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Feeding the Megacity: Challenges to Achieve Food Security in Jakarta

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Abstract. *Food security has nowadays become a major challenge for many countries including Indonesia, which has included it in its Food Law. Meanwhile, urban transition entails massive land conversion from non-built (agriculture) to built environment. This transition makes the law's objectives more difficult to achieve and consequently adds to the complexities of metropolitan governance and planning. Using Jakarta as a case study, this article aims to describe the condition of Jakarta's food security, being the only megacity in Indonesia. This research uses a mixed method approach with content analysis and descriptive statistical analysis. The analysis investigates the components of food security, which include availability, accessibility, utilization, and stability. The research found that each component has faced particular problems that are mutually connected, and the local government has yet to recognize the urgency of this issue. This research stresses the urgency of local government's role and the need for strong and sustainable cooperation with other regions, particularly Jakarta's peri-urban region, in managing Jakarta's food system.*

Keywords. *Urban food security, megacity, Jakarta*

Abstrak. *Ketahanan pangan telah menjadi tantangan utama bagi berbagai negara termasuk Indonesia, yang telah memasukkannya ke dalam undang-undang pangan. Pada sisi lain, perkembangan perkotaan telah menyebabkan alih fungsi lahan secara besar-besaran dari pertanian menjadi kawasan terbangun. Transisi ini menyebabkan tujuan undang-undang menjadi sulit untuk dicapai dan meningkatkan kompleksitas tata kelola kawasan metropolitan. Artikel ini bertujuan untuk menggambarkan kondisi ketahanan pangan Jakarta, sebagai satu-satunya megapolitan di Indonesia. Penelitian ini menggunakan pendekatan campuran khususnya metode analisis isi dan statistik deskriptif. Analisis mengidentifikasi komponen-komponen ketahanan pangan, termasuk ketersediaan, aksesibilitas, penggunaan, dan stabilitas. Penelitian ini menunjukkan bahwa setiap komponen menghadapi masalah tersendiri yang saling terkait, dan pemerintah daerah masih harus menemukan urgensi permasalahannya. Penelitian ini menekankan pentingnya kerja sama yang kuat dan berkelanjutan dengan wilayah lain, khususnya kawasan peri-urban di sekitar Jakarta, dalam mengelola sistem pangan Jakarta.*

Kata kunci. *ketahanan pangan kota, megapolitan, Jakarta*

Introduction

Food security has nowadays become a major challenge for most countries in the world, especially for developing countries. Indonesia, as a developing country, considers food security a national challenge as implied in its National Food Act number 18 in 2012, which has three

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main agendas: Food Policy, Food Availability, and Food Security. Food policy is about sustaining the food system. Meanwhile, food availability is about how Indonesia can ensure its food productivity. Lastly, food security is about how government delivers food to the society. These three agendas together are important to achieve food security.

Basically, these agendas have the same interpretation of the concept of food security. Based on Weingartner (2004), elements of food security, i.e., availability, access, utilization, and stability, are relevant to all levels of social and administrative organizations, from the individual and the household (micro level), to the community (sub-district, district and province) or *meso* level, and at the national scale and the global level (macro level). This implies that issues of food security are relevant at all of these levels and must be managed properly by the authorized stakeholders.

Meanwhile, Indonesia loses 80.000 to 100.000 hectares of agricultural land (wetlands) every year because of the conversion of agricultural land into built area due to urban development, based on data of the Ministry of Agriculture in 2014. This phenomenon also occurs in Jakarta, a megacity in Indonesia. This small area was home to almost 10 million humans in 2015, based on the website of the Ministry of Home Affairs. It means Jakarta has a high population density and is an indication of rapid population rise in Jakarta. This condition is caused by the agglomeration of economic activities and public services that make Jakarta a big population magnet.

