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The Challenges of Food Security Policy in Indonesia: Lesson Learned from Vietnam, India, and Japan

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Abstract. Food security is a fundamental issue for a country or state. In Indonesia, there are still many problems related to food, ranging from production to distribution problems. Indonesia's national food consumption is still dominated by grains, so its availability becomes important for the community. In this article, case studies on the availability and food security issues from three selected countries (Vietnam, India and Japan) are presented. Vietnam is one of the ASEAN members that has successfully built its food industries. Over the last thirty years, Vietnam has transformed from a food crisis country to a food-secure country. Meanwhile, India is a large and populous country that has built institutional systems in order to establish its national food policy. Other more advanced lessons are from Japan, which has developed its agriculture industry to achieve food security and sovereignty. Japan has successfully developed advanced technology in its agriculture and food industries. The technology is generated through synergy between the government, the private sector, and university, and reasonable to be implemented. Indonesia could learn important lessons from the three countries, particularly in building systems and institutions to manage food supplies (rice) and distribution channels. In addition, the Indonesian government should encourage the development of technology, such as to build data, improve the productivity and quality of the food, as well as the distribution system. By working on this, food policy making and implementation to achieve food security and sustainability will be effective and efficient.

Keywords. food security, food policies, lesson learned

I. Introduction

I.1. Definition of Food Security

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

- World Food Summit (1996) -
- (Zhou, 2010)

Food security and food sovereignty must be achieved by a country. The availability of food quality becomes the determining factor for achieving the ideals of a country. Indonesia is a large country with a population of more than 260 million in 2017 (UN, 2017). With such a

large population, food security is a priority for the Government of a state/country. The food security indicators set by the Food and Agriculture Organization UN (FAO-UN) are availability, access, stability, and utilization that are further detailed into 21 indicators (FAO, 2018). Together with food availability, other aspects of food security such as food safety, quality, cultural acceptability, environmental, and social stability are issues to be concerned as well.

Nowadays, the issue of availability and food security becomes an urgent issue in Indonesia.. There is already a regulation relating to national food, contained in Law No. 18/2012. It is mentioned in Article 23 (1) that to achieve Food Sovereignty, Food Self-Reliance, and Food Security, the Government stipulates National Food Reserves. It is subsequently mentioned in Article 27 that the formation of the National Food Reserves is intended as follows:

1) The Government determines the Government Food Reserves and Food Reserves of local Government.

2) Government Food Reserves as referred to in paragraph (1) shall be preferably sourced from domestic food production.

3) The local Government food reserves as referred to in paragraph (1) shall consist of: a. village Government food reserves; b. Food reserves of regency/city; and c. Provincial Government food reserves.

Regulation on food, contained in the Law No. 18/2012 mandated that the implementation of food regulation is to meet the basic human needs, as well as provide benefits in a fair, equitable, and sustainable food self-sufficiency, food security, and food sovereignty. Law No. 18/2012 stipulates several things, that are (i) improving the ability of producing food independently, (ii) providing diversified food, reaching the requirements of security-quality-nutrition for public food consumption, (iii) providing basic food at reasonable and affordable prices in accordance with the needs of the community, (iv) facilitating and improving food access to the community,and (v) increasing the added-value and competitiveness of food commodities. In addition, public knowledge and awareness of safe, quality and nutritious food should be increased, along with the improvement of the welfare of farmers, the fishermen, and food business actors, as well as protecting and developing national food resource wealth.

An important point of the Food Law is the urgency of establishing an institution with strong authority to coordinate, organize, and direct all ministries related to food. The Food Law passed by the House of Representatives (*Dewan Perwakilan Rakyat/DPR*) in October 2012 section 126 states that:

''In an attempt to achieving food sovereignty, food self-sufficiency and national food security, a government institution was established to handle the food sector under and responsible to the President'.

The institution has a very strategic position and the existence of the food authority body is expected could prevent the potential conflict of interest, while promoting other related sectors to be more independent. The food authority body functions as a food policy maker as well as a food operator, which is in charge of implementing procurement, production, deviation, and national food distribution.

Some of these things are expected to strengthen the role of central and local governments to be responsible for managing national food effectively and efficiently. Thus, the institution's operational is conducted by empowering all stakeholders, so that synergy will be established to reach food management effectively and efficiently, and overcome the future food challenges.

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I.2. Macroeconomic Indicator on Food

More than 50 percent of the per capita expenditure per month of Indonesian society is food expenditure. Types of food consumed consist of grains, tubers, fish, meat, eggs and milk, vegetables, nuts, fruits, oils and fats, and processed food.

