

# THE IMPACTS OF AFTA TO THE MAIN FOOD CROPS SECTOR IN INDONESIA

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## ABSTRACT

*Any country's involvement in the multilateral or regional blocks has its own interest. Indonesia also has certain interest in ASEAN collaboration such as commodity protection, especially its agricultural commodities either through WTO or the ASEAN. In this contending world, the main issue is how to protect domestic production in coping with more the competitive world production, especially in dealing with AFTA which will be implemented in 2015. The research objectives are to analyze AFTA's impacts on enhancement of economy, main food production (rice, corn, and soybean), and demand for production inputs: land; labor; capital; and other natural resources. The objective is conducted with the tools for analysis The GTAP Model. Impacts of AFTA on Indonesian main food development indicate that only rice output has a negative growth, but corn and soybean outputs have positive trends. On the other hand, the impact on ASEAN decline occurred in soybeans. In addition, various policies are required in developing rice, corn, and soybeans both in and outside Java.*

Keywords : Impact of Free Trade, ASEAN, Main Food, GTAP

## INTRODUCTION

Agricultural agreement in the multilateral forum is accommodated by the World Trade Organization (WTO) which was established after the General Agreement on Tariffs and Trade (GATT). It was basically an agreement after World War II to remove international trade barriers. Along with this spirit, there are many regional blocks emerging such as AFTA (*ASEAN Free Trade Area*), NAFTA (*North America Free Trade Agreement*), EU (*Europe Union*), MERCOSUR (*the Southern Part of South America*), CARICOM (*Central America*), etc. The purpose of this partnership is to create a faster than trade with distant countries in accordance with Article XX GATT Agreement /WTO on regional free trade areas are permitted (Linnan, 2003)

Any country's involvement in the multilateral or regional blocks has its own interest. Indonesia also has certain interest in ASEAN collaboration such as commodity protection, especially its agricultural commodities either through WTO or the ASEAN. It is more noteworthy during the last several years due to significant increase in production, especially rice. The more important issue is development priority toward food security at the national, regional, and community levels.

In this contending world, the main issue is how to protect domestic production in coping with more competitive world production, especially in dealing with AFTA which will be implemented in 2015. Regional collaboration intensity enhancement will speed up trade flows among ASEAN countries. Overwhelming world production will lead to import surge. If modality is already established, no other authority could restrain common agreement. Therefore, the agricultural issues are how the free trade area in ASEAN gives positive impact to the farmers.

The Ministry of Agriculture plays a major role in agricultural development. For larger context, however, support of all stakeholders including other Ministries and private sector

have important linkages in the sectors of production, postharvest/ product processing, distribution, and consumption. Agricultural development dynamics is affected by small land holding, increased import dependence, and climate change. On the other hand, all national decisions could not negate the international rules of GATT in the WTO because we have ratified it through Act No. 7/1994. The government, c.q. Ministry of Agriculture, needs to conduct a more comprehensive analysis especially on the impacts of ASEAN free trade on major food commodity development. Rice, corn, and soybeans are still prioritized. These three commodities could improve value adding activities and job creation.

In accordance with the policy to be implemented in dealing with competitive world production, the problem formulation is “what are the impacts of AFTA on economic development and main food production (rice, corn, and soybeans)?”. Corresponding to the problem formulation, the research objectives to analyze AFTA’s impacts on enhancement of economy, main food production (rice, corn, and soybean), and demand for production inputs: land, labor, capital, and other natural resources.

## METHODOLOGY

### Framework

For a long time, agricultural issues are the main topics in Indonesia. There is no basic solution for those issues resulting in poverty. According to the *Food Security Council* (Dewan Ketahanan Pangan, 2009), until year 2006, the supplies of some food commodities were not met by domestic production. The most significant import dependence figures were milk 89.5%, soybeans 60.2%, sugar 29.9%, corn 13.3%, peanut 7.10% and beef 8.39%. The relatively low imports were rice (1.35%), fruits in year 2004 (0.27) and chicken (0.44%). The trends fluctuate but tend to increase. Indonesia’s dependence on world’s import is alarming because on August 2009, the food import was more than US\$5 billion or Rp 50 trillion equal to 5% of the national budget. Remarkably, most of the commodities can be produced in Indonesia.

Globalization is an important sign of new globalized market, trade culture, and international finance and information flows. In the economic segment, there is a world economic system determined by global industrial revolution principles. Based on these principles, the old ways are destroyed and a new world is born. Trade and capital have overcome political stiffness and produce significant social transformation. The result is no gap between rich and poor countries in terms of material life. To overcome overall economy, it is necessary to change from high-technology orientation to that of agricultural industry and from a broad-base industry to domestic resources industry. It is possible that agricultural development strategy is correlated with that of international policy.

In line with the development of the negotiation process from both world and regional levels, many researchers both national and international always see how far the developments take place in one country or group of countries as a result of free trade. The ASEAN began to develop themselves to free trade for internal and cooperation with other countries such as India, China, Republic of Korea, Japan and Australia and New Zealand.

Oktaviani *et al.* (2006) conducted scenario analysis relating to the reduction of domestic support by developed countries such as ANZ, JPN, USA, EU<sup>1</sup> and its relation to developing countries such as CHN, IDN, MYS, PHL, THA, VNM, and G33<sup>2</sup>, including Indonesia, where developing countries will be disadvantaged by the high domestic support provided by the developed countries. Opportunities will be created, especially for processed agricultural products to Indonesia if the developed countries would reduce their domestic support. Haryadi

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<sup>1</sup> ANZ = Australia/New Zealand, JPN=Japan, USA=United State of America, EU= Europe Union

<sup>2</sup> CHN=China, IDN=Indonesia, MYS=Malaysia, PHL=Philippines, THA=Thailand, VNM=Vietnam, G33= the countries of G33’s group are Republic of Korea, India, Sri Lanka, Peru, Venezuela, Turkey, Botswana, Mozambique, Tanzania, Zambia, Zimbabwe, Madagascar and Uganda

