

**Sustainability of Urban Farming  
from the Viewpoint of Workforce  
in the Southern Part of Saitama Prefecture**

January 2018

Eri KODAMA

**Sustainability of Urban Farming  
from the Viewpoint of Workforce  
in the Southern Part of Saitama Prefecture**

A Dissertation Submitted to  
the Graduate School of Life and Environmental Sciences,  
the University of Tsukuba  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy in Science  
(Doctoral Program in Geoenvironmental Sciences)

**Eri KODAMA**

## Abstract

The purpose of this study is to develop an understanding of the state of urban farmers and their relationship with urban residents by examining how agricultural activities are maintained in urban areas in the southern part of Saitama Prefecture (Shiki-shi (city), Niiza-shi, Asaka-shi, and Wako-shi), where residential development has been progressing. Farming in urban areas in Japan has been increasingly performed by part-time workers, and the ability to secure a workforce suited to urban farming appears to play an important role in the venture's overall sustainability. As such, it is analyzed how urban residents find their way to such occupations, as well as how these workers perceive these activities.

Rapid urbanization occurred during Japan's postwar period of robust economic growth, particularly between 1960 and the passage of Urban Planning Law in 1968. This also accompanied increased diversification and complexity of agricultural activities in the suburbs of these developed municipalities. For example, high-revenue agricultural ventures began to proliferate as a result of interactions between farmers and new residents in these areas, such as direct sales of goods and farms oriented towards sightseeing tourism. Later, measures for the conservation of urban farmland became required following the passage of Basic Law for Urban Farming Promotion in April 2015.

As a result of this analysis of the urban farming workforce, it is found that farms in the southern part of Saitama prefecture could be classified into 3 types: family workforce-limited farmers, supporting workers employment farmers, and Agricultural Experience Farm operated farmers.

Family workforce-limited farmers regard urban residents as mere consumers and tend to grow crop types and maintain their operations at a scale manageable by family labor. 90 percent of all farmers in the study area were family-owned and operated farms, but with the emergence of successors, there is the possibility that farming ventures of this type may differentiate into farms that supporting workers employment farmers or Agricultural Experience Farm operated farmers. With the passage of Basic Law for Urban Farming Promotion, the importance of urban farming is anticipated to continue to increase. It is necessary to pay close attention to the future role of farms operating with family labor alone with regard to the overall sustainability of urban farming.

Supporting workers employment farmers are those engaged mainly in the cultivation of light vegetables, that is vegetables unsuited to the use of mechanical harvesters and sorting machines, while taking full advantage of factors such as proximity to large cities. Farmers are continuing to maintain urban agricultural ventures by hiring urban residents, who are more affordable in terms of hourly payroll costs, and who often have an affinity for farming. In many cases, farmers hire part-timer employees through networks comprised of family and relatives, but some farmers have recruited part-time volunteer workers, who reside in the southern Kanto region, through private enterprises. Farmers can now interact with urban residents with a strong interest in agriculture and also look to this group to subsidize a wide range of farming tasks. In addition, some farmers recruit volunteers at the request of the government. In such cases, urban residents interested

in farming view webpages administrated by local authorities to share their preferences about the scheduling and content of farming activities, and the authorities transmit this information and arrange introductions between these residents and farmers seeking their engagement.

Agricultural Experience Farm operated farmers not only provide farmland to urban residents to promote conservation of urban farmlands, but also offer instruction in cultivation methods. These farms also include those owned by farming families planned to be operated following retirement. Some of these parties anticipate being able to enjoy close friendships and interactions with other farmers.

By providing fresh, high-quality, local produce to urban residents, farmers operating in southern Saitama Prefecture can raise awareness and understanding from these residents regarding nuisances caused by their livelihood such as dust, as well as raise their profile in the community and gain people's support. Urban farmers also contribute to the sustainability of urban farming by offering opportunities for residents to experience farming activities. It is found that the roles of urban farmers and residents can change depending on the mode by which farms are managed. Regarding supplementary workers, urban farmers also play a role of encouraging some urban residents to become new farmers themselves, as they gain and hone their agricultural skills.

Urban residents participate in farming activities for a variety of reasons. First, supplementary workers residing in the Tokyo metropolitan area engage in agriculture as flexible part-timer workers able to freely select their working days and shifts. Other residents see farming as an important recreational activity. Supplementary workers who place emphasis on recreation often also have a stable occupation and can be characterized as people who enjoy the opportunity to immerse themselves in nature, during their leisure time, and who are interested in interacting with farmers and other workers. Meanwhile, urban residents involved with farms operated by experienced farmers are often engaged in farming not only for recreation, but also as a productive post-retirement activity. These individuals learn to cultivate multiple varieties of crops from neighboring farmers on weekends as well as practical applications of farming techniques to ensure they can operate their own farms smoothly in the future.

In essence, by recruiting urban residents with an interest in agriculture as supplementary workers, urban farmers help improve the efficiency of their harvests and distribution activities with respect to their light vegetable crops. Additionally, by acting as the experienced operator of farms worked by others, urban residents can become positioned as an important component of the agricultural work force while urban farmland is also conserved. Meanwhile, residents engage in farming-related activities including operating tourist-oriented farms for the purpose of securing wage income, recreation, and to prepare to become farmers themselves. In these ways, urban farming ventures in southern Saitama Prefecture are sustained due to farmers' need to secure labor and the willingness of urban residents to participate in agricultural activities.

**Key words:** urban farming, workforce, sustainability, farming, Agricultural Experience Farm, new farmer, the southern part of Saitama Prefecture

## Contents

<b>Abstract</b> .....	i
<b>Contents</b> .....	iii
<b>List of Tables</b> .....	v
<b>List of Figures</b> .....	vi
<b>List of Photos</b> .....	vii
<b>I Introduction</b> .....	1
1. Study background.....	1
2. Conventional study.....	2
3. Study purpose and method.....	6
<b>II Development of Urban Farming in Tokyo Metropolitan Area</b> .....	8
1. The period of traditional agriculture (pre-1960s).....	11
2. The urban farming transition period (1970s-1990s).....	12
3. The urban farming development period (2000s-to the present).....	20
4. The regional characteristics of urban farming.....	21
<b>III Types of the Urban Farming from the viewpoint of workforce     in the southern part of Saitama Prefecture</b> .....	24
1. Characteristics of urban farming in the southern part of Saitama Prefecture.....	24
1)Summary of study area.....	24
2)The agricultural workforce.....	30
3)Main crops.....	33
4)Shipping produce in different forms.....	36
5)Allotment gardens.....	40

2. Types of farm management	44
1) Family workforce-limited farmers	
(example of Farmer 2)	46
2) Supporting workers employment farmers	47
(1) Part-timers employment farmers	
(example of Farmer 4)	47
(2) Volubeyters employment farmers	
(example of Farmer 6)	52
(3) Farming volunteers employment farmers	
(example of Farmer 7)	60
3) Agricultural Experience Farm operated farmers	
(example of Farmer 8)	61

#### **IV Sustainability of Urban Farming**

<b>from the viewpoint of workforce</b>	67
1. The role of urban farmers	67
1) The supply of local farm products	67
2) Providing venues for agricultural experiences	68
3) Bringing up new farmers	71
2. The agricultural participation of urban residents	73
1) Flexible part-time	73
2) Leisure activities	76
3) How farmers prepare urban residents for farming	79
3. Sustainability of urban farming	
from the viewpoint of the workforce	81

#### **V Conclusion**

<b>Acknowledgements</b>	90
<b>Notes</b>	91
<b>References</b>	94

## List of Tables

Table 1	Change of the number of the full-time farmers and the farmers with a side job in Tokyo Metropolis	14
Table 2	Change of the number of the employment farmers with a side job in Tokyo Metropolis	16
Table 3	Outline of farmers in case area (2015)	31
Table 4	Input-output table by type of spinach cultivation (2008)	35
Table 5	Comparison of Agricultural Experience Farms in Niiza city (2016)	42
Table 6	Management form of the Farmers in case area (2016)	45
Table 7	Participation fee for strawberry picking at Farmer 4	51
Table 8	Daily schedule and Contents of agricultural work by Volubeiters (2015)	55
Table 9	The process of Farmer 8's Agricultural Experience Farm opening establishment and publicity activities	63
Table 10	Role of urban farmers and urban residents in each farming form	70
Table 11	Outline of supplementary workers in Farmer 6 (2012)	72
Table 12	Outline of supplementary workers in Farmer 6 (2015)	75
Table 13	Outline of Agricultural Experience Farm users in Niiza city (2016)	80

## List of Figures

Figure 1	Change of the total number of farm house and farmland in Tokyo Metropolis	9
Figure 2	The change of the legal system to Basic Law for Urban Farming Promotion	10
Figure 3	Division of the city area of the Tokyo metropolis (2011)	23
Figure 4	Study area	25
Figure 5	Change of the total number of farm house and farmland in case area	27
Figure 6	Change of the planted area by main crops in case area	29
Figure 7	Structure of the Volubunteers registration	32
Figure 8	Crops cultivation calendar in case area (2015)	34
Figure 9	Distribution of the allotment garden in Niiza city (2016)	41
Figure 10	Farmland distribution of Farmer 6 (2016)	54
Figure 11	Arrangement of Farmer 8 in Agricultural Experience Farm in Niiza city	64
Figure 12	Agricultural Experience Farm user and use career of Farmer 8 (2016)	66
Figure 13	Purpose of agricultural participation by urban residents	74
Figure 14	Relationship between urban residents and agriculture	78

## List of Photos

Photo 1 Farmland in study area	26
Photo 2 Direct sales place at Shiki City Hall	37
Photo 3 Grape direct selling place in Niiza City Hall	38
Photo 4 Self-service garden sale in case area (2016)	39
Photo 5 Agricultural Experience Farm schedule board	43
Photo 6 Pick-your-own Farm of strawberry by Farmer 4	49
Photo 7 Adjustment work of Komatsuna	57
Photo 8 Harvest of Chinese cabbages by Volubeiters of Farmer 6	58

# I Introduction

## 1. Study background

Basic Law for urban farming promotion was enforced in April, 2015. The basic policy that had been promoted becoming it residential land of the conventional city farmland was switched to this law. With this law, city farmland should be kept in good condition premeditatedly. This law requires that urban farmland be preserved for farming. A recent study by the Ministry of Agriculture, Forestry and Fisheries (2015), influenced the establishment of this law, by indicating that inhabitants want to “enjoy agriculture” for living well. In this study, urban farming is defined as agriculture performed in an area designated for urbanization in the metropolis, including Tokyo and neighboring areas (Miyachi et al. 2003, Basic Law for urban farming promotion). Specifically, the Tokyo metropolis includes Tokyo, Kanagawa, Saitama (except Chichibu), and Chiba (except Boso).

Urban planning law was first enforced in Japan in 1968. Per that law, city planning areas were divided into urbanization and urbanization adjustment areas to prevent disorderly urbanization and to plan for city growth. An “urbanization area” is defined as an area where urbanization should be preferentially and systematically planned over 10 years. Alternatively, an urbanization adjustment area is defined as an area where development should be restrained. Thus, farmland in areas designated for urbanization was excluded from the purview of the agricultural administration and their support was not received. Therefore, taxation on urban farmland was equivalent to that of housing, although burden adjustment measures were introduced in 1972 (Tsutaya 2009; Ono et al. 2016). In short, because of government-led city planning, farmers of the Tokyo metropolis were forced to resort to only short-term farming.

Urban farming has the advantage of proximity to large markets. However, because of management conditions under high land prices and

high labor costs, and because of the deterioration of environmental conditions, urban agricultural land is sparse and widely distributed across Japan, rendering it very difficult to convert agricultural land into an estate (Kasama 1980; Inui 1985). Landowners must therefore compete for labor in urban agricultural areas because of the very large non-agricultural job market. Agriculture is thus rendered an inferior industry in the city. Urban agricultural management is also disadvantageous, because of the labor disparity and the steadily rising agricultural labor costs (Birukawa et al. 1967). In the city, rurality (i.e., rural-likeness) declines while urbanity (i.e., city-likeness) dominates (Ilbery 1985). Furthermore, the small size and scattered nature of cultivated areas inhibits productivity improvements that most large farms enjoy (Kikuchi 2002). As mentioned, a large amount of tax is applied to agricultural land in the urbanization areas, leading to cases where farming is extremely inefficient. Moreover, from the viewpoint of the labor force, there is a problem that farmers are getting older and are running out of successors. Still, the importance of small farms in the Tokyo metropolis increases. Because urban farming persists, it is possible for urban residents to come into contact with nature through the maintenance and production of foods, and by securing green spaces for allotment gardens as places of leisure (Namai et al. 1986).

## **2. Conventional study**

Geographical studies of urban farming are roughly divided into three types: mutual economic benefits, farming management characteristics, and the intrinsic value of nature. First they discuss the mutual economic benefits. In Tokyo, a case study of multifunctional systems in urban farming was conducted (Takatori 2000), where we learned that characteristics of urban farming consist of mutually related benefits. There is a supply of fresh, safe, farm products; breeding and agricultural education for city inhabitants; immediate agriculture immersion; and interchange activities (e.g., allotment gardens). There are several studies about direct sale locations for farm products: a key component of

the farm products supply function (Miyaji et al. 2003; Miyachi 2006; Kikuchi et al. 2016). Hayashi (2013) clarified the management aspects of direct sale locations in Inagi-city and the role of agriculture in the city. From this study, we found that there are inhabitants whose interest in agriculture is low. They see farmers mixing with urban residents as problematic. Hayashi, therefore, recommended that farmers work to educate urbanites about the importance and public interest characteristics of urban farming.

Second, they discuss management characteristics. Miyachi et al. (2003) and Miyachi (2006) researched farming management in urban agricultural areas. They found that farmers can flexibly work in agriculture while obtaining a stable income via real estate management. Additionally, Tachikawa-city farmer maintained an advanced cultivated area for use by multiple sharecroppers, running a direct sale produce location while devising gains and adjusting quantity over the periods of direct-sale (Kikuchi et al. 2016). Each farmer sells organic agricultural products adapted to the needs of urban residents (Ilbery et al. 1999), while gradually developing keen management styles (Bryant et al. 1992). The farmers leverage information about affordability and proximity characteristics of the city market, including the needs of the customers. Thus, they apply intensive management styles and maintain farming with extremely high profit (Bryant 1982). Although the cited research on urban farming in Japan is restricted to Tokyo, the same situation will probably be found in other urban areas. Based on that assumption, it may be necessary for urbanites to consider urban farming to be an activity of much higher value.

Third, they discuss the intrinsic value of nature. Studies have recently been conducted to clarify the relationship between urban residents and agriculture. Via urbanization, farmland decreases every year. Under such circumstances, allotments are becoming more attractive as spaces where urbanites can easily get in touch with nature and agriculture. Via these allotments, urban residents plow the soil at a farm, grow vegetables, and experience the joy of harvest. Because of the lack-of-

successor problem, Shinpo et al. (2015) made the case for maintaining those allotments and effectively utilizing community gardens for city farmland. It may be argued that urban citizen farming is a type of commodification of the rurality element, constituting farm village spaces (Halfacree 1995). Via the conjugation of agriculture and the sentiment of the people, farming efforts can easily transition to a participative leisure activity (Butler 1998). Thus, it is necessary to investigate a maintenance method and a timeline for adapting city farmland. For example, Hobby Farmer, in the city outskirts, considers cultivated urban farming areas to be of cultural heritage, as are their farmland management activities (Stefano 2013).

Allotment types are classified roughly into the “one-day” (i.e., everyday life) model of the city and the “stay-type” model of rural mountain fishing villages. In the one-day model allotment study, allotted user properties in Kawaguchi-city were analyzed, showing that contact with agriculture by retired workers was of particular importance (Higuchi 1999). Forty percent of the Kawaguchi population lacks agriculture experience, and there are many people with high educational backgrounds. Thus, demand increase is expected. In Kai-city, Yamanashi Prefecture, it was difficult to analyze Kleingarten “stay-type” farming business profits, because they depend on an administrative subsidy (Nagai et al. 2007). For “stay-type” allotments, communication between users and local inhabitants is regarded as important; there is a community consciousness that contributes to the urban farming experience and knowledge of one’s self.

In recent years, the Agricultural Experience Farm, having interchangeable “stay-type” and “one-day” characteristics, is a leader among allotment farm types. Urban residents pay use charges, and the producer-owner leader supplies necessary farming implements (e.g., fertilizer, seed, and saplings). The users and the leaders share values and establish relationships that, along with the farms, they cultivate over time (Miyachi 2015 ; Miyachi et al. 2015). However, those studies do not touch upon the detailed user occupations or the purpose of each

user's allotment, whereas they provide age and experience details. In all cases, the existence of such a farm suggests that it is important to let urban farming continue to grow.

Whereas the above studies surveyed trends of conventional urban farming, there are few that analyze workforce. As geographical studies on agricultural labor go, there are several on the maintenance of vegetable cultivation by elderly people and women in Sakamoto (1992, 1993, 1995). These studies, however, do not target urban farming areas, whereas it is common for urban farmers to cultivate soft vegetables via a "weak" family workforce.