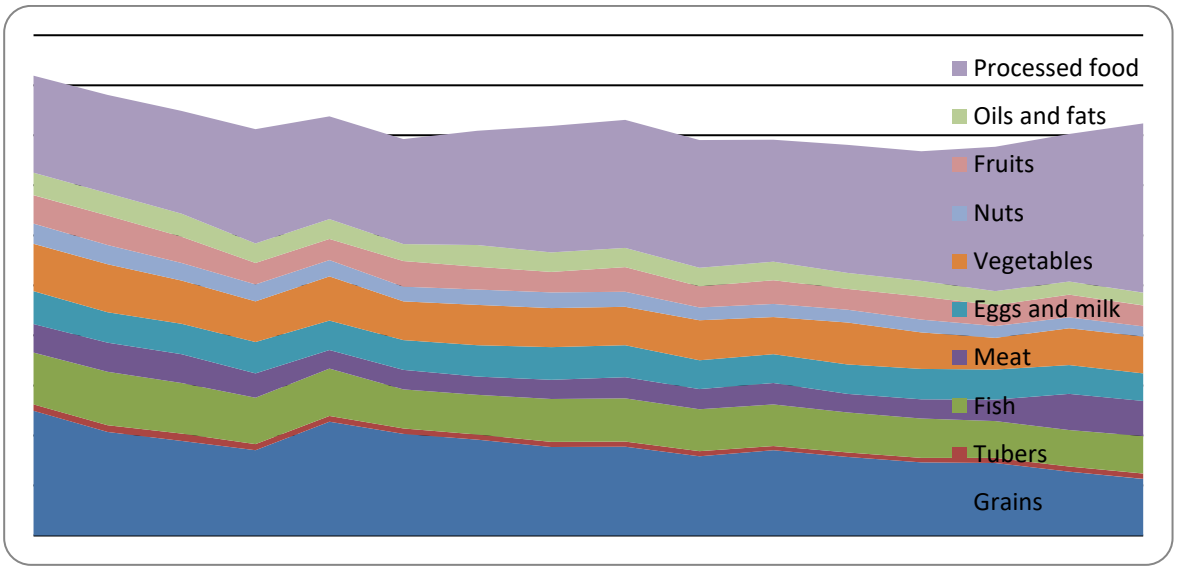

Figure 1.
Averages Food Expenditures per Capita by Food Items (percent of total expenditure), 2002-2017
Source: BPS, 2018

Figure 1 shows that most food expenditures are processed food and grain, which is an average of 12.23 percent and 8.78 percent per capita per month of the total expenditure. The expenditure trends on some foods have declined since 2002, as consumption increases for processed food. Heretofore, rice is a staple food for the people of Indonesia.
Hitherto, rice commodity is still a very important commodity for the people of Indonesia in terms of economic, labor, environmental, social, cultural and political. Therefore, the problem of domestic rice supply becomes a complex issue. Handling rice supply issues must be done carefully and comprehensively, as often the issue of rice becomes a sensitive political issue. The rice stock in *Badan Urusan Logistik*/Bulog (Logistic Agency) is a concern for the government, as the government should carefully maintain the level of rice reserves, determined by the availability and stability of domestic rice prices.

Technium Social Sciences Journal
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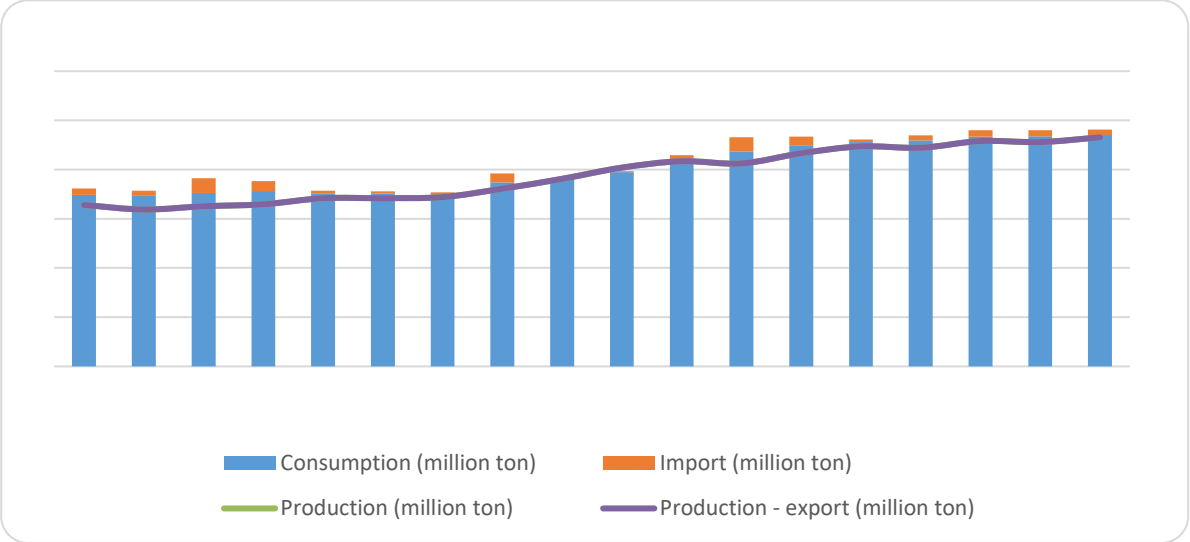

Figure 2. Production, Export, Consumption and Import of Rice 2000-2017
Source: Ministry of Trade, based on FAO and Bulog, 2017.

As shown in figure 2, the rice consumption has experienced an upward trend over the period 2000-2017 and is still increasing in 2018. While the Government Rice Stock (Cadangan Beras Pemerintah/CBP) has decreased until May 2017, the trend of CBP is still moving downward until early 2018 (figure 3 below). Until 2017, Indonesia's rice production is in the third rank after China and India. Other Asian countries in the top 10 largest rice production are Bangladesh, Thailand, Vietnam, Myanmar, Philippines, Cambodia, and Pakistan. These countries are also the largest consumers of rice in the world, which is about 90 percent of total world rice consumption. Nevertheless, Indonesia's rice production is still unable to meet domestic consumption. From the Figure 2 above, the rice production is below the consumption level for years. Therefore, the Government should import rice to meet the needs of national consumption and the price stability.

