

The Dimension of Rural-Urban Linkage of Food Security Assessment: an Indonesian Case Study

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The dimension of rural-urban linkage of food security assessment: an Indonesian case study

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ABSTRACT

This study puts emphasis on a literature review of current theoretical strands in two major fields: food security and rural-urban linkage. It then critically evaluates the relation between these two. It examines the extent to which the preparation of the Food Security Vulnerability Atlas developed by the World Food Programme considers the rural-urban linkage dimension. The linkage and differences between rural and urban characteristics that significantly affect the pillars of food security are explored based on empirical data obtained from two local governments in Central Java Province, Indonesia. This study shows that the dimension of rural-urban linkage has been included in the Food Security Vulnerability Atlas preparation guideline in Indonesia, although the notion of rural-urban linkage is not explicitly mentioned in the guideline. However, translation of such guideline at the municipality and regency government levels is problematic due to a lack of data readiness. Meanwhile, attempts to modify food security indicators to adapt to data availability are somehow not compatible with the notion of rural-urban linkage.

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1. Introduction

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Food security is one of the world's most important issues and therefore it is mandated as a second objective of the Sustainable Development Goals (SDGs), which is to establish a world free from hunger or “zero hunger” and to double agricultural productivity by 2030. However, food security is in fact a more complex matter beyond the fulfillment of food demand and supply. Food security is related to various issues, both domestically and internationally, that can affect its condition. It involves multiple perspectives, not only from the technical and engineering aspect but also from social, political, economic and trade (Diaz-Bonilla et al. 2000; Otero, Pechlaner, and Gürçan 2013), to the perspective of poverty and justice (Alkon et al. 2013; FAO 2012) and climate change (Gregory, Ingram, and Brklacich 2005; IPPC 2014). It is arguable that food security is a cross-disciplinary theme of science that requires a multidisciplinary approach to understand.

In Indonesia, food security has become a national concern with the enactment of Law 18/2012 on food. It is further regulated through Government Regulation 17/2015 on food security and nutrition. The Indonesian Food Security Council (IFSC) and the World Food

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Programme (WFP) (2015, 3) stated that, “Indonesia has achieved the first millennium development goal of halving the number of people living in hunger and extreme poverty ... [and the new government] has prioritized food and nutrition programs in the National Medium-Term Development Plan (RPJMN) 2015–2019”.

Even so, food security in Indonesia remains an enormous obstacle, especially regarding logistics associated with infrastructures and seasonal storage. The geographical characteristics of Indonesia as an archipelago are also an important consideration in achieving food security for more than a quarter billion Indonesians.

Food Security and Vulnerability Atlas (FSVA) is designed by the WFP, a food assistance branch of the United Nations and the world's largest humanitarian organization addressing hunger and promoting food security. It is an important instrument to understand the extent of food security and food vulnerability status of a country. In Indonesia, the initiative to develop FSVA begins at the central government level, subsequently mandated to the provincial, and passed down to the district and city governments. However, inspired by previous work of anthropologists (e.g. Li 2000; Tsing 1999), who emphasized discussions on political context, we argue that the utilization of global food security assessment tools in Indonesia has been less political, in a sense that there is no tension or disagreement between key state and non-state actors regarding the adoption of FSVA. In contrast, it shows collaborations among actors, in which democratization of Indonesian politics and governance regime over the last two decades (Rossotti 2019) have made such collaborations possible. Subsequent mandate to implement FSVA at the district and city levels is arguably to keep up with strict performance indicators set up by the national government for each ministry. This is a sensible action as FSVA is designed to identify areas that are vulnerable from food and nutrition insecurity and to identify factors influencing their vulnerability.

The FSVA approach has been applied and widely used, particularly at the local level or relatively small territorial units, yet it is not known whether or not the approach perceives regions or territorial matters as uniformed entities. In other words, are spatial variations across a region (e.g. urban vs. rural), including the dynamics of their interactions, taken into account? According to Indonesian spatial planning law and Indonesian statistical bureau, rural areas are dominated by agriculture-based activities, in contrast to urban areas, in which the population density is higher and the environment is built to accommodate non-agricultural activities.

In fact, urban and rural areas tend to have different roles and characteristics in the context of food security. Ignoring this functional difference, the results of FSVA assessment may suffer from bias or a gap with actual conditions. In addition, efforts to pay attention to spatial contexts in food security analysis are relevant, given that most of the regions in the globe will be transformed into cities or dominated by cities. UN-DESA (2014) projected that approximately 66% of the world's population will have resided in the city by 2050. Meanwhile, nation-wide data in 2015 showed that the population of urban areas in Indonesia had reached 53%, whereas that in Java and Bali had reached 68% of the total population within these islands (BPS 2017). Research at the regional scale that consider spatial differences may potentially serve as a point of entry (Ingram 2011) to better understand the multi-dimensional aspects of food security and at the same time to clarify approaches employed in the FSVA assessment.

Therefore, this paper aims to determine the extent to which the FSVA approach or food security mapping takes into account the spatial dimension of rural-urban areas. Specifically, this paper departs from the identification of food security aspects in the dimension of rural-urban relations. The key argument of this paper is that the rural-urban dimension has been included in the FSVA preparation guideline in Indonesia, although the notion of rural-urban linkage is not explicitly mentioned in the guideline. However, translation of such guideline at the municipality and regency government levels is problematic.

The next section puts forward a literature review of two major theoretical strands, the theory of food security and the theory of rural-urban relations. It is subsequently used to critically understand the interrelations between these two. It is then followed by the description of research method and selection of case study examples. The results section presents the process and dynamic of FSVA preparation. It compares how the global indicators of food security have been translated into practice within the Indonesian context. Finally, the last section discusses the strengths and weaknesses of current food security mapping in response to differences in rural-urban characteristics, as well as tests the need for more responsive food security indicators for rural-urban characteristics.

