

CHAPTER II.

CURRENT STATUS AND PROSPECT OF FOOD SECURITY

THE STATE OF INDONESIA FOOD SECURITY AND NUTRITION: CURRENT STATUS, CHALLENGES, AND WAYS FORWARD

Achmad Suryana.

Senior Researcher Indonesian Center for Agriculture Socio Economic and Policy Studies

INTRODUCTION: THE IMPORTANCE OF FOOD SECURITY AND NUTRITION INTERNATIONAL AGENDA.

Sustainable food security and nutrition has been at the center stage of socio economic development internationally and nationally for more than forty years. Food and Agriculture Organization (FAO) conducted at least four world level meetings on food and food security, all done at FAO headquarter in Rome, Italy. The first meeting was the World Food Conference conducted in 1974 and the government representatives at that meeting had proclaimed that "every man, woman, and child has the inalienable right to be free from hunger and malnutrition in order to develop physical and mental faculties." Through the Conference, the government representatives had set their goal to eradicate hunger, food insecurity, and malnutrition within a decade (FAO, 1996).

The goal was not achieved. Progress to eradicate poverty had moved slowly and unevenly. Countries in Africa and some in Asia were still struggle to feed their population. With this background, second high level meeting was held and called the World Food Summit. The meeting took place in 1996 and was attended by 112 heads or deputy heads of state and government and more than 70 high-level representatives. This Summit came up with declaration that calls upon all parties to reduce by half the number of chronically undernourished people on the earth by the year 2015. Since hungry people in 1996 was predicted around 800 million people, it means that during 20 years undernourished people should be reduced by 20 million annually, so in 2015 this number of the poor will become 400 million (FAO, 1996; Suryana, 2002).

Based on monitoring of the Summit goal progress by FAO, it was appear that the progress to reduce poverty was again very slow. With this pace of progress the goal could not be met, and world leaders met again in 2002 to discuss this issue. The meeting was called the World Food Summit: five years later (WFS: fyl). World leaders which were represented by 183 country delegates, with more than 70 countries were represented by heads or deputy heads of state and government. They evaluated progress, identified constraints, and tried to find ways to overcome those obstacles.

As stated in Declaration of WFS: fyl, called International Alliance Against Hunger, leaders renewed their commitment made in 1996, in particular to halve the number of hungry in the world no later than 2015. Paragraph 3 of the Declaration states that: "We recognize that progress had not been adequate to reach the WFS target. Recognizing that responsibility for assuring national food security rests with national governments in cooperation with civil society and the private sector and with the support of the international community, we resolve to accelerate implementation of action to halve hunger no later than 2015. This requires a rate of hunger reduction of more than 22 million per year on average." (FAO, 2002).

This commitment made by world leaders was not fulfilled again. The number of people suffering from hunger and poverty was not reduced as expected. In fact, in 2009 number of the poor and hungry people exceeded one billion. Once again world leaders convened in Rome

in 2009 for the World Summit on Food Security and came up with Five Rome Principle for Sustainable Global Food Security. These five principles are: (a) invest in country-owned plans, (b) foster strategic coordination, (b) strive for a comprehensive twin-track approach to food security, (d) ensure a strong role for the multilateral system, and (e) ensure sustained and substantial commitment by all partners to investment in agriculture, food security, and nutrition (FAO, 2009). Twin track approach mention in point (iii) is to provide food aids as direct action to immediately tackle hunger and at the same time to implement medium and long-term programs for sustainable agricultural, food security and nutrition, and rural development).

Food and nutrition is closely interlink. Fulfillment of food for all people is not only in term of quantity just to make stomach full, but it also should be safe and nutritious. Parallel with the progress in poverty eradication, progress in reducing malnutrition has been modest and uneven among regions. Figures on malnutrition reported as follows: In 2012-2014 number of people suffering chronically from hunger was 805 million; in 2013 number of stunting (chronic malnutrition) and wasting (acute malnutrition) children under five years of age were 161 million and 51 million, respectively; in 2013 more than two billion people suffer from micronutrient deficiencies, in particular vitamin A, iodine, iron, and zinc.; and number of children under five years of age with overweight and obesity was 42 million. This malnutrition issue was discussed in the Second International Conference on Nutrition (ICN2) attended by ministers or representatives of the members of FAO and World Health Organization (WHO) in Rome, in November 2014 (FAO and WHO, 2014).

The conference, as stated in para 5, recognized the root causes of and factors leading to malnutrition are complex and multidimensional. Poverty, under-development, and low socio-economic status are major contributors to malnutrition both in rural and urban area. Other factors are the lack of access to sufficient food in quantity and quality, poor infant and young child feeding and care practices, and epidemics (FAO and WHO, 2014). Therefore, malnutrition is not only nutrition or health issues but it is related to socio-economic and food system development.

Food security issue has been also a priority in regional communities and organizations. Concrete steps was taken by regional community such as Asia and the Pacific Economic Cooperation (APEC) and Association of South East Asian Nations (ASEAN). In October 2013 in Bali, Indonesia, APEC leaders endorsed the work done by Policy Partnership on Food Security (PPFS) a document named 'APEC Food Security Road Map Towards 2020'. In this road map, long term goals of PPFS APEC was stated the attainment of a food system structure by 2020, sufficient to provide lasting food security to APEC member economies. Three paths or strategies to achieve its goal were: (a) sustainable development of the agricultural and fishery sectors, (2) facilitation of investment and infrastructure development, and (3) enhancing trade and markets. These paths were further translated into detailed and specific activities planned by member economies. (APEC, 2013).

Within South and East Asia region, ministers responsible for food and agriculture in countries plus Japan, South Korea, and China in Jakarta meeting in October 2011 agreed to establish ASEAN plus Three Emergency Rice Reserve (APTERR). This agreement was enter into force on 12 July 2012.

This Organization was formed as a response to a situation in the region that faces more frequent emergency food insecurity due to natural disasters, such as flood, drought, earth quake, and typhoon. Total volume of rice reserves owned by APTERR was 787.000 tons as contribution from all ASEAN countries 87.000 tons, Japan 150.000 tons, South Korea 250.000 tons, and China 400.000 tons (ASEAN Secretariat, 2011; Briones, 2012; and Suryana, 2012). Since 2011 APTERR has implemented its program by donating rice to countries asking for disaster relieve Thailand, Indonesia and the Philippines (APTERR Secretariat, 2015).

DOMESTIC POLICY

Domestically, providing enough food for all people has been considered as one of strategic development goals, at least since Indonesia declared its independence. In late sixties program to increase domestic food production was launched, under the name of program *swasembada pangan* (food self-sufficiency). In practice this program was focused to increase rice production by implementing an activity called *Bimbingan Massal* (Mass Guidance). A package of rice production technology was introduced by extension workers and guided intensively to make sure proper implementation. The technology package consisted of improved and high yielding variety; proper land preparation; chemical fertilizer N, P, and K; integrated pest and disease management; and water irrigation management. This effort showed positive results, growth of rice production was higher than population growth, and in 1984 Indonesia reached for the first time rice self-sufficiency (Hafsah and Sudaryanto, 2004).