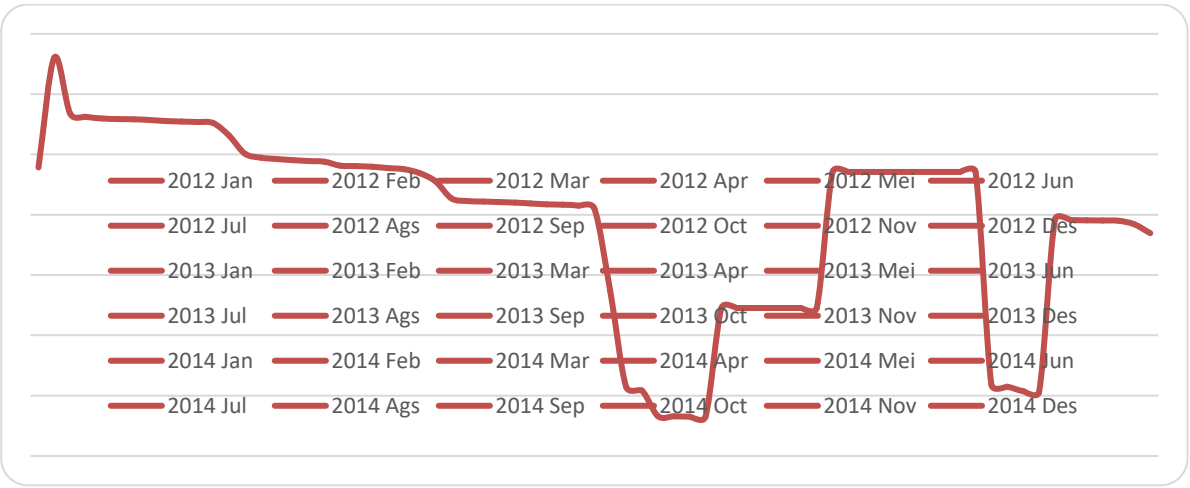

Figure 3. Government Rice Stock (Cadangan Beras Pemerintah/CBP), 2012-2018
Source: Ministry of Trade, based on FAO and Bulog, 2017

Technium Social Sciences Journal
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The insufficiency of production to meet the consumption, as well as the declining national rice stock (figure 3), has caused the rice problem to be very urgent, thus requires immediate responses. From the demand side, rice is an inelastic commodity for Indonesian society, thus whenever the rice price fluctuates, demand for rice remains stable. Therefore, the government is obliged to maintain the stability of rice prices, so that people will not be strangled by the high prices fluctuation.

Thereupon, the problem of rice is not only on the productivity, but also on the storage, distribution, export-import policy, and the inadequate farmers' welfare. Supposedly, farmers as rice producers have the ability to cultivate their agricultural products as well as obtain clear information about the time of planting, technology, and its distribution. Until now, farmers do not have complete information about it (Kementan RI, 2018). These food problems are getting more complicated, changing from time to time and is influenced by local and global specific dynamics. Food determinations are increasingly complex, including climate, population dynamics, the development of science and technology, the information revolution, telecommunications, transportation, democratization, decentralization, and globalization.

Indonesia should learn from the past experiences of the food (rice) crisis that ever happened in 1972-1973. In the 1972-1973 growing season, heavy El Nino hit the Southeast Asian region, which resulted in a sharp decline in rice production in the region. In Indonesia, rice production slumped significantly below the national consumption requirement. The government was trying to increase rice supply by import, yet this policy was not able to overcome the rice deficit, since the other rice-producing countries also affected by El Nino. There was a shortage of rice in the world. At that time, the government tried to import rice substitutes such as bulgur and wheat flour, but the consumption of rice habits was difficult to change. The price of rice also skyrocketed, along with the scarcity of this commodity. This incident strengthened the government's determination to achieve rice self-sufficiency that was only realized in 1985. Nevertheless, climate is an important deteminant factor for Indonesian agricultural development, until recently. Increasingly uncertain climate conditions could conduce unpredictable harvest time and famine. Thus, national rice reserves are increasingly important to achieve Indonesia's food security. (Boediono, 2016)

II. Method

This study uses qualitative methods with literature studies from various document sources. The author has perused documents related to food security policy in Indonesia and other countries, especially Vietnam, India, and Japan. The authors compare the food security policies in Vietnam, India, and Japan as learning materials for food policy development in Indonesia. In this literature review, the authors research various concepts pertaining to the food security policy as public policy as well as food policy dimension.

This study is descriptive and explanatory in nature for the purpose of exploring data and describing a comparative analysis of food policies of the three countries. It will use time series data from the period 2000-2018. Secondary data collected includes macroeconomic indicators related to food in Indonesia, Vietnam, India, and Japan.

III. Literature Review

III.1. Food Security Policy as Public Policy

The book of 'Perspective Administration' by Ferrel Heady (1996) mentioned that the dual goals of development are national development (nation-building) and socio-economic progress. Both of these goals are equally attractive to political leaders despite the diversity of

political orientation, political strategy, social background, and the chances of success in achieving goals. Most developing countries share a common consensus on the decisive purpose for which changes should be directed. Ferrel Heady (1996) named it a development ideology, which he considered crucial to understanding the politics and administration of these countries.

Meanwhile, according to William N. Dunn, public policy is a process when the government administration produces government decisions, where relevant agencies have authority in directing the community, and responsible for serving the public interest (Naihasy, 2006). According to Lasswell and Kaplan (1970), public policy is a set of planned programs that include goals, values, and practices. Public policy is a program to achieve goals and values. In this case, public policy can also be interpreted as a program.