2. Literature review

In the 1970s, food security was associated with the availability of food alone. This concept has changed dramatically following a worldwide food conference known as the [World Food Summit held by FAO in Rome in 1996](#). It is declared that food security is a condition where all citizens can have continuous access, both physically and economically, to healthy and nutritious foods, including a preference for food in order to live a healthy and active life. Since then, in addition to food “availability”, other food security pillars, which include access, utilization, and vulnerability, have been increasingly recognized as for their significance and urgency.

2.1. Pillars of food security

As the first pillar, food availability is highly influenced by various factors in agricultural production such as the availability and fertility of land and proper agricultural technology and engineering. However, the availability of food in a region should not be associated with food production produced by local or domestic farmers alone. Food availability is shaped by a diverse network of stakeholders including large manufacturing companies, retailers, research institutes, government bodies and policy makers, international organizations, humanitarian agencies and non-governmental organizations (Millstone and Lang 2008).

Meanwhile, food access as a second pillar can be influenced by economic ability, society livelihood capacity and access to various sources of infrastructure, especially infrastructure that ensures mobility and energy. Food access is also sensitive to global economic shocks and monetary crisis, in which inflation of food prices following shocks and crises will affect people's purchasing power. A study conducted by Brinkman et al. (2010) employing various methods – price risk analysis, survey, simulation, and regression analysis with food consumption scores – showed that economic crises in developing countries lead to an increase in the average foodstuff price and a decrease in the amount and quality of

food consumed, which overall subsequently posed implications on public health. Another study showed a positive correlation between nutritional intake and public health status in rural Java communities during the peak of the economic crisis in Indonesia in 1997–1998 (Block et al. 2004), although the ratio of body weight to age in children was relatively constant. This happened because the caloric intake of mothers was diverted to their children. However, overall foodstuff consumption quality decreased and anemia was triggered in both mother and children groups.

In addition, the economic crisis is correlated with a decline in energy consumption, both within a country (e.g. Naseem and Khan 2006; Zhao et al. 2019) or between the Global North and Global South (Liu 2015). Energy is an important component in food storage and processing. A simulated decrease in energy consumption over the 2006–2010 period indicated that approximately 4.5 billion people were at risk of starvation and many people were unable to access and process the food they needed to ensure that their community could grow well (Brinkman et al. 2010).

Food utilization as the third pillar includes the use of food both at the household and the individual levels. Food utilization, especially at the household level, is affected by, for example, (a) ownership of food storage and processing facilities, (b) knowledge and practices related to food preparation, feeding for infants and sick or elderly family members, (c) food distribution within the family, and (d) the health conditions of individuals that may decline.

Food vulnerability, the last pillar, is affected by climate uncertainty, a factor that is relatively difficult to control. For example, changes in rainfall patterns have implications on flood or drought, pest population and plant diseases, which can then lead to crop failure. In other words, the stability of land ecosystems and the atmosphere is particularly important.

Community groups that are significantly affected by food security issues include children and pregnant or lactating mothers. Malnutrition among infants of early age (two years old or younger) will lead to implications throughout their life. In addition, low-income communities are also greatly affected by food security issues (Alkon et al. 2013), in which there is a tendency to consume unhealthy food due to cost and affordability. This tendency is despite the fact that they are indeed knowledgeable about healthy diets, and healthier options are available not far from their residence. Alkon et al. (2013) criticized the food availability approach for its failure to portray so-called “food-ways” that can be defined as cultural, social and economic practices, habit, location, motivation, and means of obtaining food that affects how low-income groups set their food choices.

In brief, although the construction of food security pillars is well established and remains a stable framework to approach the issue, studies on food security are still up for more exploration. It should address at least: (i) critical examination for one of these pillars, (ii) the relationship between one pillar to another, and (iii) linking these pillars with the key discourse of a particular discipline or using multidisciplinary perspectives. Food safety is also an interesting theme that needs to be incorporated properly in food security discussions, for example as presented in an emerging study by Lee and Boccalatte (2018). In particular, this study explores the use of food security indicators at the local level, in which spatial and structural differences matter.

2.2. Rural-Urban linkage and food security

The notion of rural-urban linkage was originally established in the regional planning discipline in the early 1980s. It was first used as a conceptual strategy in overcoming regional growth imbalance during the oil boom era, particularly in developing countries, through synchronized and simultaneous management of both rural and urban key socio-economic systems, such as livelihoods, trades and labors. Rural-urban linkage has become imperative as inequality between urban and rural remains persistent, if not more disparate. According to Douglass (1998), the success of rural-urban linkage is influenced by the management of five fundamental flows among rural areas and cities, namely: human, production, commodities, income and information. Such flow is conditional and also depends on rural structures, functions and roles of the urban center, and policy interventions.

Focusing on rural-urban spatial dimension in the context of food security does not mean to exacerbate rural-urban dichotomy, as demonstrated in McGee's (2008) view on rural-urban transition management through building a more harmonious relationship between the two rather than fostering dichotomies and promoting rural-urban transformation. In one side, cities have the power to generate growth due to economy of scale, productivity and market shares. On the other hand, rural areas have natural resource advantages, for which sustainable management is of importance. This can be done by establishing mutually beneficial links (e.g. strengthen supply chains, capital access) with urban areas, which also serve as a main strategy in addressing various issues in rural areas. The 2017 Global Food Policy Report also explicitly affirms that the rural-urban linkage is key to improve food and nutrition security, both at the rural and urban areas (Fan, Cho, and Rue 2017). In addition, planning practices that promote harmony between these two are also crucial to reduce public health inequality (Friel et al. 2011).