After experiencing unfavorable situation for food security during late 1990's and early 2000's, in June 2005 President Susilo Bambang Yudhoyono declared a self-sufficiency program for five food commodities, namely rice, corn, soybean, sugar and beef. In the second term of his administration, President Yudhoyono took several policies related to food security and nutrition. Food security was treated as one of 11 priority areas of national development (Ministry of National Development Planning/ Bappenas, 2010). At the same time programs to empower micro and small-scale enterprises was implemented with aim to increase their capacity in earning income and improve their access to food.

Nutrition and health issues related to food consumption have also been tackled by Ministry of Health and Ministry of Agriculture, through nutrition improvement activities. Promotion of balance, nutritious, and safe food consumption based on local resources was launched again. Notable effort of this program was campaign to use home yard (*lahan pekarangan*) as local food and vegetables garden to increase food availability, mainly as source of vitamins and minerals. This program was launched in 2010 and implemented in all provinces. This activity was also called food consumption diversification based on local food sources (Suryana, 2014a).

Putting food security for all people in the top agenda of national development is also implemented by current administration of President Joko Widodo (2014-2019). The government sets food sovereignty among priorities mentioned in his political agenda called *Nawa Cita* or Nine Priorities of Development. (Jokowi-Jusuf Kalla, 2014). This agenda has been translated into action among others to continue food self-sufficiency program set earlier by previous government.

This effort was focused to achieve self-sufficiency on rice, corn, and soybean within three years. Main activities done at the first year were massive rehabilitation of irrigation, providing free agricultural machineries mainly hand tractors, harvesters, and water pumps to targeted farmer groups; and on top of subsidized fertilizer policy, the government also distributed free fertilizers and rice, corn, and soybean seeds to targeted farmers.

Of course food security and nutrition is not only limited to production of three food commodities. At a philosophical thinking as stated in Food Act Number 18 Year 2012, food security (*ketahanan pangan*) relates to food self-reliance (*kemandirian pangan*) and food sovereignty (*kedaulatan pangan*). At practical level, food security relates to providing enough food for the hungry, reducing number of the poor, improving nutrition condition of undernourished segment of population, especially children, and empowering poor households to increase their capacity in optimizing the use of their own resources.

To discuss further the state of Indonesia food security and nutrition, this paper presents current status, problems and challenges, and policy alternatives toward sustainable national food security and nutrition. Discussion will follow the concept of food security system: availability, affordability, and utilization; and a food supply and demand balance approach.

CURRENT STATUS OF NATIONAL FOOD SECURITY AND NUTRITION
AVAILABILITY

During the last 15 years Indonesia food production showed encouraging figures. Growth of total food production was faster than that of national population. Per capita gross availability of rice (total production divided by total population) in year 2000 was 159.9 kg and in 2013 was 184.4 kg, or rose by 15 percent (Table 1). Gross availability per capita of corn, cassava and sweet potato increased, while of soybean and peanut decreased. Compared to year 2000, per capita gross availability of corn, cassava, and sweet potato in 2013 increased by 58 percent, 23 percent, and 8 percent, respectively. However gross availability of soybean in 2013 was 3.14 kg, lower than that in 2000 (4.96 kg), and of peanut was 2.83 kg in 2013 which was lower than that in 2000 (3.59 kg), as presented in Table 2 (Suryana, 2014c).

Table 1. Paddy production and per capita rice gross availability in Indonesia, 2000-2013

Year	Dried paddy (000 ton)	Population (000 person)	Rice gross availability/ cap (kg)
2000	51,889	205,132	159.90
2005	54,151	216,415	157.70
2010	66,469	238,519	176.12
2011	65,757	241,739	171.92
2012	69,056	245,002	178.14
2013	71,280	248,310	184.42

Source: Statistics Indonesia in Suryana (2014c).

In the last 20 years, demand for corn, soybean, and cassava as directly consumed as staple food declined, but its demand for industrial use increased. At present, more than 75 percent of domestic demand for corn comes from poultry feed industry, as demand for chicken meat and eggs have risen rapidly. More than 90 percent of soybean was used as raw material for *tahu* (tofu) and *tempe* (fermented soy cake). These processed food products are important sources of protein for Indonesians, which relatively cheap in term of per gram nutrition intake. High rate of demand from soybean based food products, combined with the declining trend in domestic soybean production, increased volume of soybean imports. Last year soybean import accounted for more than 60 percent of total soybean use in Indonesia. Even though demand for fresh cassava as food declined rapidly, including in traditional cassava-eater regions, total domestic demand for cassava has increased. This demand comes from food, feed, and non-food industries, as raw material in form of fresh, dried as or starch cassava.

Table 2. Secondary crops production and per capita gross availability for consumption in Indonesia, 2000 and 2013.

Crop	Production (000 ton)		Availability (kg/cap)	
	2000	2013	2000	2013
Corn (kernel)	9,677	18,512	47.17	74.55
Soybean (bean)	1,018	780	4.96	3.14
Cassava (fresh)	16,789	23,937	78.43	96.40
Sweet Potato (fresh)	1,828	2,387	8.91	9.61
Peanut (bean)	737	702	3.59	2.83

Gross availability = Production divided by population.

Population: 2000 = 205.132.000 persons

2013 = 248.310.000 persons

Source: Statistics Indonesia in Suryana (2014c).

As source of protein, poultry production in this country posted some encouraging figures. In the last 15 years poultry (broiler and layer) population increased more than double and local chicken population rose by more than 25 percent. However, number of cattle, sheep, and goat increased just as much as the growth rate of population, resulting ratio of ruminants to human population increased only slightly, as indicated in Table 3.

Domestic production of poultry and sheep plus goat could fulfill its domestic needs, but beef and milk production could not met all its demand. Therefore, Indonesia imported sizable volumes of beef (cattle, frozen meet) and milk to fulfill demand for these foods. Fish and fish products are, of course, important sources of protein consumption. Basically, as an archipelagic country, demand for fish and fish products was all met by domestic production, from both fishing and culture. In 2011 production from marine culture was 4.6 million tons and fishpond culture 1.6 million tons. Fish is also can be captured from common/public water sources such as rivers, lakes, and dams that are available for surrounding communities.

Table 3. Livestock population and per capita gross availability for consumption in Indonesia, 2000 and 2012.

Crop	Population (000 Head)		Availability (Head/cap)	
	2000	2012	2000	2012
Cattle (beef, dairy)	11.362	16.593	0,06	0,07
Sheep+Goat	19.993	31.326	0,10	0,13
Local Chicken	259.257	274.564	1,26	1,12
Chicken Broiler	530.874	1.224.402	2,59	5,97
Chicken Layer	61.366	138.718	0,30	0,57

Gross availability= production divided by population.