The policy of food security in Indonesia actually encounters problems that can be mapped using 3 (three) policy levels by Bromley. The three policy hierarchies according to Bromley (1989) are: 1) policy level, i.e. at the level of the making process of Law/Act; 2) organizational level, ie food policy at institution level as program implementers; and 3) operational level, i.e food policy in its implementation at the regional/local level.

In general, the problem lies in the lack of strong government regulatory support for programs to strengthen food security in Indonesia. Furthermore, Bulog as the implementer and the national rice reserve guard need to be observed, especially on organizational management and supervision. At the local level, there are still unequal Rencana Pembangunan Jangka Menengah Daerah (Medium Term Development Plan/RPJMD), Perda (local regulations), and food regulations in support of food security policy. In other words, problems in policy, organizational, and operational are factual problems in this program.

III.2. Food Policy Dimension

A study conducted by Sharif and Irani (2016) entitled 'People, Process, and Policy on Perspectives on Food Security' raises awareness of and highlights the inherent relationships within the food debate for the benefit of decision and policy makers. particularly at the organizational level, and specifically around the people, process, and policy. This study also describes the importance of green technology in food production and the food supply chain. In addition, there are other important issues concerning waste that is produced, as a result of the non-consumption of food. To overcome the problem of food and waste, a framework is required regarding the efforts that should be done by people, process, and policy. Prior to the policy implementation to overcome the food problem, the policy perspective to be imposed should be mapped out beforehand . (Sharif and Irani, 2016)

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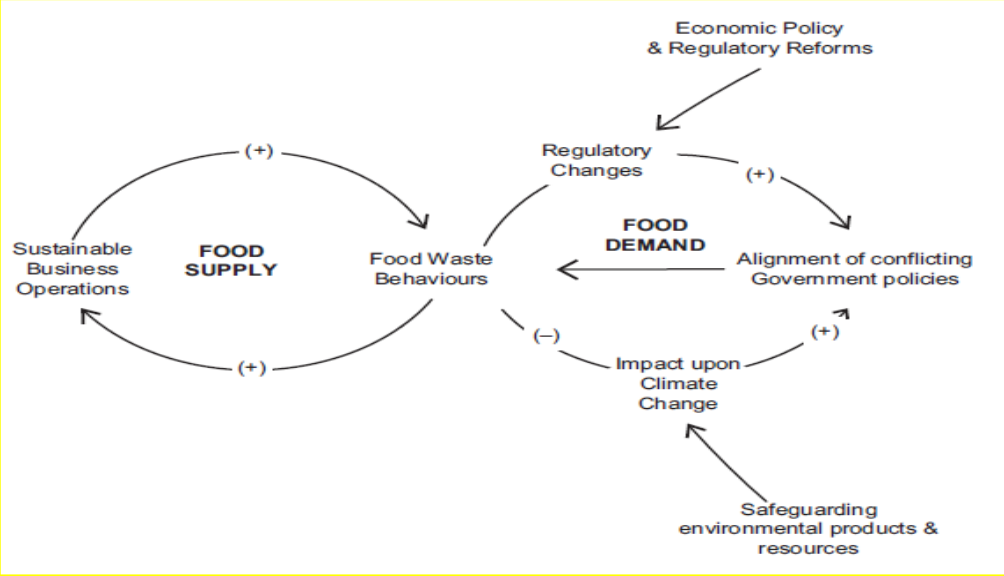

Figure 4. System Archetype for Food Policy Dimension
Source: Sharif dan Irani, 2016

The figure 4 above shows the archetype of food problems mapping, i.e from the side of food supply and food demand. From the archetype, the government may establish a policy of signifying an additional (endogenous) balancing act, which underpins the complexity of tackling food security thoroughly. For instance, does the government consider subsidy reform more important than safeguarding environmental products and resources? Are regulatory standards (such as food waste management, recycling and energy recovery) more critical than the impacts of climate change and the use of alternative energy sources and resource extraction/ infusion technologies? and so forth.

Policies that are implemented in other countries will affect the Indonesian agricultural sector both directly and indirectly, and vice versa. Even lately the phenomenon of policy-induced competitiveness has been increasingly a concern, thus the right policy should be a serious concern as well. Therefore, the case studies from other countries are strategic steps in discussing, analyzing, and formulating the direction of agricultural development policy in Indonesia. Indonesia can learn about the agricultural development policies from other Asian countries, such as Vietnam, India, and Japan. Vietnam represents a country in ASEAN (other than Thailand) that has successfully built its agriculture over the last 20 years. India represents a densely populated country, while Japan is a developed country that has succeeded in its agricultural sector.

IV. Result and Discussion

IV.1. Performance Comparison with Vietnam, India, and Japan

As one of the most developed countries in the world, farmers in Japan on average earn added- value (gross income) of about $ 44,045 per year. The added-value is much higher than the added-value that the farmers get in India, Vietnam, and even Indonesia. Vietnamese farmers can only gain the added-value of agricultural business and activities of $ 500 per year. Next followed by Indonesia and Indian farmers with $ 981 and $ 672 per year respectively (The World Bank, 2018). The position and condition of Japan as a developed country is different

Technium Social Sciences Journal
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from India, Vietnam, and Indonesia on the revenue side. In other words, the growth of farmers' added-value in the three countries are lower than in Japan. The increasing farmer incomes in real terms should be the main target for all agricultural development efforts, followed by an increase in production and real prices of agricultural commodities.