Previous researches have sought to consider the importance of food security in the context of rural-urban relations. Lerner and Eakin (2011) argue the significance of sub-urban areas (peri-urban), which is considered as a potential space to integrate food production and urban growth. Meanwhile, Djurfeldt (2015a) mentioned that farmers in areas within close proximity to cities can potentially take advantage or benefit from the growing market for food products that has been abandoned by urban communities due to rapid urbanization process. However, delivery or export of foodstuff out of rural to urban areas need to be scrutinized. Multiple case studies in nine African countries (Djurfeldt 2015b) showed that exports from farm households in rural areas reflected different food security situations. In peasant households belonging to top income groups, food exports reflected excess food production. As opposed to that, in household groups composed of farmers with lower income level, the export of food products might reduce food security within their own families. This situation is also relevant to a classic study that aimed to understand the history of famine in Nigeria from the 16th century to the late 1970s (Watt 1983), which suggested that the history of famine was not much affected by environmental conditions fluctuation, but rather by the destruction of socio-cultural structures among farmer community due to a change in command over resources (e.g. colonization). Using the same analogy, negligence of rural-urban linkage by authorities, which leads to regional inequality, may weaken food security in the region.

2.3. Unequal food security prospects for urban and rural habitants

Urban agriculture does play an important role in reducing food vulnerability and urban poverty, as demonstrated by success stories in Havana, Cuba (Cruz and Medina 2003) or in a number of small and medium-sized cities in Ghana, in which urban agriculture contributes up to 43% of total family income (Ayerakwa 2017). However, the role of urban agriculture is often overstated. The household survey data in 15 developing countries show that the distribution of acceleration and production is still very limited (Zezza and Tasciotti 2010).

A study in Mozambique (Garrett and Ruel 1999) has also introduced the importance of looking at rural-urban differences in the context of food security, although the study found no significant distinctive factors other than evidence for malnutrition among children under five years of age. However, later studies such as one conducted by Ruel et al. (2010) showed that economic uncertainty that led to food crisis exerted different effects on urban and rural communities. For example, the urban poor group is more easily affected by food price fluctuations than the rural poor group, because community members in the urban areas need to purchase their foodstuff, while those belonging to the rural communities are still able to acquire food by growing crops themselves. Moreover, existing policies are generally focused on addressing the limitations of food production in rural areas rather than addressing issues faced by the urban poor group (Cohen and Garrett 2010).

To overcome the above issue, Bloem and de Pee (2017) recommend the provision of investment in secondary cities, since these cities in general are able to spur more equitable economic growth, supported by rural villages as food commodity sources. This will then contribute to food systems strengthening and ensure improved nutrition levels within urban communities. The role of secondary cities in leveraging economic growth has been confirmed in a number of case studies in developing countries (Christiaensen, De Weerdt, and Todo 2013), including in Latin America such as in Chile, Colombia, and Mexico (Berdegue et al. 2015), which compare the investment in rural and metropolitan areas, although the degree of its impact is specific to each country.

Furthermore, cities are often seen as a more resilient entity in terms of food security. Cities mostly serve as a trade center and export and import hub, both domestically and internationally. This further creates a positive influence on the availability of food in cities. Cities are also a geographical unit where the population is concentrated within and such agglomeration can potentially attract corporate investments, including those from major retailers who can easily supply food through their distribution network (Millstone and Lang 2008). This, in turn, creates urban resilience in the context of food security.

This research puts forward a literature review of two major theoretical strands, the theory of food security and the theory of rural-urban relations. While the former is useful to frame the logic and complexity of food security, the latter is important to acknowledge that spatial differences do matter. It is subsequently used to critically understand the interrelation between these two. Understanding of both theoretical strands is beneficial to assess approaches utilized in the compilation of FSVA developed by the WFP.

3. Research methods

The linkage between and differences in the characteristics of rural-urban that significantly affect food security pillars was explored based on empirical case study data from Semarang

Municipality (Semarang) and Grobogan Regency (Grobogan), which represents a region dominated by urban and rural areas, respectively. In terms of rural-urban linkage in food security, Grobogan plays an important role as a food production area on a national scale. For example, in 2019, according to the agriculture department of Grobogan, corn harvest within the regency contributes up to 29.3% of Central Java's corn production, and approximately 2.8% of nation-wide production. As the closest urban area, Semarang is the main destination for a majority of food produced from Grobogan. In this study, we selected several assessment indicators: (1) the ratio of agricultural land area to population, (2) the ratio of trade facilities to population, and (3) the ratio of health facilities to population and compared the spatial output of utilization of these indicators between two contrasting geographic settings, i.e. the urban vs rural areas of Semarang and Grobogan, respectively.

The empirical analysis in this study employs the latest secondary data released by the Central Bureau of Statistics (BPS) in 2016, in particular the statistics of Semarang and Grobogan Governments. Other secondary data used for this study were derived from the latest agricultural census conducted by BPS in 2013, including rural-urban distribution status generated from the latest national census in 2010. This study considers the Indonesian FSVA Guideline (2009 and 2015 versions) issued by the Ministry of Agriculture and the WFP, including the Food Security Vulnerability Atlas of Semarang City Government.

4. Results

In Indonesia, the idea of FSVA development begins at the central government and is then mandated to the provincial and down to the district and city governments. FSVA is used to identify areas that are vulnerable to food and nutrition insecurity and to identify factors affecting their vulnerability. The development of FSVA in Indonesia began in 2005 and it was updated in 2009. Based on these FSVA reports, it is known that there has been a "significant increase in the aspects of food availability at the national level ... [and] poverty has decreased so that it has improved access to food" (IFSC and WFP 2015).