Therefore, this condition also contributes to Jakarta's complexity (social problem e.g. population density, population rise, and economic conditions e.g. poverty) and leads to a dilemma in urban development and food security. Furthermore, due to this phenomenon the agenda in the food law will be harder to achieve because it threatens the availability of food. In the field of food, Jakarta has a small ratio for food security. Based on Adharina (2015), Jakarta's own food production can cover only 4% of its food demand. This is further aggravated according to data from the Central Statistic Agency that shows Jakarta's agricultural area decreased between 2005 until 2013. This makes food security a major challenge for Jakarta.

Based on these indications, Jakarta needs a massive improvement in its food security management by a strong cooperation between other regions such as its peri-urban areas, other local governments which are able to supply food or even other countries. Thus, it is needed to measure the condition of Jakarta's food security to discover which indicators need to be strengthened and to be managed by the government. Therefore, this research will describe the condition of food security in Jakarta.

This paper will explain the condition of food security in the megacity of Jakarta which consists of four dimensions (availability, accessibility, utilization and stability which will be elaborated in the section on, the concept of food security). Then, for each dimension, this paper will explain the condition based on the indicators synthesized in the concept background. Lastly, the conclusion will describe the condition of food security in Jakarta based on its dimensions and give recommendations on how to cope with the challenges.

Objective and Methodology

Based on the terminology by Babbie (2007), this research is considered a descriptive research. Taking Jakarta as a case study, this paper aims to determine the condition of urban food security in Jakarta. Firstly, this study will identify the condition of each component of food security in

Jakarta, as the only megacity in Indonesia. The result will help to formulate policy recommendation in urban food security that needs to be managed in Jakarta.

This research uses a mixed methods approach with content analysis and descriptive statistics analysis. Based on Yin (2002), case study research is a combination of quantitative and qualitative evidence. Therefore, this research uses secondary and primary data collection methods. Descriptive statistics analysis based on Kachigan (1986) helps to make conclusions about population characteristics. This analysis is suitable for the indicators in this study. Most of the indicators involve numerical and statistical data, such as the amount of imported food and food productivity. For further analysis, content analysis is conducted to make some inference which possible to be imitated and is valid while considering its context. According to Krippendorff (2004), content analysis is defined as a research technique to produce a valid conclusion based on the intended context of the text or other sources. This analysis will help to explain literal data, which only can be explained through qualitative analysis, such as Local Policy to ensure food security in Jakarta.

Food Security Concept

The concept of food security was first introduced in the 1970s after a global famine occurred. The focus was food availability, which is closely related to food production and stability of food prices. This term originated as a global issue, with worldwide concern. Food security has many definitions and concepts, depending on its terms and conditions (Maxwell and Smith, 1992). Over time, the concept became more detailed and included a technical review in order to measure food security. The most widely accepted definition of food security is issued by the Food and Agricultural Organization (FAO) in 2000. Food security is achieved when it is ensured that all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, which meets their dietary needs and food preferences for an active and healthy life.

The GFSI (Global Food Security Index), as mentioned in Pangariwibowo, et al. (2013), consists of three main indicators: availability, affordability, and quality & safety. Meanwhile, the Food and Agricultural Organization (FAO, 2000) proposes that food security consist of four (4) dimensions: availability, accessibility, utilization, and stability. This paper will use the FAO concept of food security since it is more generic and replicable in most cases. Availability refers to the physical existence of food. This aspect is measured by food production and preserved food. Another concept, introduced by Riely (1992), proposes that food availability is a combination of domestic food production, commercial food imports, food aid, and domestic stock. Another aspect is food accessibility, relating to both physical and economical access. Based on Jarosz (2011) food accessibility means affordability. Physical accessibility such as market availability and economic accessibility reflect household purchasing power and food prices. The third component, utilization is usually measured by nutritious aspects such as food quality, and availability and access to clean water. Lastly, stability refers to the temporal dimension of food security that requires the previous three dimensions. Maxwell and Frankenberg (1992) divide food insecurity in two categories; cyclical food insecurity where there is a regular pattern and temporary food insecurity such as droughts or floods, climatic issues, and civil and political issues. **Table 1** shows the components and indicators used to describe the condition of urban food security in Jakarta.

