

THE FRAME OF AGRICULTURAL POLICY AND RECENT MAJOR AGRICULTURAL POLICIES IN INDONESIA

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ABSTRACT

Agricultural development in Indonesia has been successful in promoting food production, particularly rice and maize. Major policy instruments to achieve the policy objectives are price support and fertilizer subsidy, particularly for rice. While providing positive impacts to the farmers, price support policy has negative impact to the consumers, increasing the prevalence of under nutrition by 2-22%. Future agricultural development should focus on bioindustry to utilize the available biomass in agriculture, supported by strong research & development, and sound policy framework.

Keywords: food production, price support, under nutrition, bioindustry

INTRODUCTION

In 2013 agriculture accounted for 14.4% of GDP and 34.4% of employment. Furthermore, the sector also plays a significant role in ensuring food security, poverty alleviation, source of foreign exchange earning, supplier of raw material for processing industry, and provide natural landscape services. Therefore, agriculture development has been and will remain a priority in national development agenda.

In addition to government policy, the performance of agricultural sector is also reflecting the influence of external strategic environments. Emerging global issues affecting food and agricultural sector come from demand and supply factors. On demand side, population growth, increased income, urbanization, and dietary changes require higher and better quality of food and agriculture products (IFPRI, 2013). On the other hand, on supply side our capacity to produce food and agriculture products has been constrained by increasing scarcity of resources (particularly land, water, and energy), increased prices of inputs, and climate change. Therefore, sound agricultural policy framework should respond to dynamic changes on those strategic environments.

The purpose of this paper is to highlight the frame and most recent agricultural policy development in Indonesia. After introduction, the paper briefly review major features of agriculture, follow by a description on the most recent agricultural policy framework. Finally, the paper concludes by emphasizing the need to revisit the priority of future agricultural development strategy.

MAJOR FEATURES OF AGRICULTURE

Farm structures

According to the agriculture census of 2013, the number of farm household has declined from 31.2 millions in 2003 to 26.1 millions in 2013 (Central Bureau of Statistic, 2013). On the contrary, the number of agricultural corporation has increased from 4.0 millions in 2003 to 5.5 millions in 2013. This trend has reversed the previous trend, when the number of farm household still increased during the period of 1993-2003 (Sudaryanto, et.al. 2009). Based on this observation Indonesian agriculture has started an early stage of transformation toward larger farm size and increasing role of larger agricultural corporation. As a country with significant share of labor in agriculture coupled with limited land resources, this trend has signaled a desirable development path toward more efficient and productive agricultural sector.

Disaggregation of farm household by farm size also shows an interesting figure. The proportion of small farms (operating <0.50 ha) has declined from 63.4% in 2003 to 46.8% in 2013 (Table 1). On the other hand, the percentage of larger farms (operating >2.0 ha) has increased from 9.8% in 2003 to 12.4% in 2013. The average farm size has also increased from 0.41 ha in 2003 to 0.89 ha in 2013.

Table 1. Number of farm households by size, 2003 and 2013

Farm Size (ha)	2003		2013	
	Household (million)	%	Household (million)	%
<0.10	9.4	30.1	4.3	16.6
0.10-0.49	10.4	33.3	10.3	30.2
0.50-0.99	4.8	15.3	4.6	17.4
1.00-1.99	3.7	11.7	3.7	14.3
>2.00	3.0	9.8	3.2	12.4
Total	31.2	100	26.1	100

Source: Calculated from Central Bureau of Statistic (CBS)

Structure of farm size also varies across sub-sectors. Small farms are mostly found in the food crops, with an average farm size of 0.3 ha in Java and 1.4 ha in off-Java. However, in the case of perennial crops (oil palm, rubber, cocoa, coffee, etc) we may find both smallholders and large companies (OECD, 2012). The share of smallholders in the area planted ranges from 40-45% for oil palm and coffee, but much higher for rubber and cocoa, around 80-90% in 2001-2007 (Fuglie, 2010a).

Production of major crops

According to OECD (2012) gross agricultural output has increased by 97% during 1990-2010, with crop production rising by 97% and livestock production by 89%. The composition of crop production has shown the change away from staple

food crops, particularly rice, to other commodities, particularly, palm oil. Among staple food, rice is one of the most strategic crop accounted for about 18.8 % of total value of agricultural production in 2009. However, the share of palm oil in the value of agricultural production has increased significantly from 6.3% in 2000 to 11.6% in 2009. In term of crop area, rice is accounted for around one-third of the total, but the share declined slightly in the 2000s (OECD, 2012). On the contrary, the share of area planted to oil palm has increased significantly from 3% in 1990 to 14% in 2008.