Despite its widespread application, it is not well understood whether the FSVA approach considers spatial variation across regions (e.g. urban vs. rural), including their dynamic interactions. A technical guideline for the development of FSVA in Indonesia is prepared through a cooperation between the Indonesian Food Security Council (IFSC) and the World Food Program. FSVA employs thirteen indicators. Among those, only nine indicators are taken into account to calculate food security composite index. These indicators include (IFSC and WFP 2009, 2015):

- (1) The ratio of normative consumption per capita to net availability of four main cereals (i.e. rice, maize, cassava and sweet potato).
- (2) The percentage of people living below the poverty line.
- (3) The percentage of villages/sub-district with low accessibility.
- (4) The percentage of households without access to electricity.
- (5) The life expectancy at birth.
- (6) The number of underweight cases in under five-years child group.
- (7) The percentage of illiterate women.
- (8) The percentage of households without access to clean water.
- (9) The percentage of households living more than 5 km away from health facilities.

While the first indicator reflects food availability pillar, the second to sixth indicators reflect food access pillar. The last three indicators (seventh to ninth) reflect food utilization pillar. The other four indicators are: deforestation, rainfall deviation, natural disaster, and the percentage of areas affected by crop failure are not taken into account in forming the composite index. The FSVA considers these four indicators as transient or temporary drivers of food insecurity.

Due to structural mandate from upper level governments (e.g. to achieve better institutional performance) and perhaps for other reasons (e.g. lack of information and understanding on the use of such global indicators), the city government of Semarang has initiated the preparation of FSVA since 2014. By 2017, there have been four attempts by the city government to develop FSVA documents. This practice was continued in 2018 and work is in progress. The development of FSVA at the city or sub-district level is commissioned by the Food Security Agency of the Provincial Government. From 2014 to 2016, the development of FSVA was led internally by Food Security Agency at the Semarang Municipality, while in 2017 an expert from a local university in collaboration with the Food Security Agency at the Semarang Municipality led the development of FSVA.

In comparison, there are several types of indicators used in the preparation of FSVA in 2017 and in previous years. First, transient vulnerability indicators, which by the government were proven irrelevant to the preparation of FSVA in 2014–2016, have been excluded from the analysis. Indicator adjustment is also made to sharpen the regional context, which is more in line with the characteristics of Semarang. These indicators include “forest deforestation” and “crop failure incidence”. Although urban forests are important for life, both empirically and scientifically, there is no direct link between the availability of forests, which is relatively limited in Semarang, to the extent of community food security. Forests in Semarang mostly belong to or are controlled by state-owned companies instead of the community. The government of Semarang also does not record crop failure incident and include them in the agricultural statistic data. However, two other indicators of transient vulnerability remain unchanged. These are “the number of natural disaster events” and “rainfall deviations”. Instead, four other indicators were added as indicators of transient vulnerability, including topography conditions, the availability of riverbank settlements, energy sources for cooking, and the availability of drinking water sources.

Secondly, a number of indicators, such as the number of shops and health facilities, have been refined by the concept of “ratio”. Such ratio shows a relative comparison between the number of facilities and the supporting population. Considering the absolute number of facilities alone may produce bias. A high number of shops and health facilities may not reflect accessibility advantage if the number of supporting population to be served is much greater than in other areas with the same number of facilities. Therefore, the use of “ratio” instead of absolute number for facility indicators is perceived to better reflect real conditions.

In summary, there are seven indicators ³¹ used in the calculation of food security composite index in Semarang prior to 2016, while the preparation of FSVA in 2017 employs nine types of indicators. These indicators include:

- (1) The ratio of agricultural land to population
- (2) The percentage of agricultural land areas to total areas
- (3) The number of food industries

- (4) The ratio of trade facilities to population
- (5) The percentage of population living below poverty line
- (6) The ratio of health facilities to population
- (7) The percentage of families without access to electricity
- (8) The number of malnutrition cases
- (9) The number of deaths of infants and postnatal mothers

From the above indicators, the first three (indicators 1–3) reflect food availability pillar, while the next two indicators (indicator 4–5) reflect access pillar. The rest (indicator 6–9) represent utilization pillar.

The preparation of FSVA at the city or district level in Indonesia at present is often troubled by data readiness, especially for the availability pillar. At the operational level, this situation leads to adjustment on the WFP's suggested indicators. Table 1 describes the selection of indicators used in the development of FSVA in Semarang in 2014–2017.

Monitoring of food availability is crucial for the city government in responding to the lack of appropriate data, especially for the availability pillar. At this level, the Food Security Agency should cooperate with Industry and Trade Agency to develop a joint monitoring framework, for example, by creating an effective communication network that encompasses grocery retailers, large wholesalers, intermediate and small traders. This network will be a valuable asset for rapid monitoring of estimated existing food supply available in the city. For this purpose, a database of grocery retailers, large wholesalers, intermediate and small traders should be provided.

Despite the presence of the Food Security Agency, the government of Grobogan has yet to possess FSVA documents because the preparation of FSVA is a non-binding mandate for municipalities or regency. However, as a region dominated by rural areas, Grobogan has some data (e.g. ratio of agricultural land area to population and ratio of facilities to population) that can be processed with the same standards, which allows for comparison and demonstration that there are gaps between these two areas due to rural-urban differences. The next section discusses some highlighted points following the comparison of food security indicator data in Semarang and Grobogan (Figure 1).