Tabel 1. Performance of Food Security Score

Rank	Country	2012	2013	2014	2015	2016	2017
4	Singapore	83.1	82.9	83.9	83.7	84.6	84
18	**Japan**	**79.5**	**77.7**	**78.3**	**78.1**	**79.2**	**79.5**
24	South Korea	74.5	74.5	73.9	75.3	75.5	74.7
41	Malaysia	67.1	66.8	68.9	69.3	69.4	66.2
45	China	61	60.9	62.1	63.4	64.9	63.7
55	Thailand	57.6	58.3	58.5	58.3	58.8	58.3
64	**Vietnam**	**51.7**	**52.7**	**53.8**	**53.6**	**56.2**	**54**
69	**Indonesia**	**47.8**	**48.3**	**47**	**48.3**	**51.1**	**51.3**
74	**India**	**48.9**	**48.3**	**48.1**	**49.3**	**49.8**	**48.9**
79	Philippines	49.9	47.3	47.5	49.2	48.3	47.3

Sumber: Global Food Security Index (http://foodsecurityindex.eiu.com/Index)

Furthermore, seen from the score of food security (Food Security Score) processed by The Economics, Indonesia is in the order of 69 out of 113 countries. Singapore ranks 4th despite its smaller food production compared to other countries, such as Indonesia, Vietnam, Thailand, and China. This depicts that the domestic production does not guarantee that a country has high food security. The government of the country must manage the availability of the national food.

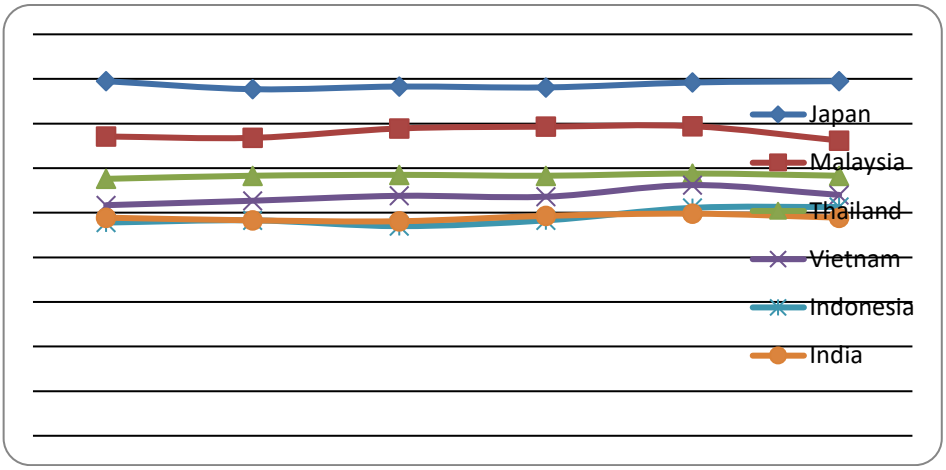

Figure 5. Food Security Score's Trend
Source: Global Food Security Index, 2018.

The Indonesia's national rice reserves (stock) are regulated by ministries and Bulog. Bulog's task is to ensure that the stock/level of rice can meet the national needs. Bulog buys rice from farmers during harvest at predetermined prices and sells it during famine. This mechanism should be maintained to meet the rice consumption and price stability. However, as shown in figure 5 above, Indonesia's food security is still inferior to the three neighboring countries,

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namely Malaysia, Thailand, and Vietnam. Since 2012, Vietnam has successfully outperformed Indonesia's food security. Even Indonesia has been a permanent importer of Vietnamese rice for the past few years.

Table 2.
Comparison of Indonesia's Indicators with Vietnam, India, and Japan (2010-2017)

	Indonesia	**Vietnam**	**India**	**Japan**
Area	1,904,569 km^2	332,698 km^2	3,287,263 km^2	377,972 km^2
Population	261,115,456	91,730,000	1,324,171,354	126,672,000
GDP perkapita	$ 4,116	$ 2,233	$ 2,134	$40,849
Agriculture land (% of land area)	31.24 %	35.35 %	60.43 %	12.46 %
Employment in agriculture sector	34.70 %	45.63 %	46.26 %	3.75 %
Agriculture, VA (% of GDP)	13.86 %	20.16 %	18.15 %	1.11 %
Food security index (ranking) 2017	51.5 (69)	54.0 (64)	48.9 (74)	79.5 (18)

Sources: FAO, The World Bank, dan Global Food Security Index, 2018.

From table 2 above, it is depicted that Japan uses its land for agriculture much less than in Indonesia, India and Vietnam, yet Japan has the highest food security index, which is ranked 18th among 113 other countries. The absorption of manpower in the agricultural sector is quite large in the three countries, namely Indonesia, Vietnam and India, with an average of 34.70 percent, 45.63 percent, and 46.26 percent respectively over the period 2010-2017. While in Japan, the absorption of manpower in the agricultural sector is only 3 percent over the period 2010-2017. However, despite the enormous labor absorption, the agricultural sector still has not contributed significantly to the Indonesia's GDP. The contribution of agricultural sector to the Indonesian, Vietnam and Indian GDPs on average are 13.95 percent, 20.16 percent and 18.15 percent respectively over the period 2011-2016. By comparison, Japan gross domestic product share from agricultural sector was 1.11 percent in the same period of time. (The World Bank, 2018)

The above macroeconomic data shows that Japan has successfully managed its agricultural sector efficiently and effectively, despite experiencing a downward trend in the agricultural production since 2000 as seen in figure 6 below.