(2008) showed: (a) the current world economic power map including agriculture is still dominated by developed countries; (b) the United States is still a market for most of the countries in the world because many countries make the United States as their trading destination; and (c) developing countries still have a relatively strong dependence on the developed world, including the import of agricultural commodities. Hakim (2004) indicates that in the long term, the government's policy to increase efficiency in the production of rice is the only appropriate policies. Valenzuela *et al.* (2008) showed an improvement in real agricultural products and exports, revenue farmers and unskilled labor, farmers' incomes in most developing countries despite the adverse impact on food importing countries and to market high-income countries. Dean and Wignaraja (2007) showed analysis of the participation of low-income countries in a free trade arrangement, reduce business costs, and promote trade and investments. In relation to Indonesia's participation in regional economic integration program, the most important thing is the urgent requirement to support consolidation of infrastructure, including roads. This can be well associated with the ASEAN Transport Action Plan (ATAP) in 2015, and would facilitate the process of integration of the broader economy that will be realized in the future as part of the APEC framework within the Asia Pacific region. (Soetanto, 2009). This is a thought that Indonesia is not being left behind in the regional production networks and the globalization of production processes (Tambunan, 2007). In this regard, Indonesia should consider the composition of the products and export destination in competition with other ASEAN countries and even the non-ASEAN countries (Hadi *et al.*, 2004).

Elasticity is one of the important analytical tools to conduct agricultural policy. There is an increasing demand to reduce supply policy. According to Widodo (2012), the basis of selection criteria in terms of government policies can minimize cost to government, and minimize the net social cost as well as minimize the cost to consumers or to producers. The smallest loss is the main aim in development; therefore increasing demand policy is the most appropriate for the commodity with inelastic demand and supply. Inelastic, while reducing supply policy, is a main priority on commodity with inelastic demand and elastic supply.

Some research suggested that the elasticity of Indonesia is relatively varied, as shown in Tables 1, 2 and 3. These tables indicate that the values of GTAP (default) used in this analysis, is relatively in line with the results obtained from various studies. Therefore, they can be considered as follows:

- (1) The income elasticity of the domestic demand for rice, corn and soybeans from GTAP is 0.578. These value is positive, but is still below one or normal goods. This means that demand for each of the three commodities are influenced by changes in consumer income. Harianto (2001) showed that the elasticity of rice is 0.554, particularly Dianarafah (1999) in East Java which showed the income elasticity is 0.639, but for income elasticity of corn and soybeans are 0.066 and 0.241 respectively. Their elasticity is still under coverage Simatupang *et al.* (1995) and Tabor (1989) has ranges from 0.104-0.753;
- (2) The own price elasticity for rice, corn and soybeans in the GTAP (default) respectively are -0.149 , -0.132 , and -0.132 . They showed inelastic price changes. In general, some of the results have a similar trend in Altemeier (1991); Adnyana (2004); Harianto (2001), and Dianarafah (1999), with a range between -0.564 and -0.013;
- (3) Based on the value of the GTAP database, cross-price elasticity for Rice-Maize, Rice-Soybean, Maize-Rice, Maize-Soybean, Soybean-Rice, and Soybean-Maize showed negative relationship, which means that if the complementary commodity prices increase the commodities will decrease. In contrast to the results of research Altemeier (2001) and Dianarafah (1999) showed a positive elasticity of Rice - Maize produced 0.059-0.699 and also contrary to Corn-Rice is in the range of 0.028-0.569. It means that there are difficulty in efforts to change substitute commodities.

- (4) Based on the GTAP, the price elasticity of import demand for all three commodities rice, corn and soybean are -76.065; -33.617; and -63.041 respectively. This showed that if the import commodities increase, the price of commodities will decrease. This suggests that there have been three integrations that occurred in the commodities markets and the huge import demand could lead to an opening and changes in the domestic price.

Table1. The elasticity value of rice in Indonesia

Elasticity/commodities	Previous results			GTAP
	Value	Year	Sources	
<b>Allen partial elasticity of substitution</b>				
- Rice	xxx	xxx	xxx	-3.57791
- Maize	xxx	xxx	xxx	0.035073
- Soybean	xxx	xxx	xxx	0.035073
<b>Income elasticities of private household demand</b>	0.554	2001	Hariato (2001)	0.578005
	0.639	1996	Dianarafah (1999)	
<b>Uncompensated Cross-Price Elasticities Of Demand By PrivatHousehold</b>				
- Rice	-0.147	1989/90	Altemeier (1991)	-0.1489
	-0.0132	2000	Adnyana, M O (2004)	
	-0.0257	2000	Adnyana, M O (2004)	
	-0.564	2001	Hariato (2001)	
	-0.478	1996	Dianarafah (1999)	
- Maize	0.059	1989/90	Altemeier (1991)	-0.00212
	0.699	1996	Dianarafah (1999)	
- Soybeans	-0.050	1989/90	Altemeier (1991)	-0.00263
	1.461	1996	Dianarafah (1999)	
<b>Own-Price Compensated Elasticities Of Household Demand</b>	-0.097	1989/90	Altemeier (1991)	-0.128194
<b>Conditional Own-Price Elasticities Of Import Demand</b>	-0.010167	2004	Azzis (2006)	-76.064796
	-0.274413	2004	Azzis (2006)	
<b>Export Demand Elasticity</b>	xx	xx	xx	-5.883529

Table 2. The elasticity value of maize in Indonesia

Elasticity/commodities	Previous results			GTAP
	Value	Year	Sources	
<b>Allen partial elasticity of substitution</b>				
- Rice	xx	xx	xx	0.035073
- Maize	xx	xx	xx	-33.146
- Soybean	xx	xx	xx	0.035073
<b>Income elasticities of private household demand</b>	0.066	1996	Dianarafah (1999)	0.578005
<b>Uncompensated cross-price elasticities of demand by private household</b>				
- Rice	0.569	1989/90	Altemeier (1991)	-0.01945
	0.028	1996	Dianarafah (1999)	
- Maize	-0.338	1989/90	Altemeier (1991)	-0.13157
	-1.427	1996	Dianarafah (1999)	
- Soybeans	0.200	1989/90	Altemeier (1991)	-0.00263
	-0.152	1996	Dianarafah (1999)	
<b>Own-price compensated elasticities of household demand</b>	-0.332	1989/90	Altemeier (1991)	-0.129314
<b>Conditional own-price elasticities of import demand</b>	0.9497	1980-2001	Kariyasa (2004)	-33.617020
	1.5332	1980-2001	Kariyasa (2004)	
<b>Export demand elasticity</b>	xx	xx	xx	-2.550716