5. Discussion

Among various indicators available, those belonging to food availability pillar often produce contradictory results. Looking at the function and position of Semarang, attempts to measure urban food security from its ability to provide foods, such as based on the ratio of agricultural land area per capita or agricultural production per capita, would be misleading, given that agricultural land is a scarce resource and land is extremely expensive in urban areas. Therefore, measuring these indicators will likely result in a negative record for many areas in Semarang. Furthermore, measurements cannot be made in the event agricultural land is not available at all. Consequently, this may reduce the status of the city government's rating for food security assessment score. As for the ratio of agricultural land to number of population, for example, our analysis shows that most areas in Semarang will get poor scores (presented in the darkest shade) as shown in Figure 2(a). In contrast, for the same indicator, Grobogan as a rural-dominant area has a better agricultural land area to population ratio as shown in Figure 2(b), where areas covered in dark

Table 1. Selection of indicators of FSVA in Semarang municipality.

No	FSVA Indicators According to the WFP's Guideline <i>Availability Pillar</i>	FSVA (2014–2016)		FSVA (2017)	
		Note		Note	
1	Ratio of normative consumption per capita to the net availability of four main components of cereals (i.e. rice, maize, cassava and sweet potato).	No	(i)	No	(ii)
<i>Access Pillar</i>					
2	Percentage of people living below the poverty line.	Yes		Yes	
3	Percentage of villages/sub-district with low road access	No		No	(iii)
4	Percentage of households without access to electricity.	Yes		Yes	
<i>Utilization Pillar</i>					
5	Life expectancy at birth.	Yes		Yes	
6	Underweight cases in under five-years child group	Yes		Yes	
7	Percentage of illiterate women.	Yes		Yes	
8	Percentage of households without access to clean water.	No		No	(iv)
9	Percentage of households living more than 5 km away from health facilities.	No	(v)	No	(vi)
<i>Transient Food Insecurity *</i>					
10	Deforestation*	No		No	
11	Crop failure incidence*	No		No	
12	The number of natural disaster events*	Yes		Yes	
13	Rainfall deviations*	Yes		Yes	
<i>Additional FSVA Indicators (Out of the WFP's Guideline)</i>					
14	Topography conditions	No		Yes	
15	Availability of riverbank settlements	No		Yes	
16	Energy sources for cooking	No		Yes	

Notes

(i): is substituted by the number of shops.

(ii): is substituted by: (1) the ratio of agriculture land to population; and (2) the percentage of agriculture land to total land area; and (3) the availability of food industries.

(iii): is substituted by the ratio of shops to population.

(iv): is substituted by the availability of drinking water sources.

(v): is substituted by the number of health facilities.

(vi): is substituted by the ratio of health center facilities to population.

*: Included in the report but is not used in the calculation of composite index of food security.

shade are relatively much smaller than those in Semarang. In Semarang, the ratio of agricultural land area to population in that area is more than 225,000 people per square kilometer, while in Grobogan such ratio is only at 1600–2600 people per square kilometer. In fact, food availability in cities (e.g. in Semarang) is also generated from surrounding areas through inter-district trade, not only with Grobogan but also with three other regencies. As a capital city and hub in the region, Semarang takes advantage of its market strategic ability to access food from nearby regencies.

By comparing the agricultural land area to population ratios in Semarang and Grobogan (Figure 2a and b) and by considering the WFP indicators, this study suggests that food commodity availability measurement, as proposed by the WFP, is likely more appropriate for territorial units in both urban and rural-dominated areas. Thus, the consumption of four main cereal products (i.e. rice, maize, cassava and sweet potato) per capita is a more appropriate indicator. Unfortunately, such data are not available at the sub-district level. As a consequence, efforts to identify the status of city or district from the availability pillar point of view are difficult to accomplish. This can be overcome if the Agriculture Agency can collect data for the four main cereal commodities from on-site sources at sub-district units, or through the development of efficient and effective networks for data collection for cereal commodities circulating in the city or district areas. This recommendation warrants further research for its effective implementation and institutionalization.



Figure 1. The geographic location of Semarang municipality and grobogan regency.

In the FSVA of Semarang (FSVA 2017, 15), it was stated the the document was developed based on a principle that “the agricultural sector in Semarang is not a sole key for the city’s food security”. The FSVA of Semarang also includes the existence of food processing industries as an indicator, considering the role of Semarang as an industrial and trade city. The existence of food processing industries in particular is an important element that can support food security of the city, despite that products of the food processing industries may not always be marketed internally. Further exploration on this indicator in Grobogan is not possible due to the unavailability of supporting data for this regency. Even so, this case study shows that the number of retailers and trading facilities to population ratio are inappropriate indicators for measuring food security within rural areas, as such areas generally do not have an advantage or a good score compared to urban areas based on these indicators (Figure 3). Although the figure shows that the distribution of trade facilities in urban and rural areas has a relatively similar pattern, they are not equal in terms of number. In Semarang, the average ratio of trade facilities to population is up to 10 units per 1000 populations; while it is only half that in Grobogan. The existence of market, manifested by the demand and supply equilibrium for food products and commodities, indicates that the existence of trade facilities is an appropriate indicator within each municipality or district, but it would be misleading to compare the urban and rural areas with this indicator.

