

## CURRENT SITUATIONS AND CRITICAL ISSUES OF PRIMARY FOOD SUPPLY IN TOKYO

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### Abstract

This research examines critical issues of primary food supply in metropolitan areas and explores solutions from the case study of the Tokyo market. Traditionally in the Tokyo market, development of suburban agriculture played important roles to keep the balance of supply and demand of food and to support domestic producing areas. However, since the late twentieth century, however, not only the expansion of domestic food supply areas but also globalisation of food supply has developed dramatically. As a result, infrastructures of food self-sufficiency in the Tokyo market have been weakened. On the other hand, alternative added values such as freshness, safety and traceability are focused upon nowadays in the food supply system to attract consumers. Therefore, restructuring the food system by examining such values can resolve the critical issues of primary food supply in Japan's metropolitan areas.

**Keywords:** *food supply, food self-sufficiency, globalisation, added value, Tokyo market*

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### 1. INTRODUCTION

Most researches on food problems have traditionally been discussed in the view of relationship between agricultural production and population increase. In particular, these studies often attribute the weakness of the agricultural production base to the decrease of cultivation lands (Motoki 2006; Yamada 2008; Ikehara and Harayama 2011) and depletion and starvation caused respectively by excess and lack of food supply (Patel 2008). Furthermore, regionality of food problems is discussed as a significant factor. For example, in North America, Europe and Japan, people consume much more food than they actually need. On the other hand, in the African countries to the south of the Sahara Desert, malnutrition and starvation are daily problem. Most of the food problems in African countries are caused by

delays agricultural investments, resulting in a food supply that does not catch up with the increasing population. This regionality of food problems can be described on a continental, national, and an urban level. In particular, in the urban level, it is important that a reasonable quantity and quality of food are supplied to sustain the urban population.

Within the urban areas of the world, some cities have a good food production base as their background, for example, Paris and its background Île-de-France (Takahashi et al. 1998). However, a breakdown of the balance between food supply from the urban hinterland and the demand of urban residents is a critical problem in most of cities, because of population increase. Measures to maintain the balance between supply and demand of food differ not only for cities in developed countries and those in developing countries but also for cities that are producers and those that are importers (Tashiro 2009; Charles 2001). Tokyo, which is a capital city in a developed country, shows the characteristics of a typical food importer, because it suffers from various food problems such as weak food production base and external dependencies for food supplies. In cities within developed countries with adequate food supply, food safety is a concern. Thus, in Tokyo, the issue of proper food supply coupled with food safety is an important issue.

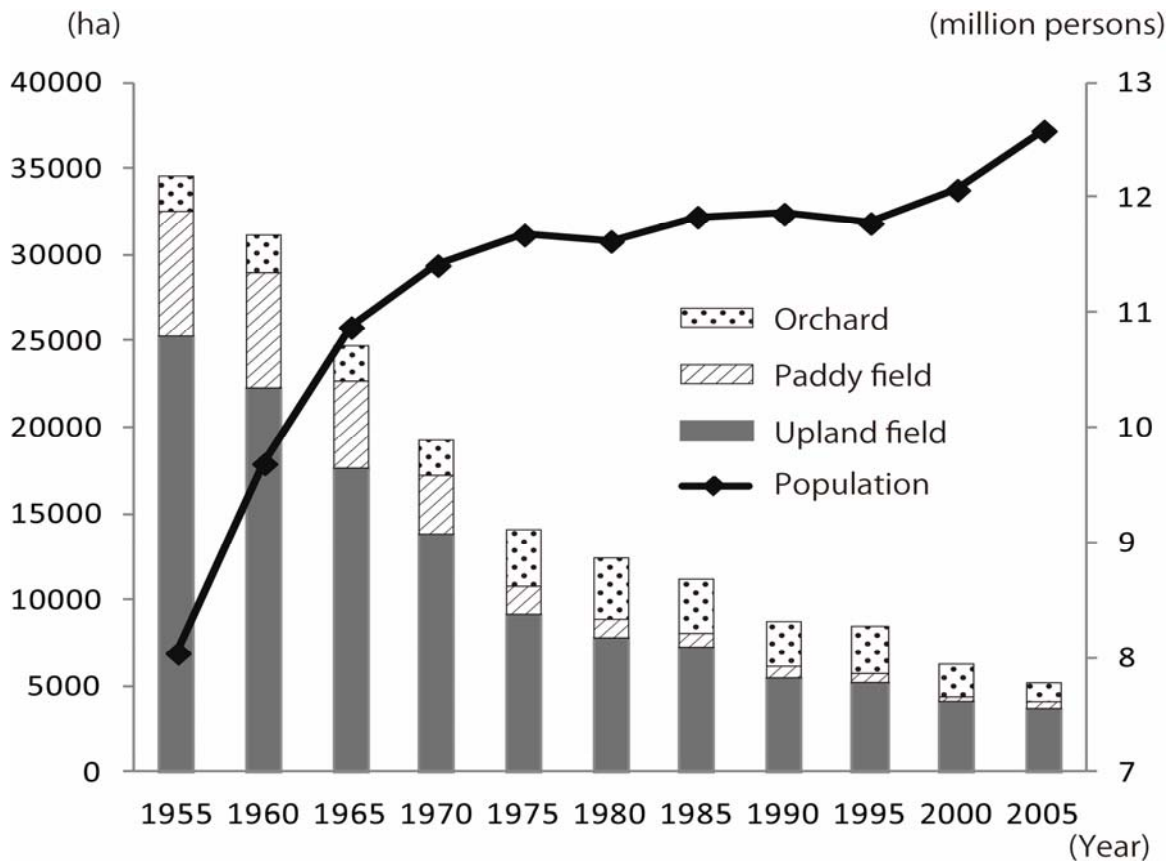
This research discusses food problems in Tokyo considering three aspects. First, the imbalance of the food supply and demand is explored considering weakness of food production base and the food self-sufficiency ratio. Second, the time and space patterns of the food supply are examined. Examining these patterns show the diversification and globalisation of the food supply in Tokyo. Finally, reactions to weakening of the food production base are discussed with the argument that food safety is a topic resulting from globalisation.

## **2. SUPPLY AND DEMAND OF FOOD IN TOKYO**

### **2.1. Acreage changes in cultivated lands**

Changes in cultivated land acreage in Tokyo have been closely related to the city's population increase. In a period of rapid economic growth which began in the latter 1950s, a prominent influx of population led to an increase in housing demand in suburban areas of Tokyo where more space for housing development was available. Property prices in the areas soared, and many farmers began converting cultivated lands into residential ones. This change caused a sharp decrease in cultivated land acreage in Tokyo. Moreover, the enactment of the City Planning Act in 1968 further accelerated this transition. In accordance with the new City Planning Act, taxation of fixed property and city planning for cultivated lands in the Urbanisation Promotion Area were increased to the same amount as that for residential lots. This increase caused many farmers to sell their cultivated lands as residential lands (Kikuchi and Obara 2004).