In a study on employment workforce (omitting family workforce), Omori (2001) studied an agricultural support business (i.e., a fruit tree production center) for which the local government helps supplement labor with a temporary workforce. In addition, Ito (1993) said that the facility around big city horticultural production is maintained by employment workforce which made use of the location of the neighborhood of the city area. Morozumi (2000) made clear that the pot production corporation "interest in the flower gardening" and attracts non-farm workers. At the vegetables production center of Fukaya-city, farmers promote personal branding by employing part-timers and foreign trainees (Kodama 2017). Additionally, studies of farming volunteers in the Tokyo metropolis are seen in (Yagi et al. 2003 ; Yagi et al. 2005 ; Funato 2013 ; Fukase 2013 ; Fukase 2015). These studies are regarded as important for understanding citizen interaction with farmers.

Public institutions plan and run a process called the "working holiday," during which an agriculture volunteer is dispatched from the city. This is recognized to be a sustainable form farm village tourism (Ikeda et al. 2013). In the case of the working holiday, city inhabitants proceed to a farm village area, actively behaving as an agriculture volunteer for a short term. However, urban residents who are farming volunteers are volunteering with farmers at a distance that is relatively close to the residential area. In any case, from the viewpoint of urban residents involved in agriculture, it is considered that the aspect of tourism is

emphasized.

For the most part, urban residents tend to participate in the agricultural workforce without clear purpose, hardly elucidating whether or not they see themselves as a part of the continuation of urban farming. When a family farmhouse promotes urban farming, the plan to obtain their workforce by several means. However, it should be emphasized that the relations with field hands will be even more important in the future. This is why it is indispensable to analyze the workforce of urban residents and to plan for the durability of urban farming.

### **3. Study purpose and method**

Based on the above information, the purpose of this research is to clarify how urban farming is maintained in the southern part of Saitama Prefecture, where housing land conversion continues. This study considers the actual conditions of securing a workforce of urban farmers and the relationship between urban farmers and residents. In urban farming, the agricultural sector requires a lot of labor in harvesting and shipping operations, where machinability is difficult and workforce shortages can make farming prohibitive. Being in the management environment implies that securing a workforce suitable for urban farming plays an important role in the farming's continuation. Urban residents should understand how to become a member of the workforce, and should understand how agriculture plays a role in their future.

In II chapter of this thesis, the development of urban farming in the Tokyo metropolitan area is described from the perspectives of the traditional agricultural period, the urban agricultural transition period, and the urban agricultural development period. Here, I analyze the agriculture and forestry census, the laws and policies on urban farming, previous research on suburban agriculture and urban farming, and workforce trends.

In III chapter, I analyze the characteristics of urban farming in South Saitama (i.e., Shiki-city, Niiza-city, Asaka-city, and Wako-city) and the management methods of each farmhouse. I arrange and analyze the

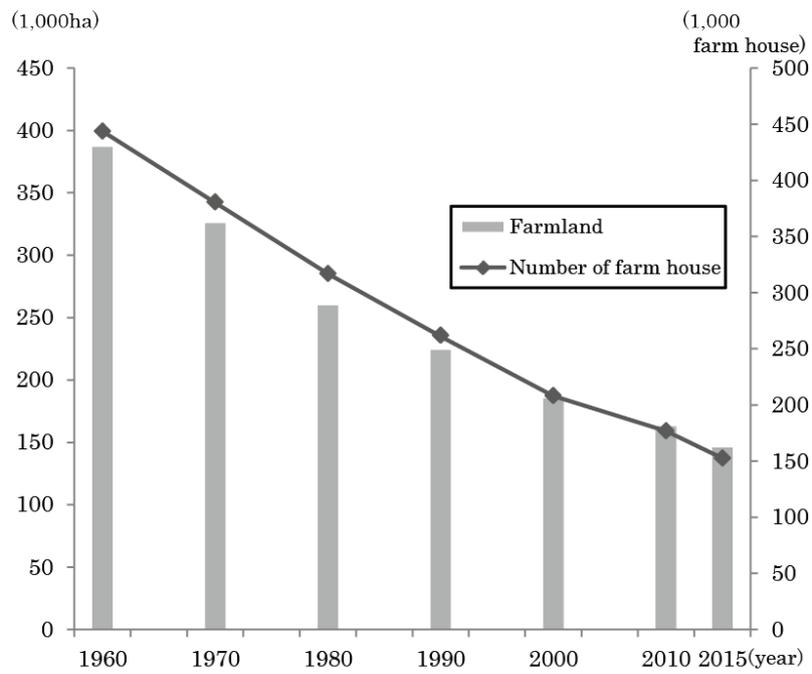
workforce, the overseer of the farmhouse, and facts about the crops. I also elucidate on the urban farming management of each farmhouse. I clarify relationships of significance and the urban residents who become field-hands. Specifically, I focus on the management form of each farmhouse and the changes that occur with regards to farming, the agricultural workforce, and the efforts of the supporting worker. I also analyze the conditions necessary for the continuation of such farming. My field survey is conducted mainly during the period of March, 2012, November, 2013, September, 2014, May – September, 2015, November – December, 2015, March – April 2016, and June 2016. From this field work, I assess the current farmhouse management and the supporting work force processes as an advisor/observer across several farmhouses. The trial farmhouses are chosen by my school administration with introductions and recommendations by JA Asakano. I am tasked by JA Asakano and the administration to examine the sustainability of urban farming.

In IV chapter, I consider what kind of role a city farmhouse plays for urban residents, followed by their perceived purposes of agriculture. Based on this analysis, I propose how urban farming may be continued via city farmhouses, and I recommend a relationship strategy for urban residents.

## II Development of Urban Farming in the Tokyo Metropolitan Area

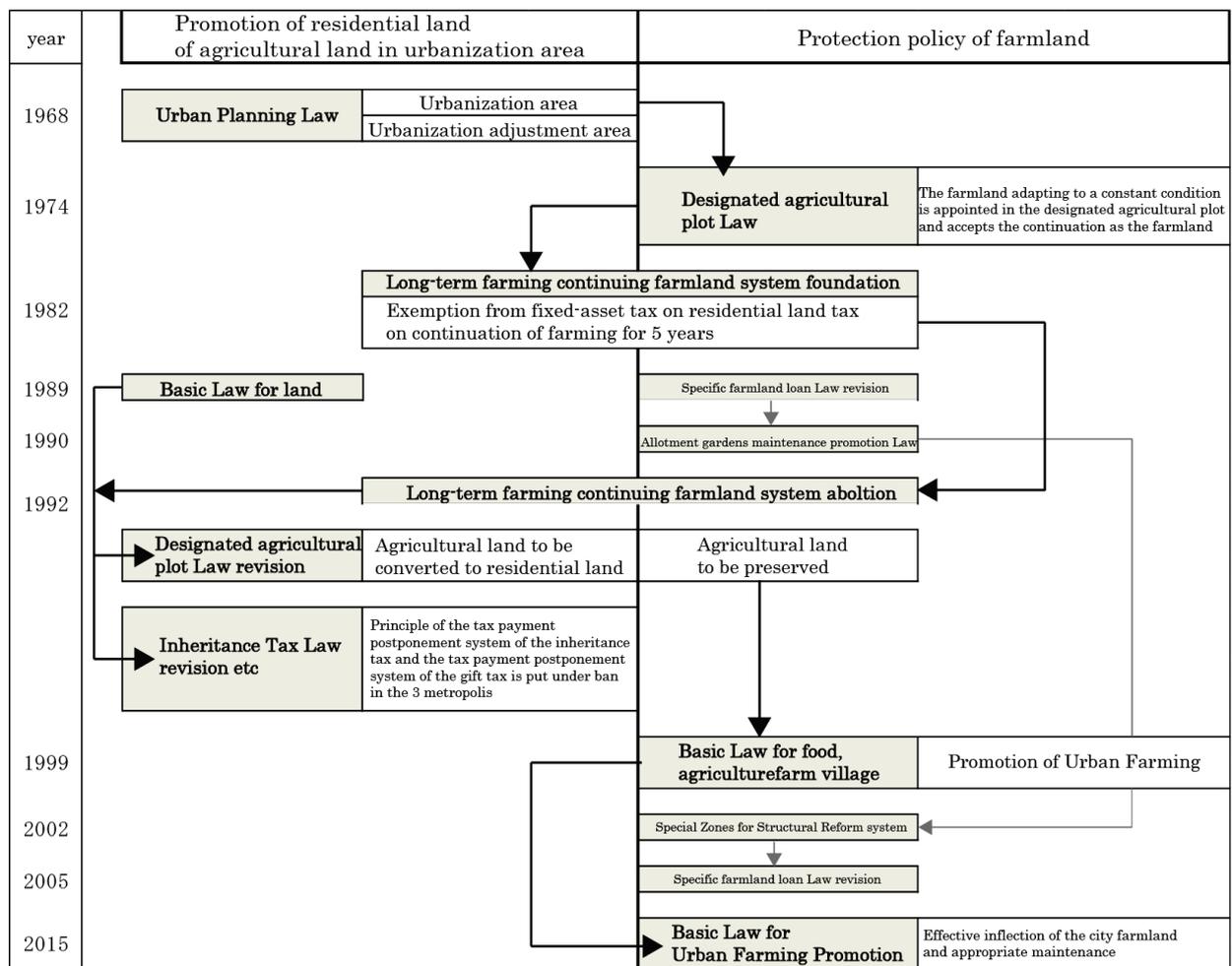
This chapter describes the development of urban farming in the Tokyo metropolitan area. In this study, the Tokyo metropolitan area is defined as the following districts: Tokyo, Kanagawa, Saitama, and Chiba, excluding Chichibu and Boso<sup>1)</sup>. Between 1960 and 2015, the total number of farmers and the area of managed cultivated land both decreased dramatically in the Tokyo metropolitan area (Figure 1). The number of farm households decreased most quickly between 1990 and 2000. By 2015, there were 34% as many farmers as in 1960. The amount of managed cultivated land also decreased dramatically, by 60% between 1990 and 2015. This decrease is thought to have been caused by the conversion of farmland to residential land continues, a process that continues today. The total number of farms is also decreasing, as many are sold to new owners who do not work in agriculture, reflecting population concentrations in the Tokyo metropolitan area.

This paper explores urban farming in the Tokyo metropolitan area, summarizing the findings of previous studies, including Yamaga 1960, Birukawa et al.1967, Kobayashi 1979, Tanaka 1982, Inui 1985, Yamamoto et al. 1990, Arai 1993, Sawada 1995, Takatori 2000, and Kikuchi et al. 2016. The analysis is divided into three sections, focusing on the labor force, shipping destinations, crop changes, and the laws and policies governing urban farming (Figure 2).



**Figure 1 Change of the total number of farm house and farmland in the Tokyo metropolis**

Source : Agriculture and forestry census



**Figure 2 The change of the legal system to Basic Law for Urban Farming Promotion**

Note: Under the certain conditions the mortgage system will be applied to farmlands designated for production green space.

Source : Tsutaya(2009) and Sone (2014)

## 1. The period of traditional agriculture (pre-1960s)

Before the 1950s, leafy vegetables, including spinach and komatsuna (mustard spinach) were supplied to major consumer centers in Tokyo, Saitama, and Chiba. Most of the spinach in the Tokyo central wholesale market in 1960 came from the Kanto region, which included Chiba, Saitama, and Kanagawa prefecture, and the Tokyo metropolitan area. It was cultivated as a cover crop, to protect the land from frost; in about 1960, the spinach began to be rotated with wheat and Chinese cabbage (Yamamoto et al. 1990).

Leafy-vegetable farmers in the eastern suburbs of Tokyo around 1964 had two sources of labor, in addition to a family workforce; as a result, they were able to harvest crops on 90% of their land 5–6 times every summer, earning a substantial cash income (Saito et al. 2001). The leafy vegetables cultivated each year had to be shipped, frozen, or preserved as soon as each crop was harvested in a small cultivated area. It was therefore advantageous to cultivate leafy vegetables in an close to the market. In other words, farms in the Tokyo metropolitan area could coordinate the harvesting of leafy vegetables with the production of low-maintenance crops (such as leeks, cabbage, and Japanese radish). This type of intensive agriculture was mainstream (Yamamoto et al. 1990).

In the field of agricultural geography, many academic studies have focused on the changes that affected farming and the use of land, during the urbanization of suburban farm villages. Agriculture in suburban areas was complex and diverse, and cannot be understood as a one-sided phenomenon (Kobayashi 1979). With urbanization, the sphere and concept of agriculture in suburban areas became less well defined, from the mid-1960s onwards: a remarkable, sprawling phenomenon of farmland mixed with residential land (Tanaka 1982). Research carried out by Birukawa et al. (1967) used as its case study the autumn fields in Tokyo's Koganei City, reexamining the way in which agricultural land was divided up in suburban areas, allowing agricultural production to survive urbanization in the form of "city area agriculture" <sup>2)</sup>. Another study (Sasaki 1969) explained how ground was cultivated for special

products, such as new greens and ornamental flowers, while agriculture in the Kohoku district was expanding to include both suburban and city agriculture.

The term, “urban farming” was introduced in the late 1960s to describe this new concept in agriculture. One influence was Japan’s rapid economic growth after the 1960s, when urbanization increased rapidly as a consequence of the Town Planning and Zoning Act enacted in 1968. This Act required farming families to continue agricultural production on farmland left behind. “Residential agriculture,” caused by an expansion of urban areas due to concentrations of urban industries policies related to Urban Planning Law<sup>3)</sup> tends to be generally defined as “urban farming.” Farmland was also converted to residential, corporate, and commercial land.

## **2. The urban farming transition period (1970s–1990s)**

When the supply of rice became excessive, the 1970 Production Adjustment Policy required farmers to change the crops they grew in paddy fields. Another factor that accounts for the remarkable decrease in fields was the pressure of urbanization on water management (Miyaji et al. 2003). Farmers within the Tokyo metropolitan area therefore took advantage of their location, being close to the market, to farm their agricultural land intensively, achieving high profitability through the cultivation of multiple harvests of vegetables (including leafy vegetables) in small quantities. In Nerima City after the 1970s, small quantities of many crops were produced by planting several different plants in the same furrow at the same time. The nature of management also diversified considerably (Takatori 2000). During this period, farmers in Higashikurume City, in the western suburbs of Tokyo, accounted for around 60% of the gross profits (Inui 1985). These farmers sent individual shipments of produce, using trucks, to the Setagaya market, which offered a higher price than any of the other markets.

The area in which urban farming is typically carried out includes Edogawa City, Tokyo where the cultivation of Japanese mustard spinach

has been very successful. This area had been an important provender base for Tokyo for a long time; Edogawa City became famous as a production center for leafy vegetables, such as Japanese mustard spinach and tsumamina (greens), during the later period of rapid economic growth (Kobayashi 1991). However, the volume of snack greens shipped to Tokyo decreased rapidly, from 2,600t in 1970 to 1,500t in 1974. The causes of this decline included the opening of the subway, a significant decrease in the number of farms, and the destruction of farmland, brought about by the division of farmland (Saito et al. 2001). Those independent farmers who “survived against the selection” relied on multiple cropping and a strong workforce to achieve a good income, while bringing in extra income through real estate management, renting houses, parking lots, and lock-ups (warehouses) (Kobayashi 1991).

The progress of urbanization developed agricultural organization and other jobs related to agriculture (Kobayashi 1979). Local core farms became collecting points for different kinds of farming, while the remarkable rise of land prices produced city areas and pushed farming forward towards specialization. Like Kobayashi’s (1991) research, a study by Ebato (1972) details the actual ways in which real estate managers and others were forced to respond to new approaches to agricultural management. Nagashima (1972) has clarified the farmers’ real estate management and the way in which the division of agricultural land advanced in the urban suburbs.

Between 1970 and 1990, the total number of agricultural houses owned by full-time farmers largely decreased (Table 1), although there was no real change in the number of farmers with an additional second jobs. In 1970, the second kind of farmer with an additional second job made up approximately 48% all farmers. This figure increased rapidly, to approximately 73% in 1990. In agriculture in the Tokyo metropolitan area, the number of agricultural farmers decreased and the proportion of type 2 concurrent farmers increased, resulting in a remarkable progress in common use. In the case of the second kind of farmer with an

**Table 1 Change of the number of the full-time farmers and the farmers with a side job in the Tokyo metropolis**

year	Total farmer	Full-time farmer	Concurrent farmer		Self-support farmer
			Type 1	Type 2	
1950	473,803	263,236	113,803	96,764	—
1960	443,888	167,760	140,575	135,453	—
1970	380,784	65,103	132,807	182,874	—
1980	317,067	41,675	78,348	197,044	—
1990	262,085	34,591	36,625	190,869	—
2000	213,472	39,060	44,628	74,733	55,051
2010	176,223	31,073	18,426	65,292	61,432
2015	153,028	31,914	12,447	50,296	58,371

Note : The unit is a farm house.

— shows no data.

The total number of farmers since 2000 is the sum of the number of sales farmers and the number of self-sufficiency farmers.

Source: Agriculture and forestry census

additional second job, employment outside of agriculture tended to involve real estate management and the conversion of city farms, as studies of the agricultural geography of the Tokyo metropolitan area have shown. For example, as farmland conversion began to advance rapidly in Kodaira City, the ratio of real estate management to farming increased (Miyaji et al. 2003). City farming families could secure a stable income by renting a house or apartment, or a wide variety of other properties, including parking lots. On the agricultural side, they could cultivate organic vegetables. This new approach, involving direct agriculture sales, provided a basic income.