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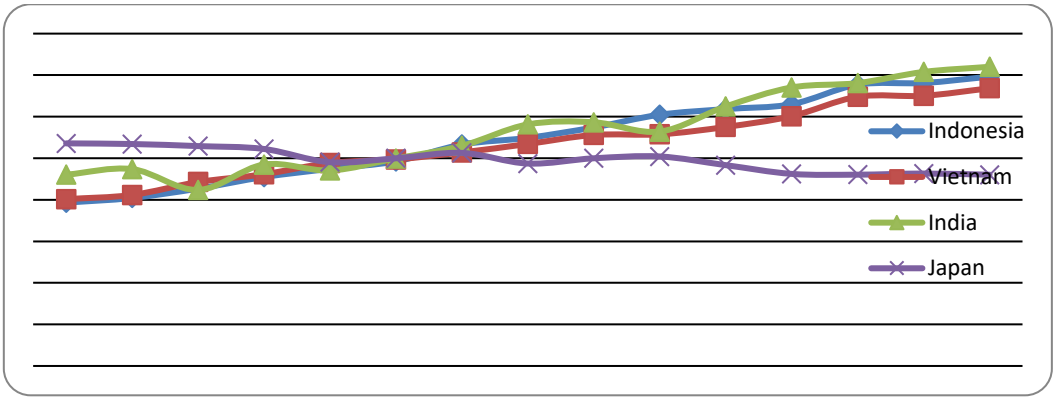

Figure 6. Crop Production Index (2004-2006 = 100)
Source: The World Bank, 2018

The three countries of Indonesia, Vietnam, and India experienced a rising trend, in contrast to Japan's decline since 2000. There are several causes of the decline in agricultural productivity in Japan, namely from the demand side and supply side. In terms of the demand, there is a decrease in self-sufficiency due to the changing consumption pattern from rice to other foods, such as meat, oil and fat. The World Bank illustrates that in Japan, the rice consumption decreased from 112 kg/capita/year in 1965 to 58.5 kg/capita/year in 2009. Whereas, meat consumption increased from 9.2 kg/capita in 1965 to 28.6 kg/capita in 2019. Consumption of oil and fat also increased significantly during the same period of time.

Meanwhile, from the supply side, there are several problems pertaining to the decreasing productivity of agricultural products in the recent years, that are: (i) increased average age of farmers from 59.1 years (1995) to 65.8 years (preliminary figure 2010), (ii) reduced agricultural land, due to land conversion from 6.07 million ha (1960) to 4.63 million ha (2008), and (iii) increased critical land from 0.13 million ha (1975) to 0.40 million ha.

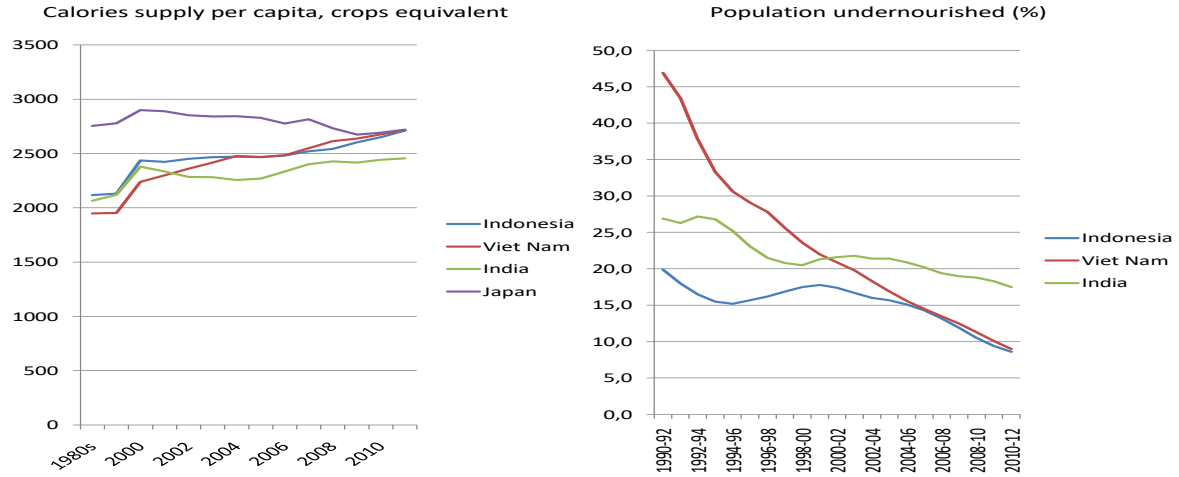

Figure 7. Calories Supply per Capita and Population Undernourished
Source: FAO, 2018

Along with productivity, it is also important to observe the per capita supply calories and nutritional adequacy of communities in a country. Figure 7 above illustrates the comparison of calories supply and population undernourished in all four countries. Vietnam is one of the

countries that has successfully increased the per capita supply calories and significantly lowered the population-undernourished rate since the 1990s. Meanwhile, Indonesia also experienced an increase in the supply calories, but there was stagnation in the 2000s. Currently the population-undernourished rate in Indonesia and Vietnam is at the same level of 8-10 percent over the period 2008-2012.

IV.2. Food Security Policy in Vietnam, India, and Japan

a. Vietnam

Food availability is ideally achieved through self-sufficiency by increasing domestic food production. However, if production is unable to meet the domestic demand then imports on food is required. Among the six agrarian countries in the ASEAN region, Vietnam was selected as the country in the comparative study on food security issues as it is currently considered as a country with high food productivity in the region.