Population: 2000 = 205.132.000 persons

2013 = 248.310.000 persons

Source: Statistics Indonesia in Suryana (2014c).

At national level, energy and protein availability for consumption were higher than recommended standard consumption agreed by nutritionists, and later on adopted by Ministry of Health through the issuance of Minister of Health Regulation Number 52 Year 2013. The standard energy and protein consumption for a person in the average was 2,400 kilocalories/day and 63 grams/day, respectively. On the other hand, at least in the last five years average availability energy was more than 3,650 kilocalories/day and protein was 92 grams/day (Table 4).

Based data published by Statistics Indonesia, food availability for human consumption was actually well above what was needed. At macro or national level, Indonesia was in the state of food secure country. Main source of this food was from domestic production, but this country also imported a sizable amount of wheat, soybean, beef, milk, subtropical fruits, and processed foods.

AFFORDABILITY

Affordability in the context of food security means food can be accessed by households and/or individuals to fulfill their needs at all time, physically and economically. Stability of supply and price of food is also seen or related to affordability.

Government of Indonesia puts a great deal of efforts to provide enough staple foods with stable and affordable prices at all time for its dispersed population across regions and islands. Government programs related to this goal are (i) food supply and price stabilization at all time and places, (ii) rice distribution for the poor, and (iii) food aid for emergency situation due to natural disaster and social conflicts.

Table 4. Per capita energy and protein availability for consumption in Indonesia, 2009-2013.

Year	Energy (kcal/Day)	Protein (gram/Day)
2009	3,320	87.75
2010	3,754	93.40
2011	3,646	93.13
2012	3,896	88.99
2013	3,849	89.26
Recommended or stand- ard requirement	2,400	63.00

Source: Agency for Food Security in Suryana (2014d).

Instruments to execute these programs, among others, are developing government food reserves, administering government procurement price, releasing foods into targeted markets to stabilize and lower its prices (called market operation), distributing subsidized rice food for the targeted low income households or the poor (called *Program Raskin*), and controlling food importation in term of quantity, time, and port of entry. Since rice is treated as the most important food economically and politically by the government as well as its community, those policy instruments are mostly applied to rice. The government tasks BULOG (state owned food logistics enterprise) to implement some of those food policies, such as rice reserves management and *Program Raskin* implementation.

Rice reserves. Since 2005 Government of Indonesia has created government rice reserve. Amount of this rice reserve was around 350,000 tons. This reserve were used to stabilize rice price hikes and to response to any emergency situation due to disasters. This rice reserves is stored at BULOG warehouses all over Indonesia, mixed with rice for *Raskin* and the company commercial trading.

This government rice reserves was released at a sizable amount several times for market operation to stabilize market price at the end of 2006, during 2007, and early 2008. Beside market operation, in 2007-2008 this reserve was also distributed to targeted vulnerable poor people (BULOG, 2012). Every year the government owns rice reserve amounts around 350,000 tons. Meanwhile, BULOG owned also rice stock around 1,0 ton to 2,0 tons for its operational purposes (*Raskin* and commercial trading). This amount of rice managed by BULOG was one of key instruments to stabilize rice market prices.

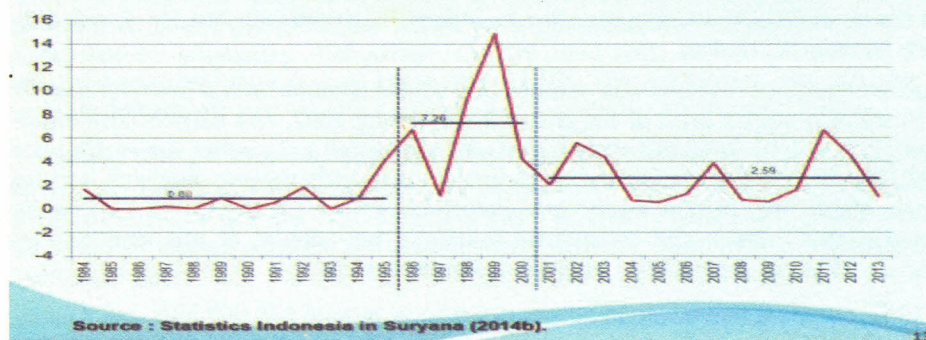
In 2014 Government had a plan to add its rice reserve around 125,000 tons, but it could not be materialized due to administrative problems. Instead, in early 2015 the reserve was used up for market operation to address the hike in rice price in February and March 2015. Therefore, at this moment in middle of 2015, volume of government rice reserve was at the lowest level.

Rice self-sufficiency. Indonesia was able to provide most rice need for all population from its own domestic production. Self-sufficiency has been taken as the main government food policy and enjoyed strong political support from community and national non-governmental organization since President Soeharto administration. During the last 30 years, to some degree this country had achieved its main goal on food security. In the period of 1984-1994 ratio of rice import to domestic production was only 0.9 percent.

In the period of 1995-2000, this country experienced a turbulence time politically and economically that caused average ratio of import to domestic production jumped to more than 7,0 percent. After that period, through various programs with huge subsidy expenditures on irrigation, fertilizers, and paddy seeds, Indonesia managed to lower the ratio to less than 3,0 percent (Figure 1). This importation of rice was taken as the last resort policy, as rice supply or availability from domestic production and national reserves was not enough to fulfill consumption demand. This importation was done as a policy instrument for supply and price stabilization.

Program Raskin. Distribution of subsidized rice or *Program Raskin* was done for the first time in 1998 to overcome national food insecurity at that time through special market operation. Subsidized rice injected into market in several cities in order to add supply and lower price of medium rice that was demanded by majority of Indonesians. In 2002 this policy was implemented not directly to rice markets, but rice was distributed selectively intended for targeted poor households only. In 2008 target of this *Program Raskin* was widened, not only for the poor households but also allocated to food insecure or almost poor households. This policy, then was called subsidized rice for low income community, but the brand name is still *Program Raskin* (Coordinator Ministry for People Welfare, 2014).

Figure 1. Ratio of rice import to domestic production in Indonesia, 1984-2013



Program Raskin has been implemented continuously up to now. In 2015 based on general guideline issued by Coordinator Ministry of People Welfare (Coordinator Minister Decision Number 54 Year 2014) goal of this program is to ease expenditure burden of targeted households through providing part of rice needs. Number of targeted households was 15,530,897 units and each household was allocated 15 kg rice/month or 180 kg/year. Total rice distributed through this program in 2015 was 2.79 million tons (Coordinator Ministry of People Welfare, 2014). Households pay for this subsidized rice Rp.1.600/kg, meanwhile price of the same quality of rice in local markets was around Rp.8.500/kg (May 2015 in Jakarta markets) This means the poor households paid only 19 percent of its market price. This was a generous food security program and required large government expenditures.