Table 3. The elasticity value of soybean in Indonesia

Elasticity/commodities	Previous results			GTAP
	Value	Year	Sources	
<b>Allen partial elasticity of substitution</b>				
- Rice	xx	xx	xx	0.035073
- Maize	xx	xx	xx	0.035073
- Soybean	xx	xx	Xx	-26.7334
<b>Income elasticities of private household demand</b>				
	0.241	1996	Dianarafah (1999)	0.578005
	0.104 to -0.425	Susenas 1990	Simatupang <i>et al</i> (1995)	
	0.540	1987	Tabor (1989)	
	0.753	1972-1974	Tabor (1989)	
<b>Uncompensated cross-price elasticities of demand by private household</b>				
- Rice	-0.893	1989/90	Altemeier (1991)	-0.01945
	0.321	1996	Dianarafah (1999)	
- Maize	0.336	1989/90	Altemeier (1991)	-0.00212
	-0.846	1996	Dianarafah (1999)	
- Soybeans	-0.549	1989/90	Altemeier (1991)	-0.13208
	-1.696	1996	Dianarafah (1999)	
	-0.275 to -0.180	Susenas 1990	Simatupang <i>et al</i> (1995)	
	-0.691	1987	Tabor (1989)	
<b>Own-price compensated elasticities of household demand</b>				
	-0.542	1989/90	Altemeier (1991)	-0.129281
<b>Conditional own-price elasticities of import demand</b>				
	-1.1308	1968-1996	Rachmawati (1999)	-63.041039
	-0.58	2004	Purnamasari (2006)	
	-0.72	2004	Purnamasari (2006)	
<b>Export demand elasticity</b>				
	xx	xx	xx	-4.802379

### Tools analysis

To respond to the objective, namely assessing ASEAN free trade impacts, this study uses a Global Trade Analysis Project/GTAP Modeling, i.e. GTAP Database Version 7<sup>3</sup>. GTAP analysis is one of a package of CGE models that can be used to see the impact of trade (tariffs, export subsidies, etc.) in the framework: (1) the country (single country) and (2) multi-markets, multi-country (many markets or countries). GTAP is a general equilibrium model (CGE) that is focused on the aspects of international trade of the countries in the world. GTAP emphasis is on the overall economy linkages (Oktaviani *et al.*, 2008).

GTAP analysis is one of the CGE model packages that has a database of up to 113 countries and 57 sectors or commodities. To observe *ex-ante* impacts of ASEAN collaboration with six partner countries (India, China, Japan, Korea, Australia, New Zealand, it is carried out through 18 simulations. The order of analysis can be seen in Figure 1.

This study conducts an aggregation, namely: (1) Indonesia, (2) other ASEAN countries, (3) AFTA partner countries, and (4) developed countries of the main producers of rice, corn,

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and soybeans and it also aggregates the commodities, namely: (1) rice and its processed products; (2) corn; (3) soybeans; (4) other foods, and (5) others commodities.

The adjustment of the instrument is as follows:

- (1) Scenario tariff cuts for the country of Indonesia and other ASEAN countries is down to 50% and 100%. Furthermore it can be called **U1 = down 50% and U2 = down 100%**.
- (2) Scenario six tariff cuts for partner countries is zero (fixed), down 50% and 100%. Furthermore it can be called **V1 = zero, V2 = down 50% and V3 = down 100%**
- (3) Scenario subsidy cuts output six partner countries, developed countries and a major producer of commodities rice, maize and soybean is zero, down 50% and 100%. Furthermore it can be called **W1 = zero , W2 = down 50%, W3 = Down 100%**. As for the six partner countries are India, China, Republic of Korea, Japan, Australia and New Zealand, while the developed countries or the countries major producers are the United States (as the main producer countries paddy / rice; corn and soybeans), Argentina and Brazil (as the main producer countries corn and soybeans), and Canada (as the country's leading producer of soybeans)

So the simulation is carried out as follows:

- (1) Simulation 1: U1V1W1
- (2) Simulation 2: U1V1W2
- (3) Simulation 3: U1V1W3
- (4) Simulation 4: U1V2W1
- (5) Simulation 5: U1V2W2
- (6) Simulation 6: U1V2W3
- (7) Simulation 7: U1V3W1
- (8) Simulation 8: U1V3W2
- (9) Simulation 9: U1V3W3
- (10) Simulation 10: U2V1W1
- (11) Simulation 11: U2V1W2
- (12) Simulation 12: U2V1W3
- (13) Simulation 13: U2V2W1
- (14) Simulation 14: U2V2W2
- (15) Simulation 15: U2V2W3
- (16) Simulation 16: U2V3W1
- (17) Simulation 17: U2V3W2
- (18) Simulation 18: U2V3W3