Thus, this study suggests that measurements that take the percentage of people below the poverty line into factor to represent food access as proposed by the WFP, for example, is likely more relevant for any regional territorial units, for both urban and rural-

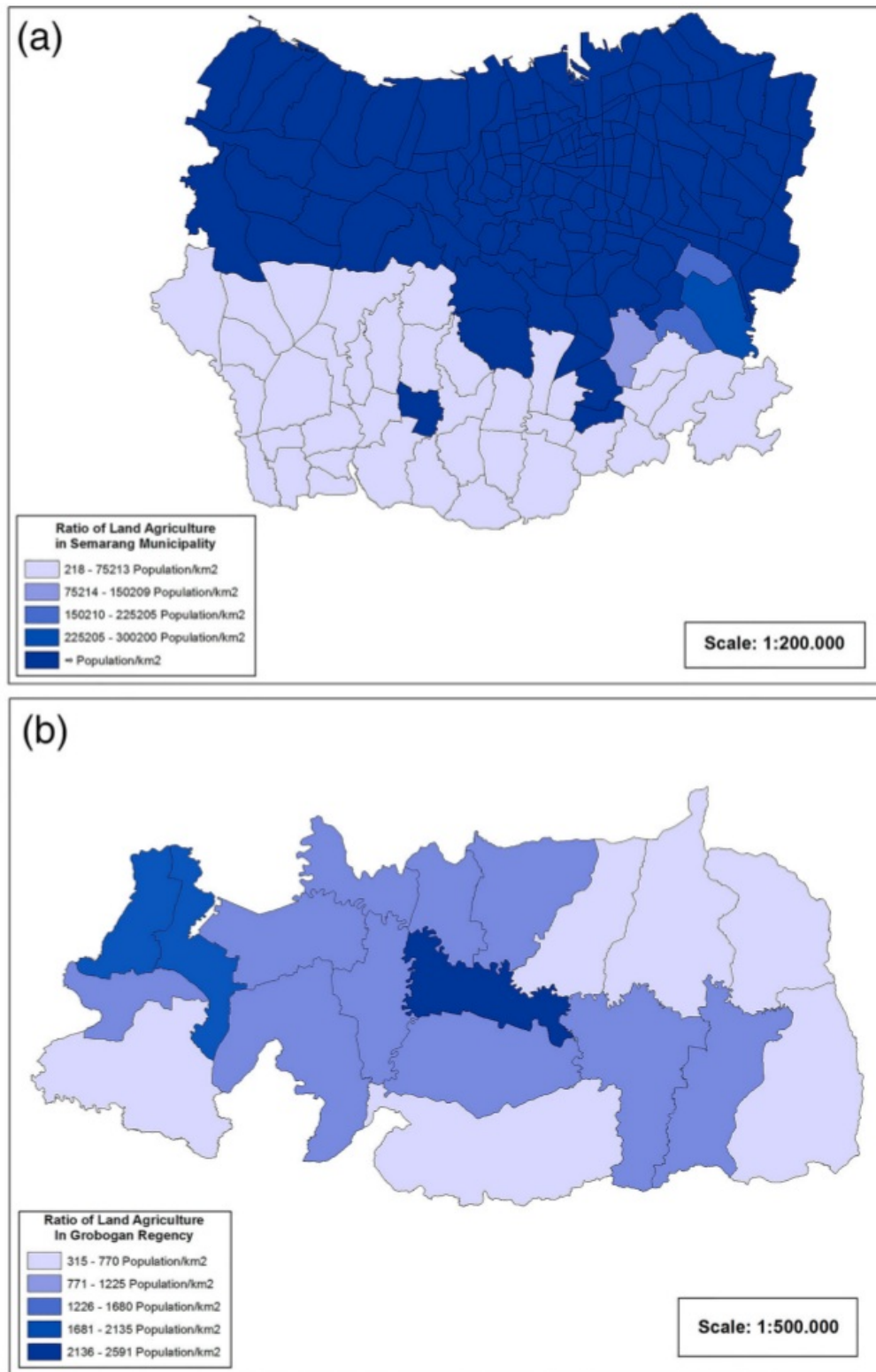


Figure 2. the ratio of agriculture land to population in (a) Semarang municipality and (b) Grobogan regency.