According to **fig. 1**, which shows changes in population and cultivated land acreage in Tokyo, the population increased by about three million in the period from 1955 to 1975.

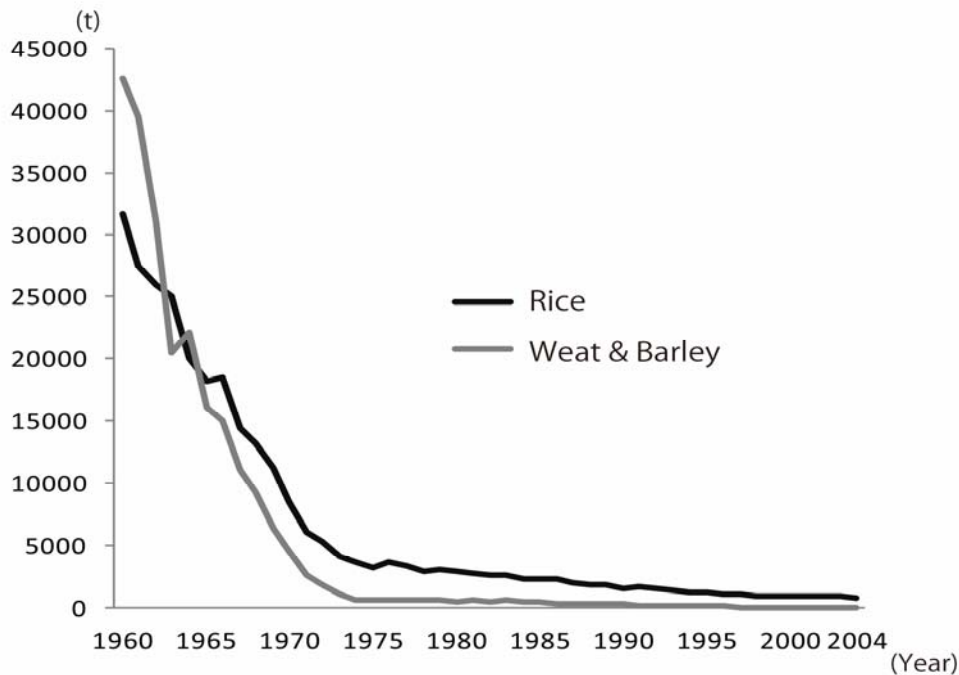


**Figure.1** Changes of population and cultivated land acreage in Tokyo Metropolis  
Source: Japan Census and Ministry of Agriculture, Forestry and Fisheries

However, cultivated land acreage decreased sharply from 34,500 ha in 1955 to 14,000 ha in 1975. In particular, paddy-field cultivation declined from 7,146 ha to 1,533 ha during the same period. This indicates that not only were paddy fields converted to residential lands, but also that upland fields were converted due to the rice production adjustment. On the other hand, the number of orchards increased temporarily because farmers began to produce fruits such as persimmon, chestnut and Japanese apricot which are labour-saving crops and can be grown while preparing for the conversion of agricultural lands to residential ones. However, in the period from the 1990s to the 2000s, those orchards were developed into residential lands because of the stability of the ground; as a result, the proportion of orchard acreage to cultivated lands decreased. Overall, there is a prominent decrease in cultivated lands in Tokyo, which is a suitable place for food production. Moreover, the gap between demand for food and its production supply have widened due to the increase in population.

Although population increased again after 1995, the decrease in the ratio of cultivated lands was relatively low. This tendency indicates that a smaller decrease of cultivated lands was achieved to some extent by a shift of some cultivated lands in Urbanisation Promotion Area to the Productive Green Zones. However, food production in Tokyo has not increased again. According to changes in the production of rice, wheat and barley (**Figure 2**), yields of each crop have been declining sharply. The decline in the yields of these crops is a critical factor in the decrease of food self-sufficiency because these crops have become a staple food item and contain many calories. Therefore, the decrease of the food self-sufficiency ratio in Tokyo is mainly caused by a decline in the production of staple grains. This tendency is

reflected in a sharp decrease of paddy fields acreage. In future, the food self-sufficiency ratio in Tokyo will decline further because progress of urbanisation and the aging of farmers will reduce rice production.



**Figure.2** Yields of rice, wheat and barley in Tokyo Metropolis  
 Source: Statistical Year book of Ministry of Agriculture, Forestry and Fisheries

## 2.2. Change of rice productivity in Japanese context

In **Figure. 3**, the change of rice yields per 10 are is presented to examine rice production tendencies by prefectures. Rice yields per 10 are can be indicator of food productivity in the areas. Before the World War II, rice yields per 10 are were at a low level in prefectures of the Tohoku region and Hokkaido, which are in the northern part of Japan. This low productivity caused food scarcity and starvation, and people immigrated as colonial farmers to the foreign countries such as the US and Canada (Ichikawa et al. 1984). However, the geographical tendency of rice production changed dramatically after World War II. Improvement in rice productivity made prefectures in Tohoku region and Hokkaido the main areas of rice production in Japan. This improvement was the result of new kinds of rice which were hardy, yielding and tasty, and innovations in agricultural technologies such as the use of protected semi-irrigated rice nurseries, early raising and mechanisation in the producing processes.