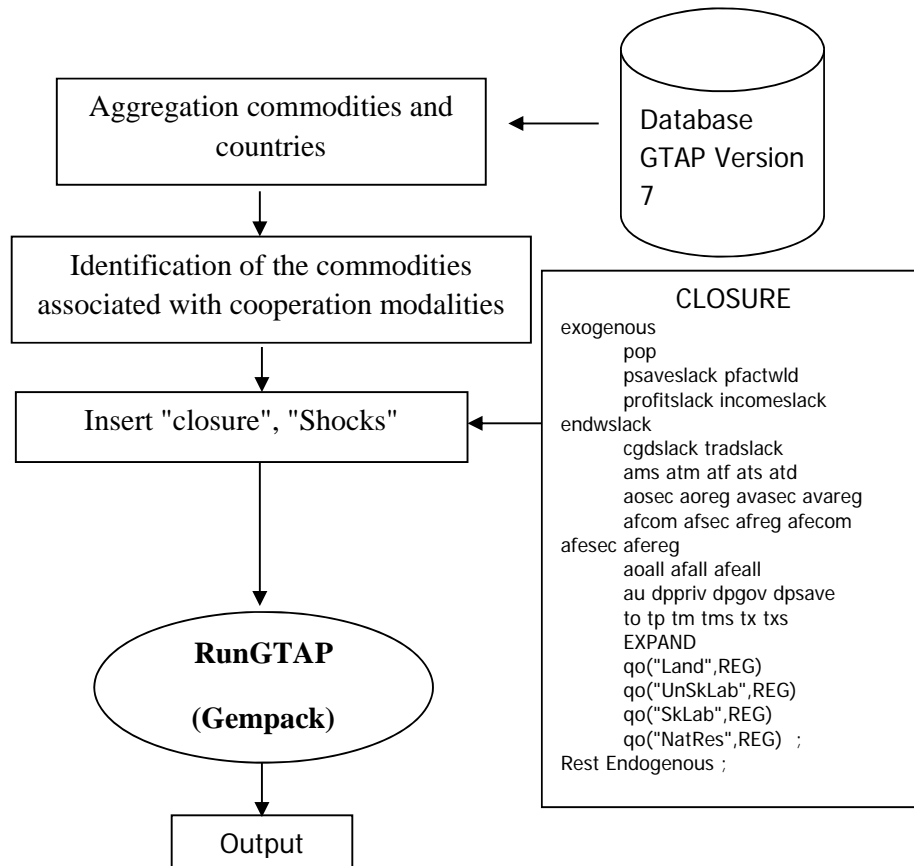


Figure 1. The order of analysis in the GTAP program (Hutabarat *et al.*, 2008)

## RESULTS AND DISCUSSION

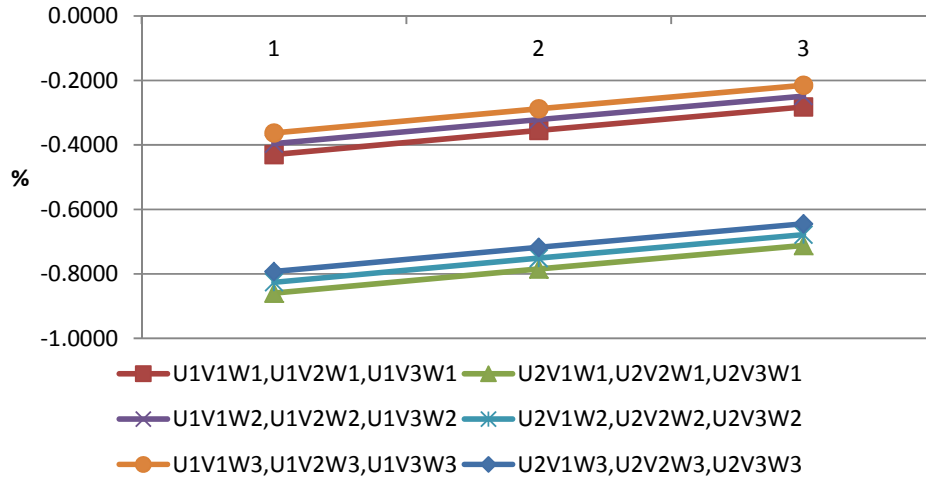
The simulation results showed the simultaneous impact of the reduction to the elimination of internal trade tariffs in the ASEAN and the six partner countries, and the elimination of developed countries subsidy (Figure 2 - 4) will lead to increased food production or output in Indonesia and other ASEAN countries, except Indonesia rice where the decline ranged from -0.8% to -0.2% (Figure 2a), while soybeans decreased in other ASEAN countries which ranged from -0.6% to -0.1% (Figure 3b).

In Indonesia, due to tariff reduction, resulting rice prices abroad are lower than domestic prices so that farmers reduce the desire to produce and result in decreased production. As is shown in above, it is known that corn and soybeans complement rice which consistently increased its demand. Thus in accordance with what is happening on the impact of free trade on a positive output changes in corn and soybean in Indonesia.

Other ASEAN countries indicated that initially, the ASEAN tariff reduction and the six partner countries impact the declined output, but if the developed countries reduce subsidies output significantly increased by 1.5% - 2%. This suggested that the cooperation between ASEAN and its agenda is output subsidies of developed countries, and will be an important concern in the future because this is a major commodity for the ASEAN countries.

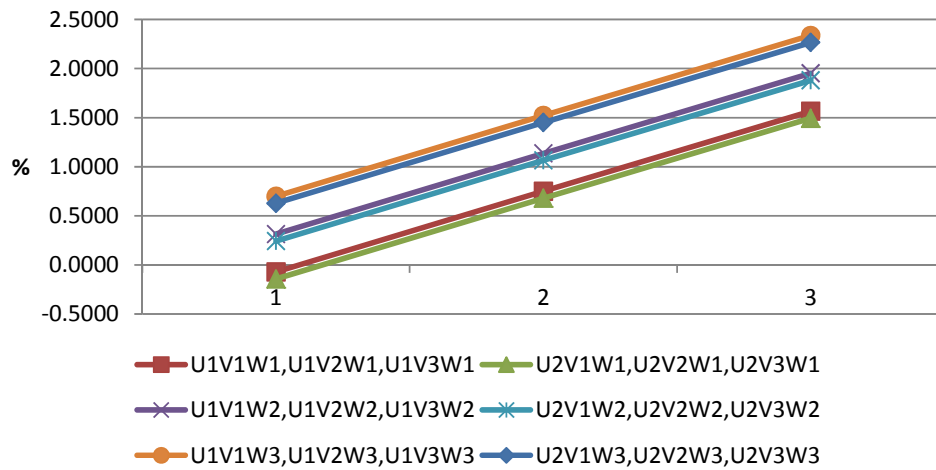


(a) Indonesia



Note: Cutting tariffs of ASEAN : U1 = down 50 % dan U2 = down 100%.  
Cutting tariffs of 6 country partners: V1= nil, V2 = down 50 % dan V3= down 100%  
Cutting subsidy's output of developed countries and the main of producer's countries : W1 = nil, W2 = down 50% dan W3 = down 100%