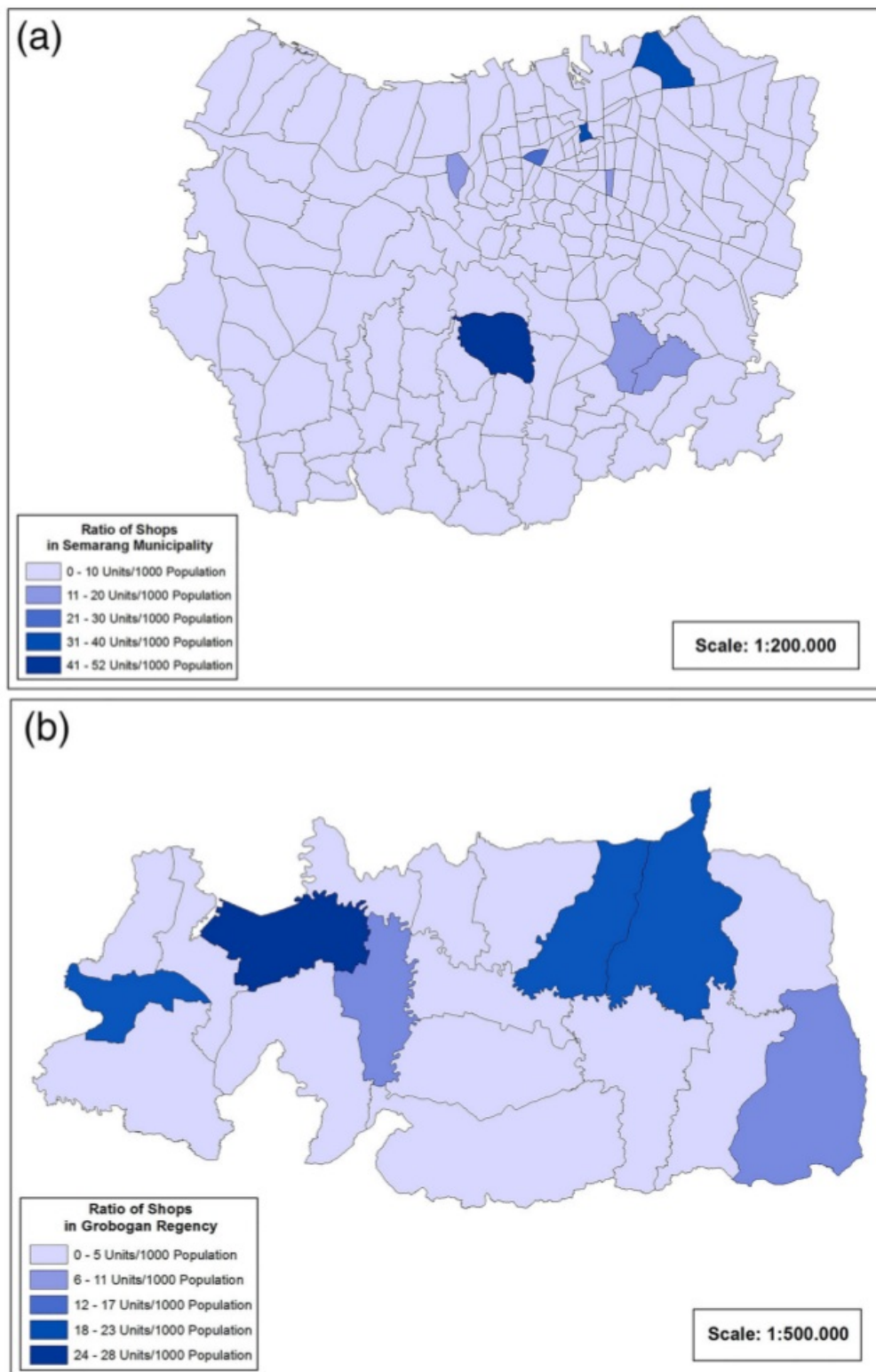


Figure 3. The ratio of shops to population in (a) Semarang municipality and (b) Grobogan regency.

dominated areas. The poverty line is closely associated with people's purchasing power, which makes them able or incapable to access food regardless of the number of trade facilities available in their neighborhood. A lower ratio of trade facilities to population in rural-dominated areas, such as in Grobogan, is also insignificant in analyzing such regions, particularly in cases where a large percentage of the community members provides their food in a subsistent way. This is related to not only the food availability but also to the cultural acceptance to non-market sectors. For example, it is common in Grobogan to consume paddy field frogs during dry seasons. Rural community members will also put aside some of the harvested crops and consume them over each crop season, which makes them less dependent on trade facilities.

Health care facilities pose an impact on individual health, which affects the capability of individuals to execute food utilization, and therefore it is justifiable to their presence in the food security analysis. However, the use of various types of facilities (e.g. health facilities) or infrastructures (e.g. access to electricity) as an indicator on food utilization pillar, is also predicted to produce bias. Rural dominated areas are predicted to have lower food security scores for this indicator due to location or other geographic factors. In the two highlighted case studies, for example, the ratio of available health facility to population in Grobogan is much lower than in Semarang. As shown in Figure 4, almost half of the sub-districts in Semarang have at least two or more health facilities for every 1000 population, while only a few sub-districts possess the same level of service in Grobogan. This situation is likely an inevitable structural problem.

Food utilization as the third pillar includes the use of food both at the household and the individual level. Especially at the household level, this pillar is affected by (a) ownership of food storage and processing facilities, (b) knowledge and practices related to food preparation, feeding for infants and ailing or elderly family members, (c) food distribution within the family, and (d) health conditions of individuals.

Any food security indicators that emphasize the structural differences between rural and urban areas should not be included in assessment at the regional level, particularly when they are then used for comparison purposes. However, they may be useful at the municipality or district level, because population as the focus of assessment in food access and utilization pillars represent relatively mobile entities, and they need to be treated equally with justice or fairness principles. It is assumed that in a relatively small geographic unit, people have the ability to seek for better basic services in a borderless and integrated system established by local and central government authorities.

Agricultural land availability generates structural differences. Land resources are relatively immobile assets. It is in contrast to the availability of food commodities, which is more neutral, as it requires or depends on agents to mobilize food through exports and imports among regions. Thus, if agricultural land availability is linked to the food security of rural-urban areas, there will be bias to understand it at the regional scale.

Based on the above evidence, this study argues that although the FSVA preparation guidelines developed by the Ministry of Agriculture and the WFP do not explicitly mention the rural-urban dimension, they have been integrated into the FSVA concept and process. Indicators suggested by the Ministry of Agriculture and the WFP to be used in the preparation of FSVA are not in conflict with the nature of rural-urban linkage. Thus, efforts to integrate a rural-urban linkage perspective into the practice of FSVA preparation and development will not result in drastic changes in food security