Rice Price Policy. Price policy is also frequently used by government around the globe to secure food supply and price stability. This price stability for Indonesia is not only important in term of securing affordability for certain foods for households, but also as a necessary condition for economic stability. Food, especially rice, in Indonesia has a significant share to inflation, so volatility or persistent hike of food prices will increase inflation rate. High inflation rate may lower economic growth, and also hamper poverty eradication and cause depth food insecurity for the poor.

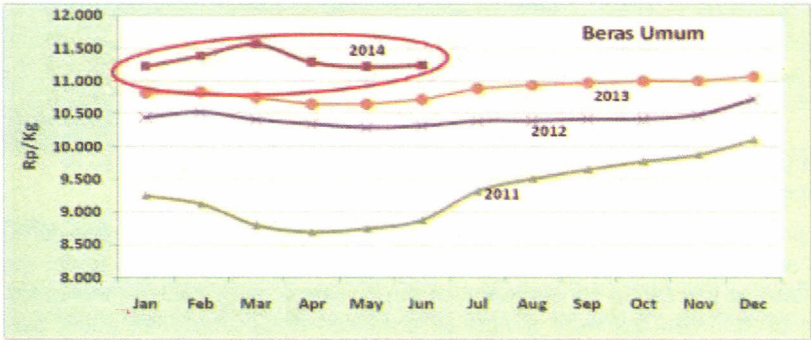
For the last 35 years, food price policy in this country had been administered to several commodities, namely rice, corn, soybean, sugar; and recently implemented for red onion, red chili, and beef. However, only price policy on rice that got full package and was supported by other necessary policies to be effective, such as government budget, border policies, procurement program, and outlet system of rice bought by BULOG. This was done, again because rice was and still is an important and a strategic commodity for the country.

Rice price policy was implemented in 1973 for the first time through the issuance of President Instruction Number 2 Year 1973 pertaining *Pembelian Beras Dalam Negeri untuk Tahun 1973/74* (Domestic Rice Procurement for 1973/74). The first rice price policy was government procurement price for paddy and rice, with the main goal was to protect farmers from price decrease, especially at harvest time. Level of procurement price was increased almost every year to adjust to inflation rate.

In 1980 for the first time government administered floor price policy for paddy and rice at farm gate, on behalf of farmers' interest. At the same time ceiling price for rice was also regulated to protect consumers. The latest was not announced to public, but as operational guidance for BULOG to stabilize rice market price. Starting from 2001, rice price policy had gone back to use procurement price policy for paddy and rice. Main goals of this policy were to increase farmer income and rural economic development. In 2008, in response to global

food crisis issue, priority of goals of rice price policy was changed to national economic stability as the first and farmer income came second. (Suryana, Rachman, and Hartono, 2014). This policy has been continued until this year, through President Instruction Number 5 Year 2015.

Figure 2. Trend of average nominal price of medium rice in major cities in Indonesia, 2011-2014



Source: Statistics Indonesia in Agency for Food Security (2014a).

Using qualitative analysis Saifullah (2010) concluded that price policy implemented by the government played an important role in stabilizing rice prices. Suryana, Rachman, and Hartono (2014) reported that rice price policy had a positive impact of rice price stabilization, measured by coefficient variant (cv). Using average monthly prices at Cipinang Rice Wholesale Market in Jakarta, in the period of 2002-2014, on the average value of cv was 4.84 percent per year, which indicated stability in rice price. Meanwhile, cv values for monthly rice prices in five retail markets in Jakarta during 2010-2014 were around 1.2 percent to 4.3 percent (Figure 2). For comparison, during the same period, cv values for sugar and chicken meat were around 1.1 percent to 7.7 percent and 4.1 percent to 8.5 percent, respectively.

UTILIZATION

Food utilization relates to (a) the ability of a household or an individual to get food from his/her own production and market and (b) the capacity and effectiveness of an individual digestive system to absorb food substances, including vitamins and minerals. This is related to income level of a household or individual and health condition of a person.

Average per capita energy consumption during the last five years was a little bit lower than recommended level of 2,000 kilocalorie/day, meanwhile average per capita protein consumption was higher than recommended level of 52 gram/day. Quality of food consumption is measured by Ideal Dietary Pattern (IDP). Ideal score of IDP is 100, meanwhile the government has set a target score 95 in 2015. However during the last four years the IDP score was stagnant at around 80, which was far below the target in 2015 (Table 5).

Per capita rice consumption has been declining, the same as for local carbohydrate sources such as cassava, sweet potato, and corn. Unfortunately for Indonesia food system, this decline has been substituted by wheat. Since this country has not cultivated wheat for commercial purpose because of climate incompatibility, almost 100 percent of wheat was imported and in 2014 amount of wheat import was more than seven million tons. Instant noodles and wheat flour based cake and snacks have been getting more popularity as part of Indonesian consumption habit.

Table 5. Average per capita energy and protein consumption, and ideal dietary pattern (IDP) Indonesia, 2009-2014

Nutrition	Per capita consumption						Recommendation	
	2009	2010	2011	2012	2013	2014	Up to 2012	Start 2013
Energy (kcal/day)	1,927	2,025	2,048	1,944	1,930	1,949	2,000	2,150
Protein (gram/day)	54.35	57.88	59.10	55.87	55.71	56.64	52.0	57.0
IDP Score	75.7	85.7	85.6	83.5	81.4	83.4		

Source: Statistics Indonesia, Susenas 2009, 2010, 2011, 2012, 2013, and 2014 adjusted by Consumer Price Index by Agency of Food Security (2014b)

Quality of protein consumption improved during the last five years. Per capita consumption of livestock and fish products increased even though at slow rate and still under recommended level. Average per capita consumption of poultry meat, egg, and fish increased significantly. These protein sources were almost all produced domestically. In 2009, average daily per capita chicken meat and egg were 10.7 grams and 17.5 grams, and in 2013 these consumption level rose to 13.8 grams and 20.9 grams, respectively. Significant increase noted for fish consumption/capita which rose from 46.8 grams to 53.4 grams (Table 6). Consumption of horticultural products also increased during that period. Average daily per capita consumption of fruits rose from 63.2 grams to 82.9 grams, and of vegetables increased from 136 grams to 156.0 grams.

Table 6. Average per capita consumption of animal protein sources in Indonesia, 2009 and 2013

Food	2009 (gr/day)	2013 (gr/day)	Recommended (gr/day)
Ruminant Meat	4,4	4,9	8,6
Poultry Meat	10,7	13,8	18,7
Eggs	17,5	20,0	28,8
Milk	5,4	6,4	6,6
Fish	46,8	53,4	87,3

Source: Directorate General for Livestock and Animal Welfare and Ministry of Marine and Fishery in Suryana (2014c).

Nutrition status indicates physical quality of an individual. This is influenced by quantity, quality, nutrition content, safety of food consumed. Based on data for children under five years of age, nutrition status of Indonesian children has improved, even though has not reached an ideal situation. In 2013, prevalence of children under five years old identified as stunting, underweight, and wasting were 32.9 percent, 19.6 percent, and 12.1 percent, respectively. In the same year, infant mortality rate was 32 per 1,000 birth (Table 7).