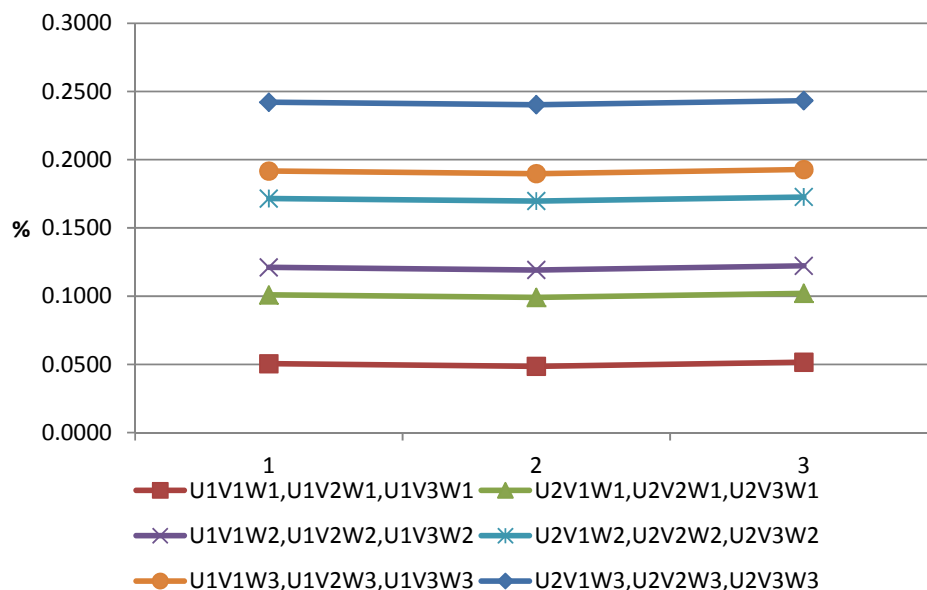
(b) Others of ASEAN



Note: Cutting tariffs of ASEAN : U1 = down 50 % dan U2 = down 100%.  
Cutting tariffs of 6 country partners: V1= nil, V2 = down 50 % dan V3= down 100%  
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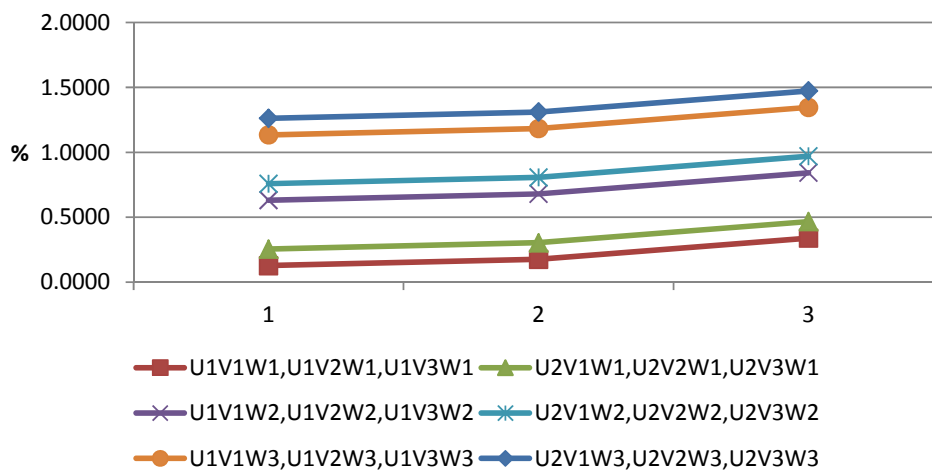
Figure 2. Impact of ASEAN Free Trade on percentage change output of paddy / rice in the ASEAN region (%)

(a) Indonesia



Note: Cutting tariffs of ASEAN : U1 = down 50 % dan U2 = down 100%.  
Cutting tariffs of 6 country partners: V1= nil, V2 = down 50 % dan V3= down 100%  
Cutting subsidy's output of developed countries and the main of producer's countries : W1 = nil, W2 = down 50% dan W3 = down 100%

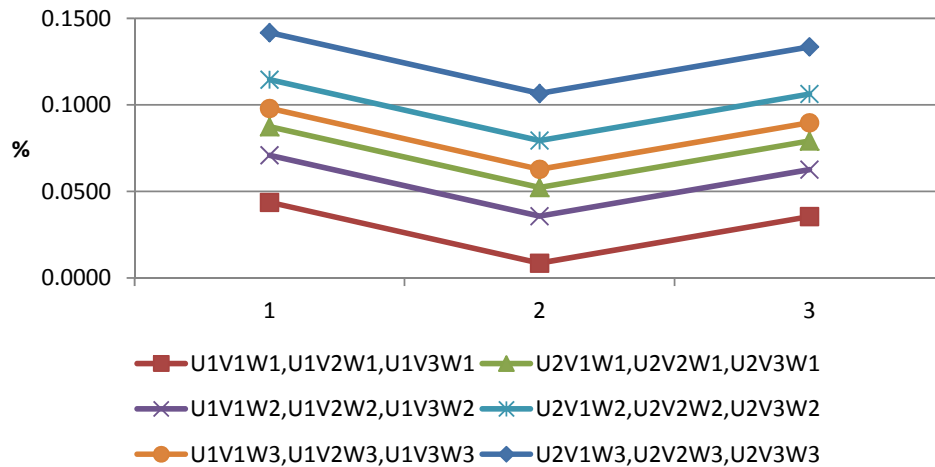
(b) Others of ASEAN



Note: Cutting tariffs of ASEAN : U1 = down 50 % dan U2 = down 100%.  
Cutting tariffs of 6 country partners: V1= nil, V2 = down 50 % dan V3= down 100%  
Cutting subsidy's output of developed countries and the main of producer's countries : W1 = nil, W2 = down 50% dan W3 = down 100%

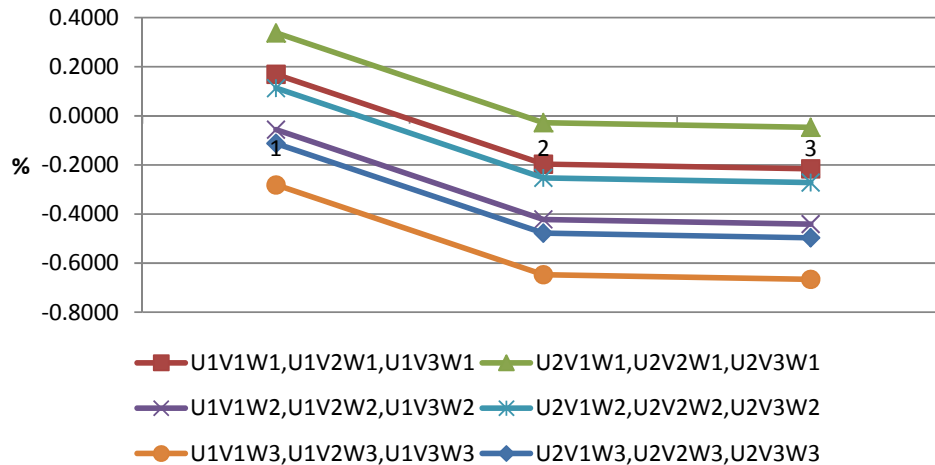
Figure 3. Impact of ASEAN Free Trade on percentage change output of maize in the ASEAN region (%)