During 2002-2006 periods, Total Factor Productivity (TFP) grew at a rate of 2.9% per year, which contributed around 60% to agricultural growth, and the rest 40% was due to the increase on resource use. Main drivers of the growth on TFP during that period are: adoption of improved technology, diversification into high-value commodities, and expansion of area planted to perennial crops (Fuglie, 2010b).

Rice production has grown at a rate of 3.5 %/year during 2005-2013, which was due to 1.9 % growth on harvested area and 1.45% growth on yield (Table 2). Productivity of rice at around 5.2 mt/ha in 2013 was higher than that in Thailand and the Philippines, but lower than that in China and Vietnam. The last two countries have adopted hybrid rice extensively, whereas in Indonesia this type of rice is still at early stage of development. Other staple food which also shows an impressive growth is maize, which increased at a rate of 5.5%/year during the same periods. The significant growth of maize was due mostly to impressive growth of yield (4.3%/year), whereas harvested area was only grew at a rate of around 1%/year. The significant growth of maize yield was driven particularly by extensive adoption of hybrid seed, promoted by private seed companies (mostly multinational corporations).

Table 2. Trend of rice production, 2005-2013

Year	Harvested area (million ha)	Yield (mt/ha)	Production (million mt)
2005	11.8	4.6	54.2
2006	11.8	4.6	54.5
2007	12.1	4.7	57.2
2008	12.3	4.9	60.3
2009	12.9	5.0	64.0
2010	13.3	5.0	66.5
2011	13.2	5.0	65.8
2012	13.4	5.1	69.1
2013*)	13.8	5.2	71.3
Growth (%/year)	1.92	1.45	3.45

Source: Central Bureau of Statistic; *) Preliminary figure

On perennial crops, palm oil production shows a remarkable growth. Responding to the growth on demand in the international market, production of palm oil in 2010 was nine times higher than in 1990. Since 2007 Indonesia has been the largest palm oil production, ahead of Malaysia. Cocoa production has also expanded significantly in response to the growth in both domestic and the world markets. In 1990-2010, cocoa production has increased six-fold which lead Indonesia as the second largest producer of cocoa, contributing to 18% of the world cocoa production.

Table 3. Trend of maize production, 2005-2013

Year	Harvested area (million ha)	Yield (mt/ha)	Production (million mt)
2005	3.6	3.5	12.5
2006	3.3	3.5	11.6
2007	3.6	3.7	13.3
2008	4.0	4.1	16.3
2009	4.2	4.2	17.6
2010	4.1	4.4	18.3
2011	3.9	4.6	17.6
2012	4.0	4.9	19.4
2013*)	3.8	4.8	18.5
Growth (%/year)	0.96	4.27	5.45

Source: Central Bureau of Statistic; *) Preliminary figure

Food security

In 2012, the available energy was estimated at 4 475 kilo calories/capita/day, and the available protein was 83.9 grams/capita/day, above the recommended rate of 2 200 kilo calories and 57 grams respectively. However, the actual energy consumption just reached 92.6% to the recommended rate, whereas the consumption of protein was already above the recommended level (102.2%).

Despite these achievements, around 19.5% of the population still suffer from food insecurity problem (energy consumption less than 1 400 kilo calories/capita/day). Furthermore, according to the 2013 Global Hunger Index, Indonesia was in the serious category (hunger index of 10.1), below Malaysia and Vietnam, but above Cambodia, Lao PDR, and the Philippines (IFPRI, Concern Worldwide, and Welhungerhilfe, 2013).

On the other side, the success story of Indonesia in strengthening food security has been recognized in international community. In June 2013, Indonesia along with other 17 countries received an award from FAO for achieving the target of the Millennium Development Goal (MDGs) number one (reducing hunger and poverty by

half in 2015) earlier than the target. In 2013, the number of people live below poverty line was 28.6 millions (11.5%).

Trade

Despite deficit of the national current account balance, agriculture always contributes to foreign exchange surplus. The surplus has significantly increased from US\$ 13.1 billions in 2009 to US\$ 20.9 billions in 2013. In 2011, the surplus achieved the highest level during five years period due to price spike of most of the agricultural commodities. Estate crops, particularly palm oil and rubber, is the primary contributor to foreign exchange surplus which increased from US\$ 17.6 billions in 2009 to US\$ 28.0 billions in 2013. On the contrary, food crops, horticulture, and livestock experienced trade deficit in 2009-2013. Indonesia still imports wheat, soybean, and also rice, and maize. Imported horticulture products are particularly temperate regions fruits such as apple, pear, grape, and oranges. Beef is the most significant imported livestock product due to accelerated domestic demand while production is lag behind.

On export side, palm oil contributed to 50.4% of agriculture export earning in 2010-2012, whereas the contribution to rubber was around 24.6% in the same period. Furthermore, the composition of export of processed products also showed an increasing trend, particularly palm oil and cocoa. In 2010-2012, the proportion of export of processed palm oil reached 45% in average, and similarly the average proportion of export of processed cocoa, which reached 46.7% during the same period. Export of cocoa products showed an impressive trend from 26.3% in 2010, 52.7% in 2011, and 61.3% in 2012.