The Vietnam War of 1957-1975 had a devastating impact on the country. The agricultural land was destroyed. The land that was originally planted with rice turned into a landmine and a battle arena. During the 20 years of the war, Vietnam experienced a food crisis. To recover from the the damage was quite difficult and took a long time. On the other hand, farmers are afraid to cultivate land for fear of mine exposure. At that time, Vietnam relied on several countries to meet the adequacy of food. The peak of food shortage in Vietnam occurred in 1985-1986. At that time, Vietnam imported one million tons of rice from a number of countries. In 1986, Indonesia, which had rice self-sufficiency, supplied 50,000 tons rice to Vietnam under a two-year loan period.

From the research conducted by LIPI, it is known that Vietnam combines the development of the agricultural sector and international trade to maintain the food security. In the agricultural sector, rice is still a symbol of food security in Vietnam, thus has a special place in the development policy, particularly in the country's agricultural sector. High rice production, not only can meet domestic demand but also achieve a surplus exported overseas. However, self-sufficiency in food is not the only way Vietnam has to maintain for the food security. Along with that, the people of Vietnam also diversify the food and initiate changes in consumption patterns. Rice is no longer the only staple food. Vietnam is concentrating on improving rice production, while importing some food that cannot be produced locally. Thus, international trade is now also a priority of the Vietnamese government in maintaining its national food security. (Presilla, 2017)

Vietnam has transformed from a country that suffered from food shortages 30 years ago into the second largest rice exporter in the world after Thailand. Last year the country exported 7.2 million tons of rice. Several policies imposed by Vietnam include boosting investment in agriculture, building agriculture infrastructure, providing assistance to farmers, developing distribution system, along with maintaining sustainability. (FAO, 2017)

The Vietnamese government is intensively boosting investment in agriculture, building agricultural infrastructure to support rice productivity. Infrastructures that have been built are irrigation, dams, reservoirs, and flood control channels and embankments. Along with physical development, the government also provides assistance to farmers. Some of the incentives given are in the form of seeds and production facilities, as well as price incentives. Vietnam also makes regulations governing that farmers should benefit at least 20 percent of all production costs. It means, every buyer of grain should provide benefits for farmers by at least 20 percent. Vietnam increases its rice production, both in terms of quality and quantity, so that Vietnamese origin rice can be competitive and ultimately give the advantage of higher income

for farmers. In addition, one of the keys to the success of the agricultural industry in Vietnam is the development of distribution systems.

The Vietnamese government involves farmers as an important part of the distribution or supply chain of rice. Vietnam has Vietnamese Vietnam Northern Food Corporation (Vinafood) I and II. Vinafood I is in charge of maintaining the national rice supply. The distribution channel involves farmers, collectors, rice mills, rice business entities, the holding market, and retail markets, whereas, Vinafood II is in charge of running an international rice trading business. Food business became one of the mainstays of Vietnam. To maintain sustainability, Vietnam protects farmland in villages as an asset. Vietnam expressively prohibits land grabbing, illegal conversion of land rights, and inappropriate land use. The agricultural areas in the Mekong and Red River basins are protected. The irrigation-based agricultural area is also protected and should not be converted.

b. India

As the second most populous country in the world (after China), India faces two major challenges related to the agricultural development. Firstly, the agricultural sector involves about 46.26 percent of the country's population and involves nearly 1.6 billion people. Secondly, India encounters several problems that include water resources degradation, land degradation, decreased productivity and profitability due to the narrowing land tenure, shortage of agricultural labor, rising costs and uncertainty related to agricultural commodity price fluctuations in international markets. In dealing with these problems, the government of India stipulates various policies, one of which is to determine the minimum subsidized price-level support policy. This policy is implemented by an Indian state-owned enterprise called Food Corporation of India (FCI). The state-owned enterprise is similar to Bulog in Indonesia with some other significant differences. FCI India is a state-owned enterprise controlled by the Government of India through the Ministry of Food and the Ministry of Agriculture established in 1965 under the Indian Food Corporation Act.

Operationally, FCI is assigned to implement national food policy objectives. First, carry out effective price support operations to protect the interests of farmers. Second, implement the distribution of grain-based main food throughout the country to create the public distribution system. Third, maintain a safe and satisfactory level within the operational level and buffer reserves of major food commodities to ensure India's national food security. The main agricultural development policy implemented by the Government and the Ministry of Agriculture of India is Price Support Policies for agricultural commodities. The Government of India sets a minimum subsidized price level for major agricultural commodities. The minimum price level of such subsidies is recommended by the Agricultural Cost and Price Commission. (Dabukke dan Iqbal, 2014)

c. Japan

In the last few decades, agricultural productivity in Japan has declined. There are several challenges faced, namely from the demand side and supply side. Japan is a non-food self-sufficient country. In 1961, Japan was still able to meet the needs of domestic food by 78 percent. Unfortunately, in 2010 Japan was only able to provide 39 percent of the domestic needs, so the rest was fulfilled through imports. Japan progressed in the 1960s-1980s. There are several key successes of agriculture in Japan, among others are the intensive development of the agricultural sector, income support for farmers, as well as several agricultural policy programs.