(a) Indonesia



Note: Cutting tariffs of ASEAN : U1 = down 50 % dan U2 = down 100%.  
 Cutting tariffs of 6 country partners: V1= nil, V2 = down 50 % dan V3= down 100%  
 Cutting subsidy's output of developed countries and the main of producer's countries : W1 = nil, W2 = down 50% dan W3 = down 100%

(b) Others of ASEAN



Note: Cutting tariffs of ASEAN : U1 = down 50 % dan U2 = down 100%.  
 Cutting tariffs of 6 country partners: V1= nil, V2 = down 50 % dan V3= down 100%  
 Cutting subsidy's output of developed countries and the main of producer's countries : W1 = nil, W2 = down 50% dan W3 = down 100%

Figure 4. Impact of ASEAN Free Trade on percentage change output of soybean in the ASEAN region (%)

Unlike imported corn, the impact of output subsidy reduction of developed countries have output change of 0.5-1.5%, but for soybeans, there is a significant decrease of -0.6 to -0.1%. This means that soybeans is a competition crop to rice and corn, so if their volumes increase, that of soybeans will likewise decrease.

Based on the above description, there is still a need to strengthen domestic food production system in each ASEAN member countries through technology cooperation. Also, based on what is happening in the countryside, there is a desperate need to improve the

efficiency of production, particularly in increasing revenue. There is a need for a policy framework that can support increased food production while at the same time increase profits (gains) from each of the ASEAN member countries. It should be reminded that the market penetration rate of production is seen through the boundaries of a country the higher the market, will not be constrained by the dimensions of space and time (Love P., 2009; Feenstra, 1998; Devarajan, 1989; Bell, 1984 ; Chacholiades, 1981; Crovers, 1997 ) .

Indonesia needs to cooperate in increasing production either through intensification or extension together with other ASEAN countries. Thus to be considered in the development of production (Rahman *et al.*, 2008), there should be (1) an increase of the input supply and the smooth distribution to the farm level, post-harvest handling systems, the development of science and technology system, and seed subsidies; and (2) implementation of the policy price and subsidized farm credit program. Given the condition of the elasticity of substitution is complimentary and its impact in the simulation results are not expected, therefore there needs to be an effort in changing the supply of local food substitution and the development of processing industries and dissemination of knowledge of food and nutrition to the community (Rahman *et al.*, 2008).

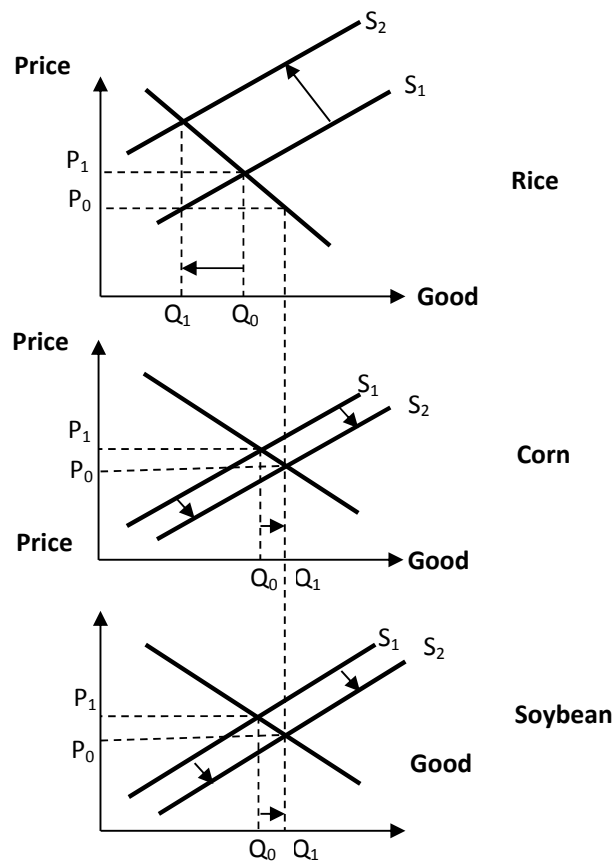
Simulations of various scenarios have been done, and the interesting thing here is that Indonesia should better not do rice import tariff exemption with the ASEAN scope to zero because it would reduce domestic production, that is, when 50 % tariff cut would decrease production ranging from -0.8% to -0.7%. On the other hand, 100% tariff cut will decrease the production of paddy between -0.4% to -0.2%, as shown in Figure 2. The impact of the higher decrease in output subsidies by developed countries will provide output or higher rice production. In addition, the impact of tariff reduction, along with six partner countries (ASEAN+6) will also provide increased production. This suggests that attention to protection against paddy rates within the ASEAN should not necessarily decline, but through ASEAN cooperation, can set tariffs against the six partner countries, and continue to keep asking the developed countries to reduce output subsidies. The last thing, which is quite a significant impact on rice production in ASEAN, because the developed countries perform output subsidy reduction will increase rice production in the ASEAN region. Thus the scope of tariff reduction paddy in the ASEAN is a final policy of the ASEAN rice trading patterns .

The ASEAN free trades' mpact on corn production due to tariff reduction together with six partner countries and the decline of subsidies output of developed countries in Indonesia, relatively has little impact, in contrast with other ASEAN countries that provide a better condition. However, both Indonesia and other members of the ASEAN have main priority in maize tariff reduction. The impacts have increased production, followed by a decline in output subsidies of developed countries resulting in lowering of tariffs among ASEAN +6. This suggests an important concern in the ASEAN free trade cooperation for improving maize production in Indonesia .

Increase the benefits of increased food production in the AFTA and ASEAN through the expansion of cooperation with the +6 AFTA tariff reduction simulation and output subsidies of developed countries, will provide an increase in Gross Domestic Product or GDP (Table 4). Beginning with the scope of the tariff cut simulation shows Indonesia and other ASEAN countries, with an impact on GDP growth (U1V1W1 - U2V1W1) of 0.1% to 0.02% and 0.001%-0.019% respectively. If they are followed by the expansion of tariff cuts through AFTA+6 then it will increase GDP growth of Indonesia and other ASEAN (U1V2W1 - U2V3W1) which are respectively from 0.012-0.022 and 0.005-0.009. If they are followed cutting output subsidy of developed countries and the main of rice producing countries then the impact of GDP growth Indonesia and other ASEAN (U1V2W2 - U2V3W3 ) respectively 0.022% – 0.04% and 0.012%-0.022%. This suggests that the scope of ASEAN trade needs to be followed by cutting subsidies output of developed countries.