Table 1. Components and Indicators of Food Security in Jakarta

Objectives (GFSI)	Objectives (FAO)	Components	Indicators
Availability	Availability	Agriculture Productivity	Amount of Agriculture Productivity in Jakarta
		Food Import	Amount of Food Import in Jakarta
Affordability	Accessibility	Food Price	Food Price per Commodity in Jakarta
		Food Subsidy	Recipients of Food Subsidy in Jakarta
		Market Availability	Distribution of Market Places in Jakarta
		Food Distribution System	Food Distribution System in Jakarta
Quality and Safety	Utilization	Public Health Condition	Malnutrition Cases in Jakarta
			Child Mortality Cases in Jakarta
		Food Quality	Degree of Food Hygiene in Food Distribution Systems in Jakarta
			Accessibility of Water in Jakarta
			Sanitation Facilities in Jakarta
	Stability	Weather Condition	Weather Condition in Jakarta
		Food Price Fluctuation	Trends in Food Price in Jakarta
		Political Condition	Jakarta's Local Policy for Food Security
			Jakarta's Programme for Food Security

Food Availability in Jakarta

Based on Weingartner (2004), availability refers to the physical existence of food, be it from own production or in the markets. It means that the availability of food was measured by the amount of productivity from inside and outside one area, in this case, Jakarta. Availability measured by agriculture productivity inside Jakarta and food imports from outside Jakarta.
Food productivity inside Jakarta was measured by the amount of harvested area, the amount of food production inside Jakarta, and the trend of the average of food production. Harvested area is the amount of area used for crops to produce food. Based on the Jakarta Statistical Centre Board (BPS), some commodities were planted in Jakarta in 2009-2012: wetland paddy, maize, cassava, and peanuts. However, based on the data in 2013, only one commodity was planted in Jakarta, namely wetland paddy. Meanwhile, other commodities like maize, cassava, and peanuts are not produced because there is no land to use for crops. This is ironic because in several years earlier 2013, there was still land available for those commodities. **Table 2** shows this phenomenon.

Table 2 shows a decreasing trend of harvested area from 2009 until 2013 for all commodities. Furthermore, the worst fact is there is no land for maize, cassava, and peanuts anymore. This indicates that the food productivity is decreasing over years. This also applies to wetland paddyfields, al though Jakarta still has argricultural land for itdata shows that the possibilities for planting paddy fields decreased.

Table 2. Harvested Area in Jakarta, 2009-2013

Harvested Area (ha)	2009	2010	2011	2012	2013
Wetland Paddy	1974	2015	1723	1897	1744
Maize	16	15	12	3	0
Cassava	26	25	15	4	0
Peanuts	9	9	7	1	0

Source: BPS, 2014

Food production and the trends of food productivity also show a lowering trend for all commodities. Cassava had a big amount of production in 2012 (47 tons or 117.5 kws, as can be seen in **Table 3** and **Table 4**) but in 2013 the amount of production and the average of productivity of cassava is zero.

Table 3. Average Food Productivity in Jakarta, 2009-2013

Average of Productivity (kw/ha)	2009	2010	2011	2012	2013
Paddy	55.79	55.41	55.23	58.22	58.87
Maize	20.02	20.6	19.06	19.24	0
Cassava	117.4	115.9	117.4	117.5	0
Peanuts	9.97	11.14	9.95	10.11	0

Source: BPS, 2014

Table 4. Food Production in Jakarta, 2009-2013

Production (ton)	2009	2010	2011	2012	2013
Paddy	11013	11164	9516	11044	10268
Maize	32	31	23	6	0
Cassava	305	290	176	47	0
Peanuts	9	9	7	1	0

Source: BPS, 2014

This indicates that the food production inside Jakarta is decreasing over the years and excludes the expectation to become higher again in the future. These facts show that the condition of agricultural productivity in Jakarta is relatively bad. Moreover, these facts are related to the issue of urbanization in Jakarta which is inevitable, therefore Jakarta needs a supply from other regions.