The number of farms offering the first kind of employment farms largely decreased in the Tokyo metropolitan area from 1970 through 1990 (Table 2), except the case of migrant workers. The percentage of mom-and-pop operated farms managed by farmers of the second kind, supported by side jobs, was 28% of the whole in the 1970s. By 1990, it had grown to approximately 42%.

On the legal side, the “Designated Agricultural Plot Law,” enacted in 1974, had a considerable effect on securing a good living environment. It provided a structure for maintaining farmland that was suitable for planned sites, such as future public facilities—keeping it in good condition. Farmland set aside as a “designated agricultural plot” was exempt the taxes imposed on an equivalent amount of residential land. However, although “a purchase proposal” was possible for a moderate period of time, the area standard was 1ha (for a first-class designated agricultural plot), 20a (for a second-class designated agricultural plot). A piece of farmland could not become a first-class designated agricultural plot for ten years, or a second-class designated agricultural plot for five years (Sone 2014).

The “long-term, continuously-used farmland system” founded in 1982 allowed farmers to postpone paying property tax. If a piece of land was continuously farmed for more than ten years, and the head office of the city (municipality) authorized it, the farmer could be exempt from residential land taxes, provided that he or she continued to cultivate and

**Table 2 Change of the number of the employment farmers with a side job in the Tokyo metropolis**

year	Type1 Concurrent farmer					Type2 Concurrent farmer				
	Total	Family-run farmer	Employment farmer			Total	Family-run farmer	Employment farmer		
			Permanent work	Migrant work	Temporary/Day labor			Permanent work	Migrant work	Temporary/Day labor
1970	132,807	13,589	68,896	711	49,611	182,874	50,626	105,133	575	26,540
1980	78,348	10,095	48,726	77	19,450	197,044	47,973	126,537	148	22,386
1990	36,625	5,624	26,518	287	4,196	190,869	80,474	100,383	785	9,227

Note : The unit is a farm house.

For convenience, the data excluding the number of Employed Farmers from the number of concurrent farmers was taken as the number of Family-run farmers.

Source: Agriculture and forestry census

farm the land for five years (Sone 2014). Farmland in an area designated for urbanization could be granted a postponement of tax; this system allowed urban farming to become accepted. Encouraged by this incentive, farmers worked to conserve agricultural land within urbanization areas, and to create green spaces for production.

Thus, the role of urban farming was defined and promoted as a business that could, “maintain and manage stable and advanced agriculture, as a consistent element of city planning, which targeted farmland to ensure that it lasted for the long term, so that agriculture would continue to be carried out in areas designated for urbanization, contributing a steady supply of fresh food and maintaining good green tracts of land.” At the same time, after 1987, more farmland was taxed at a rate equivalent to that of residential land. As well as urban farming, the theory underpinning the administration of Japanese agriculture was reviewed. There was criticism of agricultural cooperation between 1985 and 1987, reflecting an increasing surplus in background trade and the import liberalization of farm products. As Japan entered the economic bubble economy, soaring land prices in central Tokyo made an urban agricultural land residentialization policy more urgent (Tashiro 2016).

The role of farmland in city life and the multifaceted functions of agriculture were reviewed, particularly the maintenance and cultivation of the living environment. In 1992, “the designated agricultural plot method” was revised to promote the city’s ability to farmland in areas designated for urbanization by making taxes on farmland equivalent to those on residential land. The main purpose of this revision was to focus on the various functions of green tracts of land, and farmland in particular, in supporting the aims of the city and social harmony. The revisions introduced a new designated agricultural plot system, recognizing that green land provides agricultural products and maintains a good city environment. Urban agriculture in urbanizing areas was given various designations by the city planners, with “residential farmland” distinguished from “farmland (a designated agricultural plot) that must be kept in good condition.” Property taxes

on “residential farmland” became the same as on residential land; this land was excluded from the inheritance tax postponement system. By contrast, “a designated agricultural plot” qualified for measures such as the postponement of inheritance tax, on condition of life farming and a farmland evaluation of the property tax. When a piece of agricultural land had been continuously farmed for 30 years, it became a “designated agricultural plot” (Sone 2014). This revised designated agricultural plot system reduced the standard area required for designated agricultural plots and relaxed the district designation that imposed severe conversion regulations. As a result, farmland owned by farming families came to be taxed at the same level, in relation to both property and inheritance tax, as residential land in areas designated for urbanization. Farming families demanded a serious, short review of this policy. Because they felt uncertain about environmental changes and found it difficult to be sure that they could hand the farm down to a younger generation, farming family hesitated to claim that their land should be classified as a “designated agricultural plot,” rather than “residential land often used as farmland” (Sone 2014). Many considered selling or converting their farmland.

The “Basic Law for Food, Agriculture, and Farm Villages” was established in 1999. It requires the planning and promotion of urban agriculture, declaring that “the country shall take necessary measures to plan the promotion of agricultural production, keeping the characteristic agriculture of a city and its outskirts alive to support nearby centers of consumption and meet the demands of city inhabitants.” One aspect of urban farming is that it builds a symbiosis, creating direct interchanges with city inhabitants and neighborhoods in a mixed habitation society. The allotment is a representative example of city agriculture. This flourishing trend used farmland to provide inhabitants with allotments (Shinpo et al. 2015), enabling farmland to remain in areas designated for urbanization as “the agriculture of the city,” without being in demand as residential land. Farming families that provide farmland in this form are exempt from annual property tax,

because the farmland is administered as allotments. As urbanization progressed, city inhabitants had a greater need to engage in farming, and allotments were introduced in unused farmland (Oba 1999). Shinpo et al. (2015) have shown that allotment users are motivated by their enjoyment of agriculture. For elderly people, in particular, it can be a way to enjoy life more. Even in the 1970s, the demand for allotments exceeded the supply in Mitaka City in Tokyo and Kawasaki City in Kanagawa Prefecture. In the 1980s, this was also the case in Setagaya City, Adachi City, Katsushika City, and Hachioji City. In the 1990s, demand exceeded supply in Nerima City (Shinpo et al. 2015).

According to a hearing on a farm, an advanced farming family in Nerima City, Tokyo, led the way in establishing allotments (followed by agricultural experience farms) in 1996, to accommodate the increased desire of city inhabitants to experience agricultural cultivation. In an agricultural experience farm, the farm becomes a model, initiating inhabitants into the methods of cultivation used by the farming family. As well as conventional allotments, a family with elderly members and children can use an allotment in an agricultural experience farm as a private field. However, rates of participation varied among allotment users because the system of very flexible. It became problematic that some users did not really manage their allocated farmland. In the case of an agricultural experience farm, city farmland tends to be kept in good condition because there is an overseer.

Because city farming families continue to farm, selling their produce through direct sales, sightseeing farms also exist, interchanging basic facilities with city inhabitants. Situated near major consumer centers, while managed on a small scale, urban farms near residential areas can provide fresh and appropriate farm produce, meeting the demands of local inhabitants. Initiatives to label farm products with place names can raise interest in an area's local agriculture (Takatori 2000). Farmers were distributing outside the market variously, such as selling to the garden, shipping to the direct sales department, provision of agricultural products to school meals.

### **3. The urban farming development period (2000s–to the present)**

The demand for allotments exceeded the supply in Itabashi City, Shinagawa City, Shibuya City, Tokyo, Noda City, and Chiba in the 2000s (Shinpo et al. 2015). In Setagaya City, Nagareyama City, Chiba, Niiza City, Saitama, Nerima City, and Tokyo, agricultural experience farms were set up to meet this need. Companies established divided farms, offering a plan of instruction and products to rent, in commercial facilities, allowing city inhabitants to take over the unused public land. In this space, various types of urban farming appear, as local people jointly cultivate farm produce and ornamental flowers (Shinpo et al. 2015). They cultivate and pick their crops; in Nerima-city, the farmers and local inhabitants developed an interchange through their “contact with the agriculture” in a city blueberry garden (Hanzawa et al. 2010). In Tachikawa City, urban farming has been maintained through the commodification of a farming space at the heart of the village that develops and sell produce directly (Kikuchi et al. 2016). Using Saitama City as an example, each full-time farmer manages his or her section in various ways, changing the combination every time. They therefore continue to farm by managing the overall plan and design of various sections (Ohara 2004).

The Basic Law for Urban Farming, enforced in April, 2015, required city farmland to be properly maintained. Urban farming has many different functions, ranging from supplying farm products and other amenities to conserving the environment, preventing disasters and providing anti-disaster measures, and offering leisure activities. Takatori (2000) has elucidated the mutual benefits derived from this wide range of functions. City inhabitants have fresh farm products, an experience of agriculture, and a better living environment. City farm families benefit from high profit agriculture, enjoying interactions with the local inhabitants of the area (Miyada 2001). They exploit the advantages of urban farming and agriculture by producing smaller quantities of organic goods, adding extra value to their farm products by selling them directly to consumers (Takatori 2000, Kikuchi 2008 ; 2012).

Because they are independent, farming families can decide what price to sell homegrown and original products for, using the farm to produce and sell their produce (Miyachi et al. 2003). In addition, farming families can produce small quantities of many different items, derived from the multiple cropping system, providing farm products that meet the demands of city inhabitants through direct sales (Kikuchi et al. 2016). By delivering fresh produce to home businesses, farming families can advance the distribution of local farm products, helping residents appreciate the value of organic vegetables and consider including them in school meal. Thus, farmers who own city farms can increasingly diversify their businesses.

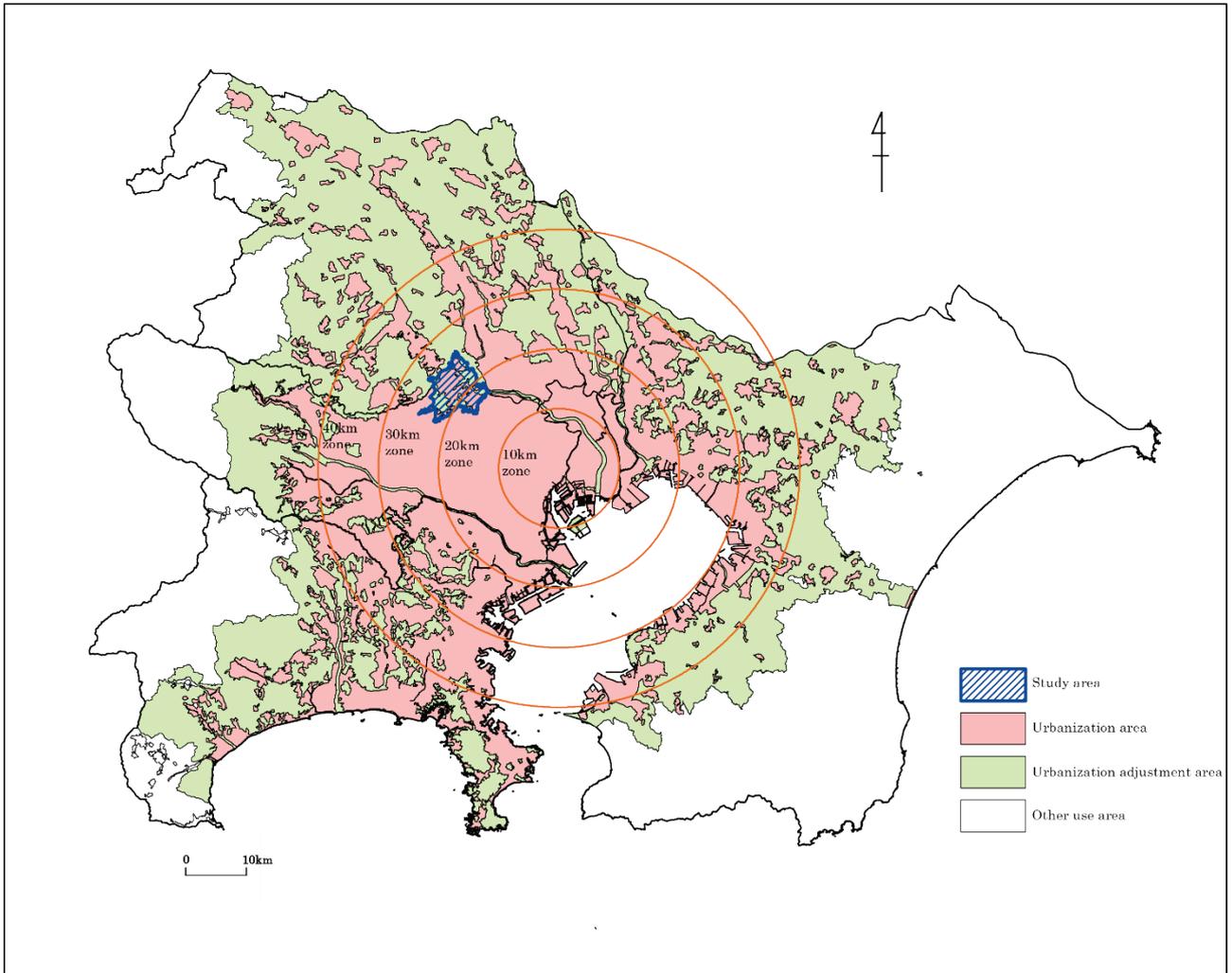
A farm also has access to a readily available workforce of city inhabitants who are interested in agriculture. Each government in Tokyo has introduced a system of farming volunteers, as a new agricultural workforce has appeared. volunteers strengthen farms by supporting farms without elderly people or a younger generation, carrying out various jobs and improving productivity (Funato 2013). In Tachikawa city, for example, a shortage of trained farmworkers is offset by farming volunteers and supporters, who do not cost the management anything (Kikuchi et al. 2016). However, farms must avoid taking too many free volunteers. It has been pointed out that the production of pear products in the city suburbs involves difficult work, and a scale of management and dispersion of farms that requires the right number of people (Yagi et al. 2005). In addition, farm managers who depend on volunteers find it difficult to enforce schedule changes to ensure the correct number of people because the volunteers are giving their labor free, out of good will.

#### **4. The regional characteristics of urban farming**

From Nihonbashi, in central Tokyo, an urban area with a 30km radius spreads out, from the high-rise business district to residential areas (Yamamoto et al. 1987). This area incorporates urban rural spaces and urban farming. There are three basic types of agriculture taking place in these urban rural spaces. The first is harvesting, about one month

after sowing and cultivating leafy vegetables in urbanized. It is possible to harvest these patches of land five or six times a year. The second involves using residual agricultural land on behalf of other areas, which commissioning cultivation. The third approach makes effective use of farmland by incorporating new urban residents. Consumers can be invited to participate directly in the production process, through rental farming, potting, and digging, enjoying the fun of harvesting grapes or picking strawberries, purchasing fresh vegetables, and similar activities. This paper explores the relationship between urban farmers and urban residents by examining the first and third forms of urban rural spaces.

As Figure 3 illustrates, the central areas in prefectural capitals in Tokyo and Kanagawa prefecture, Saitama prefecture, and Chiba prefecture are urbanized. Despite being close to the center, there are areas of mixed urbanization next to Tokyo and the prefectural seat of Saitama. The actual context and examples of urban farming will be discussed in Chapter III, focusing on this study area.