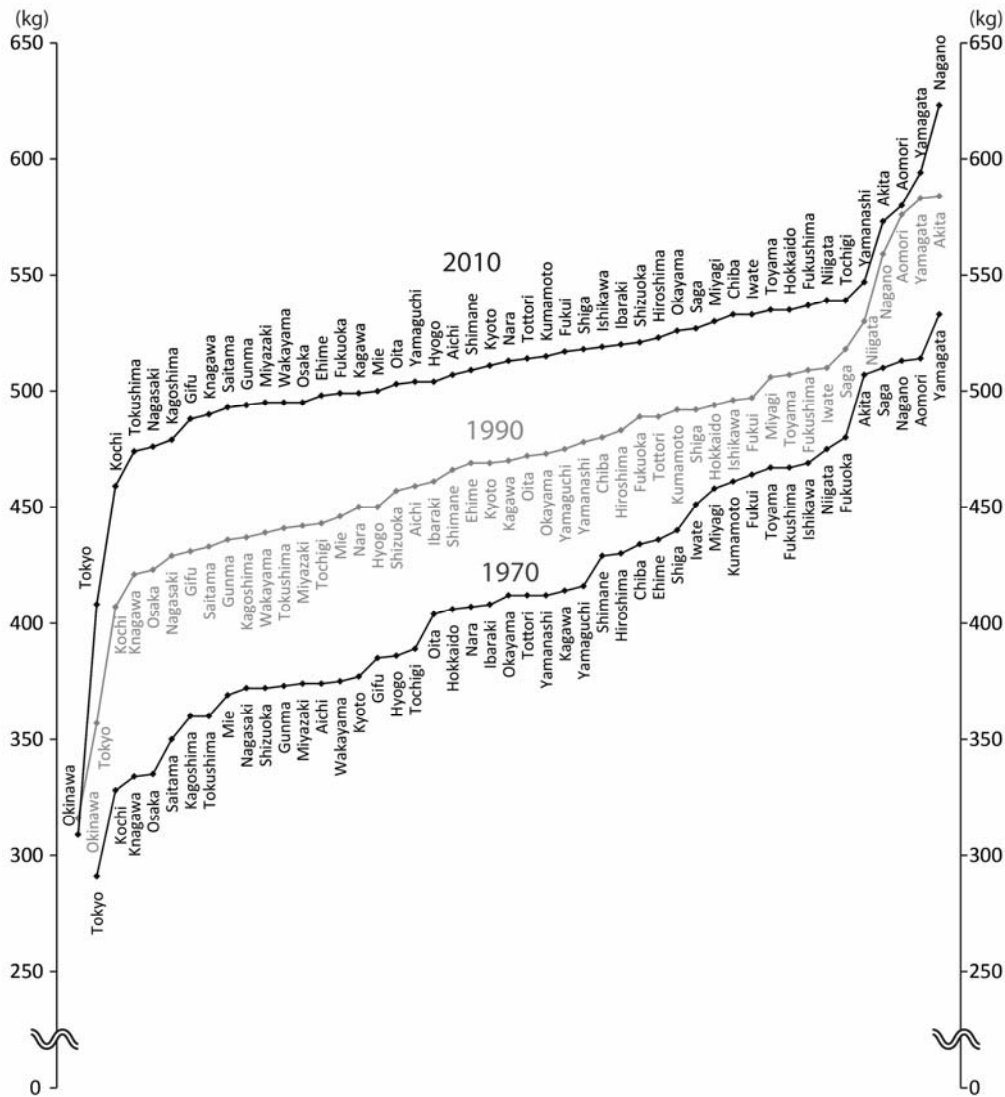


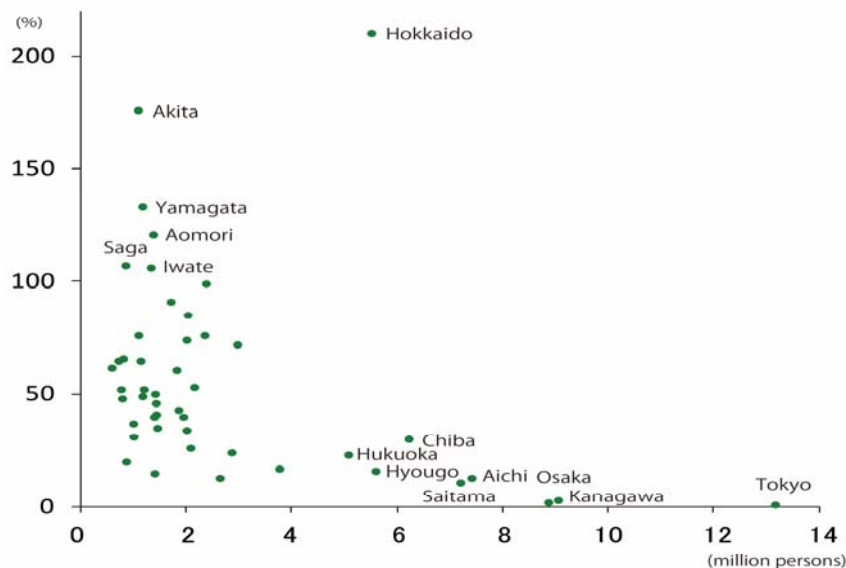
Figure.3 Changes of paddy rice yields per 10 are by prefecture in Japan

Source: Ichikawa et al. 1984 and Statistical Year book of Ministry of Agriculture, Forestry and Fisheries

On the other hand, prefectures in the western part of Japan and those in the southern Kanto region which are traditional rice-producing areas, ranked worse. In particular, the increase of rice yields per 10 are in Tokyo from 1970 to 2010 was only 300-400kg which was the worst level in Japan. In prefectures such as Okinawa and Kochi, rice yields per unit area were low because of long periods of rain and typhoons. However, in Tokyo, Osaka and Kanagawa, where the rice-production base including land and labour had been lost as a result of urbanisation, rice yields per unit area were limited less than 500kg in 2010. Therefore, they depended on supplies from the Tohoku and Hokuriku regions because large consumers such as Tokyo were unable to support themselves and keep pace with the demands in each prefecture.