The government regulates the agricultural trade system. The types of plants are determined uniformly and farmers cannot plant as they want. This is done, so that the agricultural output can be absorbed by the market. Along with that, the government also sets price control (price floor) on agricultural products, thus the selling price cannot be below the price floor. In order to maintain the stability of production and sustainability of the agricultural sector, the farmers usually owned very wide farms that are not allowed to be converted into other designations. Other important point is that the Government of Japan encourages productivity through sophisticated agricultural technology, e.g. rice seedlings, fertilizers, tractors, and others. Solid synergy between government, private sectors, and universities is required in developing the technology. This synergy raises the integration between agricultural technology research, technology funding, and the implementation of food-technology research results.

These technologies are also used in predicting the climate, so that the pattern of planting can be arranged in accordance with the climate that will be faced. As mentioned, climate is an important factor in agricultural policy and the estimation of the the national food reserves. In addition to the various policies above, the Japanese government had been delivering direct payment for income support for farmers. The policy provides direct payments of both fixed and variable payments to each farmer willing to voluntarily join the Japanese Ministry of Agriculture's demand-supply adjustment system (scheme). Through this policy, the government ensures the welfare of farmers is maintained.

Furthermore, the government has made various efforts to maintain the sustainability of Japanese agriculture, among others through transformation of agrarian policy (target of 50% self-sufficiency of food and maintain multifunctional land), creation of a sustainable agriculture environment through the motivation of farmers' stabilization (household income subsidy), and changes in agricultural policy orientation from reduction pattern to production system.

IV.3. Lesson Learned: The Way Ahead

From several policies and strategies of the three countries, there are several things that can be learned by Indonesia. It involves various parties to achieve the food security of a country, not only the government. Food security is the first step to reach a prosperous society. Here are some policies and strategies that can be done by the Indonesian government in the near future.

Of the three countries above, the development of a system is fundamental along with the physical development of infrastructure. In terms of policy to overcome the deficit of rice commodities in the short run, the government should implement the Standby System (Sistem Siaga/SS) in its decision on time and quantity of imports. The import policy must be based on a legalized reason, so it does not become polemical, each time a policy is implemented. In the case of one of the three symptoms, the Ministry of Trade (MoT) and Bulog must initiate the coordinating meeting. The results of the coordination meeting shall be binding and implemented. In the event of urgency and coordination, the MoT and Bulog have the right to determine the time and quantity for imports under the Standby System. Three symptoms must be considered are the price of rice, government rice stock, and the estimation of production-consumption. The government could establish indicators of symptoms that can be used as an alarm to import rice, e.g., when the price of rice is 25 percent higher than the normal price in the last 3 weeks, considering the adequacy of rice for the next several months, as well as the estimation of production growth, which is less than the consumption growth (% yoy).

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In addition, the Indonesian government should establish systems and institutions to manage food supplies (rice) and distribution channels. Learning from Vietnam, this institution should be independent and engage stakeholders, such as farmers, gatherers, rice mills, rice business entities, the wholesale market, and the retail market. Finally, other lesson learned from India is the existence of Institute of Food Corporation of India (FCI). This state-owned enterprise is similar to Bulog in Indonesia with some fundamental differences. The FCI India is controlled by the Government of India through the Ministry of Food and the Ministry of Agriculture. It was established in 1965 based on the Indian Food Corporation Corporation Act. Moreover, Indonesia needs to improve the community empowerment through *lumbung* in various regions. *Lumbung,* which is the traditional rice barn found on every island and among all ethnic groups is extensively used as a symbol of food security guarantee.

Likewise, Indonesia has to build a sustainable agriculture system, thus the food policy taken will not only targeted to solve the short-term problems. Sustainable agricultural development should be supported by infrastructure development that can protect agricultural land and increase productivity. The system should be developed immediately which includes but not limited to a database or dataset system on national agricultural production, systems on cropping patterns, and systems of climate prediction.

Until recently, Indonesia retrieves data from other institutions that use satellites to monitor their agricultural production, i.e., from the United State Department of Agriculture, Foreign Agricultural Service (USDA FAS). Often, the USDA data is more accurate than the data built by the Indonesian technical ministries. If the data used is not accurate, then the policy will not be effective and efficient to solve the problems. For instance, data on rice production must be accurate, thus the government may decide to import without any controversy regarding the difference in data between institutions. Furthermore, climate prediction should be accurate as well, since climate is the decisive factor in formulating agricultural policy, especially in Indonesia with high climate uncertainties. Therefore, food policy related to food reserves (stock) is highly important.

V. Conclusion

As mentioned above, food problems in Indonesia occur on three levels: policy level, organizational level, and operational level. At policy level, there are still lacks comprehensive policy formulation schemes on food, thus policies often address short-term problems. At organizational level, an independent institution is needed which has authority regarding food, from the production process to its distribution. Whereas in operational level, institutions and ministries related to food issues are still scattered, making coordination difficult. Therefore, Indonesia should conduct the important thing in the short run that is to build systems and institutions related to food security policy. The Law No. 18/2012 needs to be strengthened through the subsidiary regulations that could be legitimated to the food security system and institutions. Indonesia needs institutions that could empower communities in operating the agriculture and food industries, regulated by law as well. Currently, the role of Bulog and other relevant agencies are still vulnerable, due to the absence of law/regulation, as well as the lack of coordination with the technical ministries (Ministry of Agriculture and Ministry of Trade).

At last, the government must improve coordination among ministries/institutions related to food, since The Coordinating Ministry for the Economy plays an important role in maintaining and overseeing the coordination system. The other important thing is solid synergy between government, business sector, and academia (universities) in developing technology

and implementing it in the agricultural industry to achieve national food security. Above all, it is the time for Indonesia to put food security as a top priority for sustainable development.

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