**Figure 3 Division of the city area of the Tokyo metropolis (2011)**

Source: Ministry of Land, Infrastructure, Transport and Tourism,

National Land Numeral Information, urban area data

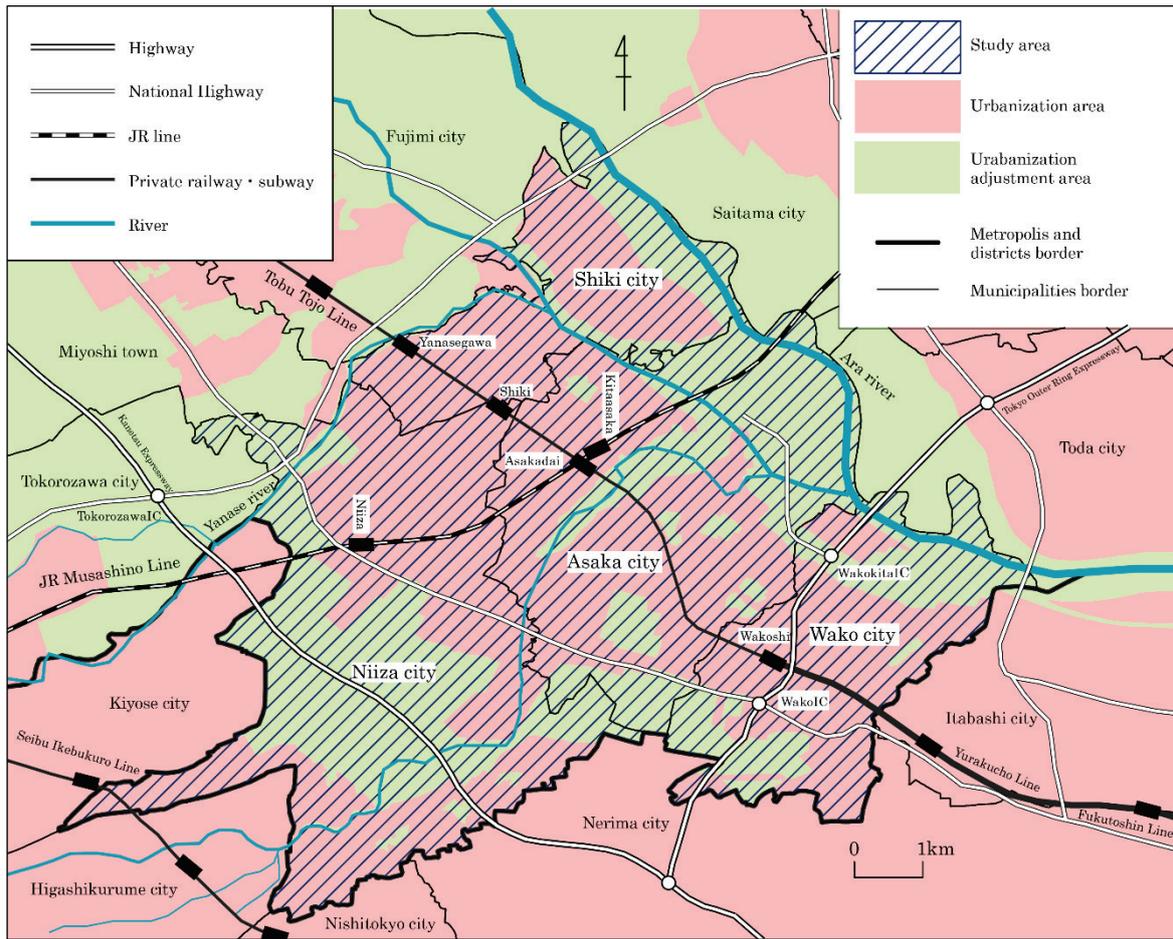
### **III Types of Urban Farming from the viewpoint of the workforce in the southern part of Saitama Prefecture**

#### **1. Characteristics of urban farming in the southern part of Saitama Prefecture**

##### **1) Summary of study area**

The research study area includes Shiki city, Niiza city, Asaka city, and Wako city, which make up the southern part of Saitama (Figure 4). This area, which is under the jurisdiction of JA Asakano, is located within 20–30km of downtown areas (cf. Figure 3). The total area is 61.28 km<sup>2</sup> and the population exceeds 400,000. This area is linked to downtown areas by rail by the Tobu Tojo Line, Tokyo Metro Yurakucho Line, Seibu Ikebukuro Line, and Tokyo Metro Fukutoshin Line. The convenience of the JR Musashino Line makes that neighborhood a superior residential quarter. The area along the Tobu Tojo Line is designated for urbanization and the development of additional housing. The farmland in South Saitama is mixed, in an area designated for urbanization within the controlled urbanization zone. In this region, therefore, farmland tends to exist between residential areas (Photo 1). Changes in the form of agriculture were required in this area in 1968, when the Town Planning and Zoning Act was enforced. In Shiki city, Niiza city, and Asaka city, a famous private university, with an attached private university junior high and high school, function as an education city, together with the Institute of Physical and Chemical Research and the Legal Training and Research Institute in Wako city. The urbanization of this caused a decrease in the number of farms and the area of managed cultivated land (Figure 5).

South Saitama is located on the Musashino plateau, between the Ara, Shingashi, Yanase, and Kurome Rivers, on low land near the Shirako River. Deposits of volcanic formed the Kanto loam layer that covers the Musashino plateau. The soil is oxidized and reddish. In some places it is 30m thick, but in most areas, it is 6–10m thick. Thick gravel and clay

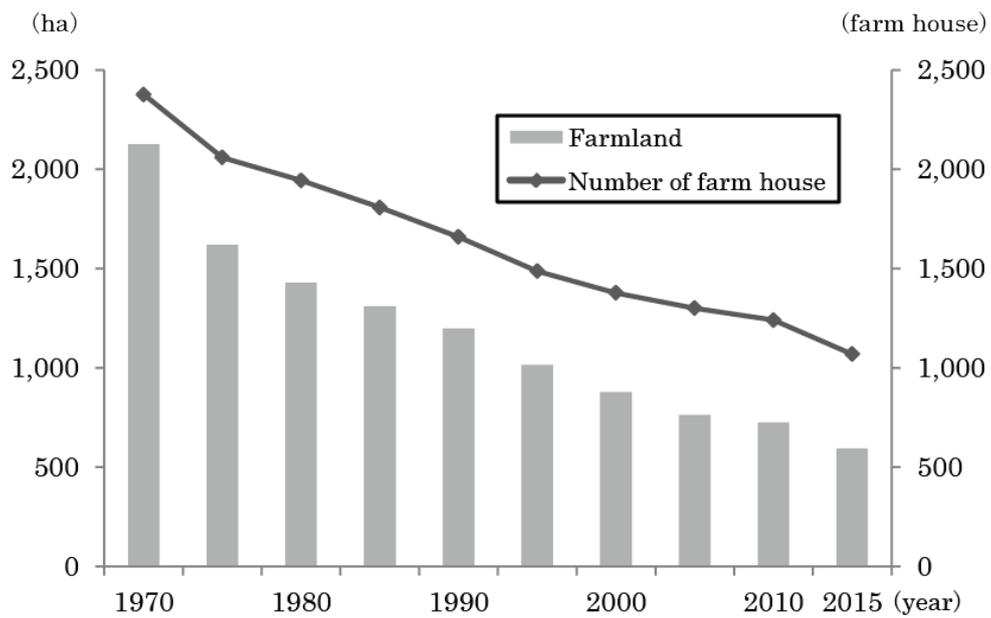


**Figure 4 Study area**



**Photo 1 Farmland in study area**

(May 2016)



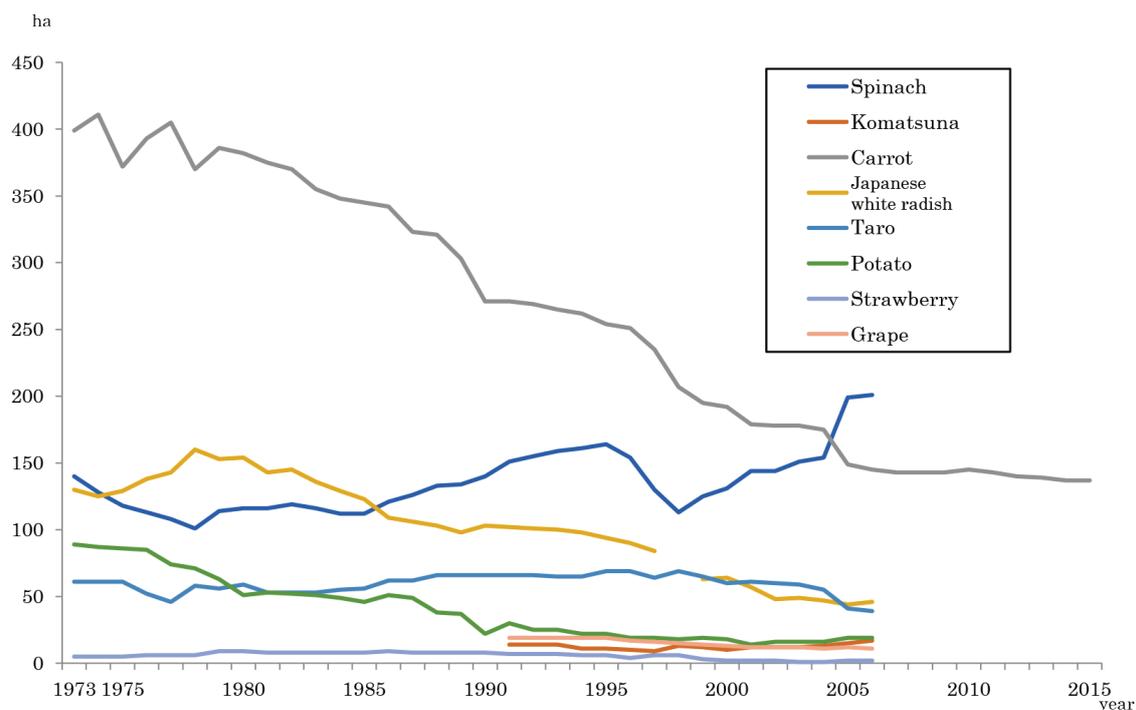
**Figure 5 Change of the total number of farm house and farmland in case area**

Source: Agriculture and forestry census

layers lie beneath the Kanto loam, on top of a layer of tufa. Water resources are poor because the water table is low. Because groundwater penetrates easily, there is little surface water from big rivers or wetlands: between -20 and -15m on the ground in Musashinodai (Inui 1992).

In the last years of the Meiji period, taro, pumpkins, and corn were grown in this area. During the last years of the Taisho era, burdock, carrots, and various kinds of crops, including Japanese radish, were cultivated. Until before World War II, the main crops were wheat and rice grown in dry fields, sweet potatoes, and winter crops planted in summer (Inui 1993). The production of wheat and sweet potatoes was introduced because Musashino plateau farm villages experienced famine throughout the war, until the middle of the 1950s.

During the period of rapid economic growth, the planting of wheat and the sweet potato, as a result of improving standards of living and changing national taste. Agriculture in suburban areas changed mainly to the production of vegetables. The area was more suitable for growing taro than sweet potatoes. According to the hearing investigation on JA and the farm, a constant scale of production has been maintained (Figure 6). In addition, the Musashino plateau plays a key role in the cultivation of spinach; following some changes to the planted area, this crop has tended to increase after 2000. Because there are major outbreaks of pests during the hot summer period, cultivation is difficult and there is little production. Most outdoor cultivation is carried in the spring, autumn, and winter. As Figure 6 shows, the area planted with carrots suddenly decreased in the 1980s. Niiza city and Asaka city on the Musashino plateau play a key role now in carrot production. Local farms find it difficult to compete with large-scale carrot production centers, such as those in Hokkaido. Farming families have therefore switched from carrots to other crops, such as leafy vegetables and foreign vegetables.



**Figure 6 Change of the planted area by main crops in case area**

Notes: The area of cultivation other than carrots since 2007 has not been announced.

Since the acreage area of radish in 1998 is expected to be incorrect, it was not shown in the figure.

In the case of Komatsuna, from 1991 to 2000 other miscellaneous, 2001 to 2006 showed the cultivated area of Komatsuna.

In the case of grapes, the result shows the area of the tree from 1991 to 2006.

Source: Saitama Agriculture, Forestry and Fisheries Statistics Annual Report

## 2) The agricultural workforce

Vegetables grown outdoors are a profitable crop in this area. The area planted with spinach has increased, as previously mentioned. Spinach is often harvested by hand, requiring a substantial agricultural workforce. One out of every 2–3 people in the area is an agricultural worker. As of 2015, according to an interview with JA Asakano, mom-and-pop operations play a key role. Table 3 shows the general conditions of farms in the study area. Approximately 33% of farms are self-sufficient; 35% are owned by farmers with additional second jobs. Farming families in the area appreciate the need for outside income. The maximum number of farms in an area of managed cultivated land is 50, in an area of 100a. This confirms the point made by JA Asakano that, in most areas of managed cultivated land, 70a are allocated to farms. As farming families occupy approximately 20% of the whole 100a of managed cultivated land, they must supplement the shortage of farm workers in one way or another.

In particular, supporting workers are needed annually on farms to pack produce for supermarkets and the neighborhood at pick-your-own farms during the busy season. The types of supporting worker vary. In study area, they include part-time workers and “volubeiters,” or farming volunteers. Their characteristics are as follows:

A part-time worker is a supporting worker in a farm village area. In cities, part-time workers are often hired by word of mouth. It is rare for new urban residents to be employed as part-time workers.

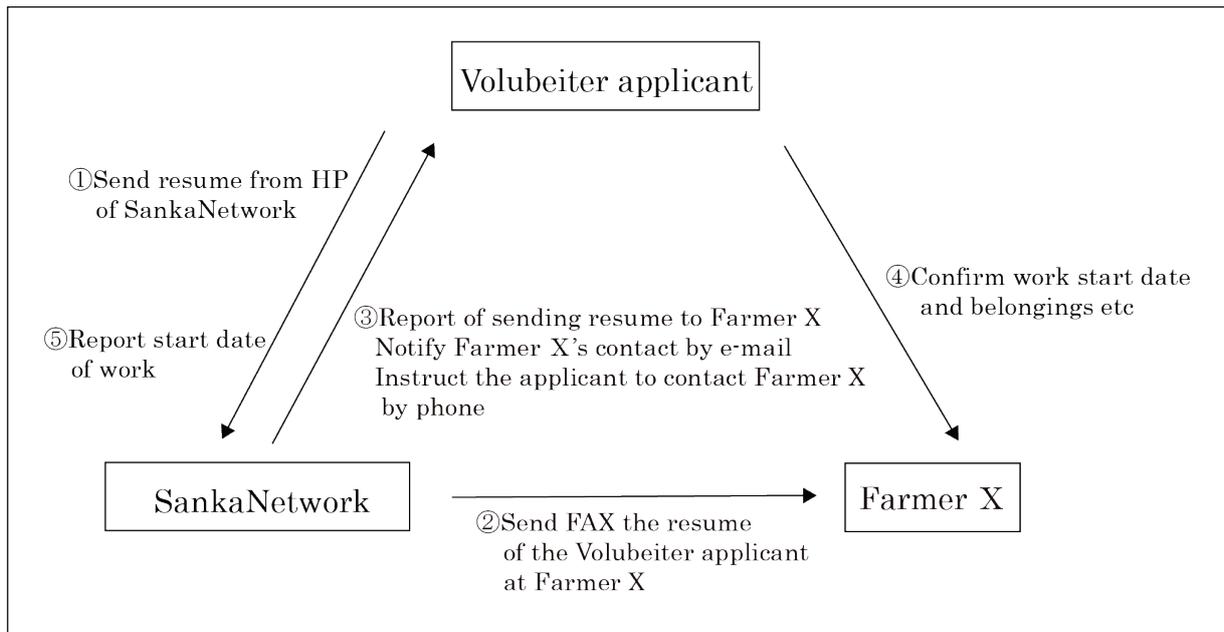
Volubeiters are usually skilled and find jobs online. The Sanka Network, a private enterprise, offers such roles (Figure 7). volunteers receive a volubeiter payment. They are defined as “eager” volunteers, in this study. Volunteers are usually philanthropists; they do not work to receive compensation. Although the volubeiters’ transportation expenses are not paid, agricultural work provides lunch and a small wage for labor. Volunteers are engaged in a variety of farming activities, depending on their skills and experience. Volubeiters can cultivate crops, or prepare farm shipments.

Farming volunteers can be recruited at any time by administrative

**Table 3 Outline of farmers in case area (2015)**

Total farmer (farm house)		1,069
Sales farmer (farm house)	Full-time farmer (farm house)	281
	Type1 Concurrent farmer (farm house)	54
	Type2 Concurrent farmer (farm house)	356
Self-support farmer (farm house)		378
Business scale by area Sales farmer (farm house)	Less than 30a	17
	30~50a	182
	50~100a	285
	100~150a	140
	150~200a	38
	200a~	29

Source: 2015 Agriculture and Forestry Census



**Figure 7 Structure of the Volubeiters registration**

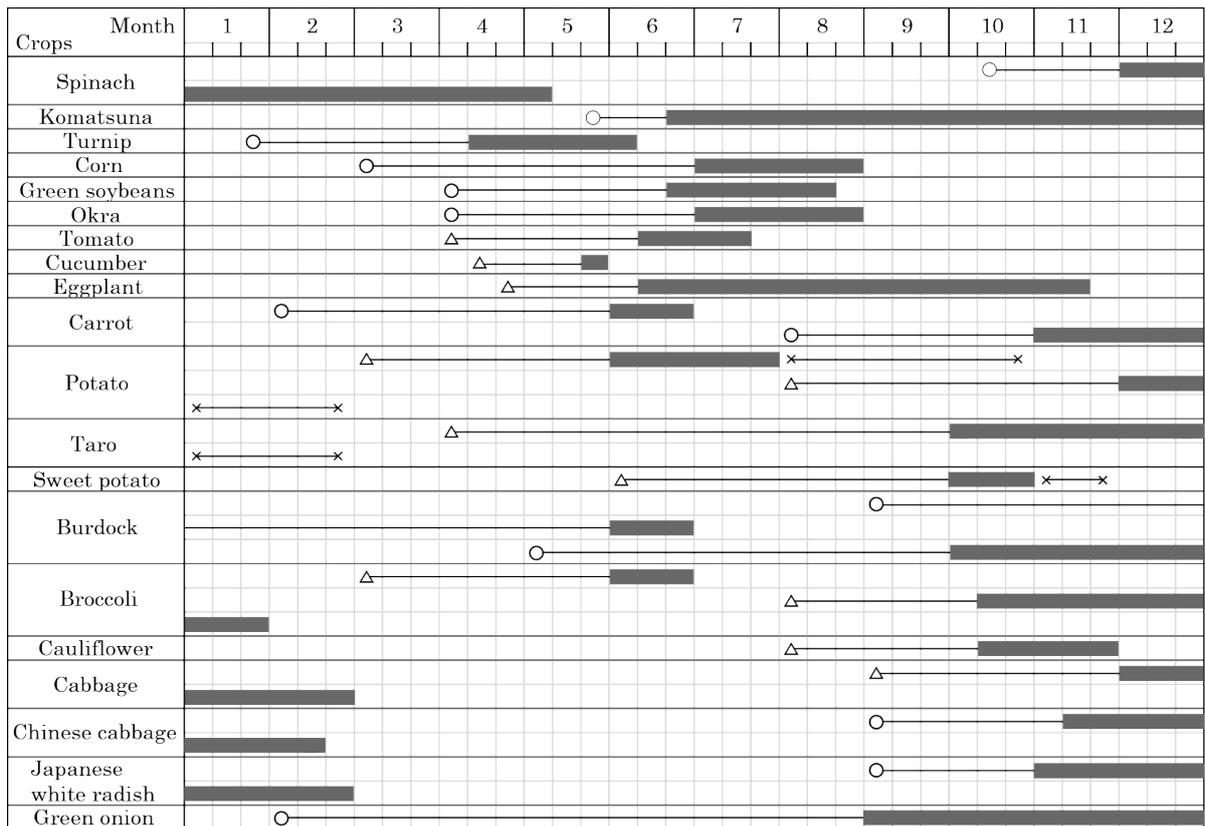
Source: Author's Interview.

bodies and public information. The recruitment of farming volunteers varies in each local administration. In the study area, only Wako city, in 2008, introduced a system of providing volunteers in response to requests from farms. As of April, 2016, 55 farming volunteer were enrolled in the program, and 11 farms employed them. Farms and volunteers fill out questionnaires so that they can be matched by Wako city administrators. Wako city also surveys urban residents who participate in agriculture and asks the city's main farming families to accept volunteers. In age, volunteer range from their late teens (university students) to their 70s. Many are 50–60 years old. According to Wako city, the ratio of men to women is approximately equal, although there are many women in their 50s.