Table 4. Current account balance of trade in agriculture, 2009-2013 (billion US\$)

Sub-sector	2009	2010	2011	2012	2013*)
1. Food crops					
Export	0.3	0.5	0.6	0.2	1.0
Import	2.7	3.9	7.0	6.3	5.7
Balance	-2.4	-3.4	-6.4	-6.2	-4.7
2. Horticulture					
Export	0.4	0.4	0.5	0.5	0.8
Import	1.1	1.3	1.7	1.9	1.5
Balance	-0.7	-0.9	-1.2	-1.3	-0.7
3. Estate crops					
Export	21.6	30.7	40.7	33.1	30.7
Import	3.9	6.0	8.8	3.1	2.7
Balance	17.6	24.7	31.8	30.0	28.0
4. Livestock					
Export	0.8	1.0	1.6	0.6	1.2
Import	2.1	2.8	3.0	2.7	3.0
Balance	-1.4	-1.8	-1.4	-2.1	-1.8
5. Total					
Export	23.0	32.5	43.4	34.3	33.7
Import	9.9	14.0	20.6	14.0	12.8
Balance	13.1	18.5	22.8	20.4	20.9

Source: Calculated from Central Bureau of Statistic; *)Data for December 2013 was estimated

AGRICULTURAL POLICY FRAMEWORK

Agricultural development plan

As described in the Strategic Plan of Agriculture for 2009-2014, the primary goals of agricultural development during that period are (Ministry of Agriculture, 2011): (a) achieve and maintain self sufficiency of five strategic commodities (rice, maize, soybean, sugar, and beef); (b) enhance food diversification; (c) increase value added, export, and competitiveness; (d) increase farmers' welfare. To achieve those goals the Ministry of Agriculture implement seven strategic policies, focusing on revitalization of: (a) land resources; (b) seed and breed; (c) infrastructures; (d) human resources; (e) agriculture finance; (f) farmers' institution; (g) technology and downstream industry.

Among the four primary goals, maintaining and achieving self-sufficiency of five strategic commodities has been the highest priority, particularly on rice. More specifically, the Ministry of Agriculture has set the target to achieve 10 millions mt of rice surplus in 2014. Somewhat less ambitious targets are also set for other commodities. Therefore, any policy instrument will always be considered in order to achieve self-sufficiency.

Agricultural land policies

As mentioned earlier, 46.8% of farmers categorized as smallholder farms managing less than 0.5 ha of land. With small parcel of land, farm household cannot rely on farming only as source of their livelihood. Furthermore, land available for food production in aggregate is declining due to land conversion for other purposes such as industry, residential, and public infrastructures. Some estimates mentioned that, the rate of agricultural land conversion is roughly 100 thousands hectare/year. On the other hand, the capacity of government to open up new agricultural land is very limited.

Responding to this challenge, the government has launched the Law No.41/2009 on Protection of Sustainable Food Crops Farmland. Major elements of this law are: (a) local government determines a protected zones dedicated to food crop production and cannot be converted for other purposes; (b) any party willing to do land conversion in the protected zone must prepare replacement of the land with similar quality in other region; (c) local government is in charge of monitoring the implementation of the law in their respected regions.

In practice the implementation of the law is not strictly enforced, which indicate that economic incentive to change agricultural land for other purposes is more important. The most common case is conversion of paddy land areas located around palm oil plantation, due to higher return offered by palm oil plantation.

Environment and natural resources

The environment is threatened by a growing population, increasing urbanisation, and rapid economic development, which put pressure on natural resources. Agriculture is a critical sector that can either increase or mitigate negative environmental impacts (OECD, 2012). Achieving the self-sufficiency targets for five food commodities requires agricultural intensification and the expansion of agricultural land.

The expansion of perennial crops, particularly palm oil is leading to rapid deforestation and a leading contributor to Green House Gas (GHG) emissions. The area of palm oil plantations is projected to increase from 8 million ha in 2011 to over 11 million ha in 2020. Deforestation contributes to climate change and leads to wildfires, floods, soil erosion, desertification, declining water quality, and downstream sedimentation. Indonesia accounts for one third of deforestation-related carbon emissions, making it one of the world's largest greenhouse gas emitters, with 75% of its emissions resulting from deforestation.

