer price has an effect on the increase of input cost of tradeable which have impact on result of calculation of DRC and DRCR obtained. The results of this DRCR can see how the sensitivity of comparative advantage of cassava farming to the increase of input production prices in the form of inorganic fertilizers. The calculation on the sensitivity of the comparative advantage of cassava farming to the increase of inorganic fertilizers has similarities in non-tradeable input costs at normal prices, 10% and 20% that is 16,886,738.00. Non-tradeable inputs have no impact on the increase of inorganic fertilizers because inorganic fertilizers are currently traded in the world market, so classified as a tradeable input. The greater the price of inorganic fertilizers the greater the cost for the inputs are tradeable. Normal price is US $ 250 for input costs; increased 10% for inorganic fertilizer prices of tradeable input cost is US $ 287.25 and at a 20% increase in price of inorganic fertilizers the cost of inputs also increased by US $ 309.64. This increase also affects the results of DRC calculations obtained. The bigger the cost for the input is tradeable the greater the DRC, the higher the DRC value. The DRC value in normal condition is 7,942.51, at 10% increase of inorganic fertilizer price, DRC value is 9,183.21 and at 20% increase of inorganic fertilizer price, DRC value is 9,296.41. The higher the calculation value for DRC will also affect the magnitude of the sensitivity value of competitive advantage of cassava farming. The greater the value of DRC the greater the value of DRCR. DRCR in normal condition that is equal to 0.64, at 10% increase of price of inorganic fertilizer, DRCR value that is equal to 0.74, while for 20% increase of inorganic fertilizer price got DRCR value equal to 0.75. Changes in the DRCR are not great, but there is still an increase in every price increase of inorganic fertilizers. The value increase in DRCR is still below 1, so the comparative advantage of cassava farming in Pogalan village is sensitive to the increase of inorganic fertilizer price and economically the activity of cassava farming is efficient in the use of available resources and save the country's foreign exchange.

Production costs that farmers must incur when there is an increase in inorganic fertilizer prices will be higher. However, the amount of production output and production output prices remain, so that will have an impact on the decrease in farmers' profits in cassava farming. The decrease of farmers' profit on the increase of inorganic fertilizer price

by 10% and 20% had an impact on the sensitivity of comparative advantage of cassava farming in Pogalan Village, but not large. Increase

The price of inorganic fertilizer that will occur continuously will result in cassava farming in Pogalan Village has no comparative advantage. Thus, farmers and governments should work together to balance supply, price and use of inorganic fertilizer in cassava farming in Pogalan Village.

Impact of Rupiah Exchange Rate Raise Against US Dollar against Level of Comparative Advantage. Current changes in the rupiah exchange rate are often the result of various factors. This change tends to happen on a daily basis. Cassava farming using tradeable inputs will have an impact on the trend of this change. Then the assumptions are made on the basis of the frequent occurrence of these changes. This sensitivity analysis is used to see the sensitivity of comparative advantages of cassava farming when the rupiah exchange rate increases against the US dollar. Percentage change of increase of 5%, 10% and 20% respectively.

Table -7: Comparative Advantages of Cassava Farming When Experiencing Rupiah Exchange Rate Rupiah against US Dollar at 5%, 10% and 20%

Description	Value			
	Normal	Increased 5%	Increased 10%	Increased 20%
Non-Tradable Input (IDR)	16,886,738	16,886,738	16,886,738	16,886,738
Tradable Input (IDR)	250	276.23	287.25	309.64
Production Output (Cassava) (US$)	2,126.12	2,300.45	2,474.81	2,779.91
Domestic Resource Cost (DRC)	7,942.51	8,342.34	7,719.44	6,835.99
Shadow Exchange Rate (IDR)	12,403.00	12,403.00	12,403.00	12,403.00
Domestic Resource Cost Ratio (DRCR)	0.64	0.67	0.62	0.55

Based on the Table 7, it is known that non-tradeable inputs also have similarities because they are not traded internationally. The difference lies in the input tradeable because the exchange rate is closely related to the goods being traded internationally. This increase in exchange rates has an impact on the cost of the tradeable inputs and the output value of cassava production. This will also affect the changes in the calculation of DRC cassava farming. The greater the value of the input of the tradeable and the output of production then the resulting DRC will be smaller. DRC after being divided by the specified SER value will also have an impact on the value of DRCR or the sensitivity of comparative advantage of cassava farming in Pogalan Village.