Food availability can also be considered from the amount of food imported from outside Jakarta. Some data that is able to explain the condition of food imports are the amounts of imported rice and imported meat in Jakarta. For imported rice, West Java is the biggest contributor. West Java contributes about over 60% of the imported rice in Jakarta. The data shows that there is no constant amount of imported rice from West Java from 2005 until 2013. This indicates that there is no certainty for Jakarta to receive a constant amount of rice from its biggest supplier. **Figure 1** shows this trend.

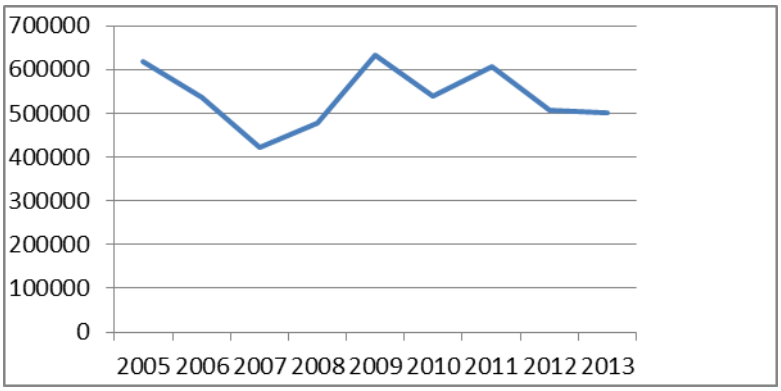

Figure 1. Amount of Imported Rice from West Java, 2005-2013
Source: Food Station Cipinang Jakarta, 2015

Other areas show a different trend for their contribution of imported rice in Jakarta. There is a lowering trend of imported rice from East Java and from outside Java. This indicates that rice, coming from those areas (almost 4% of imported rice), will decrease for the years ahead. This threatens food availability in Jakarta. However, there is an indication for Jakarta to secure its imported rice from Central Java, because its contribution to imported rice in Jakarta is increasing over the years (from 2005-2013). Moreover, the increasing trend of the amount of imported rice from Central Java is significant (there is a steep slope of the amount of imported rice, shown by the peak in **Figure 2**). Nevertheless, this does not mean Jakarta has a secure condition of its food availability from outside. The data shows a threatening indication since the three areas (West Java, East Java, and outside Java) which contribute the most will possibly supply a smaller amount of imported rice to Jakarta while only Central Java will do the opposite. **Figure 2** shows the data for this phenomenon**.**

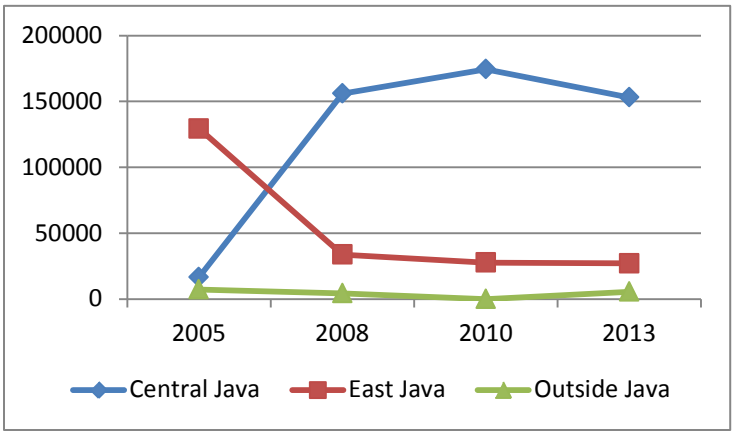

Figure 2. Amount of Imported Rice from Central Java, East Java, and outside Java, 2005-2013
Source: Food Station Cipinang Jakarta, 2015

The indication of uncertainty for all areas to export their food to Jakarta is worsened by the fact that the majority of all available food comes from outside Jakarta. About 95-99% of the food in Jakarta was imported from other areas. This is an indication that the uncertainty of food availability from outside Jakarta is getting stronger. Moreover, the degradation of food production inside Jakarta causes food availability in Jakarta to be in a threatening condition.