Responding to the above mention problems, stronger environmental protection has been legislated. The Law No.23/1997 on Environmental Management supports the principles of environmentally sustainable development, promotes the precautionary principle, inter-generational equity and the polluter-pays principle, and sets rules and obligations to perform the environmental impacts assesment (AMDAL) of agricultural projects. The Law No. 32/2009, revising the Law No.23/1997, upgrades the authority of the Ministry of Environment (MoE) by giving it the power to issue environmental licenses for large-scale priority projects, to revoke environmental licenses, to arrest and detain persons in co-ordination with the police, and to sue persons or companies for causing a loss to the state. It also increases sanctions on environmentally damaging activities and stipulates sanctions for government officials who issue licenses or undertake supervision inappropriately or illegitimately.

As a follow up action to the 2009 High Level Conference on Climate Change in Copenhagen, the government has given a commitment to reducing GHG emissions from peat, energy, waste, forestry, industry and agriculture by 26% in 2020. As a step to achieve this, the Ministry of Agriculture has been entrusted with the task of reducing GHG emissions by 29.3 mt of CO₂ from agriculture and 55.6 mt of CO₂ from peat during 2010-14.

At the eighth annual Roundtable Sustainable Palm Oil (RSPO) conference in November 2010, Indonesia announced its own Indonesian Sustainable Palm Oil (ISPO) scheme, to enhance the environmental sustainability of palm oil production. This scheme has been implemented voluntarily since February 2011, and it becomes mandatory for all Indonesian palm oil producers in 2012. The emergence of ISPO has been motivated by concerns of the government and the Indonesian Palm Oil Producers Association (GAPKI) regarding the RSPO scheme, including: (a) certification costs prohibitive for small and medium-sized enterprise and smallholders; (b) departure of the RSPO scheme from its original objectives to evolve into a non-tariff trade barrier on palm oil imports; and (c) lack of consideration of the conditions specific to domestic laws and regulations.

Production and marketing policies

As part of food security policy, production policy is focused to achieve (or maintain) self-sufficiency on five priority commodities, namely rice, maize, soybean, sugar, and beef. Among five commodities, rice production receives higher supports. Therefore, discussion in this section will focus mainly on rice.

To achieve self-sufficiency target, each year the Ministry of agriculture set the target on planted area and yield of rice disaggregated by provinces and districts, and discuss the target with agricultural officers from the provincial governments. The policy to achieve the targets include: (a) dissemination of new production technology; (b) facilitate the availability of production inputs (seed, fertilizer, chemical); (c) provide subsidy on fertilizer and seed; (d) procurement of limited quantity of paddy at the reference price; (e) support to extension services around the country. In the following, we will discuss the two most important policies, namely subsidy on fertilizer and seed, and price policy.

Subsidy on fertilizer and seed. To accelerate productivity growth, particularly for staple food, the application of modern input such as fertilizer is essential. In promoting the application of fertilizer by smallholder the government provide subsidy, so that the farmers may buy fertilizer at affordable price (exclusively for farmer operating less than two hectares of land). The subsidy is given indirectly to fertilizer manufacturer, which then sell the fertilizer to the farmer at lower price than otherwise. Before the beginning of the planting season, the Ministry of Agriculture issues a decree on the estimated demand for different type of fertilizer by provinces along with the reference price of fertilizer at the retail level. Based on this information, the Governor of the corresponding provinces break down demand for fertilizer in every district. The decree also serves as a reference for the fertilizer companies to distribute fertilizer in the corresponding regions.

In 2014, the demand for fertilizer is estimated around 3.6 millions mt of nitrogen (Urea), 760 thousand mt of phosphate (SP-36), 800 thousand mt of Zinc Ammonia (ZA), 2 millions mt of compound fertilizer (NPK), and 800 thousand mt of organic fertilizer. The reference retail prices of those fertilizers are: US\$ 0.16/kg for Urea, US\$ 0.17/kg for SP-36, US\$ 0.12/kg for ZA, US\$ 0.20/kg for NPK, and US\$ 0.04/kg for organic fertilizer. In 2013, total expenditure for fertilizer subsidy was around US\$ 1.4 billion. According to OECD (2012), expenditure on fertilizer subsidy is accounted for about 37% of total budgetary support to agriculture in 2006-2010.

Similar subsidy scheme is also used for seed of rice, maize, and soybean. The seed is produced by state own enterprises (PT Sang Hyang Sri and PT Pertani) in collaboration with the farmers. In 2013 the government distributed 152 thousands mt of subsidized seed (rice, maize, and soybean), with total budget of US\$ 150.3 millions. According to the Decree of the Minister of Agriculture No.67/2013, the subsidy is around 75% for open pollinated rice, 91% for hybrid rice, 77% for open pollinated maize, 55% for hybrid maize, and 76 % for soybean. With that subsidy, the retail price of the seeds are as follows: US\$ 0.20/kg for open pollinated rice, US\$ 0.43/kg for hybrid rice, US\$ 0.23/kg for open pollinated maize, US\$ 1.27/kg for hybrid maize, and US\$ 0.31/kg for soybean.