### **3) Main crops**

Nowadays, in areas reserved for vegetables, the main crops are leafy vegetables such as spinach, komatsuna, and vegetables used in many popular dishes, such as carrots, Japanese radishes, tomatoes, cucumbers, and eggplant. Various crops are cultivated annually. In particular, the cultivation schedule focuses on leafy vegetables (Figure 8). Leafy vegetables are ready to harvest after 1–1.5 months. Winter crops are sown between the end of November and the middle of February. Autumn crops are sown from the middle of September to the beginning of November. Spring crops are sown from the end of February to the beginning of May. The spring sowing produces the highest income from ten acres (Table 4). Spring crops are harvested from the middle of April to the beginning of June, including the changeover period for spinach.

In addition to the crops mentioned above, urban farms have introduced rare vegetables such as romanesco, yam leeks, and red onions. In addition, crops that provide a good harvesting experience are cultivated on tourism farms. Taking advantage of locations that are close to central consumer zones, tourism farms in the southern part of Saitama Prefecture grow grapes and strawberries, sweet potatoes and potatoes, all of which offer good harvest experiences.



○ Dissemination   △ Planting   ■ Harvest period   × Storage

**Figure 8 Crops cultivation calendar in case area (2015)**

Note: Spinach, Komatsuna can be harvested 5-6 times per year.

Source: Author's Interview.

**Table 4 Input-output table by type of spinach cultivation (2008)**

Item	Spring sowing	Autumn sowing	Winter sowing
Seeding Fee	15,242	11,940	16,500
Fertilizer expenses	54,560	18,901	69,252
Repair costs	2,818	—	—
Pesticide sanitation expenses	3,399	4,000	24,000
Material expenses	18,633	44,186	16,546
Power utility cost	7,500	3,675	3,798
<b>Cultivation management cost total</b>	<b>102,152</b>	<b>82,702</b>	<b>149,166</b>
Packaging materials cost	61,971	25,079	48,480
Shipment fare	0	20,801	480
Union fee	21,053	8,199	23,268
Market fee	115,450	46,463	65,926
<b>Selling cost total</b>	<b>198,474</b>	<b>100,542</b>	<b>138,154</b>
Total direct production selling expenses	300,626	183,244	287,320
Shipment(kg)	3,323	—	2,000
Average price(yen/kg)	356	—	350
Gross income	1,358,240	546,623	775,600
Difference department income	916,696	272,336	210,319

Note : Depreciation expenses are not included in expenses. (yen per 10a)

Source: Provided by Saitama Prefecture Agriculture and Forestry Department

#### 4) Shipping produce in different forms

A farming family in South Saitama is a member of the JA Asakano association. However, the family does not ship produce to JA because the association does not transport such cargo. In recent years, they switched from shipping the produce of each farm through conventional market shipments in Urawa and Itabashi to sending produce directly to a supermarket and direct sales venue. There are four main types of shipment. The first is to send produce directly to a supermarket or concession. There are only two farmers' markets under the direct management of JA, in Wako city and Niiza city.

In addition, a farmers' market<sup>4)</sup> is held regularly in every South Saitama city hall (Photos 2 and 3). The farming family ships versatile popular and rare vegetables to the farmers' market and to the vendors' corner of the supermarket. It is important for the farm to sell popular, in-demand produce in the supermarket. In the farmers' market, the family can sell new foreign vegetables, introducing variety alongside versatility. Other farms maintain a good relationship with JA and the administration. The second approach is to deliver produce directly to people's homes. Home supplier comes to the farm to collect produce; order forms can be sent to local homes. The family's own restaurant also consumes this produce. The third approach is to sell produce in the wholesale market. The fourth approach is to sell produce wholesale; the Central Wholesale Market (Tsukiji, Ota) in Tokyo and the local wholesale market in Itabashi are known for garden sales. In later years, the farm family installed a type of locker (Photo 4) to carry out unmanned sales. Multi-generational farm families generally either supply agricultural products regularly to supermarkets or supermarket concessions, or deliver organic vegetable products with added value. According to interviews with farmers, although older farmers continue to ship produce to the market, their numbers are decreasing. Farmers who sell garden produce have secured stable shipping destinations and sell products to local residents. In other words, shipping targets are used properly, reflecting each product item and the available labor force.



**Photo 2 Direct sales place at Shiki City Hall**

Note: Government entrusts to NPO corporations, etc. and regularly holds direct sales place.

As with other direct sales outlets, farmers ship and display agricultural products before opening.

(December 2014)



**Photo 3 Grape direct selling place in Niiza City Hall**

Notes: At the main entrance of the city hall, vine farmers in Niiza City will sell many kinds of grapes every Wednesday from August to September.

Every week, different grape farmers ship and sell grapes at the direct sales department.

(September 2015)



**Photo 4 Self-service garden sale in case area (2016)**

Notes: The farmer stands a simple hut at the home site or the field ground.

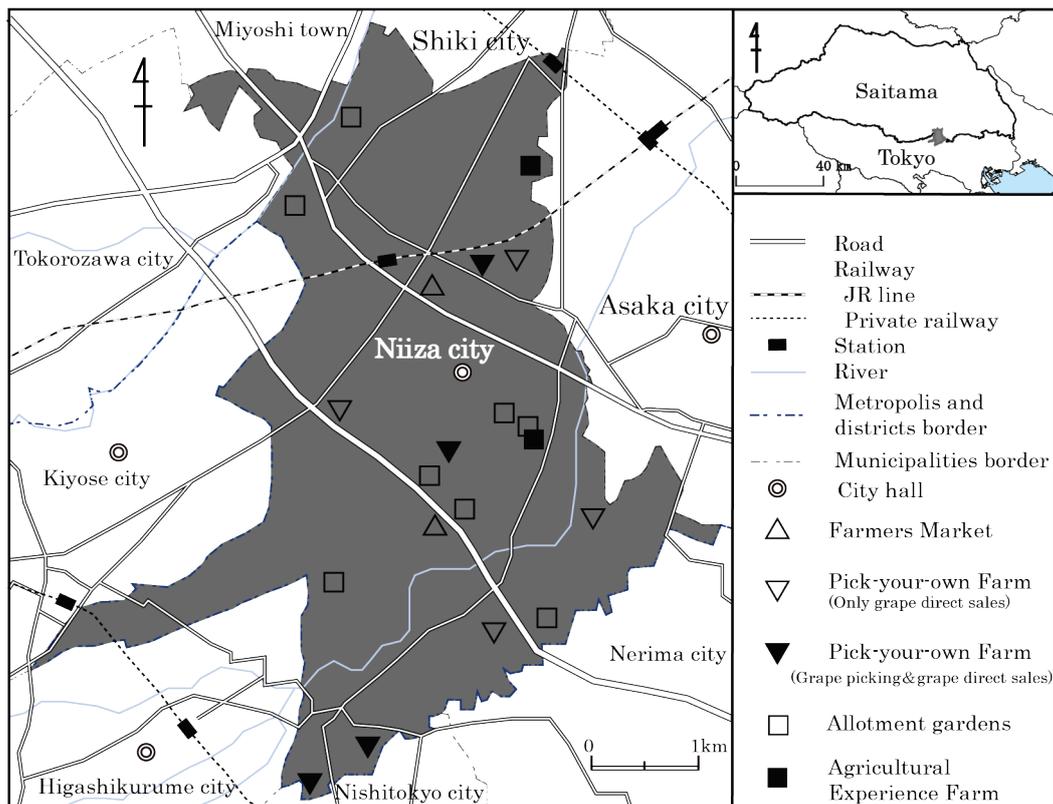
A coin locker style vegetable vending machine is installed in the hut.

(April 2016)

## 5) Allotment gardens

The target area includes citizen farms managed by the local administrative entity (see Figure 9). However, Wako city has consolidated its abandoned land and scattered citizen farms in one place, and opened a citizen farm called “Agri Park.” Shiki city and Asaka city have citizen farms run by private enterprises; there are two citizen farms with lead farmers (Agricultural Experience Farms) in Niiza City (Table 5). In agricultural experience farms, farmers become leaders on weekends and teach farming methods to participants (Photo 5). At Bell Sound Farm, farmers and their neighbors decided to open agricultural experience farms after visiting some in Nerima Ward. The lead farmer at Bell Sound Farm shares his expertise with farmers at Hatanaka Green Farm. All participating farms have the same entrance fee, to make it easier for urban users to visit agricultural experience farms.

Information on agricultural experience farms in Niiza city is posted on web-site and the public notice board in Niiza city. Niiza city acts as a window, choosing agricultural experience farm users by lottery. Initially, agricultural experience farms were established to alleviate taxes and conserve agricultural land, but nowadays the emphasis is placed on deepening exchanges between agricultural leaders and urban residents.



**Figure 9 Distribution of the allotment garden in Niiza city (2016)**

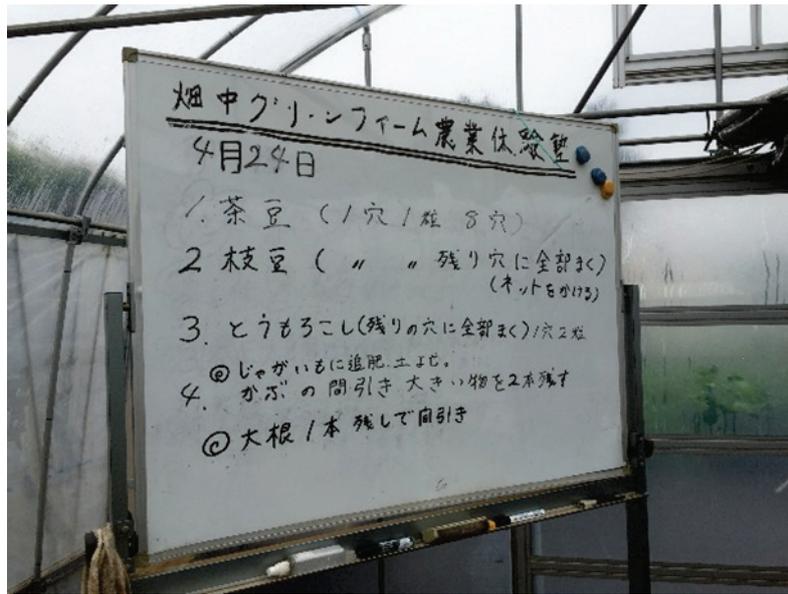
Source: Materials provided by Niiza city and Niiza city HP.

**Table 5 Comparison of Agricultural Experience Farms  
in Niiza city (2016)**

Agricultural Experience Farm name	Kanenone Farm	Hatanaka Green Farm
Work scenery		
Agricultural land attribute	Urbanization area	Urbanization adjustment area
Start year	2010	2013
Management entity	Farmer(Landlord)	Farmer(Landlord)
Area per section	30m <sup>2</sup>	30m <sup>2</sup>
Total section number	31 section	17 section
Usage period	From late March to the end of January the following year	From late March to the end of January the following year
Annual usage fee	40,000yen	40,000yen
Target users	Those who can visit on foot or by bike	Those who can visit on foot or by bike
Exchange event	Training session and Harvest festival	Training session and Harvest festival
Remarks	The farmer is a lecturer of the Japanese Court on weekdays.	

Note : The picture of the work landscape was taken in April 2016.

Source: Author's Interview and Niiza city HP.



**Photo 5 Agricultural Experience Farm schedule board**

Notes : When users gather, we will briefly explain the content and method of farm work done on the day in lecture form.

Thereafter, each user performs work at a predetermined field.

(April 2016)

## **2. Types of farm management**

This section summarizes the types of farm management styles, revealing the characteristics of urban agriculture in the southern part of Saitama Prefecture through case studies. As urban farmers consider which types of crops to produce at what scale and what kind of farm management policy to focus on, they have to focus on the available labor force.

The first question to ask is whether an agricultural business will be managed entirely by a family workforce or will hire outside labor. If the former, a distinction must be made between agricultural experience farms, and other farms, in terms of the type of supplementary workers they employ.

As shown in Table 6, farmers who do not hire outside workers are limited to family farms (Farmers 1 and 2) and agricultural experience farms (Farmer 8 to 9). Farmers who hire supplementary workers hire farm hands and part-time workers (Farmers 3 to 5), volubeiters (Farmer 6), and volunteers (Farmer 7).

Table 6 Management form of the Farmers in case area(2016)

Farmer No.	Family workforce	Form of Supporting workers	Farmland (a)	Agricultural land attribute	Crops	Shipping destination	Year of farming	Remarks
1	M7, F5, M5	—	70	Urbanization adjustment area	30 items of vegetables	Supermarket, Farmers market, Food service center(Asaka)	2007	Digging potatoes
2	M6, F6	—	70	Urbanization area	20 items of vegetables	Co-op, Market(Itabashi), Farmers market	1975	Previously, rented farmland
3	F8, M6, F6, M3	Part-timer, Senior worker	200	Designated agricultural plot	Grape	Self-service garden sale, Farmers market, School lunch(Niiza)	1976	Picking grape, Full-time farmer
4	M7, M2, F5, F5, F3, M7	Part-timer	123	Urbanization adjustment area	Strawberry 15 items of vegetables	Self-service garden sale, Farmers market, Market(Itabashi)	2012	Picking strawberry
5	M6, F6, M3	Part-timer	230	Urbanization adjustment area	30 items of vegetables	Supermarket, Market(Tsukiji), Individual home delivery, School lunch(Niiza), Self-service garden sale	2000	Digging potatoes, Harvesting experience
6	M6, F7, M4, F3	Volunteer, Senior worker	200	Urbanization area	20 items of vegetables	Supermarket, Farmers market, Delivery	1965	Organic cultivation
7	M8, F8, M5	Farming volunteer	70	Urbanization area	10 items of vegetables	Co-op, Farmers market, Individual home delivery	1986	Organic cultivation, Leader of allotment gardens
8	F5, M8	—	27	Urbanization area	Vegetable for self consumption	—	2009	
9	M6, F6, M3	—	100	Urbanization adjustment area	20 items of vegetables	Farmers market, Self-service garden sale	1976	

Note: M is male, F is female, numbers are tens of years old, and — indicates nothing  
AEF means Agricultural Experience Farm.

Source: Author's interview.

### 1) Family workforce-limited farmers (example of Farmer 2)

Farmer 2 is the head of a farming household. He is 67 years old, and his wife is 62. They cultivate the same crop every year; because they lack freedom, they run the farm entirely through family labor. All of the cultivated fields are upland fields (area 70a) and designated urbanization areas. The area has not changed between 1996 and 2016. Farmer 2 ships cucumbers, eggplants, tomatoes, green peppe to the JA Direct Sales Office<sup>5)</sup> in Wako city, along with broccoli, cauliflower (10a), pumpkin squash (mini-pumpkins), komatsuna, and radishes. Farmer 2 once lent a 10-acre field to provide a farm for to urban residents. The residents used to pay 3,000–4,000 yen per year to Farmer 2, but summer visits to the farm have decreased and the crops are no longer being carefully cultivated; they are no longer providing this resource.

Producers of potatoes and onions is compete fiercely with major producing areas, including Hokkaido. This farm therefore specializes in vegetable production, take advantage of its location in the suburbs of a large city called Saitama-ken South. Broccoli, for example, can be cultivated early; farmers can adjust the timing of their shipments to compete effectively with other regions and farmers. A co-op provides cauliflower and baby pumpkin; sixteen farmers in Wako city jointly produce these crops, cultivating and shipping them at different times, so that they don't overlap. In 2010 16 members of the Wako city cooperative sold about 20 million yen's worth of produce; in 2016, this figure was 40–45 million yen. Two of the farmers' vegetables were affected by rumors of damage, caused by the March 2011 nuclear accident at Fukushima Nuclear Power Plant. Since fiscal year 2011, sales are said to have halved.