Food Accessibility in Jakarta

Access is ensured when all households and all individuals within those households have sufficient resources to obtain appropriate foods for a nutritious diet (Riely et al. 1995). This means that households might access food under conditions that make most households able to afford the food in Jakarta. Accessibility is measured by food price, food subsidy, market availability, and food distribution systems.

Food price is one indicator that is unpredictable and uncertain. There are many factors which cause this indicator increase and decrease again even in just one month. However, the prices of all commodities in Jakarta still were controlled by the free market mechanism. This causes food price to fluctuate over months or even weeks. The government seems unable to do anything to control food prices which puts food accessibility in an uncertain condition.

Subsidies from the government were given to people who have difficulty in accessing food with their own salary. Even though the price of food still is manageable, as long as their income is insufficient to afford food, food subsidy is needed to increase affordability. In Jakarta, there is a rice subsidy, which was given to people in each area of Jakarta. However, the recipients of subsidy are not exactly the same number compared to the number of poor people in Jakarta. The recipients are just about 30-50% less than the total number of poor people in Jakarta (Based on Jakarta Development Agency (Bappeda) and BPS, 2015). This indicates that not all poor people are able to afford rice properly although the subsidy was just given to only one commodity (rice). In conclusion, not all food is accessible and not all poor people can access subsidized food (rice). This condition can be seen in **Table 5.**

Table 5. Comparison between Poor People and Recipient of Subsidy, 2015

Area	Poor People (thousand)	Recipient of Subsidy (thousand)	Percentage (%)
Seribu Islands	2.5	1.4	56%
South Jakarta	74.6	37.9	50.8%
East Jakarta	86.8	57.1	65.8%
Central Jakarta	33.6	23.6	70.2%
West Jakarta	83.2	47.6	57.2%
North Jakarta	90.9	58.7	64.6%
DKI Jakarta	371.7	226.5	60.9%

Source: BPS and Bappeda, 2015

To assess the food distribution systems, we could consider how the distribution system works and the problems that emerge during the process. In Jakarta, private local companies handle all commodities in the distribution systems. For rice, there is the Food Station Company and Indonesian National Logistics Agency- Jakarta Branched Area (BULOG Jakarta), Dharma Jaya Company for meat, and for fruits and vegetables there is Pasar Jaya Company (PD Pasar Jaya). These companies were authorized by the local government to control the distribution system of each commodity.

Therefore, these companies should manage the distribution system. However, they are still unable to handle all kinds of food distribution coming to Jakarta. Based on information from Food Station Cipinang, there are three kinds of food distribution mechanisms in Jakarta:

authorized cooperation (with the government), company initiative (without the government), and direct distribution (not handled by companies and/or government).

Table 6. Market Places Distribution in Jakarta, 2013

Area	Wholesaler	Spesific	Retail
Seribu Islands	0	0	0
South Jakarta	1	0	26
East Jakarta	1	3	31
Central Jakarta	1	0	38
West Jakarta	2	1	23
North Jakarta	0	0	25
DKI Jakarta	5	4	143

Source: BPS, 2014

The government also realized that they cannot handle commodities distribution. This also leads to the government to build some distribution controller spots in some marketplaces in Jakarta (**Table 6**). Nevertheless, this initiative still cannot ensure all of the food distribution to be handled by the authorized stakeholders (food companies or government).

Furthermore, these companies always set up a cooperation mechanism with other regions as suppliers. The local government below the FKD-MPU Institution and the local government secretary, as a key stakeholder, protected this cooperation. However, this cooperation was not implemented well, according to technical institutions. Technical institutions such as the Jakarta agriculture agency and Jakarta trading agency consider that the implementation of this kind of food distribution is not applicable.
Based on these conditions, it is understandable that the government has made some efforts to control food distribution. However, black markets for food distribution still operate behind the authorized stakeholders (food companies or government). This condition indicates that uncertainty of food accessibility is getting stronger.