Table 7. Nutrition status of children under five years of age in Indonesia 2013

Indicator	Current		Baseline	
	Year	(%)	Year	(%)
Underweight	2013	19,6	2007	31,0
Wasting	2013	12,1	2002	15,5
Stunting	2013	32,9	2007	36,8
Infant Mortality rate (/1.000)	2012	32,0	1994	66,4

Source: Agency for Food Security (2014a)

INDONESIA FOOD SECURITY IN GLOBAL PERSPECTIVE

Policies and programs of this country in achieving food security and nutrition showed some positive results, especially in reducing number of hungry people and malnutrition, as presented earlier. Using criteria of attainment the Millennium Development Goal (MDG) target 1.c, having reduced the prevalence of undernourishment by 50 percent or more compared to the level of 1990/92, in 2013 Indonesia was among 20 countries recognized by Director General FAO as outstanding achievement country in improving food security for its population (FAO, 2013).

This achievement was a notable one, but Indonesia was still below average in term of global standing among countries on food security and nutrition. Global Food Security Index (GFSI) Report indicated that in 2015 Indonesia was ranked 74th out of 109 countries evaluated with its score 46,7 out of 100. The highest score was the United States (89.0), follow by Singapore (88.2), and the two lowest countries were Chad (27.9) and Burundi (25.1). Among ASEAN countries Indonesia was ranked lower than Singapore, Malaysia, Thailand, Vietnam, and the Philippines, as presented in Table 8. Compare to previous year, Indonesia position slightly decreased even-though its score was increased by +0.1 point (The Economist Intelligence Unit, 2015).

Last year Indonesia was ranked by GFSI at 72nd with its score 46.6 and two years ago or 2013 was at 69 position with the same score. Another global measurement for food security standing is Rice Bowl Index (RBI). This report indicated that Indonesia made some progress in food security that was indicated by 3 point increase in its score (Suryana, 2014e).

These two measurements used different set of criteria even-though both concentrated on food security. GFSI used indicators related to food affordability, availability, and quality and safety. This index was constructed from several variables including the indirect one to food security, such as political stability risk and corruption (under food availability category). Measurement for RBI used indicators of food system development that categorized into environment factors, policy and trade, demand and price, and farm factors. From both GFSI and RBI findings, it can be concluded that Indonesia has made some progress on food security development, but the speed of improvement was relatively slower than other ASEAN countries (Table 8). Therefore, this country should continue, speed up, and enlarge policies and programs on food system development in order to achieve sustainable food security and nutrition.

Table 8. Indonesia position among ASEAN Countries on food security based on Global Food Security Index (GFSI) 2015.

Rank	Country	Score	Change 2014-2015
1	United States	89.0	-0.9
2	Singapore	88.2	+3.4
34	Malaysia	69.0	+0.7
52	Thailand	60.0	-0.3
67	Vietnam	53.4	+4.2
72	Filipina	49.4	-0.1
74	Indonesia	46.7	+0.1
78	Myanmar	44.0	+7.7
96	Cambodia	34.6	+0.7

Source: The Economist Intelligence Unit, 2015.

Other measurement of food security situation is the ratio of beginning stock to domestic utilization or stock to use ratio (SUR). For rice, it was predicted that the ratio of 17 to 20 percent may ensure stability in rice prices and food security for its people (Briones, 2014, Suryana 2014b). Indonesia rice production in 2012 was the highest in ASEAN countries, but all was consumed domestically. In fact, during the last 10 years Indonesia imported rice, but the amount was relatively low, which was less than 3 percent of the country total need. Therefore the beginning stock of rice in this country was relatively low. The rice stock was sum of stocks owned by government and privates, including communities.

The rice beginning stock to use ratio for ASEAN was 20.53 percent and Indonesia was 7.60 percent, which was the lowest in ASEAN. Other countries in this region which had ratio less than 20 percent were Myanmar (15.1%) and Vietnam (18.56%). Brunei and Singapore were rice importing countries, but had higher ration than Indonesia (Table 9). This fact indicated that to maintain rice price stability and ensure food security, Indonesia has to continue implementing its rice production program with high growth rate target. Improvement of infrastructure and irrigation facilities, farmer empowerment, better farming technology dissemination and adoption, and resources sustainability must be taken into account on this rice production program.

Table 9. Rice domestic use, and beginning stock in ASEAN countries, 2012

Country	Production (000 ton)	% P/DU	% BS/DU
ASEAN	131,713	116.51	20.53
Indonesia	40,287	99.59	7.60
Vietnam	26,738	13.71	18.56
Thailand	25,148	190.85	68.83
Myanmar	18,311	99.37	15.07
Philippines	11,756	90.49	20.25

Cambodia	5,619	170,14	27.63
Lao PDR	2,131	101.23	19.06
Malaysia	1,722	70.62	24.79
Brunei	1.5	4.57	34.92
Singapore	-	-	15.56

P/DU = Production to Domestic Utilization

BS/DU = Beginning Stock to Domestic Utilization

Proportion of BS/DU that may guarantee supply and price stability in ASEAN Countries is 20%

Source: ASEAN Commodity Outlook 2013 in Suryana (2014d).

PROBLEMS AND CHALLENGES

Problems in achieving food security and nutrition are rooted from unbalance food supply and demand globally or nationally. Those problems are sometimes aggravated by political stance of a country or government. For example, if a country has a position leaning toward giving excessive protection to one component of stakeholders, it may hamper progress in achieving the country sustainable food security. Discussion on those problems is presented below.

SUPPLY SIDE

On supply side, as frequently mentioned in scientific and government planning meetings, at least five aspects identified as problems and challenges in maintaining sustainable food security. First is natural resource constraint. Competition use of land and water will continue even stiffer due to high economic growth target and high population growth. Demand for more land as industrial sites, roads, housings will increase much faster. At this moment annual land conversion rate frequently mentioned by scientists as well as government officials was around 60,000 to 100,000 hectares.

Land and water quality were also degraded because of chemical fertilizers and pesticides use for a long period of time continuously and intrusion of industrial waste to agricultural land. Just currently, government and civil society have initiated more serious efforts to reduce intensity of this problem and mitigate current damage to environment. Another problem related to resource constraint was insufficient investment in agriculture and rural infrastructures. Funding for rehabilitation and maintenance was also not enough. For example around 2.6 million out of 7.2 million hectares of irrigation networks or 36 percent was damaged (Director General for Water Resource, Ministry of Public Work, 2013). This case alone will have a significant effect in reducing national capacity to produce food.