### 2.3. Change in food self-sufficiency ratio

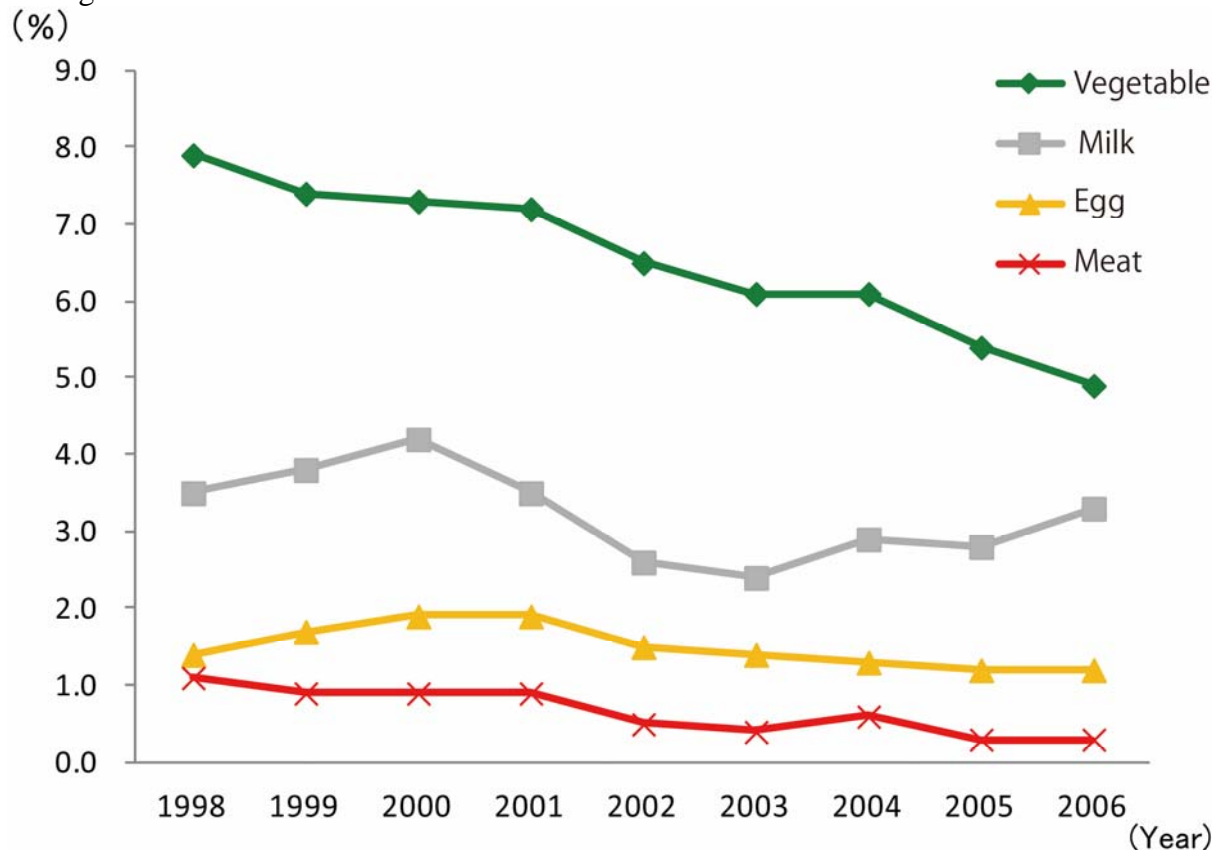
**Figure 4** shows that there is a negative correlation between food self-sufficiency ratio and population by prefectures. Surprisingly, only six prefectures, Hokkaido, Aomori, Akita, Yamagata, Iwate and Saga, have a self-sufficiency ratio of more than 100%. The main causes of this result are the large-scale farming operations in Hokkaido and the fact that rice production is stable and has a high productivity per unit area because of the progress of farmland consolidations in the other prefectures. However, this means that the remaining prefectures are not able to support themselves and depend on other prefectures and producers in foreign countries. Problems are critical within the prefectures of Tokyo, Kanagawa and Osaka, whose self-sufficiency ratio for food is less than 10%. In particular, the food self-sufficiency ratio in Tokyo is approximately 1%, which is the worst in Japan. Thus, it is evident that a critical food crisis could occur when the supply is severed in the event of an accident.



**Figure.4** Correlation between food self-sufficiency ratio and population by prefecture in Japan  
Source: Japan Census and Ministry of Agriculture, Forestry and Fisheries

**Figure 5** shows the food self-sufficiency ratios of main food items without stable grains from 1998 to 2006 and captures the trend of food self-sufficiency in Tokyo. The graph describes that the self-sufficiency ratio of vegetables was decreasing consistently in the period. This was caused by both a decrease of supply due to the decline of cultivated lands and an increase of demand due to the influx of population in Tokyo. As for milk, the tendency of the self-sufficiency ratio differed by year, but it had been at a stable level of around 4% overall. The self-sufficiency of milk had once been high based on the supply from dairy farms in urban and suburb areas. However, the ratio declined due to innovation of milk-supply infrastructures, which urged dairy farms to move to suburbs that were farther away from the city where they were better able to manage vast farms. The self-sufficiency of eggs has been stable at a low level with relatively small changes. On the other hand, the self-

sufficiency of meat had traditionally been at the low level, but decreased greatly in the period as did vegetables.



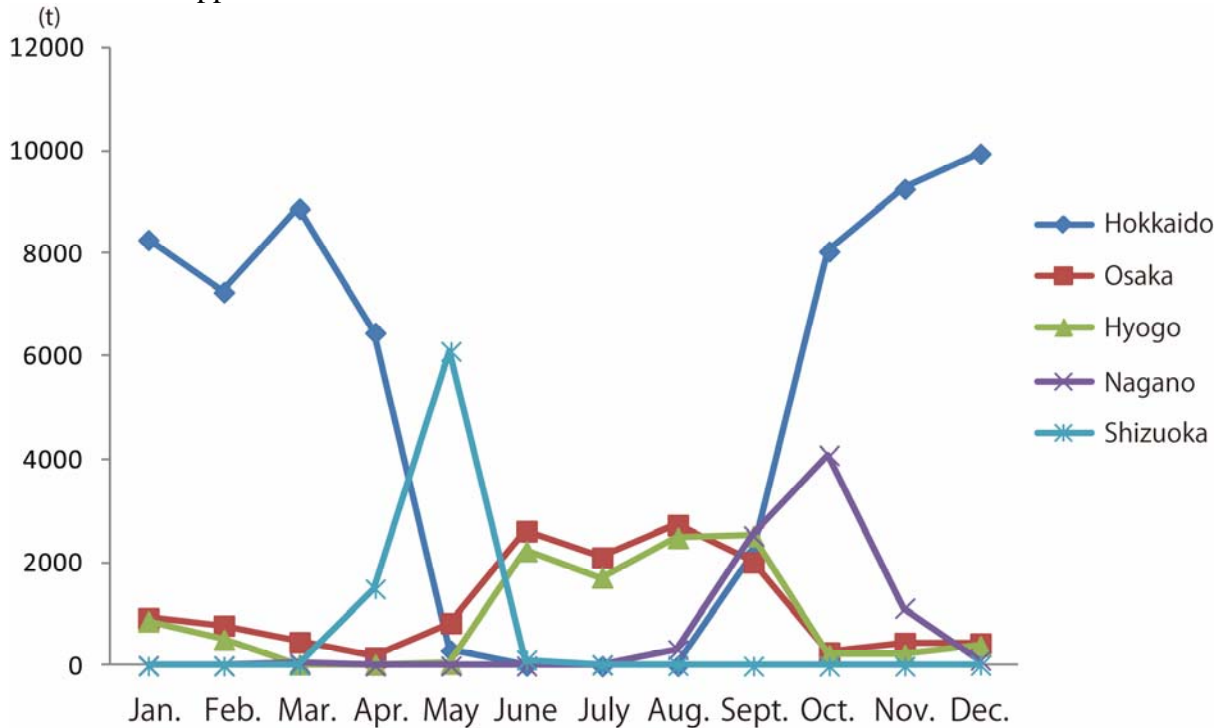
**Figure.5** Self-sufficiency ratio of major food items in Tokyo Metropolis  
Source: Tokyo Metropolitan Gov., and Bureau of Labor and Economic Affairs

On the whole, the food self-sufficiency ratios in Tokyo have decreased not only for items with high calories such as stable grains and meat, but also for vegetables which are mainly supplied from suburban areas as perishable foods. An important factor behind this trend is the decline of cultivated lands due to the growth of residential areas, which resulted in situations of conflict between agricultural and urbanised land use. This weakening of the food production base has become a significant food problem in Tokyo. Therefore, to solve the food problems in Tokyo, it is important to examine the spatial patterns which explore the stable sources of food supply.