Food Utilization in Jakarta

The utilization aspect in food security simply refers to a population's ability to obtain sufficient nutritional intake and nutrition absorption during a given period. Indicators are used to measure food utilization; according to Pangaribowo, et al. (2013) utilization is measured by sufficient intake of nutrients and diet variety. In this study, we used the number of cases of malnutrition and child mortality in Jakarta to assess nutrition intake in Jakarta. In line with that, we also assessed the availability of food facilities such a sanitation and access to clean water as indicators for measuring food utilization in Jakarta.

Based on the latest data from Jakarta's Public Health Office, there are 1.129child mortality cases in 2012 in Jakarta, while 1.376 toddlers passed away. There were also 1254 malnutrition cases in Jakarta in 2012 or 0,03 percent of the total amount of children in Jakarta. This number significantly decreased from 2007 where 0,24 percent of children in Jakarta were affected by malnutrition. A higher percentage of child malnutrition occurred in 2009 while 1,4 percent of children was affected by malnutrition, as shown in **Figure 3**. However, these numbers significantly decreased in 2010 and until now the trend shows a better condition. Nevertheless,

food utilization is closely related to food accessibility. Poor nutrition intake is caused by the inability to access adequate food. This data proves that food utilization in Jakarta is still problematic.

The Jakarta Public Health Office uses a term to measure clean and healthy living called *Perilaku Hidup Bersih dan Sehat (PHBS)*. They use ten indicators, some of them are clean water use and good sanitation. People who have good access to clean water and good sanitation are classified as Rumah Tangga Berperilku Bersih dan Sehat (Clean and Healthy Household).

Based on the Public Health Office, 68.2% of households in Jakarta are classified as clean and healthy. By using this statistic, we can conclude that clean water and good sanitation are not accessible by all people in Jakarta. This condition will affect food utilization because clean water and sanitation are needed to live a healthy life.

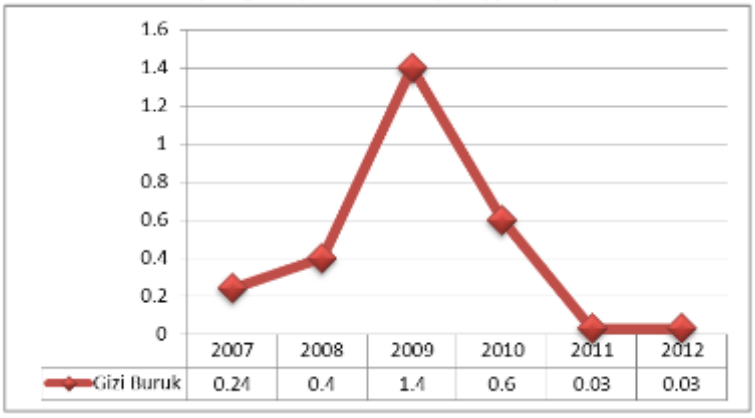

Figure 3. Malnutrition Cases in Jakarta, 2007-2012
Source: Administrative City/Regency Health Profile of Jakarta, 2007-2012

Food utilization in Jakarta is in aninsufficient condition which is proven by the significant number of malnutrition and child mortality cases. This condition shows that not all households in Jakarta have good diet variety and nutrition intake. Ruel, et al. 2010 mention that diet variety is often associated with nutrition deficiency. Other indicators such as clean water and sanitation accessibility also show similar output that proves an inadequate utilization condition.

Food Stability in Jakarta

The stability aspect refers to the stability of three dimensions: availability, accessibility, and utilization at all times. The main risks that might happen are extreme weather, flooding, economic situation and political crisis. This aspect shows the importance of food policy to make sure food stabilization.

Flooding is one of the main threats to food security in Jakarta. Annual flooding often causes an emergency situation Jakarta. People have no access to adequate food because of paralyzed infrastructure such as roads or marketplaces because they are submerged by flooding. With regard to Jakarta incapability to produce its own food, annually flooding might affect food distribution from other regions. Nevertheless, the last flooding in Jakarta, in February 2015, did not affect food stock because Jakarta's warehouse stores had enough supply for Jakarta despite access was cut due to flooding.