Second is impact of global climate change. In the last five years occurrence of extreme climate change impact in this country was more frequent. Intensity and pattern of rain fall was deviated from normal one, global air temperature was increase, extreme heat or cold for certain period of time happened in specific regions, and local flood and drought came more frequent. Those will certainly have impact on agriculture productivity and production, mostly in a negative sense. Researchers at International Rice Research Institute came to conclusion that during period of year 1979 to 2003 on the average maximum and minimum temperatures had increased by 0.35 and 1.23 degrees, respectively. They also concluded that for every 1 degree Celsius increases in night minimum temperature may decrease paddy yield by 10 percent. (Peng, *et al*, 2004).

Third is the dominance of small scale farm. Based on National Agriculture Census 2013, number of household farmers were 26.14 million units with average land holding size of 0.98 hectares. Of that amount, 56 percent households operated less than 0.5 hectares. Meanwhile, land holding size of rice field was even smaller, less than 0.2 hectares (Directorate Food and Agriculture, Bappenas, 2013). These small scale farmers are faced with classical problems, namely less access to sources of capital, technologies, information, and markets. Small size of land may also create inefficiency because of not fulfill economy of scale principle.

Forth is the existence of unbalance food production, across times and among regions. Most food crops have different harvesting time during a year that creates peaks of food logistic activities, surpluses at harvesting time and shortages at planting period. On the other hand, logistic system in this archipelagic country has not properly developed. This condition creates food logistic problems such as high cost of distribution to provide enough food at all times and in all over regions, including small islands. Food security and nutrition at individual level, especially in remotes areas, then is difficult to maintain.

Fifth, is high rate of food losses and food waste. Food losses due to improper handling at harvest and post-harvest activities, including transporting and marketing were estimated around 10 percent to 20 percent of total production, depend on commodities, weather condition, and technology used. Efforts have been taken to reduce food losses but have no significant result.

Food waste occurs mainly at household level, is started after one buys food at retail market, cooks in own kitchen, and serves on the dinning plate. This food waste occurs simply due to community and individual ignorance of the values and means of food. Food was left rotten or pass expires date in a refrigerator and/or left in a dinning plate because one takes food more than he/she can eat. As reported by FAO, this food waste was predicted around 30 percent of total food availability (FAO, 2011). This situation was also occurred in this country. Indonesians have bad eating habit either in their own houses or in meetings and parties. Many Indonesians take foods and put in their plates more than they can eat. This fact creates additional burden on natural resources use.

DEMAND SIDE

On demand side, food security and nutrition problems relate to population dynamics, continuous change in consumer's preference, and change in purchasing power of communities. First, number of people in this country was huge and population growth was relatively high. In 2014, Indonesia population was predicted around 252 million people with annual growth rate of 1.35 percent. With these figures, every year new born baby will be more than three millions and consequently need more foods. Quantity of food demanded will rise continuously with a sizable amount, on the other hand natural resources are also depleting continuously.

Second, urbanization and women labor force are two main factors in population dynamics which have significant impacts on food demand pattern. Movement of rural population to urban areas are continuing because rural cannot provide quality jobs for new labor forces, either in term of wages or work condition. Urbanization also means a transformation from a village into a place with urban characteristics or a small city becomes a bigger one. This is in line with economic growth and regional autonomy. Currently urban population was around 49.5 percent of total population and is estimated to be around 60 percent in 2015. Participation of women into labor force has also increased. Statistics Indonesia reported that in 2010 around 36.4 percent of total labor force was women. In the next 10 years it is estimated that proportion of women enter into labor force will be approaching 50%. These two population dynamics will increase demand for processed foods. Share of processed food expenditure to

total food expenditures rose triple during the last 20 years, from 8.40 percent in 1990 to 26.58 percent in 2012.

Third, as an emerging economy moving toward middle income class, demand for food of average Indonesian has been changing toward more variety, quality, nutritious, and safety. This changing food consumption pattern was also strongly driven by intensive and massive advertisement in promoting processed foods, especially global and ready to eat food products.

Forth is double burden of malnutrition. Statistics Indonesia (2015) reported that in September 2014 number of poor people was 27.73 million or 10.96 percent of total population, and around 62.64 percent lived in rural area with small scale agriculture as the main source of income, and 54.45 million people stayed in Java (six provinces, including Jakarta). Main source of their income was from informal sector economy and low wage jobs. This group of people consumed energy and protein lower than the standard requirement for a healthy life.

At the same time, in 2013 in this country prevalence of children under five years of age with under-nourishment was 19.6 percent, of that amount around 5.7 percent was severe undernourishment (Suryana, 2014d). Data 2012 published by Organization for Economic Co-operation and Development (OECD, 2014) presents that prevalence of obesity among children aged 5-17 in Indonesia were 11 percent among boys and 8 percent among girls; and among adults (age 15 years and over) was 2.4 percent. Indonesia faced under-nourishment and over-nourishment at the same time or double burden on malnutrition

CHALLENGES

Some problems can be seen as opportunities or challenges. Urbanization, consumption pattern dynamics, and change in farms size are among problems fall into this category. Fan (2014) identified transformation of Asia's agri-food system as opportunities and challenges for Asia food security and nutrition. This transformation at a certain degree is happening in Indonesia. Based on Fang analysis (2014) there are five interlinked transformation.

First is fast urbanization, means increase role of urban areas in food economy. This creates more demand for and supply of foods, including nutritious food, since food expenditure per capita in urban is higher than in rural areas.

Second is diet change. This creates consumption increase of non-grains and processed or prepared food products, decrease of cereals, and increase of quality food (nutritious, healthy, and safe). Opportunity for small scale and medium business of processed foods are opened. Food consumption will move toward more balance diet.

Third, food market transformation is characterized by the emergence of supermarkets and large wholesalers, and in Indonesia also grows chain mini-markets from big cities to small towns. If this phenomena is responded with right steps, among other by linking small scale farmers as producers into food value chain, then rural economy will grow at faster rate. At the same time availability of quality and variety of foods in rural areas and small towns will increase.

Forth is rise in rural non-farm labor markets, and fifth is agricultural technology and farm size change. Basically, these two transformations relate to changes in employment structures, agricultural machinery use, and institutional innovation on farming practices. If this is done right, it will increase income of farmers and rural households, then increase food expenditures, and finally improve quality of food and nutrition consumed.

POLICY OPTIONS

GOAL AND APPROACH

Strategic environment for food security and nutrition development at national and global levels have been changed substantially. The most notable change is now world becomes more integrated in term of economics, markets, movement of goods and services, and social values. These changes can be credited mostly to fast development of communication and information technologies. On natural resources, global climate change created new environment for food production system, such as a planting season shift because of change in rainfall pattern, uncertain wet and dry seasons, and increase in average air temperature. On the other hand, demand for food increases continuously in term of quantity and quality in a broad sense, due to population and economic growth. Therefore, development goals, policies, and programs of sustainable food security and nutrition in the country for next 25 years should be refocused or sharpened. Discussion on this direction and policy issues on food security has been presented earlier with various approach in Suryana (2014b, 2014c, and 2014d).