Price policy. In view of achieving self-sufficiency objective, price of staple food, notably rice, is highly regulated. To ensure sufficient incentive for the farmers,

the government determine procurement price for rice higher than the world market price. The procurement price serves as a reference for BULOG (state own enterprises) to buy rice from the farmers. Even though BULOG only procures around 5% of the total rice production, but this scheme has influenced the market price to move upward than otherwise. The stock of rice procured by BULOG is used for two purposes: (a) sell rice at the subsidized price for poor families (RASKIN, rice for the poor program); (b) open market operation to stabilize rice price at the retail level if the price has reached a certain level. In 2014 BULOG will distribute rice to 15.5 million poor household under the RASKIN program, with total budget around US\$ 1.6 billion. Every poor household is entitled to buy 15 kg rice/month at subsidized price (US\$ 0.14/kg). However, according to Rahayu (2014), because of the leakage to non-beneficiaries, the quantity of rice distributed to the poor is only around 4 kg/month at the price higher than the reference US\$ 0.14/kg.

With this policy framework, coupled with rice import control, domestic rice price has been around 13-18% higher than the world market price (Table 5). The exception was in the year 2005-2006 and 2008-2009 when the world market price was accelerated, then to stabilize rice price, the domestic price is lower than the corresponding parity price. This observation indicates that domestic rice farmers have enjoyed a moderate protection at the expense of rice consumers (some of them are small holder farmers). OECD (2014) estimated that price support policy increases the number of people suffer from under nutrition by 2-22%.

To a lesser extent similar policy is also applied to soybean. Driven by accelerated soybean price in 2012, the Minister of Trade released a decree No.47/2013 on soybean price policy. Under this decree, BULOG procures soybean grain from the farmer at the reference price of US\$ 0.65/kg at the farm gate. BULOG then sell the soybean to small scale processing industries at subsidized price. Therefore this policy is intended to cushion farmers from low price of soybean at the farm gate, and at the same time ensures the small-scale soybean processing industries to secure supply of soybean at reasonable price.

Food security and safety

Enhancing national food security has been one of the strategic policy goals. Based on Food Law No.18/2012, the state has an obligation to secure the availability and access, to adequate, balanced, safe, and nutritious food consumption at national, regional, and individual level in all regions of the country by utilizing local resources, institution and culture. Some important elements of the law are: (a) the state should pursue food sovereignty and food self reliance; (b) based on this principle, food import is only allowed when domestic production cannot meet domestic consumption.

To enhance food security status of all population, the government pursues a twin tract strategy, namely: (a) in the long run to promote economic development on rural and agriculture bases, to provide employment opportunities and income generation; (b) to meet demand for food, particularly the poor and food vulnerable people through direct assistance and community empowerment to make them able to develop their own food security. Based on this strategy, the priority program are: (a) promote a sustainable food production system; (b) develop & strengthen food reserved managed by local government and community; (c) accelerate diversification of food production and consumption

by utilizing local resources; (d) community empowerment on food security, to build resilient to various food insecurity's shock.

With regard to food safety aspect, the National Drug and Food Agency set a policy on food standard and regularly collect food sample and conduct laboratory test of food product sold in the market place. For the Ministry of Agriculture, the challenge is how to ensure that farmers apply good agricultural practices to comply with the established standards. Therefore, one of the priority programs is to build capacity of the farmers on applying an appropriate technology in accordance to those standards.

Table 5. Comparison of domestic (retail) and parity price of rice, 2005-2013

Year	Domestic price (US\$/kg)*	Parity price (US\$/kg)**	Domestic/parity price (%)
2005	0.34	0.42	81.0
2006	0.47	0.57	82.5
2007	0.56	0.49	114.3
2008	0.59	0.89	66.3
2009	0.59	0.79	74.6
2010	0.72	0.68	105.9
2011	0.86	0.73	117.8
2012	0.85	0.75	113.3
2013	0.84	0.74	113.5

Source: Ministry of Agriculture; *) Medium quality rice; **)Thai broken 5%

Agricultural disaster insurance

Indonesia is one of the country that is prone to natural disaster affecting agriculture such as pest and diseases infestation, earthquake and tsunami, flood and drought. The disaster may directly affect the lost of crop yield and indirectly to the lost of asset and public infrastructures influencing livelihood of the people in the rural community. According to OECD (2014), the infestation of brown plant hopper in 1998 and 2011, as the most significant pest affecting rice production, has reduced rice production by as much as 12%.

To partially compensate the impact of natural disaster to the farmers experiencing total lost of the crops, the government provide assistance at the amount of US\$ 69.3/ha. The budget is managed and released by the Ministry of Agriculture after receiving request from the local government. Provincial and regency government also set similar policies but with different amount of assistance depend on budget capacity of the local government. For those farmers experiencing partial damage of the crops, the Ministry provides assistance in the form of seed, to stimulate farmers replant their field.