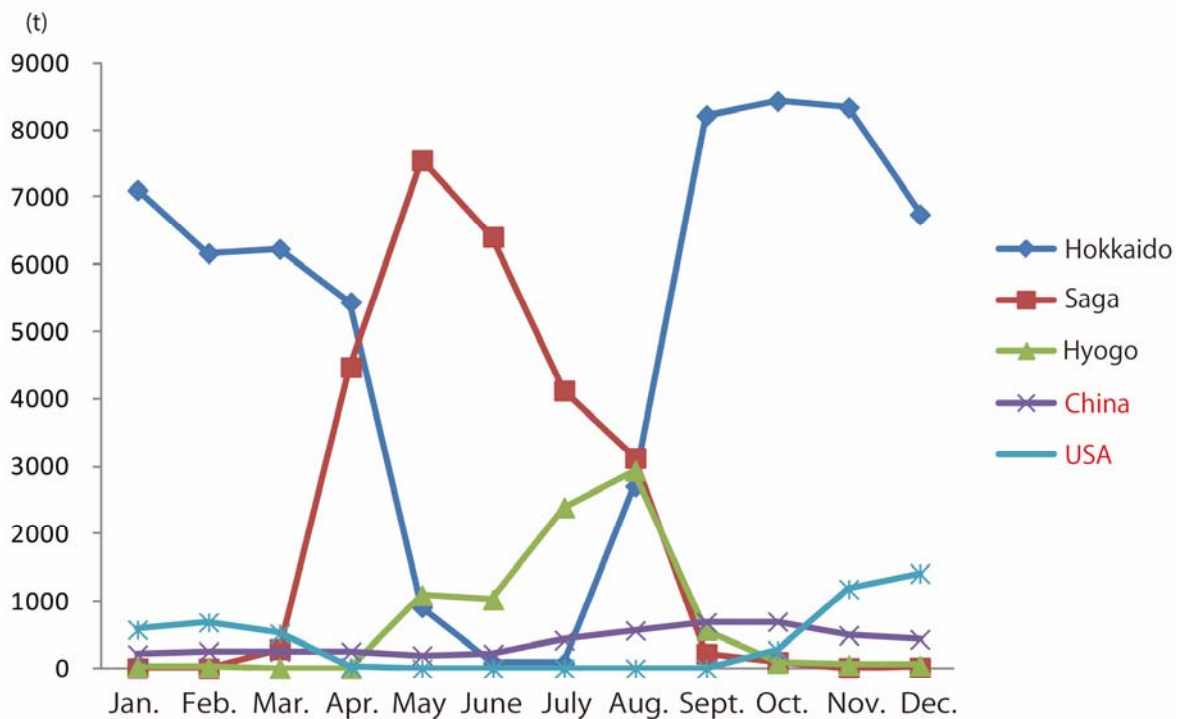
### 3. CHRONOLOGICAL CHANGES OF SPATIAL PATTERNS OF FOOD SUPPLY IN TOKYO

In this chapter, the spatial patterns of food supplies in Tokyo are examined from the viewpoint of changes in the vegetables supplied to the Tokyo market. In the examination of food supply to markets, vegetables are used as factors because it is easy to capture seasonal and regional changes of supply due to vegetables' seasonality and regionality (Takayanagi 1995; 1990). In particular, onions and pumpkins, which are supplied the most to the Tokyo Metropolitan Central Wholesale Market (TMCWM), are chosen as factors, and trends of their supplied amounts to TMCWM by production areas in 1970 and 2010 are compared. Next,

spatial patterns of supply and their changes are examined within five production areas where the amounts supplied to TMCWM were the most.



**Figure.6** Amounts of onions arriving at Tokyo Metropolitan Central Wholesale Market (1970)  
Source: Monthly report of Tokyo Metropolitan Central Wholesale Market



**Figure.7** Amounts of onions arriving at Tokyo Metropolitan Central Wholesale Market (2010)  
Source: Monthly report of Tokyo Metropolitan Central Wholesale Market



In 1970 onions were mainly domestic and supplied to TMCWM by Hokkaido, Osaka, Hyogo, Nagano and Shizuoka, which supplied 73% of the total (**Figure 6**). Ordinary onions are divided into 'autumn onions' which seed in autumn and harvest the next summer and 'spring onions' which seed in spring and harvest in autumn. At TMCWM, combinations of spring onions from Hokkaido and autumn onions from mainland were supplied to the market all year without missing a season, thus satisfying the demands of residents of Tokyo.

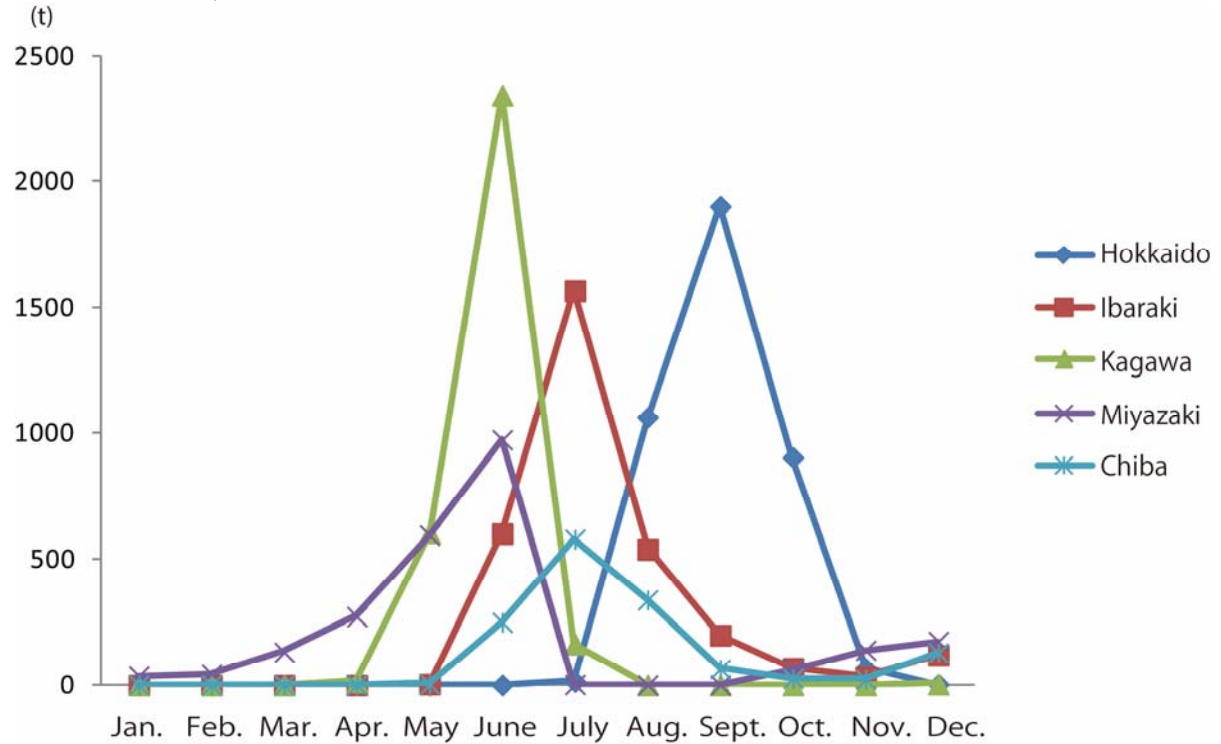
However, in 2010, the onion-producing areas that supplied to TMCWM changed (**Figure 7**). Although the main producing area of spring onions was Hokkaido as usual, autumn onions which were distributed to the market from spring to summer were increased in quantity and by a new supplier, the Saga prefecture. This indicates that the production areas for vegetables were moved to the far suburbs and remote rural areas due to both urbanisation and the improvements in transportation infrastructure and storage technologies. Furthermore, consumers demand sustaining throughout the year, including traditional off-crop seasons, altered the structure of supplying places. To satisfy those demands, onions were supplied from the US and China as well as domestic producing areas. However, in 2010, the percentage of amounts supplied from the US and China to TMCWM was only 8% and that from the domestic producing areas was as strong as ever.