In Jakarta's Short Term Development Plan document 2013-2017, food security is one of the main issues. Regarding food security issues in Jakarta, the government planned some strategies. The first strategy is to increase commodity distribution and to revitalize the warehouse function in Jakarta's Area. Other strategies are conducting some programs such as ensuring food availability, food price control, distribution control, and food promotion. Another program is food quality control. All of these strategies can be found in Jakarta's RPJMD document 2013-2017.

The local government of Jakarta also conducts a partnership with other regions related to the food security agenda. The partnership is called Forum Kerjasama Daerah Mitra Praja Utama or FKDMPU. This partnership is one of Jakarta's government's efforts to ensure food supply and availability in Jakarta (Purwanto, 2004) and controls quality of food entering Jakarta (Department of Fishery, Agriculture, and Food Security of DKI Jakarta, 2015).

This partnership has four main agendas, one of them including food security issues. The agenda is an economic agenda, which includes poultry, agriculture, plantation, fishery, forestry, labor, and economic partnerships such as small-scale enterprises. This partnership proves Jakarta's government's concern about issues of food security. Unfortunately, Jakarta's government only focuses on the dimension of food availability, which they do by ensuring food supply in Jakarta. Other dimensions such as availability and utilization do not get as much attention as accessibility.

Operasi pasar, or market operation, a program held by BULOG to stabilize food prices by selling cheap commodities is not enough to maintain food price stability in Jakarta. In line with that, there is a lot of black market activity that sells food which will threaten food price stability. This issue is not local government's top priority as proven by the resilience of black market activity in Jakarta.

Food stability can only be achieved if the other dimensions; availability, accessibility, and utilization, are ensured at all time. This study found that none of these dimensions were ensured which leads to an unstable food security condition in Jakarta. Nevertheless, local government have to cope with these challenges by enacting some policies and programs to ensure food availability, accessibility and utilization at all time in order to achieve food stability. Since the availability and accessibility of food in Jakarta depends much on other regions, strong cooperation between the government and the business sector regarding food should be formed in order to stabilize the condition of food security in Jakarta as the biggest megacity in Indonesia.

Conclusions

To measure the condition of food security, four (4) dimensions are used; availability, accessibility, utilization and stability. In the availability dimension, there is a decreasing trend of harvested area from 2009 until 2013 for all commodities and there is no certainty for Jakarta to receive a constant amount from its biggest supplier and all suppliers regarding rice. From the dimension of food accessibility, food prices fluctuate much over time and the government has no control over food pricing. Moreover, food subsidy is not that helpful in enabling people to access food. From the dimension of food utilization, cases of malnutrition in Jakarta still pove to be a problem for poor people.

Ensuring and optimizing the imported food (e.g. rice) from areas nearby Jakarta (for example, West Java) is needed since Jakarta cannot rely on its agricultural productivity due to inevitable urbanization. Government's control is also needed to handle all types of food distribution, food pricing, and food subsidy since based on the finding that still many problems occurred regarding those issues (direct distribution, food price fluctuation, and poor access as well as malnutrition). Therefore, looking at the concept of food security, it can be achieved if other dimensions; availability, accessibility and utilization, are ensured at all time. This condition, which also mentioned as food stability, is difficult to achieve judged by the condition of other dimensions of food security.

Moreover, other big challenges, such as flooding, causes people to have no access to adequate food. Local policy is not very helpful in coping with this challenge since it only focuses on food availability and ignores other dimensions. This condition causes Jakarta to still have some problems in achieving its food security. Jakarta's local government has to be comprehensive by considering all dimensions of food security in their local policies and programs. Cooperation with other regions is needed and should be considered in policies since Jakarta cannot stand alone in coping with this challenge (all areas, especially the production area, are involves in the system). Therefore, there is an urgency to strengthen local government's role and a need for strong and sustainable cooperation with other regions which includes all stakeholders (government and business), especially in the Jakarta peri-urban area so that we can "feed" this megacity adequately for all time to come.

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