Impacts of AFTA on Indonesian main food development indicate that only rice output has a negative growth, but corn and soybean outputs have positive trends. The pattern is not

only found on output indicators, but also on production factors use, i.e. land, skilled and unskilled labor, capital, and other natural resources. While the impact on ASEAN decline occurred in soybeans, this decrease could be due to increased planting of corn and rice crops, causing a decrease in soybean yield. The condition is due to: (1) Lowered import tariff of rice leading to lower rice price such that demand for rice decreases. It will also reduce rice production; (2) Cross-price elasticity of corn and soybeans applied in the GTAP analysis are negative -0.00212 and -0.00263. It indicates that rice and corn and also rice and soybeans are complementary; (3) Therefore, the shrinking price of rice will enhance the demands for corn and soybeans. In the price equilibrium, corn and soybean supplies shift assuming that price changes in corn and soybeans are not greater than that of rice because rice import tariff is greater than those of corn and soybeans. Along with rice import tariff decrease, it also applies for corn tariff; and (4) corn and soybean supplies shift results in corn and soybean production expansion. This shift is due to increases of production factors, i.e. land, labor, capital, and other natural resources. Rice supply shifts leftward due to negative production factors resulting in decrease of production. Assumptions of this GTAP model is Leontief production function, constant return to scale (CRS) and perfect competition. The following graph depicts the details.



Based on the shift described above, it causes negative net balance trade or import is greater than export. In the free trade, it is possible that imports increase because these three commodities are sensitive to price. In this GTAP model the price elasticities of rice, corn, and soybean to import are each of -76.06; -33.62; and -63.04 respectively. There are production factors which reduce costs although the income increases as shown by GDP improvement (Table 1). It leads to improved community's welfare especially on rice due to more decreasing significant production factors compared to those of corn and soybeans. Even though corn and

soybeans production improves, increases of production factors of those two commodities will enhance income at smaller amounts compared to that of rice.

**Table 4. Impact of ASEAN Free Trade to the GDP before and after the elimination of trade tariffs**

Countries	ASEAN Tariffs Down 50% (U1)				ASEAN Tariffs Down 100 % (U2)			
	Before	After	Change		Before	After	Change	
	US\$ Million	US\$ Million		%	US\$ Million	US\$ Million		%
<b>A. V1W1</b>								
Indonesia	254702.11	254728.33	26.22	0.01029	254702.11	254754.58	52.47	0.02060
Others of ASEAN	531569.06	531619.63	50.56	0.00951	531569.06	531670.25	101.19	0.01904
India	641257.88	641258.94	1.06	0.00017	641257.88	641260.00	2.13	0.00033
China	1674127.75	1674128.88	1.13	0.00007	1674127.75	1674130.25	2.50	0.00015
Japan	4658738.00	4658738.50	0.50	0.00001	4658738.00	4658739.50	1.50	0.00003
Republic of Korea	676497.25	676498.56	1.31	0.00019	676497.25	676499.94	2.69	0.00040
New Zealand	96443.37	96443.37	0.00	0.00000	96443.37	96443.38	0.01	0.00001
Australia	637790.38	637790.13	-0.25	-0.00004	637790.38	637789.88	-0.50	-0.00008
<b>B. V1W2</b>								
Indonesia	254702.11	254752.19	50.08	0.01966	254702.11	254778.44	76.33	0.02997
Others of ASEAN	531569.06	531656.13	87.06	0.01638	531569.06	531706.69	137.63	0.02589
India	641257.88	641172.81	-85.06	-0.01326	641257.88	641173.88	-84.00	-0.01310
China	1674127.75	1674242.88	115.13	0.00688	1674127.75	1674244.13	116.38	0.00695
Jepang	4658738.00	4659047.00	309.00	0.00663	4658738.00	4659048.00	310.00	0.00665
Korea	676497.25	676523.31	26.06	0.00385	676497.25	676524.69	27.44	0.00406
Selandia Baru	96443.37	96452.20	8.84	0.00916	96443.37	96452.21	8.84	0.00917
Australia	637790.38	637834.63	44.25	0.00694	637790.38	637834.38	44.00	0.00690
<b>C. V1W3</b>								
Indonesia	254702.11	254776.05	73.94	0.02903	254702.11	254802.30	100.19	0.03934
Others of ASEAN	531569.06	531692.56	123.50	0.02323	531569.06	531743.13	174.06	0.03275
India	641257.88	641086.69	-171.19	-0.02670	641257.88	641087.75	-170.13	-0.02653
China	1674127.75	1674356.75	229.00	0.01368	1674127.75	1674358.00	230.25	0.01375
Japan	4658738.00	4659355.50	617.50	0.01325	4658738.00	4659356.50	618.50	0.01328
Republic of Korea	676497.25	676548.06	50.81	0.00751	676497.25	676549.44	52.19	0.00771
New Zealand	96443.37	96461.04	17.67	0.01832	96443.37	96461.05	17.68	0.01833
Australia	637790.38	637879.13	88.75	0.01392	637790.38	637878.81	88.44	0.01387
<b>D. V2W1</b>								
Indonesia	254702.11	254732.98	30.88	0.01212	254702.11	254759.22	57.11	0.02242
Others of ASEAN	531569.06	531597.13	28.06	0.00528	531569.06	531647.69	78.63	0.01479
India	641257.88	641268.69	10.81	0.00169	641257.88	641269.75	11.88	0.00185
China	1674127.75	1674167.00	39.25	0.00234	1674127.75	1674168.25	40.50	0.00242
Japan	4658738.00	4659272.00	534.00	0.01146	4658738.00	4659273.00	535.00	0.01148
Republic of Korea	676497.25	677133.25	636.00	0.09401	676497.25	677134.63	637.38	0.09422
New Zealand	96443.37	96445.26	1.89	0.00196	96443.37	96445.27	1.90	0.00197
Australia	637790.38	637795.69	5.31	0.00083	637790.38	637795.44	5.06	0.00079
<b>E. V2W2</b>								
Indonesia	254702.11	254756.84	54.73	0.02149	254702.11	254783.08	80.97	0.03179
Others of ASEAN	531569.06	531633.56	64.50	0.01213	531569.06	531684.13	115.06	0.02165
India	641257.88	641182.56	-75.31	-0.01174	641257.88	641183.63	-74.25	-0.01158
China	1674127.75	1674280.88	153.13	0.00915	1674127.75	1674282.25	154.50	0.00923
Japan	4658738.00	4659580.50	842.50	0.01808	4658738.00	4659581.50	843.50	0.01811
Republic of Korea	676497.25	677158.00	660.75	0.09767	676497.25	677159.38	662.13	0.09788
New Zealand	96443.37	96454.09	10.73	0.01112	96443.37	96454.10	10.73	0.01113
Australia	637790.38	637840.19	49.81	0.00781	637790.38	637839.94	49.56	0.00777