The change of the spatial supplying pattern of pumpkins is also examined. In 1970, pumpkins were mainly supplied from Kagawa and Miyazaki in June, Ibaraki in July and Hokkaido from August to October (**Figure 8**). This shows that the supplying areas of pumpkins to TMCWM were moving northwards by season within the year from the Kyusyu and Shikoku regions, where are southern and have warmer climates, to Ibaraki, which is a suburb of Tokyo, and then to Hokkaido, which is remote from Tokyo and has a cooler climate. Seasonal changes of supplying areas is not only caused by Japan's geographical position, which extends north and south, but also by one of markets' struggles to supply vegetables to consumers continually all year. These best five producing areas for TMCWM satisfy the demand in the area and their shares are 74%. However, the off-crop season was obviously from November to March and consumers were not able to obtain pumpkins continually all year.

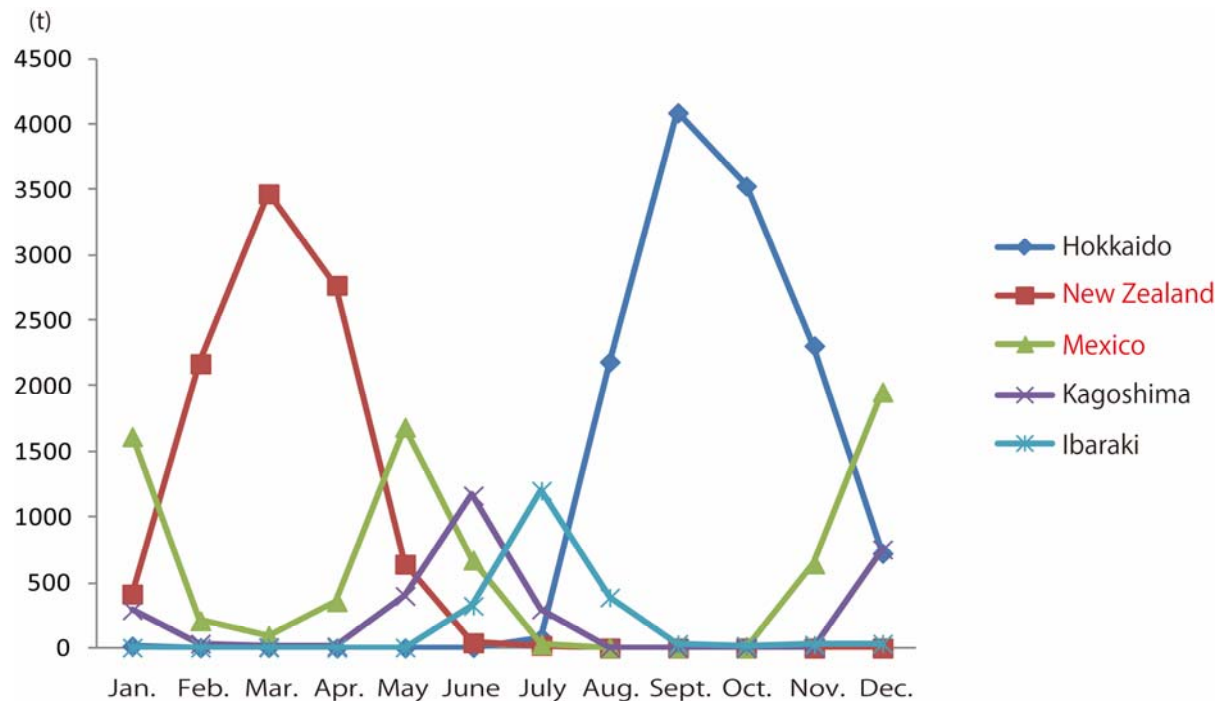
In 2010, the supplying pattern of pumpkins changed dramatically from the pattern in 1970 (**Figure 9**). First, supplied amounts increased overall. This was the result of consumer demands that became diversified and annualised due to the concentration of population to Tokyo. Second, pumpkins were supplied in traditional off-crop season. In fact, pumpkins supplied from New Zealand and Mexico supplemented amounts supplied from domestic producing areas in the off-crop season. In particular, New Zealand supplied pumpkins from February and April, leveraging its geographical advantage of being in the southern hemisphere. On the other hand, Mexico supplied pumpkins not only in high season but also in the early months and at the end of the year, because pumpkins are harvested twice a year in warmer climate.

As for supply of pumpkins, in 1970, the domestic areas were common and their producing areas tended to move northwards by season. Those tendencies are a typical supply pattern, according to best seasons for pumpkins. Then corresponding to changes in consumer needs and demand, pumpkins began to be supplied from New Zealand and Mexico. At TMCWM, pumpkins were supplied all year because these areas were able to supply pumpkins in the off-crop season in Japan. At the point of supply, the amount of pumpkins supplied from New Zealand was 24% of all supplied amounts to TMCWM and that from Mexico was 19%. The supply of pumpkins to TMCWM was sustained and globalised by these two producing areas.