In the long run, a much more sustainable financing of the impact of natural disaster is through agricultural insurance. Currently the Ministry of Agriculture is implementing a pilot project on crop insurance for the rice farmers involving local government and insurance company. The insurance coverage is equal to production cost of US\$ 500/hectare, with the premium of 3% of the coverage (US\$ 15). At the pilot stage, government provide 80% subsidy of the premium. However, the premium subsidy is gradually phase out and ultimately will be paid fully by the farmers.

Trade liberalization counter measures

Indonesian trade policy (include agriculture) has experienced a series of deregulation processes responding to various commitments such as WTO, ASEAN Economic Community, and Free Trade Agreement (FTA) with selected countries, such as Australia/New Zealand, China, and Japan. As a result, average Most Favored Nation (MFN) tariff of agriculture products was around 5.3% in 2010, significantly lower than the corresponding bound rate of 47%. In the case of rice, a specific tariff rate of US\$ 0.04/kg is applied, or equivalent to 20% of *ad valorem* tariff rate. In addition, import of rice is only implemented exclusively by BULOG at the amount decided by the government based on the rice supply-demand in the country. However, import of rice for special purposes (health/dietary consumption and seed) can be done by any importer holding import permit and recommendation from the Ministry of Agriculture. Similar to rice, a specific tariff is also applied to sugar. The tariff rate is US\$ 0.05/kg for raw sugar from cane and US\$ 0.06/kg for raw sugar from beet, which are equivalent to 30% and 35% *ad valorem* tariff respectively.

For selected products, in addition to tariff, non-tariff barriers are also imposed. Import of beef and certain horticulture products was regulated by restricted import permit coupled with determining import quota for the corresponding products. Due to reaction from the importers and cumbersome in the implementation, in 2013 the policy was modified by determining a threshold price for the corresponding commodities. If the market price falls below the threshold level, then import will be stopped temporarily. Again, this policy is also subject to criticism because it creates uncertainty to importers.

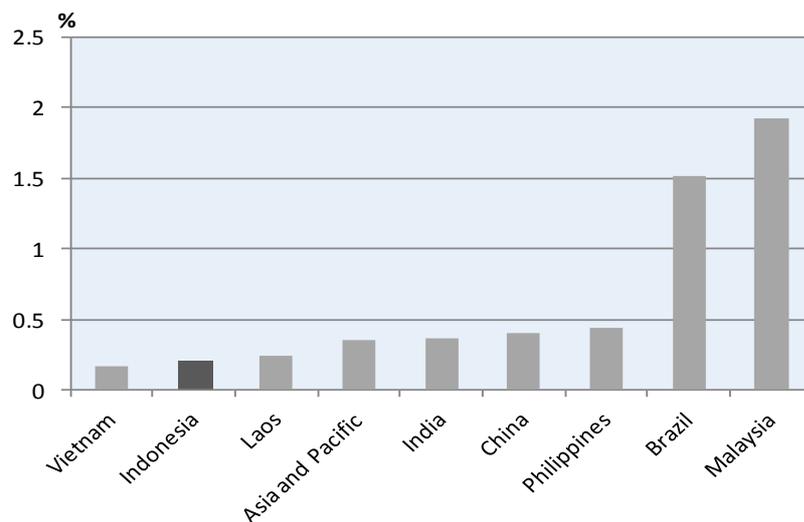
On export side, palm oil and cocoa export are subject to export levies. The primary objective of this policy is to guarantee availability of the products for domestic processing industries. The industries have claimed that this policy has been effective in promoting domestic processing industries as indicated by strong growth of production and export of processed products.

Agricultural science policies and technology development

Research and development (R&D) in agriculture is critical to improve agricultural productivity. However, public spending on agricultural R&D in has been relatively low compared to other Asian countries. Agricultural research intensity (ratio of R&D expenditure over total agricultural output) remained at 0.2% in 2005 compared to other developing countries (OECD, 2012). After adding in private agricultural R&D spending, this ratio stood at only 0.27% in 2009. The low level of spending is exacerbated by an ineffective spending structure, which emphasises non-research staff salaries. Spending for salaries of non-research staff and for O&M at the Indonesian Agency for Agricultural Research and Development (IAARD), Indonesia's central agricultural R&D agency, has increased significantly in recent

years. In 2008, only 19% of the staff was classified as researchers and this ratio has declined since then (WB, 2012). Agricultural R&D also suffers from a highly fragmented effort, the limited involvement of universities, and weak linkages with the private sector.

Figure 1. Public agricultural R&D spending as a share of agricultural GDP, 2005



Source: Agricultural Science and Technology Indicators (ASTI) database; World Bank staff calculations (WB, 2012) as reported by OECD (2012).