The family nurturer fell into farming through domestic circumstances, having been an office worker in 1975. If he was a farmer, he paid 50 million yen for taxes, or if he was a office worker, he was forced to pay tax liability of 100 million yen. For that reason he changed jobs to the farmers. He continues to far for his health in 2016; there are around five producers in their 80s in the neighborhood. He also enjoys cooperating with other farmers in the JA market. He communicates with around ten

producers, learning about their sales every morning when he ships vegetables to the JA market. In other words, the interchange between farming families add a challenge to farming. However, it is forbidden to ship vegetables in large quantities to the JA market and farmers are responsible for collecting vegetables that remain unsold. He sells vegetables as cheaply as possible to reduce the leftover goods in the JA market. His sales<sup>6)</sup> at the JA market total 600,000–700,000 yen per year. However, he thinks that Farmer 2 may convert a farm into a parking lot in future because of the cost of fertilizer, agricultural medicine, and car inspections, especially as there is no younger generation to take over the farm.

## **2) Supporting workers employment farmers**

### **(1) Part-timers employment farmers**

#### **(example of Farmer 4)**

Farmer 4, is the head of the household and a man in his 80s. He cultivates outdoor vegetables, including tomatoes (large and cherry), cucumbers, eggplant, carrots, cabbage, radishes, Chinese cabbage, broccoli, corn, taro, ginger, onions, and potatoes. These vegetables are shipped to the JA Direct Sales Office in Wako city, Itabashi Market<sup>7)</sup>.

Farmer 4 stopped cultivating rice in 1970, to devote himself to vegetables. He began shipping vegetables directly to a large chain supermarket in Wako City around 1994. The agricultural land owned by Farmer 4 is in an urbanization adjustment area; he currently has 1 ha of managed cultivated land for multi-item vegetables and 23 a for strawberries. The head of the household is a vegetable farmer and also manages real estate. His son-in-law is a non-agricultural worker (civil servant). Along with urbanization, agriculture must be centralized; the soaring land prices and inheritance tax are expensive. Farmer 4 is searching for new agricultural management.

After having majored in agriculture at a university in Tokyo, Mr. T., who is in his 20s, like the grandchild of the family nurturer, entered the agricultural college school in Saitama. After completing an agricultural

course in 2012, he began cultivating strawberries in a vinyl house. As Mr. T. specialized in strawberry cultivation, that is said to have influenced his choice of red crops (including tomatoes and strawberries). He learned in a university lectures that red crops have few price fluctuations and a high unit price. The tomato is a widely available vegetable; differentiation is difficult neighboring farming families also cultivate tomatoes. Because a relative of Mr. T. cultivated strawberries on the bare and sold them, and Farmer 4 cultivated bare ground strawberries his own family to consume, Mr. T. grasped the advantages of cultivating strawberries. He therefore made up his mind to cultivate strawberries outside, as Wako city gardening facilities had made outdoor culture mainstream. For around two years, he learned about the administration of this cultivation technology and how to run a sightseeing farm. He studied this specialty at an agricultural college school and a strawberry farm in Gyoda city, learning the method of cultivating high setting strawberries in facilities<sup>8)</sup>. In Wako city, Farmer 4 opened the first strawberry sightseeing farm (Photo 6) after introducing strawberry-picking facilities. In addition, he grew two types of strawberries: Akihime and Benihoppe. These strawberries are sold through direct garden sales, and also in the JA market in Wako city.

Mr. T. became a leader in strawberry cultivation. His regular labor force includes his sister (30s) and his mother's uncle (70s), as temporary workers. Mr. T.'s mother and aunt (both in their 50s) are also engaged in agriculture<sup>9)</sup>. Farmer 4 has an extensive family workforce, hiring only one part-time worker for two days a week (approximately) during strawberry season: December–May. The part-time worker is a friend's of Ms. T's aunt (also in her 50s), who lives in Asaka city.

Wako City has asked farmers to use volunteers and Farmer 4 plans to employ 2–4 volunteers from late November 2016 to late February 2017. Mr. T. believes that farmers rely too much on volunteers who are not paid and want to work hard. Mr. T. believes that farming volunteers want to take responsibility for agricultural work; as a result, the farmers want



**Photo 6 Pick-your-own Farm of strawberry by Farmer 4**

(April 2017)

to pay them a wage. Depending on the work, Mr. T. hopes to change from volunteers to part-time workers.

In considering the construction of new facilities, Mr. T. wants to make it easier for consumers to use tourism farms, by extending parking lots and eliminating steps at the entrance of the house. To reach out to local residents, Farmer 4 hosted tours of second-grade elementary school students in Wako city and gave strawberry farm nursery tours from 2016 onwards, helping to provide educational activities for local children. In addition, the farm hosts elderly people from nursing homes on weekdays.

Consumers visit Wako city, Itabashi city and Nerima city to buy strawberries at the farm concessions there. According to Mr. T., most visitors arrive by car. Most come from Itabashi, Nerima, and Toda and quite a few also from Shinagawa and Suginami. Like other strawberry tourist farms, families mainly visit on weekday mornings and weekends. One consumer does not pick strawberries, but visits a farm stall twice a week, and buys about 300,000 yen worth of strawberries during the season. Strawberries, which are luxury goods, are also purchased as gifts. Customers living in the city center want good, high quality strawberries that can be purchased directly from the producers. Mr. T. targets consumers who can afford to pay higher prices for strawberries with a high sugar content at the peak of the season. Late season strawberries are for ordinary consumers and the pricing is changed in accordance with the season (Table 7).

In the future, farm managers will need to scale up operations and improve quality. Since Wako city has no abandoned land to cultivate, it is very difficult for farms to expand. Mr. T. is focusing on raising very high quality strawberries. In Japan, Shizuoka, Chichibu, Tochigi and Boso are well-known strawberry production areas. However, the advantage of cultivating strawberries in Wako City is that it is adjacent to Tokyo. Branded strawberries shipped to high-end fruit shops take two days from harvest to shop front, while strawberry tourist farms in Wako are located within the Tokyo metropolitan area. It is possible to harvest, ship, and sell strawberries with the highest sugar content. Contract

**Table 7 Participation fee for strawberry picking at Farmer 4**

Period	More than primary schoolchild	Less than primary schoolchild
From late December to January 3	2,200	1,700
From January 4 to April 10	1,700	1,200
From April 11 to May 10	1,400	1,100
From May 11 to late May	1,100	900

Notes : The amount unit is yen.

Picking strawberry takes the form of all-you-can-eat in the house for 30 minutes.

Infants younger than 2 years are free.

Source: Author's Interview.

sales of strawberries to department store cake shops will soon begin; in future, Farmer 4 will launch and promote original strawberry brands. To establish a strawberry brand, Farmer 4 must hire new urban residents to harvest strawberries and sell garden produce.

## **(2) Volunteers employment farmers (example of Farmer 6)**

Farmer 6 is the head of a household. He is 69 years old and his wife is 71 years old. His son is 42 and his son's wife is 30; they are all mainly engaged in agriculture. Their current plot of cultivated land is about 2 hectares; the upland fields span Shiki city, Miyoshi-town, and Fujimi city; fields are scattered in about 10 places (Figure 10). By naming each upland field, the family can clarify which crops to cultivate where, and manage a smooth division of labor.

Farmer 6 is located in the urbanization area, but his upland fields are located in the urbanization adjustment area. He has upland fields in both the urbanization area and the urbanization control area. He cultivates about 20 crops, including spinach, komatsuna, turnips (April), edamame (July), radishes, carrots, cucumbers, tomatoes (from seedlings), eggplants (from seedlings), okra, goya, sesame, and Chinese cabbage. Most of the crops are cultivated in open fields, but the cucumbers and tomatoes cultivated inside facilities. The main crops cultivated by Farmer 6 are spinach and komatsuna, with other crops grown in particular seasons.

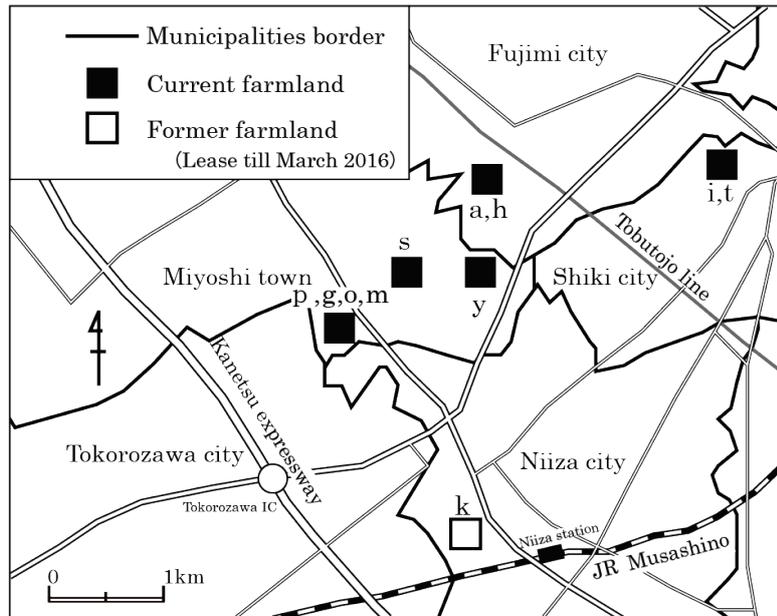
After graduating from high school in 1965, Farmer 6 began farming in earnest. Beforehand, his mother had cultivated rice, taro and other crops. Even when they were elementary school students, household heads were all eagerly helping their mothers with farm work. After Farmer 6 began farming, the crops began to change from potatoes to leafy vegetables. In the case of potatoes, there is competition with other large-scale production areas, although harvest times can be adjusted. Leafy vegetables can be harvested 1–2 months after sowing, 5–6 times per year. The fact that they are easy to harvest is a major reason for cultivating leafy vegetables. In addition, when Farmer 6 is looking for another

market<sup>10)</sup>, beyond Urawa, it is clear that cultivating organic vegetables is an advantage, for farm families hoping to continue farming in the future. In the 1970s, they did not use any agricultural chemicals or soil disinfectants, but specialized in cultivating many kinds of organic vegetables. Originally these were shipped to gardens or peddlers; the current shipping destinations include supermarkets, couriers, dealers specializing in organic vegetables, the JA shop in Niiza City, and the morning farmers' market at Shiki City Hall.

Since 2002, Farmer 6 has employed volubeiters, who are residents of the Tokyo metropolitan area, through private companies in Tokyo. Volubeiters, which allow day trips to work, are adopted from time to time. Farmer 6 lives 20 minutes on foot from the nearest station on the Tobu Tojo Line. Volubeiters can walk from the station to his home. When they leave, they are driven to the nearest station by car. Volubeiters who live in nearby areas also travel by car, bicycle, or on foot. More than 90% of Farmer 6's volubeiters are agricultural beginners, working in various other jobs, at IT companies, trading companies, and as self-employed people and care workers. In addition to helping with agricultural work, they enjoy interacting with other volubeiters, of different ages and with different occupations. In other words, the farm is a place where agricultural beginners can experience agricultural work while networking and meeting other people.

Volubeiters work 7–8 hours per day. The work agricultural, including some processing and shipping of spinach and komatsuna (Table 8). Volubeiters work under the supervision of the farmer's son from 9 am to noon, processing and shipping leafy vegetables harvested the day before. After an hour's lunch break, they continue working until 1–3 pm. After another a small break, they continue processing and shipping produce until 6 pm. When Farmer 6 arrives, each volubeiter receives approximately 4,000 yen to cover his or her labor costs for the day. The volubeiters complete activity sheets and chat to the farmer and other volubeiters before heading home.

The Farmer sows and waters the upland fields and enriches the soil.



[Place name]Farmland name:Farmland or Vinyl house(places)

[Shiki city]i:Farmland(1),Vinyl house(2) t:Farmland(2),Vinyl house(3)

[Fujimi city]a:Farmland(1) h:Farmland(2)

[Miyoshi town]y:Farmland(1) s:Farmland(1) p:Farmland(1) g:Farmland(1) o:Farmland(1) m:Farmland(1)

[Niiza city]k:Farmland(1)

**Figure 10 Farmland distribution of Farmer 6 (2016)**

Source: Participation observation.

**Table 8 Daily schedule and Contents of agricultural work  
by Volubeiters (2015)**

Time	Work content	Place	Work ①～③
～9:00	Meeting at Farmer G's home entrance		
9:00～12:00	Work①	Workplace	Adjustment of spinach, Komatsuna, turnip
12:00～13:00	Lunch Break		Sorting work of green soybeans
13:00～15:00	Work②		Weigh the vegetables and pack it
15:00～15:30	Tea break		Stuffed bags are packed in cardboard
15:30～18:00	Work③		Assembling cardboard
18:00～18:30	Filling out the contents of the activity in the notebook and receiving Labor Fee	Farmland	Helping with sowing and planting
18:30～	Dissolution		Harvesting vegetables, Weeding
			Installation and removal of insecticidal net and arch pipe

Source: Author's Interview and Participation observation.

His eldest son of household is in charge of harvesting and shipping. While deciding what kind of work the volubeiters will be asked to do, the family studies the shipping conditions and weather of each day, tailoring instructions to the conditions. The farmer, his son, and the lead volunteer occasionally communicate using a cellphone. They work flexibly, taking account of the changing situation.

Beginning volubeiters are taught to coordinate their work carefully, (Photo 7) when handling spinach and komatsuna, from other workers, including the volubeiters the farm's Workplace 11<sup>11</sup>). In other words, agricultural beginners learn to pack leafy vegetables and to assemble corrugated cardboard shipping containers. In the field, they store the harvested vegetables in containers and learn how to carry them to the truck carrier (Photo 8). Volubeiters with a few months' to years' agricultural experience weigh vegetables, pack bagged vegetables, and instruct beginning volubeiters. Experienced volubeiters, after harvesting fields, as instructed by Farmer 6, or shipping produce to the supermarket or market stall, return to the workshop and continue shipping vegetables. In other words, skilled volubeiters carry out harvesting and shipping operations alongside the family workforce.

The farmer's wife and daughter-in-law work on processing the crop, together with volubeiters. At other times, they teach the volubeiters how to farm. In addition, they make lunch for the volubeiters.

Farmer 6 began to ship and display his produce directly at a neighboring supermarket, as soon as he launched the business, in February 2011. Near the entrance is a corner dedicated to vegetables, where photographs of Farmer 6's parents are posted. Bags of nursed organic vegetables, marked with the place name, are sold here. The farmer's son ships vegetables every day, building relationships that allow him to communicate directly with consumers.

In the 1960s, farmers put vegetables into truck worked out the prices themselves, and sold vegetables to residential areas around Tokorozawa city. As they could sell large quantities of vegetables in a short period of time, the farmers were keenly aware of the need to



**Photo 7 Adjustment work of Komatsuna**

Note: Prevent drying with newspaper when interrupting work.

Komatsuna harvested is contained in the container on the right, grab a few bundles and drop it on the ground except for weeds and worm-eaten parts and unnecessary parts (yellow part or small part).

Only items that can be commercialized are arranged in the left container.

Urban farmers always carry out this adjustment work, weigh, bag and pack the boxes when shipping soft vegetables.

Adjustment work is mainly focused on farm work of supplementary workers.

(December 2015)



**Photo 8 Harvest of Chinese cabbages by Volubeiters of Farmer 6**

(December 2015)

produce the vegetables and to sell them directly. It can be said that face-to-face agriculture has been practiced since the 1960s.

Since Farmer 6 cultivates produce without using pesticides or soil disinfectant, he finds it frustrating that mass-produced vegetables grown with pesticides bring the same price. In order to cultivate clean, safe vegetables on agricultural land surrounded by houses, the farmers spend time and effort weeding by hand or treating the soil with charcoal. After harvesting, volubeiters help to sort the produce, taking off the extra leaves and roots of the spinach and komatsuna to improve their appearance, and bagging them<sup>12)</sup>.

Farmer 6 also ships produce to the courier<sup>13)</sup> who specializes in organic vegetables. In order to be accepted as an organic producer by this parcel delivery agent, a farm must be recommended by who understand how to cultivate vegetables without pesticides, by taking extra time and trouble<sup>14)</sup>. Procurers are carefully selected because Courier A is committed to delivering safe and clean organic vegetables nationwide. According to Farmer 6, the courier pays a higher unit price for vegetables than retail stores do. After the earthquake in 2011, vegetable sales in Saitama Prefecture were affected by rumors that they were contaminated. The courier inspected them with radiation measuring equipment to confirm their safety. The courier's truck comes to pick up the vegetables directly from Farmer 6 at around 7 pm, as requested by Farmer 6 who prefers to sell his organic vegetables at that price.

The vegetables produced by Farmer 6 are mainly consumed in Saitama Prefecture. However, they are delivered nationwide by Courier A. Customers of the home delivery company learn to recognize the vegetables and prices of Shiki city Farmer 6, which can be a trigger for branding. Farmer 6 has appeared on television programs as the "Master of turnip-growing" and on the front cover of JA Asakano marketing magazine. He is well versed in the technology of advertising vegetables.