Moreover, as a solution to the food problems of Tokyo, or as a measure to balance the supply and demand of food, the importation of food has been considered (Kobayashi 1999; Takahashi 2010).



**Figure.8** Amounts of pumpkins arriving at Tokyo Metropolitan Central Wholesale Market (1970)  
Source: Monthly report of Tokyo Metropolitan Central Wholesale Market



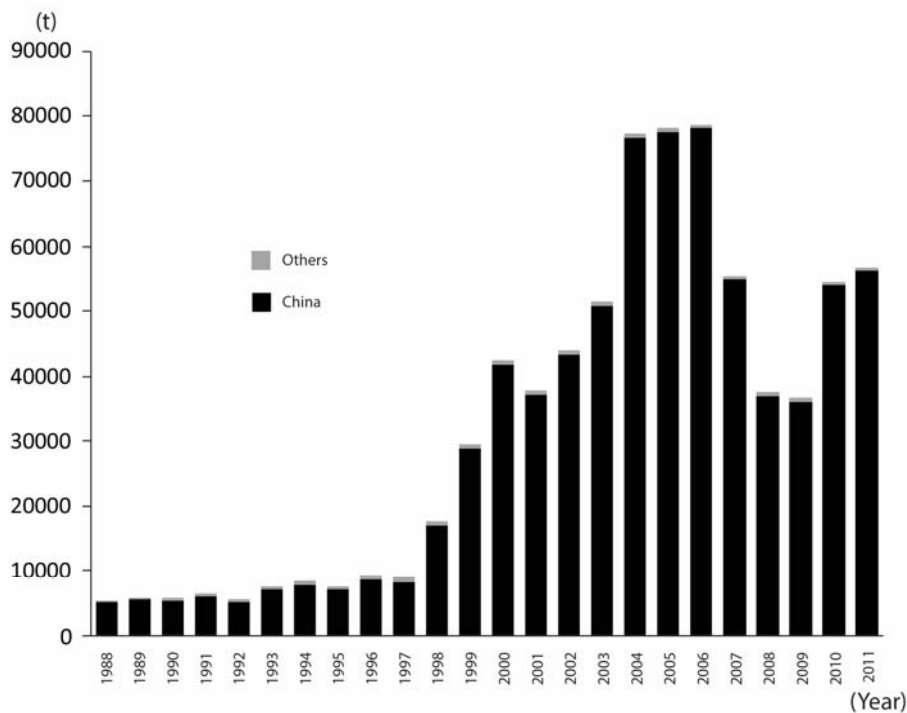
**Figure.9** Amounts of pumpkins arriving at Tokyo Metropolitan Central Wholesale Market (2010)  
Source: Monthly report of Tokyo Metropolitan Central Wholesale Market

The expansion of imported vegetables for TMCWM is sustained by consumer needs of wanting to eat fresh, reasonably priced vegetables irrespective of season. In the early period of expanding vegetable importation, the imported vegetables were supplied in their off-crop season in the domestic market. Then, the innovation of a pre-cooling system, which was to chill vegetables and fruits before shipping and storing them at 3 °C to 5 °C in order to retain their freshness, using air transportation for supplying vegetables and combinations of reducing shipping costs and production costs in growing areas enabled imported vegetables to compete with domestic vegetables in freshness and price. Furthermore, the loosening of regulations such as tariffs also expands the importation of vegetables.

#### 4. NEW PROBLEMS AND MOVEMENTS OF FOOD SUPPLY

##### 4.1. Problems between consumers and producers

Various problems have arisen from globalisation of food supplies in domestic markets of Japan, including the Tokyo market. For instance, the Japanese government enacted safeguards against imported Welsh onions and shiitake mushrooms, which were increasing in numbers due to imported amounts from foreign countries such as China for the first time in 1999. A safeguard was an emergency measure to restrict imports and was exercised when the WTO recognised the danger to domestic industries. In the food supply context, the exercise of safeguards represents a shrinking and weakening of the food production base by globalisation, because safeguards are implemented because of the rapid increase of particular imports (Kobayashi 1999).



**Figure.10** Amounts of Welsh onion imports in Japan  
Source: Trade Statistics of Japan

In fact, imported amounts of Welsh onions were under 10,000 t until 1997, but increased rapidly and reached 42,385 t in 2000, which was almost five times as much as that in 1997. The price of imported Welsh onions per 1 kg in 2000 was about 100 yen, which was half or one-third of domestic products because 98% of imported Welsh onions were from China where the production cost was cheap. Those low-priced Welsh onions have been sold at supermarkets as bargain goods and have been used in food service industries, but they have also become a threat to domestic producers. In the Tokyo market, Welsh onions have traditionally been supplied from Saitama and Ibaraki which are located in the suburb of Tokyo. Welsh onions have been an important crop, sustaining the suburban agriculture of large cities. Thus, the safeguard was exercised to protect domestic producers of Welsh onions in 1999, and it restricted imports temporally and raised tariffs on particular items.

According to **Figure 10**, imports of Welsh onions have increased rapidly since 1998. This tendency can be attributed to the emergency importation of vegetables by the Japanese government to restrain price rise of vegetables caused by unseasonable weather in the summer of 1998. In particular, as for Welsh onions, vast amounts were imported from China and distributors in Japan also began to deal in Welsh onions from China after the emergency import act ended. Imported Welsh onions for the Tokyo market are cultivated in the middle south-shore provinces of China such as Shandong, Zhejiang and Fujian, using Japanese types of seeds. The onions are shipped to Japan after peeling, bundling and packing in boxes. Low-priced Welsh onions from China attract consumers in the Tokyo market, because Welsh onions from China are as good in quality as those from Japan. Therefore, the needs of consumers and food service industries were the factors behind the rapid increase of the imported Welsh onions.

On the other hand, the low price of Welsh onions from China was reflective of cheap labour and transportation costs. According to 'Yearbook of Labour Statistics', in 2000, the average monthly income in China was 9,955 yen. This figure was far lower than that of Japan, which was 321,000 yen. Transportation costs were about 1.4 yen per 1 kg from Anqiu where was a producing place of Welsh onions to Qingdao where was an outport and about 10 yen per 1kg from Qingdao to Tokyo. The total of those transportation costs were the same as transportation costs from Ibaraki to Tokyo. Furthermore, the resolution of the political instability issue in China and the improvement of infrastructures for export resulted in shipping Welsh onions from China to the Tokyo market only about 5days after harvesting. Therefore, it was obvious that domestic producers would not be able to compete with Chinese production and transportation prices, and as a result the safeguard was implemented.