DRC under normal circumstances obtained a yield of 7,942.51, when a 5% increase in the rupiah exchange rate against the US dollar obtained a yield of 8,342.34, for a 10% increase the exchange rate of the rupiah against the US dollar amounted to 7,719.44, while for a 20% the rupiah exchange rate against the US dollar amounted to 6,835.99. The value of DRC that has been divided by the SER value will show the sensitivity of comparative advantage of cassava farming. The higher the DRC value the higher the DRCR value. The value of DRCR is known in normal circumstances is as much as 0.64, in the case of a 5% rise in the exchange rate of the rupiah against the US dollar by 0.67, in the case of a 10% rise in the exchange rate of the rupiah against the US dollar by 0.62 and on the increase 20% of the rupiah against the US dollar of 0.55. 3 assumptions that are expected to occur have a value less than 1 DRCR, then cassava farming in Pogalan Village can be said to have a comparative advantage which means economically

The activity of cassava farming is efficient in the use of available resources and can be developed to reduce the import of cassava and can improve the prosperity of Indonesian cassava farmers. Based on the data, the sensitivity of comparative advantage of cassava farming is caused by the value of the input of tradeable and the production output. This is because both factors are closely related to international markets such as input production of inorganic fertilizers and depreciation of tools and output of cassava production itself. The greater or weaker the exchange rate of the rupiah against the American dollar, the more the farmer must pay for the tradeable input (inorganic fertilizers and equipment depreciation) but will be proportional to the revenue earned from the output of production with the amount of output that remains with normal circumstances. Judging from the data that the higher the percentage of the weakening of the rupiah, the value of DRCR or the comparative advantage of cassava cultivation will be closer to 0 or the more comparative advantage. This is because the price in the world market is increasing so as to make cassava growers more prosperous.

CONCLUSIONS

Conclusions

- Cassava farming in Pogalan Village has a financial and economic advantage. The calculation obtained from the analysis for the financial profit of cassava farming in Pogalan Village is 19,066,503 IDR/hectare area/planting season, while for the economic profit of cassava farming in Pogalan Village is 55,710,136 IDR/hectare area/planting season.

The feasibility of cassava farming in Pogalan Village which was calculated using R/C Ratio formula, got result for financial analysis equal to 2.85 while for economic analysis equal to 1.26. The R/C Ratio shows a positive result and both analyzes show a value greater than 1, so that cassava farming in Pogalan Village can be said to be feasible to be cultivated and developed to reduce the importation of cassava.

- Cassava farming in Pogalan Village has a comparative advantage with DRCR value of 0.64. This shows that cassava farming in Pogalan Village has been efficient if it becomes an export commodity, so it can generate foreign exchange for the country and if it is sold domestically, it will serve as import substitution which can save the country's foreign exchange.

- The calculation result for the sensitivity of comparative advantage of cassava farming for the first assumption is the increase of input production price in the form of inorganic fertilizer by 10% and 20% have positive impact also for comparative advantage of cassava farming. DRCR values obtained were 0.74 and 0.75 respectively. This shows that farming is feasible to develop and economically cassava farming activities are efficient in the use of available resources and save the country's foreign exchange. The second assumption is that the increase of the rupiah exchange rate against the US dollar by 5%, 10% and 20% has a positive impact on the comparative advantage of cassava business. DRCR values obtained were 0.67, 0.62 and 0.55, respectively. This shows that farming is feasible to develop and economically cassava farming activities are efficient in the use of available resources and save the
- Country’s foreign exchange.

Suggestions

- Cassava farming in Pogalan Village is feasible to be developed by generating high financial and economic benefits so that it can become a reference for other areas in order to minimize the production cost that must be spent.
- In improving comparative advantage, farmers need to optimize intensive maintenance, so that the productivity will be higher so as to meet domestic demand without importing.
- Judging from the sensitivity of the comparative advantage of cassava farming to the increase of fertilizer price and the increase of rupiah exchange rate to the dollar, the farmers are expected to know the latest information that directly related to the cassava farming or not, so the possibility of loss can be avoided.

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