### **(3) Farming volunteers employment farmers**

#### **(example of Farmer 7)**

Farmer 7 is the head of household. He is 82 years old and his wife is 81. Their son is 53, and they are all mainly engaged in agriculture. At present, they have 60 to 70 a of cultivated land in the urbanization area. In the spring, they produce spinach, komatsuna, turnips, radishes, cabbage, chinensai, eggplant, zucchini, edamame, maize, tomatoes, and cucumbers are in a plastic greenhouse. In the spring and autumn, they grow carrots, Chinese cabbage, broccoli, and cauliflower. In autumn and winter, they produce yam and a few organic strawberries<sup>15)</sup>. Farmer 7 ships these vegetables to the co-op 6 days a week.

Mr. S. majored in international agriculture at the university and began farming in 1986. After damaging his hand spraying agricultural chemicals, he began aware of the need to grow safe vegetables; he has cultivated organic vegetables since 1988. Mr. S. participated in a study group on organic cultivation, deepening his knowledge of organic cultivation, and establishing his own organic cultivation method, drawing on the knowledge he had acquired in university. Every Friday, Mr. S. delivers produce to ordinary households, nursery schools, and restaurants in the north of Tokyo (Nerima city, Itabashi city, and Toshima city) and the southern part of Saitama-ken (Toda city, Saitama city, and Wako city). His customers send in their orders by e-mail or fax in advance. In 1999, he offered organic vegetables to the midwives in Toda city, gaining customers by word of mouth. Many of his individual home delivery consumers are young people with children, who take a keen interest in eating, and senior citizens who want small amounts of high quality vegetables. He also receives vegetable orders on the Internet from restaurants such as Gotanda and Odawara, and sends their vegetables by courier. In the future, he plans to continue to produce original products using natural and organic farming methods.

Mr. S. is an instructor at a seminar, which has been held, a couple of times a year since around 2006, at the Wako city agricultural park. His method of instruction differs, depending on what the user wants to make

and whether this is his or her first time undertaking agricultural. When the mailing list “Agri-Park” users, Mr. S. provided advice on agricultural methods via e-mail as well as workshops.

He accepted senior workers in 2009–2010, but judged that it was not cost-effective, and did not hire a supplementary labor force. However, in response to requests from Wako city, he has accepted volunteer assistance from 2011. As of 2016, he has accepted two volunteers in their 40s—company employees living in Saitama city (2011–) and a 50-year-old housewife living in Wako city (2014–). They keep in touch with Mr. S. by mail or LINE and visit twice a month (mainly on Saturday). The volunteer work involves weeding, and bagging vegetables and cucumber after harvesting. The volunteers are not paid, but fresh vegetables are offered as rewards.

### **3) Agricultural Experience Farm operated farmers**

#### **(example of Farmer 8)**

Farmer 8 was a vegetable farmer growing mainly radishes and carrots. As urbanization advanced, agricultural land was consolidated, becoming became self-sufficient farms<sup>16)</sup>. After graduating from high school, his successor, Ms. K (50s) attended a Japanese Court vocational school for four years and was a Lecturer at the Public Hall Culture School for 14 years. He currently lectures at vocational colleges and other venues in Tokyo on weekdays, and runs an Agricultural Experience Farm on Saturday and Sunday, where he is the agricultural leader.

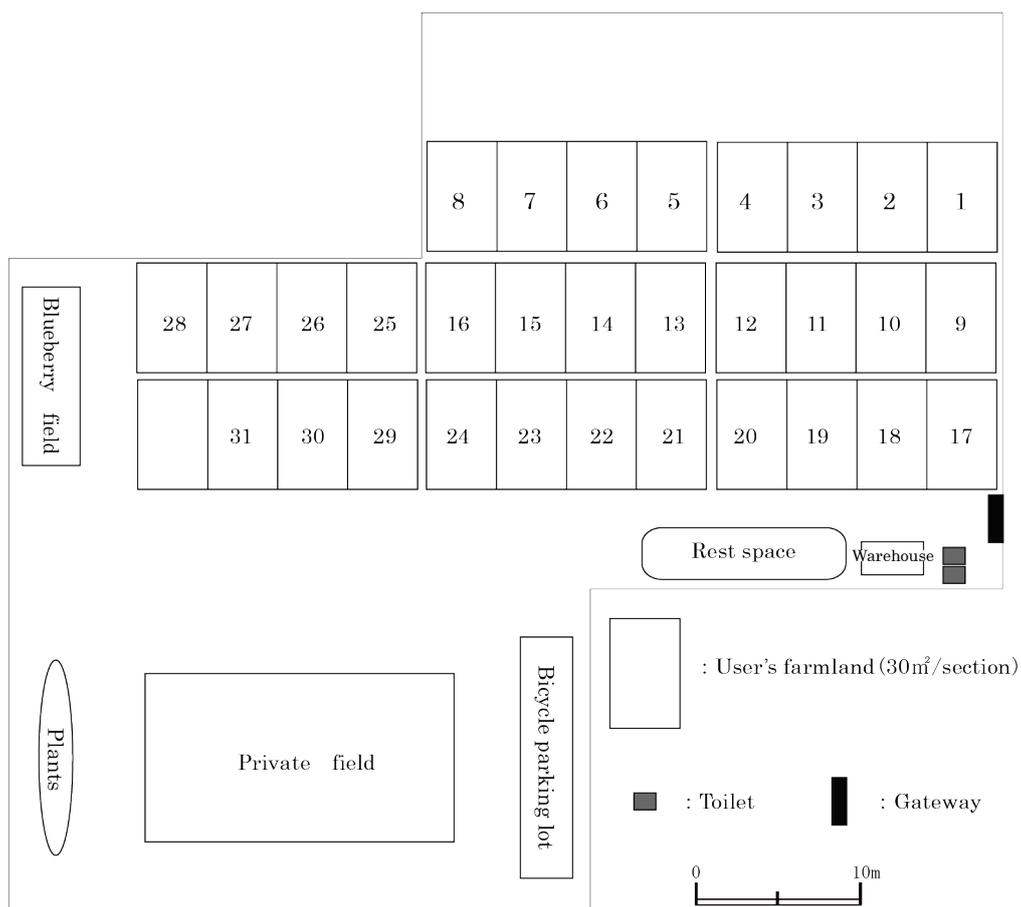
Although she raised vegetables for her own consumption on part of the farm, after Ms. K’s parents died in around 2007, the land was becoming barren. The farmland owned by Farmer 8 is in an area designated for urbanization, crowded around by single-family houses. Ms. K explored ways of using the farm she inherited her parents, without turning it into a residential area or restaurant. Having visited the Agricultural Experience Farm in Nerima city to inspect a neighboring farm, Farmer 8 decided to open an Agricultural Experience Farm. She launched and began to administer the Agricultural Experience Farm in April, 2010

with the cooperation of neighborhood inhabitants (Table 9). There are two leaders—Ms. K's uncle (80s) and Ms. K herself (50s). As an application condition, farm users must have bicycles and be able to travel on foot to the agricultural experience farm. Administration becomes the contact of the participation offer of the agricultural experience farm, and lottery magnification of the agricultural experience farm is approximately 2.5 times. There are 32 divisions in Farmer 8's Agricultural Experience Farm; one division is approximately 30 square meters (Figure 11). The user borrows necessary agricultural machinery from the warehouse after Ms. K explained what the work will be and helps him or her prepare for it<sup>17</sup>). The number of users cultivated on the farm is determined at the beginning of the fiscal year. Because users who have had long careers understand cultivation and work procedures, they are able to advise other users. If Ms. K uses an agricultural beginning to teach a work method and other users complain, she copes with the situation every time.

**Table 9 The process of Farmer 8's Agricultural Experience Farm opening establishment and publicity activities**

year	Event
2007	Visiting Agricultural Experience Farm in Nerima city
2008	Exploring how to utilize Farmer 8's farmland
2009	Preparation of Agricultural Experience Farm
2010	Establishment of Agricultural Experience Farm
2012	Presentation as a representative of Agricultural Experience Farm operated farmers in Saitama Prefecture
2015	Exchange meeting with Kamikawa-town as COC project of nearby University by Farmer 8 and User 4

Source: Author's Interview.



**Figure 11 Arrangement of Farmer 8 in Agricultural Experience Farm in Niiza city**

Note: The Upland Field Number of the user is decided in April.

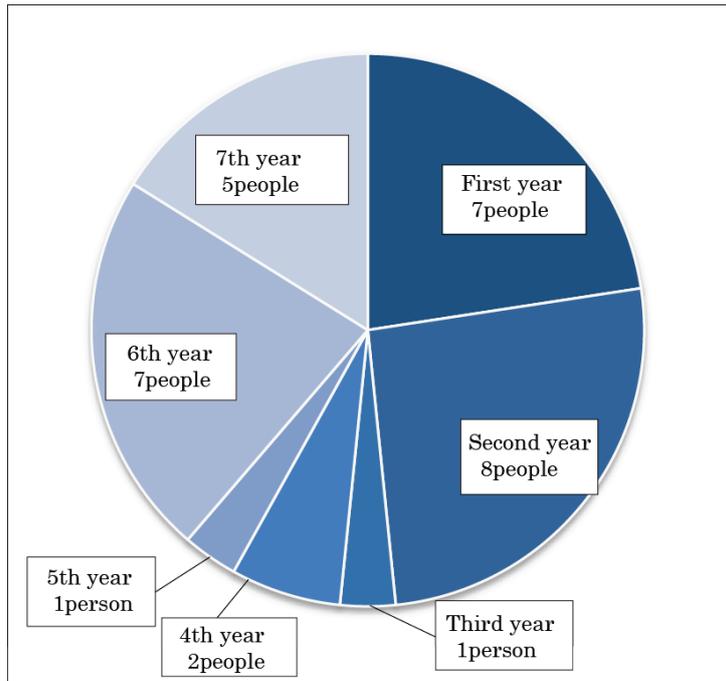
We do not necessarily use the same farmland next year.

From 2016 numbers 25 to 31 are exclusively for agricultural beginners.

Source: Field survey

There are 31 users. Only 7 users joined in 2016 (Figure 12). They complete a funding form only when a user gets a place. Half of the users are men, and the other half are women. Approximately 30% of users are elderly. The people who use Agricultural Experience Farms have a strong interest in agriculture and food. There is a wide age span, ranging from children in the lower grades of elementary school to elderly people in their 80s. Agricultural beginners tend to receive agricultural instruction at agricultural experience farms, while also learning about farming through TV programs and a book about cultivation methods. Both employees and elderly people not involved in agriculture learn methods of cultivating vegetables actively; this is the purpose of agricultural experience farms. Although they approached agriculture in their own way, they could not grow vegetables because they didn't understand practical methods for enriching soil and using pesticides. Users pay 40,000 yen a year to receive training from a farming family in agriculture methods and ways of using an agricultural experience farm. The farm also holds a harvest festival as a networking event for users. They steam potatoes in the spring and cook yakisoba. In the autumn, they cook Kenchin-soup and mix rice in autumn. Users can also pick blueberries on the Agricultural Experience Farm, enhancing their experience.

In the case of Farmer 8, although managing an agricultural experience farm does not make money, it is worth maintaining these farms to use the land effectively and reduce property tax.



**Figure 12 Agricultural Experience Farm user and use career of Farmer 8 (2016)**

Source: Author's Interview.

## **IV Sustainability of Urban Farming from the viewpoint of the workforce**

### **1. The role of urban farmers**

#### **1) The supply of local farm products**

Farmers with a family workforce and those who employ supporting workers ship small quantities of vegetables and other products directly to district market stalls and supermarkets to be exhibited. Sticker with the name of the producer are stuck on the vegetables, so that the urban residents can see that farmers are shipping and displaying their produce directly. In other words, farmers and urban residents build face-to-face relationships. In addition, some farmers set up coin lockers in front of their homes and sell vegetables at unattended agricultural marketplaces. Among the nine farmers who participated in this interview survey, Farmers 5 and 9 carried out unmanned sales.

Other urban farmers, like Farmer 7, take advance orders by e-mail from consumers. The farmers deliver the orders to the homes of urban residents and to city restaurants once a week. Farmer 7 can charge more than the average unit price for vegetables because he adds value through organic farming. Many urban residents care a lot about high quality food. They get their information by word of mouth and purchase vegetables directly from farmers who promote organic farming. This pattern establishes a positive relationship between farmers and consumers. In another consumer trend, families with young children and elderly couples have a strong interest in eating. Housewives with infants are particularly concerned about the quality of vegetables and use Farmer 7's delivery service to ensure to provide safe food.

Farmers who operate tourism farms sell agricultural products in their houses or in tents set up in upland fields. Farmers who manage tourism farms not only produce agricultural products but also sell agricultural products to consumers. In addition, they are able to communicate their specialized knowledge of agriculture in answering a wide variety of

questions. Urban residents ask questions about preserving vegetables and types of vegetables at sightseeing farm. The farmers role involves responding to such customers.

In this situation, the farmer can receive customer feedback very quickly, developing a close, face-to-face relationship with consumers. The appreciation and positive feedback of customers supports the continuation of urban farming. For farmers in South Saitama, the most important consumers are neighborhood inhabitants. It is necessary for farmers to build good relationships with them. Farmers must provide fresh, high quality local agricultural products to local residents, demonstrating that farming is impossible without cooperation and an understanding of the needs of local people, especially in relation to agricultural chemicals, odor, noise, and dust.

## **2) Providing venues for agricultural experiences**

Although the harvest time is limited, farmers who manage tourist farms must often plan harvest experiences involving grapes and strawberries, potatoes, and sweet potatoes. These offer agricultural experiences to urban residents, while supporting the work of local government. For example, Farmer 5 has planned a “parent-child fun and digging event” every September. A maximum number of 30 parent-child pairs can attend, each pair paying 800 yen. The event is publicized by the local government, which also runs a lottery for users. Farmer 5 has enough experience with agricultural crops to be able to respond to a request from an acquaintance at any time. It is important for sightseeing farms to be close to the city (Bowler 1981). A study of blueberry tourism farms in Nerima city (Hanzawa et al. 2010) has pointed out that residents living nearby bring visitors to the farms. At tourism farms in the Tokyo metropolitan area, urban residents can experience specific types of agriculture by participating in harvests at neighboring farms.

Such agricultural experiences continue for approximately ten months at agricultural experience farms. They allow farmers to prepare the materials and equipment they need for agricultural machinery, seeds,

and fertilizers, while teaching agricultural methods to urban residents. A lottery is held by the local government. To regularly visit an agricultural experience farm, a user must pay 40,000 yen a year to the farmer<sup>18)</sup>. Farmers who run agricultural experience farms not only provide agricultural land to urban residents, but also teach urban residents how to cultivate crops, teaching them agricultural methods that will make it easier for the urban residents to continue farming. As the users gain more agricultural experience, they can talk about farming together and deepen their exchanges, obtaining a fulfilling agricultural experience.

In addition, farmers who hire urban residents as supporting workers because they are interested in agriculture provide a place for agricultural experiences. It is difficult for urban residents to experience agriculture casually in the Tokyo metropolitan area. However, in areas in the urban fringe, urban residents with no financial constraints can have an agricultural experience and learn from a farming family by working as volunteers or farming volunteers. The farmer pays a wage of about 4,000 yen per day to volunteers, and gives them surplus vegetables<sup>19)</sup>. Farmers also give surplus produce to volunteers.

Farmers 1 and 3–9 all provide agricultural experiences to urban residents, but the roles of urban farmers and residents can differ, depending on the form of agricultural management used (Table 10). In sightseeing farms and Agricultural Experience Farms, urban residents tend to treat farming as a leisure activity. Farmers who run agricultural experience farms allocate some of their own farmland for the use of urban residents, acting as leaders in the cultivation of farm products. By contrast, farmers 3–7 hire urban residents as supporting workers in order to manage their farms efficiently. Providing a place for urban residents to experience agriculture experiences has become an incentive for sustaining urban farming.

**Table 10 Role of urban farmers and urban residents  
in each farming form**

Farm management style	Urban farmer	Urban resident
Pick-your-own Farm (Farmer1, 3~5)	Producer and Host	Guest
Agricultural Experience Farm (Farmer8~9)	Producer and Leader	Learner
Supporting workers employment farmers (Farmer3~7)	Producer	Supporting worker

### 3) Bringing up new farmers

Farmer 6, who hires volubeiters, is asking urban residents who are agricultural beginners to subsidize a wide range of agricultural work. It may be said that the urban residents receive training in the cultivation, harvesting, and shipping of approximately 20 vegetables. Some urban residents become involved in agriculture and even consider careers in farming as their skills improve. Farmer 6 began employing volubeiters in 2002. From this group of several hundred people, five “new farmers” had emerged by 2016. In other words, after these volubeiters mastered the work of harvesting and shipping, they became or married farmers. In fact, the daughter-in-law of the household head of Farmer 6 is a former volubeiter. Such supporting workers are fairly fluid, but as farmers move toward family labor, they gain a fixed workforce.