## **4.2. Reaction to globalisation of food supply**

Today, the increase of imports causes restructuring of domestic food-producing areas supplying to the Tokyo Market. For example, most of the pumpkin-producing areas in Japan tend to decrease production due to not only the lower prices offered by foreign producing areas but also the farmers' reduced motivation to cultivate pumpkins. In changes of the spatial pattern of pumpkin supply to the Tokyo Market, domestic pumpkin-producing areas tend to concentrate in the areas where they are able to cut production costs by cultivation in bulk such as Hokkaido and Kagoshima or where transportation costs can be reduced due to proximity such as in Ibaraki and Kanagawa. Without the aspect of cost, domestic pumpkin-producing areas struggle to differentiate themselves from foreign producing areas by cultivating new kinds of pumpkins of high quality and taste. Strategies of domestic producing

areas lead to alternative marketing values such as sophistication, branding and improvement of taste and food safety well as improving profitability by cost reduction. These efforts can be seen as reactions to the globalisation of food supply.

Especially in the Tokyo market, food safety has become an important factor of food supply in the last 10 years (Kikuchi 2012). Consumers have consciously focused on a sustainable supply of 'safe food', because food supply in the Tokyo market is currently adequate in quantity due to area expansion and globalisation of the food supply. The need for food safety is reflected as an increase in the demand for organic crops. Amounts of organic crops that have been sold increased rapidly from 33,734 t in 2001, the year in which the system of certification of organic crops was established, to 53,446 t in 2007. Safety of organic food is guaranteed by the Japan Agricultural Standard (JAS) because production and supply are strictly managed by JAS. In fact, organic crops are cultivated in JAS-certified fields and supplied by JAS-certified distributors. Thus, the increase of organic crops is also a topic of food problems in the Tokyo market today and represents the theory that consumer consciousness is shifting from 'quantity' and 'price' to 'quality'. Sales ratios of organic onions for one distributor by prefecture and per month are shown on **Table 1**, as an example of organic crop distribution in the Tokyo Market.

**Table.1** Sales ratio of organic onions of a distributor by prefecture and per month (2003-2004)

Source: Interview by author

Collect facility	2003												2004	
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mar.	Jan.	Feb.		
Hokkaido1						35	35	35	35	35	50	50		
Hokkaido2						25	25	25	25	35	50	50		
Hokkaido3						20	20	20	20	20				
Hokkaido4						10	10	10	10	10				
Hokkaido5						5	5	5	5					
Hokkaido6						5	5	5	5					
Hokkaido7					50									
Gunma1				10	50									
Gunma2				40										
Osaka				10										
Nara			10											
Kagawa		10												
Kumamoto			30	20										
Saga	40	50	60	20										
Nagasaki1	20	20												
Nagasaki2	20	20												

According to this table, the sales ratios of organic onions in April from two collection facilities in Nagasaki were 30% each and 40% from a collection facility in Saga. In June, the sales ratio of organic onions from the facility in Saga increased to 60% and facilities in Kumamoto and Nara were added instead of those of Nagasaki. Then, in August, the sales ratios of organic onions from facilities in Gunma and Hokkaido were 50% each, and from September to March, the sales ratio of organic onions from the facility in Hokkaido remained at 100%. These collection facilities' shifts are derived from the difference of harvesting terms

due to various climate characteristics of Japan, because of its positioning from north to south. Therefore, stocking onions from producing areas with different harvest terms enables consumers to buy from retailers for a long period within a year.

Moreover, the sales ratios of organic carrots for the same distributor by prefecture and per month are shown on **Table 2**.

**Table.2** Sales ratio of organic carrots of a distributor by prefecture and per month (2003-2004)

Source: Interview by authors

Collect facility	2003												2004	
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mar.	Jan.	Feb.		
Hokkaido1						30	10							
Hokkaido2						30	40	30						
Hokkaido3					10	10								
Aomori1					20	10								
Aomori2				80	20	20	10							
Aomori3				20	50		40	40						
Chiba			20						50	50	30			
Kagawa1										5	20	30		
Kagawa2											20	30		
Miyazaki	100	100	80						30	50	45	30	40	

The producing areas of organic carrots were shifted from Miyazaki, south to Hokkaido, and then north from spring to summer. In contrast, producing areas were shifted again from north to south from summer to winter, which means that organic carrots are being supplied to consumers as long as possible within a year, making use of difference harvest seasons due to climate characteristics; the patterns are similar to that of production of organic onions.

## 5. FOOD SYSTEM RESTRUCTURING IN TOKYO FOR FUTURE FOOD SUPPLY

A balance between supply and demand in the context of weakening food supply bases in large cities, such as Tokyo, and their surroundings is important for solving food problems. The Tokyo Market has struggled with various strategies to solve this problem. In the context of the historical development of suburban agriculture, the improvement of the transportation infrastructure for food supply has played an important role in arriving at a balance between the supply and demand of food. Within the food system, food problems are considered from the viewpoint of supply and demand. The notion of the food system represents a flow from production, collecting, shipping, distribution, dealing and sale of food to consumption, and in this flow, the balance between production and consumption, or supply and demand, is seen as an important factor.

An expansion of demand causes a lack of food as in the Tokyo market, and then the production and supply infrastructures are improved. In the Tokyo market, not only has there been an expansion of food supply areas due to increase of domestic producing areas but also globalisation of the food supply has progressed. These changes of the food system were based on the notion of the production basis and the ‘economies of scale’, because consumers tended to value reasonably priced and regulated food by quantity. As a result, in the Tokyo

market, mass-produced food from major and large producing areas, which produce food cheaply and in well-regulated form with regard to colour, form and size, is preferred in comparison to food produced by small producers and in minor and small producing areas. As a result, producers have been urged to stop producing food in many cultivated fields. Moreover, weakening of food production base caused an increase of abandoned fields and a deterioration of rural environment.

In the 21st century, the notion of the food system based on production basis has begun to change. This means that not only economic profits and efficiency are valued but also alternative-added values are appreciated in the production, supply and consumption of food. Those added values are deeply related to upgrading and branding of food and will change food supply systems in which safety, freshness and traceability are appreciated. For example, in the Kagura-Tomioka district, a western Gunma prefecture, farmers struggle to restructure the food system in order to compete with inexpensive imported vegetables. In particular, these farmers tie up with well-known supermarkets in Tokyo and consumers' cooperative stores through agricultural cooperatives and ship their vegetables harvested early in the morning to reach the stores the same day before opening time. The vegetables are known as 'Asadori-yasai', meaning 'vegetables harvested in the morning'. The challenge, which is to supply fresh and reasonably priced vegetables to consumers directly from the farms, indicates that alternative added values of freshness, safety and traceability enable farmers to differentiate their products from imported vegetables. Therefore, this also implies that a restructuring of food system is one method of solve food problems in Tokyo.

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