Based on country political commitment as stated in Food Law, basic policy on national food development is food sovereignty, food self-reliance, and food security. Implementation of this basic policy is that food security and nutrition should be based on the country capacity and capability in producing enough food for all Indonesian population, by utilizing domestic resources optimally. In a normal situation, food self-reliance comes as prerequisite to achieve food security. Food import can only be done if the country experiences a shortage situation in providing enough food for all people from its domestic production. Food sovereignty means that government of Indonesia has a freedom in food policy making process and decision, free from any intervention from any party or vested interest, and based solely on national and people interest. In this context, the government may decide to import certain foods for a predetermined amount and at a certain period of time and still has food sovereignty, if the decision based on national interest.

Goals of national food security and nutrition as follow: (1) To increase domestic capacity and capability in producing food sustainably, (2) to promote food consumption diversification based on local food, (3) to stabilize food supply and prices, especially staple foods at affordable prices, and (4) to provide food aid or social safety net for the poor, communities with nutrition problems, and households under emergency situation. With these goals, current policies related to food security and nutrition development must be redirected.

To achieve food security and nutrition, food policy development has to be refocused or redirected. Proposed refocusing of this policy as follow. First is redirection from food self-sufficiency approach toward food self-reliance. The later means ability of the country in producing variety of food based on local resources by using natural, human, social, and economic endowments, and local wisdom with dignity (definition from Food Law). This new approach will certainly change basic policy and program in pursuing domestic food production increase. With self-sufficiency approach, efforts to increase food production sometimes was done at all costs, but this new one offers implementation of competitive and comparative principles to increase efficiency and competitiveness in food farming practices.

Second, from food production increase approach toward farmers' income improvement. Main policy to be implemented with this new approach is farmers' protection and empowerment in order to increase their food production capacity efficiently. Policies and programs on food production campaign should put improvement of farmers' income and welfare as a main priority. Choice of crops, technologies, and food pricing policies should consider farmers interest in balance with consumers' needs. Both farmers and consumers should have the same position in term of sustainability of national food security and nutrition.

Third, from providing food consumption in term of quantity approach toward promoting consumption with food diversity based on local resources, balance in nutrition, and safe food. This can be achieved by increasing households' income including farmers, improving community knowledge and awareness of better nutrition, and providing more variety of food based on local resources with better nutrition and safe. Application of food processing technology will help implement this approach.

POLICY DIRECTION

Based on new approach, selected policies and programs of food security and nutrition are identified as follow. First, sustainable development of food sector. This is promoted through (a) enhancing research and development to create innovation and technology which can increase productivity and competitiveness of food production, (b) accelerating innovation and technology dissemination to farmers and other agribusiness players, (c) promoting sustainable management of natural resources, including marine ecosystem and aqua-culture, (d) facilitating investment and infrastructure development in agriculture and rural areas, and (e) improving farmers capability in framing practices and other small and medium scale players of agribusiness activities.

Second, reliable national food reserves system. National food reserves consists of government and community reserves. Government food reserves consist of central, province, and district reserves. Community reserves are basically food stock held by households, rice millers, traders, and institutions that serve meals such as hotels, hospitals and correction facilities. Another form of community food reserves is that community food reserves (*lumbung pangan masyarakat*) which exists and grows in villages based on social arrangement and managed by community itself.

Third, enhancing food trade and markets. Under this policy and refer to Food Law, food international trade is treated as the last resort if domestic sector fail to produce enough food for all people. International trade must be treated as an instrument to enhance food security and nutrition without sacrificing agricultural and farmers' interest. Other policy related to food trade is promoting distribution from gain from trade more equitable among players, especially small scale farmers which often being left out. One of means to increase small scale farmer participation and income is to align them into food value chain.

Forth, reducing food losses and waste. As stated earlier, amount of food losses and waste from farm to dining table was very sizable. If the losses and waste of food can be reduced, for example by half, task to achieve sustainable food security and nutrition will be much more easier, and pressure to open forest for new rice field or agricultural land will be lessen. Key to reduce food losses is application of proper food technology and agricultural machinery at every steps of food handling and product development. Meanwhile, food waste relates to buying and eating habits. A housewife or an individual buys more food than she/he needs or take food more than she/he can eat. Reducing food waste should be done through a campaign to build awareness of the value of food wasted.

Fifth, improving food standard and safety. Demand for quality food is increasing, and this is opportunity for food business as long as food industry can give a positive response to changing this demand characteristics. At present food standardization and food safety compliance in the country are still weak. Improving food standard and assuring food safety will increase competitiveness of food products in markets, both domestic and global. Efforts to seriously improve food standard and food safety compliance will increase quality of food consumed and market opportunity. At the end income of farmers and small and medium enterprises will rise and food industry based on local sources will grow, and at the end, sustainable food security and nutrition can be achieved and maintained.

CLOSING REMARKS

Sustainable food security and nutrition has been at the center stage of social-economic development globally and nationally for years. Government leaders and international organization top managements had made commitment to eradicate poverty, hunger, food insecurity and malnutrition. However problems still exist, hungry people is still sizable in amount, especially in Africa and Asia. Indonesia has made a positive progress, but with slow pace. People live under poverty line in this country in 2015 was around 28 million or 11 percent of total population. Percentage of children who undernourished, underweight, stunting, and wasting were sizable.

To achieve sustainable food security and nutrition, based on proposed new approach, five policies and programs of food security and nutrition are identified as follow: promoting sustainable development of food sector, building reliable national food reserves system, enhancing food trade and markets, reducing food losses and waste, and improving food standard and safety. This new approached should be translated further into detailed and specific activities. This is intended as national policy and then its implementation should involve all actors, namely governments (central and locals), privates including state owned enterprises, and communities.

REFERENCES

- Agency for Food Security, Ministry of Agriculture. 2014a. National Nutrition Strategy Paper of Indonesia. Prepared for FAO/WHO Second International Conference on Nutrition (ICN2). Jakarta.
- Agency for Food Security, Ministry of Agriculture. 2014b. *Direktori Perkembangan Konsumsi Pangan*. (Directory of Food Consumption Trend). Jakarta.
- APEC. 2013. Policy Partnership on Food Security (PPFS), APEC Food Security Road Map Towards 2020 (version 2013). Published by Indonesian Agency for Food Security, Ministry of Agriculture. Jakarta.
- APTERR Secretariat. 2015. Activities/APTERR: ASEAN Plus Three Emergency Rice Reserves. www.apterr.org/index.php/news.events
- ASEAN Secretariat. 2011. ASEAN Plus Three Emergency Rice Reserves Agreement. Sign in Jakarta 7 October 2011. Jakarta.
- Briones, R.M. 2014. Food Reserves in ASEAN Countries. <http://www.oecd.org/tad/events/Food>
- Briones, R.M. 2012. Climate Change and Price Volatility: Can We Count On The ASEAN Plus Three Emergency Rice Reserve? SDP Sustainable Development Working Paper Series. Asian Development Bank, Manila.
- Coordinator Ministry of People Welfare. 2015. *Pedoman Umum Raskin 2015*. (General Guideline on Rice for the Poor 2015). Jakarta.
- Director General for Water Resource, Ministry of Public Works. 2013. *36% Jaringan irigasi rusak. Ini rincian perbaikan dan pembangunan PU*. (36% Irrigation networks was damaged. This was details of rehabilitation and construction by Ministry of Public Works). tempo.com. 27 November. Jakarta.