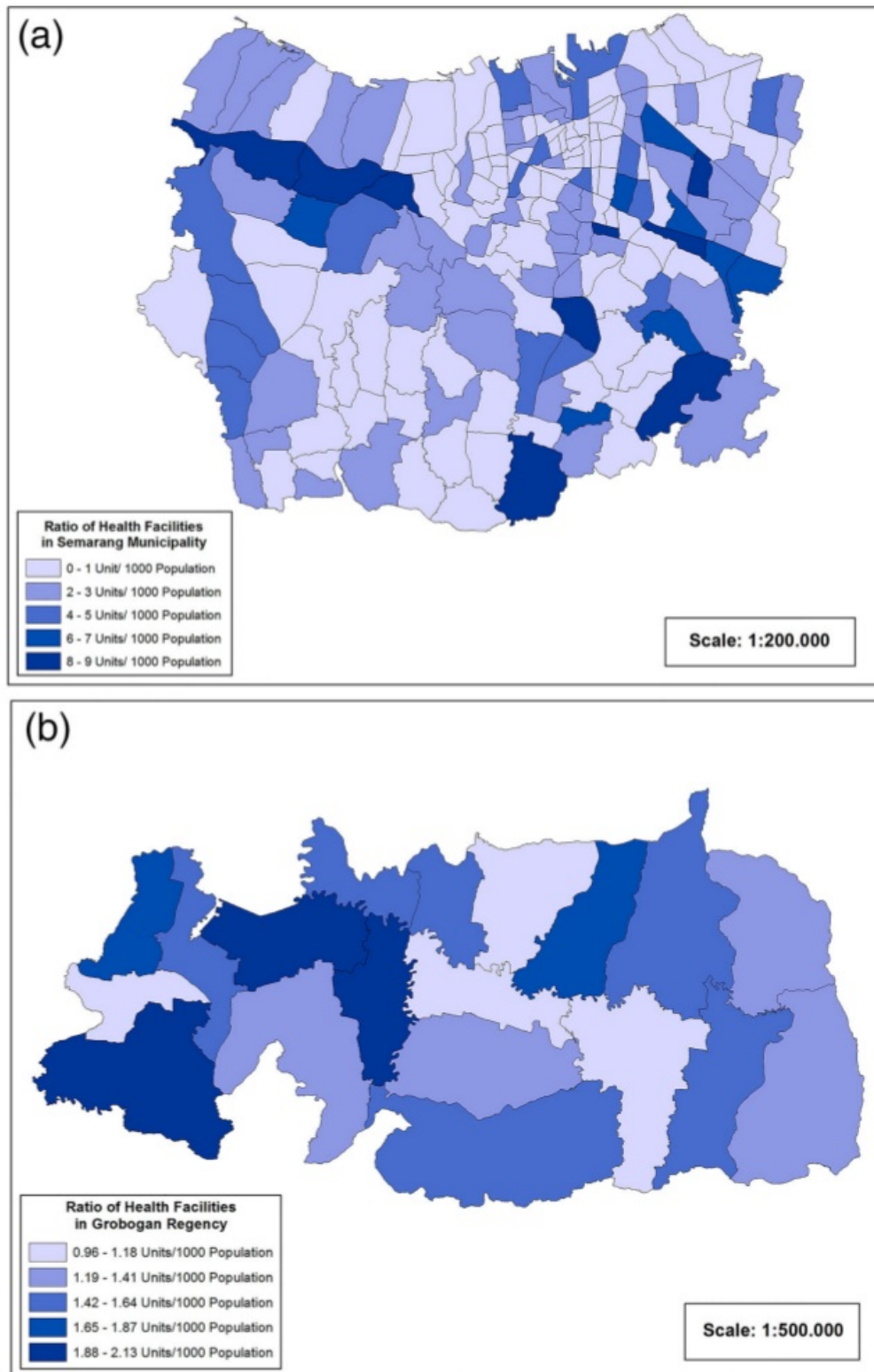


Figure 4. The ratio of health facilities to population in (a) Semarang municipality and (b) Grobogan regency.

vulnerability maps at the city and regency levels. Thus, the assumption that rural areas, which are dominated by agricultural activities and have extensive agricultural land, will likely have higher food security status than urban areas from the food availability point of view, is not always true. Similarly, areas dominated by urban areas do not necessarily have higher food security status from the food access point of view. Better availability of supporting facilities does not always illustrate better food access either.

The FSVA preparation guideline is appropriate to food security assessment at the national and regional level, yet they are problematic at the local level (e.g. municipality and regency). Problems also arise in the event that the regional government (e.g. provincial government) merely sums up the FSVAs from the municipal or regency level and aggregates them for comparison purposes that lead to decision making. The result of this study suggests that FSVAs at the municipal or regency level can justifiably be compared to each other and they are best used as decision-making tools for their own jurisdiction.

Regardless of the complexity of utilization and adoption of policy research at the local level (Setiadi and Lo 2017), food security indicator modification for FSVA development at the municipality and regency levels is reasonable and legitimate as long as such indicators are used within their own context. However, modifications of food security indicators for the development of FSVA at regional and national levels should not be conducted as they may clash with the existence of and the structural differences between rural and urban areas. Most importantly, they may disrupt the logic of FSVA as a decision-making tool.

6. Conclusion

Food security is a complex issue. The dimension of rural-urban linkage is only one of many points of view, and it cannot be used to explain the whole complexity of food security. This paper extends a theoretical understanding on the importance of differentiating food security in urban and rural areas. Food availability is somehow related to the capacity of regions that are geographically and structurally unequal, for example, the urban versus rural areas. Nevertheless, food security cannot be simplified solely in terms of rural-urban divide. This study shows that rural-urban dimension has been included in the FSVA preparation guideline in Indonesia, although the notion of rural-urban linkage is not explicitly mentioned in the guideline. However, translation of such guideline at the municipality and district government levels is problematic due to data readiness issues. Meanwhile, attempts to modify indicators to adapt to data availability somehow are not compatible with the notion of rural-urban linkage. Modifications of the the WFP's food security indicators to specifically indicate spatial variations between urban and rural characteristics are not necessary in the development of FSVA at the regional and national levels. However, it is reasonable and legitimate to modify the indicators for FSVA development at the local level, so long as they are used for local context and purposes.

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