Continued (Table4)

Countries	ASEAN Tariffs Down 50% (U1)				ASEAN Tariffs Down 100 % (U2)			
	Before	After	Change		Before	After	Change	
	----- US\$ Million -----	----- US\$ Million -----	----- % -----	----- % -----	----- US\$ Million -----	----- US\$ Million -----	----- % -----	----- % -----
<b>F. V2W3</b>								
Indonesia	254702.11	254780.70	78.59	0.03086	254702.11	254806.94	104.83	0.04116
Others of ASEAN	531569.06	531670.00	100.94	0.01899	531569.06	531720.56	151.50	0.02850
India	641257.88	641096.44	-161.44	-0.02518	641257.88	641097.50	-160.38	-0.02501
China	1674127.75	1674394.88	267.13	0.01596	1674127.75	1674396.13	268.38	0.01603
Japan	4658738.00	4659889.00	1151.00	0.02471	4658738.00	4659890.00	1152.00	0.02473
Republic of Korea	676497.25	677182.75	685.50	0.10133	676497.25	677184.13	686.88	0.10153
New Zealand	96443.37	96462.93	19.56	0.02028	96443.37	96462.94	19.57	0.02029
Australia	637790.38	637884.69	94.31	0.01479	637790.38	637884.44	94.06	0.01475
<b>G. V3W1</b>								
Indonesia	254702.11	254732.42	30.31	0.01190	254702.11	254758.66	56.55	0.02220
Others of ASEAN	531569.06	531566.38	-2.69	-0.00051	531569.06	531616.94	47.88	0.00901
India	641257.88	641280.69	22.81	0.00356	641257.88	641281.75	23.88	0.00372
China	1674127.75	1674210.50	82.75	0.00494	1674127.75	1674211.88	84.13	0.00503
Japan	4658738.00	4659805.50	1067.50	0.02291	4658738.00	4659806.50	1068.50	0.02294
Republic of Korea	676497.25	677767.75	1270.50	0.18781	676497.25	677769.06	1271.81	0.18800
New Zealand	96443.37	96447.11	3.74	0.00388	96443.37	96447.12	3.75	0.00389
Australia	637790.38	637801.00	10.63	0.00167	637790.38	637800.75	10.38	0.00163
<b>H. V3W2</b>								
Indonesia	254702.11	254756.28	54.17	0.02127	254702.11	254782.52	80.41	0.03157
Others of ASEAN	531569.06	531602.81	33.75	0.00635	531569.06	531653.38	84.31	0.01586
India	641257.88	641194.56	-63.31	-0.00987	641257.88	641195.63	-62.25	-0.00971
China	1674127.75	1674324.50	196.75	0.01175	1674127.75	1674325.75	198.00	0.01183
Japan	4658738.00	4660114.00	1376.00	0.02954	4658738.00	4660114.50	1376.50	0.02955
Republic of Korea	676497.25	677792.50	1295.25	0.19146	676497.25	677793.81	1296.56	0.19166
New Zealand	96443.37	96455.94	12.57	0.01303	96443.37	96455.95	12.59	0.01305
Australia	637790.38	637845.50	55.13	0.00864	637790.38	637845.25	54.88	0.00860
<b>I. V3W3</b>								
Indonesia	254702.11	254780.14	78.03	0.03064	254702.11	254806.38	104.27	0.04094
Others of ASEAN	531569.06	531639.25	70.19	0.01320	531569.06	531689.81	120.75	0.02272
India	641257.88	641108.44	-149.44	-0.02330	641257.88	641109.50	-148.38	-0.02314
China	1674127.75	1674438.38	310.63	0.01855	1674127.75	1674439.63	311.88	0.01863
Japan	4658738.00	4660422.50	1684.50	0.03616	4658738.00	4660423.00	1685.00	0.03617
Republic of Korea	676497.25	677817.25	1320.00	0.19512	676497.25	677818.56	1321.31	0.19532
New Zealand	96443.37	96464.77	21.41	0.02220	96443.37	96464.78	21.41	0.02220
Australia	637790.38	637890.00	99.63	0.01562	637790.38	637889.75	99.38	0.01558

Sumber : Processing results of GTAP

## CONCLUSIONS

Impacts of AFTA on Indonesian main food development indicate that only rice output has a negative growth, but corn and soybean outputs have positive trends. The pattern is not only found on output indicators, but also on production factors use, i.e. land, skilled and unskilled labor, capital, and other natural resources. The impact of ASEAN free trade leads to three main commodity imports. However, this results in an increase in GDP and an increase in social welfare.

Output drop of rice commodity in Indonesia due to lower tariff in the ASEAN countries indicates that Indonesia still needs more comprehensive policy on product development. Relatively high price elasticities to import demand (in using of this research) show that Indonesia is a significant market for the main food producers. Therefore food diversification policy is still important in rice consumption control. On the other hand, more efficient production factors use are critical in the future since use of land, irrigation and labor



become more competitive. Thus, technology acceleration disseminated to the farmers becomes the main program such that commodity availability corresponds to domestic production growth. Farmers' capital plays significant role implying that all financial institutions in rural areas should keep providing credit required by the farmers.

In particular the development of international trade model takes a broader linkage system that uses a more relevant analysis tools which can be used in accordance with the objectives of agricultural development which focused on national food sovereignty.

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