- Deputy Minister for Human Resources and Culture, Bappenas. 2015. *Kebijakan Perencanaan Pembangunan Kesehatan dan Gizi* (Development Planning Policy on Health and Nutrition). Presented at Rapat Kerja Nasional Regional Barat in Batam, 5 March.
- Directorate Food and Agriculture, Bappenas. 2013. *Studi Pendahuluan Rencana Pembangunan Jangka Menengah Nasional (RPJMN) Bidang Pangan dan Pertanian*. (Preliminary Study on National Middle Run Development Planning of Food and Agriculture). Jakarta.
- Economist Intelligence Unit. 2015. Global Food Security Index. An annual measure of the state of global food security.
- Fan, S. 2014. Achieving Food Security and Nutrition for All Asian by 2025. International Food Policy Institute (IPFRI). Presented at International Conference on Asian Food Security (ICAFS). Singapore, 21 August.
- FAO and WHO. 2014. Conference Outcome Document: Rome Declaration on Nutrition. Second International Conference on Nutrition (ICN2). Rome, November.
- FAO. 2013, Briefing Note. Thirty-eight Session of the FAO Conference Rome (15-22 June 2013) Special Event: Recognizing Outstanding Progress in Fighting Hunger. Rome.
- FAO. 2011. Global Food Losses and Food Waste: Extent, Causes, and Prevention. Rome.
- FAO. 2009. Declaration of the World Summit on Food Security. Rome, November 2009.
- FAO. 2002. Declaration of the World Food Summit: Five Years Later, International Alliance Against Hunger. Rome, June 2.
- FAO. 1996. Monitoring Progress Since the World Food Summit. http://www.fao.org/wfs/main_en.htm. Downloaded 21 May 2015.
- Hafsah, M.J. And T. Sudaryanto. 2004. *Sejarah Intensifikasi Padi dan Prospek Pengembangannya* (History of Rice Intensification and Its Prospect). In F. Kasryno, E. Pasandaran, and A.M. Fagi (eds.). *Ekonomi Padi dan Beras di Indonesia*. (Paddy and Rice Economy in Indonesia). Badan Penelitian dan Pertanian, Departemen Pertanian Jakarta. Hlm.17-29.
- Jokowi-Jusuf Kalla. 2014. *Jalan Perubahan untuk Indonesia yang Berdaulat, Mandiri, dan Berkepribadian, Visi, Misi dan Program Aksi*. (Path of Change for Sovereignty, Resilient, and Identity of Indonesia, Vision, Mission and Action Program). Jakarta.
- Ministry of National Development Planning/Bappenas. 2010. *Peraturan Presiden RI No. 5 Tahun 2010 tentang Rencana Pembangunan Jangka Menengah dan Panjang (RPJMN) Tahun 2010-2014*. (President Regulation No. 5 Year 2010 pertaining Short Run and Long Run Development Planning). Jakarta.
- OECD. 2014. OBESITY Update. June 2014.
- Peng, S., J. Huang, J.E. Sheehy, R.C. Laza, R.M. Visperas, X. Zhong, G.S. Sentena, G.S. Kush, and K.G. Cassman. 2004. Rice Yield Decline with Higher Nigh Temperature from Global Warming. *Proceedings of the National Academy of Science of the USA*. Vol. 101, No. 27. July.
- Perum Bulog. 2012. Sekilas CBP. (Government Rice Reserve in Brief). www.bulog.co.id.sekilas_cbp.php. Downloaded 5 June, 2015.
- Saifullah, A. 2010. Indonesia's Rice Policy and Rice Stabilization Programme: Managing Domestic Prices During the 2008 crisis. In D. Dawe (ed) *The Rice Crisis: Market, Policies, and Food Security*. FAO and Eartscan. p.109-122. Rome.

- Suryana, A. 2015. *Kebijakan Cadangan Pangan Nasional CPN dan Regional APPTERR*. (Policy on National Food Reserves and Regional APTERR). Materi Kuliah S2 Agribisnis IPB. Bogor, 27 November.
- Suryana, A. 2014a. *Perspektif Pengembangan KRPL ke Depan: Tinjauan Kebijakan*. (Perspective of KRPL Development: Policy Assessment). Presented at Focus Group Discussion on KRPL (home-yard garden) at Indonesian Agency for Food Security, Jakarta, 10 December.
- Suryana, A. 2014b. *Menuju Ketahanan Pangan Indonesia Berkelanjutan 2025: Tantangan dan Penanganannya* (Toward Sustainable Indonesian Food Security 2025: Challenges and Its Responses). FORUM PENELITIAN AGRO EKONOMI. Vol.32, No. 2, December 2014. Hlmn 123-135.
- Suryana, A. 2014c. *Arah dan Kebijakan Ketahanan Pangan Nasional* (Direction and Policy on National Food Security). Presented at Focus Group Discussion on "Achieving Indonesia Food Sovereignty through Food Security Development", organized by TNI AD (Indonesian National Army). Jakarta, 28 October.
- Suryana, A. 2014d. Food Security Challenges Faced by Developing Asian Countries and Responses toward 2025: The Case of Indonesia. Presented at International Conference on Asia Food Security (ICAFS). Organized by RSIS Nanyang Technological University. Singapore, 21 August.
- Suryana, A. 2014e. Global Food Security Index, Tool for Policy Planning of Food Security. Presented at Seminar GFSI, organized by Food Security Council (*Dewan Ketahanan Pangan*). Jakarta, 26 August.
- Suryana, A., B. Rachman, and M.D. Hartono. 2014. *Dinamika Kebijakan Harga Gabah dan Beras dalam Mendukung Ketahanan Pangan Nasional*. (Dynamics of Rice Price Policy in Support of National Food Security). Pengembangan Inovasi Pertanian. Vol. 7, No. 4, December 2014. Hlm. 153-168.
- Suryana, A. 2013. *Kemitraan Kebijakan Pangan*. (Food Policy Partnership). REPUBLIKA. Senin, 29 Juli.
- Suryana, A. 2012. *Cadangan Beras Darurat*. (Emergency Rice Reserves). REPUBLIKA, 29 Agustus.
- Suryana, A. 2002. *World Food Summit: Aliansi Internasional Mengikis Kelaparan* (World Food Summit: International Alliance Against Hunger). KOMPAS, 18 June.
- Statistics Indonesia. 2015. *Laporan Bulanan Data Sosial Ekonomi April 2015* (Monthly Report of Socio-Economic Data April 2015). Jakarta. www.bps.go.id/index.php/publikasi/1213.