Agriculture research and development (R&D) is coordinated by Indonesian Agency for Agricultural Research and Development (IAARD), Ministry of Agriculture. IAARD consists of 11 institutes focusing on commodities (food crops, horticulture, estate crops, livestock) and cross-cutting issues (soil and agro-climate, socio-economic and policy, machinery, postharvest, and biotechnology). The 11 institutes are sub-divided into 18 research centers and 33 assessment institutes focusing on adaptive research which located in all provinces around the country.

The IAARD constitutes 61% of total public agricultural R&D spending. In addition, the Indonesian Research Institute for Estate Crops (IRIEC) is a semi-public R&D agency linked to IAARD but not formally part of it. It conducts research on main perennial crops and is by far the largest agricultural R&D agency in the country in terms of research spending. Agricultural research on food and horticulture crops and livestock is heavily reliant on government funding, while IRIEC is mostly financed through the sale of perennial crops and contract research, which cover 75% of its internal income.

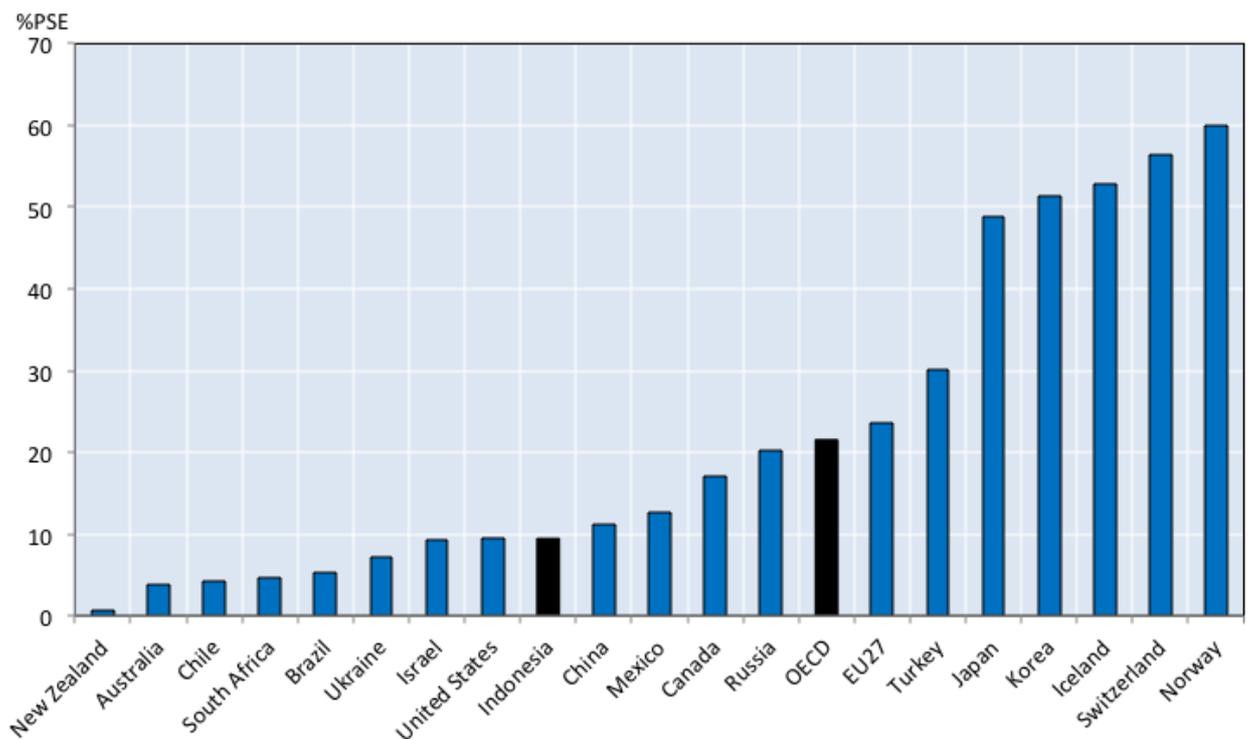
The government follows a precautionary approach as regards biotechnology, taking into consideration environment, food and feed safety based on scientific analysis as well as religious, ethical, and socio-cultural dimensions. Several regulations and guidelines have been issued, with time frames pushed back on several occasions, to avoid the possible negative consequences of biotechnology utilisation. Indonesia has not yet produced any GM crops, but it has carried out confined field-testing on several GM crops including rice, sugar cane, cassava, potato, and tomato.

Measurement of policy support

OECD (2012) has quantified policy support to agriculture using a framework such as Producer Support Estimate (PSE), Total Support Estimate (TSE), etc. In 2006-2010, average PSE to agriculture sector in Indonesia was estimated around 9% of total value of agricultural production (Figure 2). Compared to support in other countries, the PSE was about half to the average of OECD countries (22.4%), and also lower than China (11%). However, the TSE was estimated around 1.9% of GDP, around twice to that of OECD average (0.9%), but lower than in China and Korea (Figure 3). This means that even though the support to agriculture is still relatively small, but the cost to the economy was sizeable.

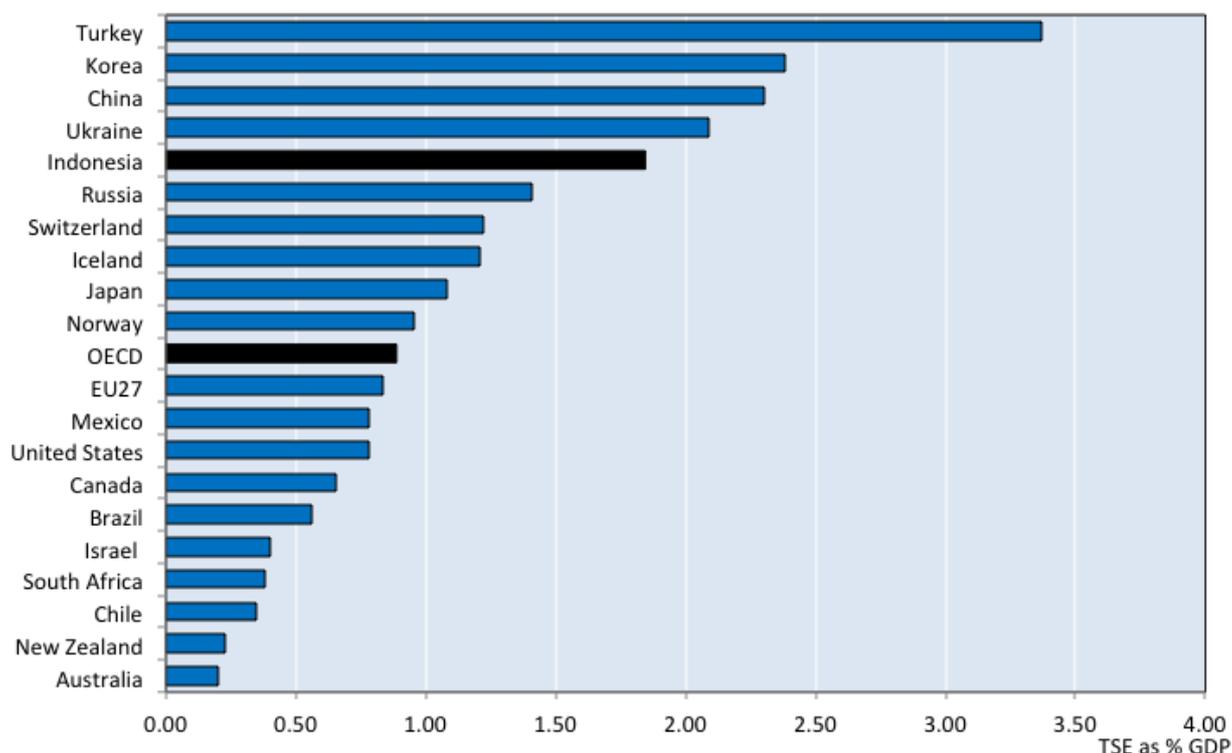
Most of the support is in term of market price support, whereas direct budgetary support is small. This is particularly true for rice, which is highly intervened by the government. General support estimate covering expenditure such as infrastructure, land conservation and rehabilitation, research and development, extension, and certification was only around 15% to total expenditure in agriculture.

Figure 2. Comparison of % PSE in selected countries, 2006-2010



Source: OECD (2012)

Figure 3. Comparison of % TSE in selected countries, 2006-2010



Source: OECD (2012)

CONCLUDING REMARKS

Agricultural development policy has been focused more on strengthening food security, particularly by accelerating domestic food production. The primary policy instruments in promoting food production are price support and fertilizer subsidy. Price support policy has been effective in providing incentive for the farmers to increase rice production. However, at the same time the policy leads to the increase on the number of person under nutrition, most of them poor household in rural areas. The benefit of fertilizer subsidy is primarily goes to large scale farmers, and creates budgetary burden to the government. Overall, the level of agricultural support, as measured by % TSE to agricultural GDP was sizeable compared to other countries, and was considered as a burden to the economy.

Future agricultural policy should focus more on general support such as research and development, infrastructure development, environment conservation, certification and standard. This policy promotes the growth of agricultural productivity in a sustainable manner but do not distort market mechanism. Furthermore, future agricultural development should also focus on “bioindustry” to expand production scope by utilizing all agriculture biomass to produce food, feed, energy, fertilizer, and chemical products. This strategy creates higher value added and increase income of rural community. The implementation of this strategy requires strong research & development supports and appropriate policy framework.

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