It is not easy for a person who has never farmed to borrow farmland, but such borrowing may be enabled through the agricultural experience provided by Farmer 6. Farmer 6 is famous in the southern part of Saitama Prefecture; he has appeared in JA magazines and made TV appearances, ambitiously promoting urban farming. Supporting worker F in Table 11 works on a farm in Tokorozawa city. Along with Farmer 6, supporting worker F ships vegetables to the direct marketing department of a new supermarket which opened in Shiki city in 2014. In addition, after worked for Farmer 6, one woman became a farmer, specializing in organic cultivation in Itoshima city, Fukuoka Prefecture. Another woman married a strawberry farmer in Kuki city, Saitama Prefecture, and men working in Akita Prefecture have become farmers.

**Table 11 Outline of supplementary workers in Farmer 6 (2012)**

Type	No.	Supporting worker's sex and age				Occupation	Frequency	Transportation	Address	Birthplace	Purpose
		-25	26-40	41-60	61+						
I	A		▲			③	①	◆	Saitama Fujimino city	Saitama Fujimino city	①②
	B		▲			③	①	◇■	Tokyo Kita city	Tokyo Kita city	①②
	C	▲				⑤	①	◇■	Saitama Ageo city	Saitama Ageo city	①③
	D		▲			④	②	■	Tokyo Bunkyo city	Tokyo Bunkyo city	④
	E		▲			③	②	■	Tokyo Nerima city	Shizuoka Hamamatsu city	①②
	F		●			④	②	◇	Saitama Shiki city	Saitama Shiki city	③
	G		▲			⑤	①	◇	Saitama Asaka city	Saitama Asaka city	①②
	H		●			①	②	■	Tokyo Bunkyo city	Okayama	①③
	I			▲		③⑤	①	◆	Saitama Asaka city	Fukushima	①②
II	J				●	⑤	③	◇	Saitama Shiki city	Saitama Shiki city	①④

Type: I Volunteer II Senior worker

Sex: ● Male ▲ Female

Occupation: ① Office worker ② Student ③ Housewife ④ Self-employed person ⑤ Others

Frequency: ① 3 days or more a week (Weekday) ② 1-2 days a week (On weekends) ③ Others

Transportation: ■ by Train and on foot ◆ by My car ◇ by bike or on foot

Purpose of agriculture participation: ① Getting wages ② Volunteer ③ Studying agriculture ④ Others

Source: Author's Interview.

## **2. The agricultural participation of urban residents**

Among urban residents are people who choose to participate in agriculture for a variety of reasons (Figure 13). Some do it just to receive a wage but others do it both for pay and as a leisure activity. In the following sections, types of labor motivated by wages are described as part-time work.

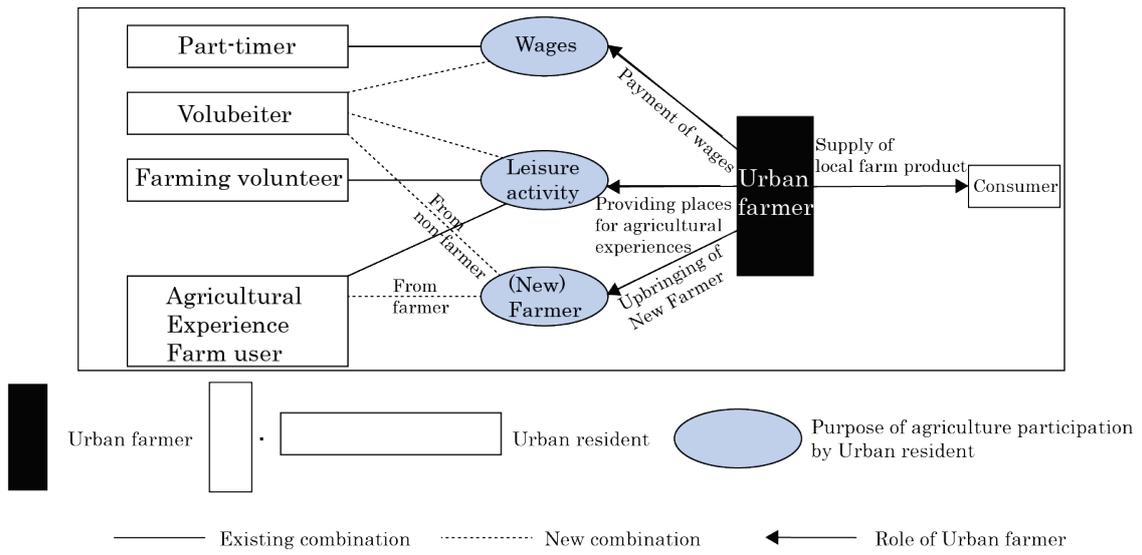
### **1) Flexible part-time**

The first thing to notice in the example of Farmer 6 is he offers employment opportunities to women. Housewives work on weekdays, and employees and students on Saturdays and Sundays. Housewives who engage in agriculture recognize that it offers them flexible part-time jobs, with the freedom to work often at various times of day. Workers engage in agriculture to find refreshment and study agriculture during the holidays. The agricultural labor fee is only about 4,000 yen per day—it is not possible to live independently on such an income. For this reason, women who are volubeiters on Farm 6 fall into one of three groups:

- ① Married women whose husbands have a stable job;
- ② Unmarried woman who work in other occupations on weekdays;
- ③ Unmarried woman living with their parents

while job hunting or working at part-time jobs.

In other words, women who work for Farmer 6 as volubeiters have another source of income. Because Farmer 6 lives the southern part of Saitama Prefecture, his volubeiters come from Tokyo, Kanagawa Prefecture, and Chiba Prefecture, in addition to the surrounding area (Tables 11 and 12). Some women who work as volubeiters take full advantage of the agricultural experience, either by marrying farmers, as mentioned above, or by going on to agricultural training abroad, in places such as Australia. On the other hand, farm work is often abandoned when the weather is very bad weather. Apart from one volubeiter, who has worked as a supporting worker for more than 3 years, and one Silver Award winner (Tables 11 and 12), volubeiters change frequently. In cases



**Figure 13 Purpose of agricultural participation by urban residents.**

**Table 12 Outline of supplementary workers in Farmer 6 (2015)**

Type	No.	Supporting worker's sex and age				Occupation	Frequency	Transportation	Address	Birthplace	Purpose
		-25	26-40	41-60	61-						
I	1	▲				②	②	■	Saitama Wako city	Saitama Wako city	①③
	2	▲				⑤	①	■	Saitama Saitama city	Saitama Saitama city	①②
	3	▲				⑤	②	■	Saitama Misato city	Saitama Misato city	①③
	4	▲				②	①	■	Tokyo Hachioji city	Niigata Niigata city	①②
	5		▲			①	②	■	Kanagawa Sagami city	Chiba Matsudo city	②③
	6		▲			③	①	■	Tokyo	Chiba Yotsukaido city	①
	7		▲			①	②	■	Tokyo Shinjuku city	Tokyo Edogawa city	②
	8		▲			③	②	■	Tokyo Nerima city	Unknown	①②
	9		●			⑤	①	■	Saitama Saitama city	Saitama Saitama city	①③
	10				▲	③④	②	■	Tokyo Setagaya city	Hokkaido	①④
	11	▲				⑤	①	◇	Saitama Tokorozawa city	Saitama Tokorozawa city	①③
	12		▲			①	②	◇	Saitama Saitama city	Unknown	②
	13				●	⑤	①	◇	Tokyo Higashiyamato city	Saitama Saitama city	①③
	14		●			①	②	◆	Saitama Gyoda city	Tokyo Hino city	②
	15				▲	③⑤	①	◆	Saitama Asaka city	Fukushima	①②
	16		▲			③	①	◇	Saitama Fujimi city	Korea (Taegu)	①②
	17		▲			③	①	◇	Saitama Shiki city	China (Shandong)	①②
II	18				●	⑤	③	◆	Saitama Fujimino city	Saitama Asaka city	①④
	19				●	⑤	③	◇	Saitama Shiki city	Saitama Shiki city	①④

Type: I Volunteer II Senior worker

Sex: ● Male ▲ Female

Occupation: ① Office worker ② Student ③ Housewife ④ Self-employed person ⑤ Others

Frequency: ① 3 days or more a week (Weekday) ② 1-2 days a week (On weekends) ③ Others

Transportation: ■ by Train and on foot ◆ by My car ◇ by bike or on foot

Purpose of agriculture participation: ① Getting wages ② Volunteer ③ Studying agriculture ④ Others

Supporting worker I and 15, J and 19 are the same.

Source: Author's Interview.

where the volubeiter lives near the farm or has a very strong interest in agriculture, he or she may continue to work for many years.

Farmer 3 cultivates grapes and employs a full-time neighborhood homemaker as a part-time worker. Because this woman is from Kagawa, and her parents cultivated grapes, she feels nostalgic about her hometown and has chosen to be a part-time worker. Although the southern part of Saitama Prefecture is close to the city center, with a wide selection of occupations to choose from, some urban residents choose to become agricultural workers because they are attached to agriculture. Other reasons include the short working hours, while elementary school children are going to school. As the work period for grape cultivation runs from June to September, they can freely select working days for a limited time.

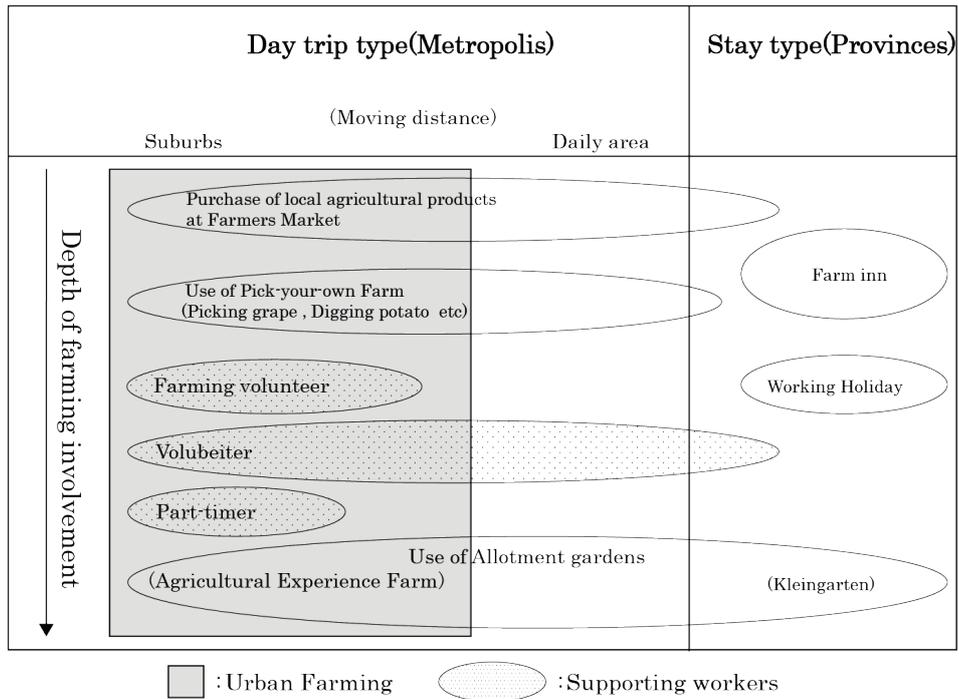
In this way, during the farmers' busy seasons, urban residents choose the dates and times that suit them and work flexibly. Depending on weather conditions and the growth of crops, the experience can feel like a holiday, even when the residents are working.

## **2) Leisure activities**

In the background, whenever urban residents are concerned with agriculture, this influences the growth of rural tourism throughout Japan. Urban residents expect an agricultural experience, not only when at purchasing farm products at market and garden sales (Kikuchi et al. 2016) but also at sightseeing farms (Hayashi 2010). For independent urban residents an allotment can be a form of rural tourism (Higuchi 1999), while an agricultural experience farm (Miyachi 2015) allows them to participate in agriculture (Figure 14). It has been argued that the growth of rural tourism reflects the emergence of urban residents trying to more aggressively engage in agriculture. There are studies focusing on volunteers as a supplementary workforce in urban farming; however, the actual status and conditions of volubeiters have not been explored at all. The following section explains the situation of the volubeiters, who treat agricultural participation as a leisure activity.

Supporting Worker 14 in Table 12 is an office worker in the construction industry on weekdays and participates in agriculture on Saturdays and Sundays. Volubeyters usually work from 9 o'clock, but Supporting Worker 14 joins other volubeyters during his lunch break and engages in agricultural work in the afternoon. He started working for Farmer 6 as a volubeyter in about 2012. He enjoys the contact and interactions between people and nature, and is healthy enough to do agricultural work regularly for Farmer 6. Also, since Farmer 6 particularly appreciates help with heavy work, supporting worker 14 feels challenging. In other words, supporting worker 14 recognizes agriculture as an important leisure activity, not a wage-earning purpose.

One feature of supporting workers who emphasize leisure activities is that they often work as company employees on weekdays and have a stable income (Supporting Workers 7, 12, and 14). They are refreshed by participating in agriculture during their vacations and holidays, and look forward to the interactions with the farmer and other supporting workers. This is why active and sociable supporting workers view agriculture as a leisure activity.



**Figure 14 Relationship between urban residents and agriculture**

Source: Ministry of Agriculture, Forestry and Fisheries HP

### **3) How farmers prepare urban residents for farming**

The agricultural experience farm plays an important role as a place to train people from outside the agricultural community to become farmers. The farmers who run agricultural experience farms and the users who participated in this investigation enjoy managing farms themselves, as far as their time permits. They engage positively in agriculture. These users are thought reflect the actual situation on agricultural experience farms. As shown in Table 13, 4 out of 10 users come from farm families; both User 5 and User 10 will return to their hometowns to farm when they retire.

User 5 comes from a rice cultivation center farm in Tabuse-town, Yamaguchi Prefecture. Although he was involved in agriculture from childhood onwards, he has a rather passive attitude. He currently lives in Niiza city, Saitama Prefecture, and works for publishers related to agricultural cooperatives. User 5's relationship with agriculture came from plowing his family's field twice a year, during his long holidays. User 5 planned to return to his hometown when he retired, to begin farming, but he felt uneasy about being so actively involved in agriculture. Therefore, he decided to engage in agricultural work at a neighboring agricultural experience farm. He enjoys learning about agriculture in a hands-on way because he wants to understand the details, such as which pesticides can be used on onions but not potatoes.

Agricultural employees want to learn techniques that they can practice by themselves, without learning how to cultivate small quantities of many types of vegetable from a neighborhood farming family. Working at an agricultural experience farm allows them to train as farmers, so that when they retire, they can make the transition smoothly.

**Table 13 Outline of Agricultural Experience Farm users  
in Niiza city (2016)**

User number	User	Occupation	Use career of the AEF (year)	Means of knowing AEF	Agriculture experince	Others
1	M3	Civil servant	4	City public relations	×	He does not understand soil making in home garden or allotment garden.
2	M7	Retirement (Former civil setvant)	6	City public relations	○	He is from farmhouse in Uonuma city. His parents cultivated rice and vegetables.
3	M6	Retirement (Former office worker)	6	Introduction of acquaintance	○	It is AEF of short distance from his home. Seedings and farm tools are prepared.
4	F6	Retirement	2	Unknown	○	She is from farmhouse in Niiza city. After retirement, she was farming on my own.
5	M5	Office worker	3	Unknown	○	He is from farmhouse in Tabuse town. After retirement, he will farm.
6	F4	Dietitian	7	City public relations	×	Her hobby is farming. Using harvested vegetables,she gives them her recipes.
7	F3	Office worker	4	City public relations	×	She is from Sendai city. She graduated from Tokyo University of Agriculture.
8	F6	Housewife	4	City public relations	○	She used other AEF from 3 years. She changes to short distance AEF.
9	M6	Retirement (Former civil setvant)	4	City public relations	○	He uses both AEF and allotment garden.
10	M6	Retirement (Former office worker)	4	City public relations	○	He is from farmhouse in Sano city. He will farm. His parents cultivate strawberries.

Note: AEF means Agricultural Experience Farm.

Source: Author's Interview.

### **3. Sustainability of urban farming from the viewpoint of the workforce**

Family workforce-limited farmers strive to maintain their current conditions of both cultivated land and agricultural labor. However, these farmers have a lot of work to do, cultivating and shipping crops to meet the demands of recipients. Moreover, if they add new people to their labor force, they will have to teach them cultivation and harvesting methods, which they believe will take considerable time and effort. This is why they tend to stick to the scale of agriculture and types of crops they can manage with a family workforce. In addition, they are unlikely to need ancillary workers, as family farmers are more willing to move away from farming into real estate management. About 90% of the farms in this study area were family workforce-limited farms. In other words, family workforce-limited farmers may differentiate in supporting workers employment farmers and Agricultural Experience Farm operated farmers when a successor appears. Because the Basic Law for Urban Farming Promotion was enforced in 2015, the importance of the urban farming will continue to increase in future. It will be necessary to watch the trends in family farming closely, when considering the sustainability of urban farming.

At the same time, farmers who employ supporting workers aim to increase the area of cultivated land and to market agriculture aggressively in future. Demand for labor has increased, due to the diversification of shipping destinations. Many people must work on agricultural land to expand the scale of management, marketing direct shipments to supermarkets and direct sales offices. This is why farmers are training nearby urban residents to become an agricultural workforce. Because urban areas are dotted with farmland, it is more efficient to engage dispersed workers, enabling them to work on farms. Particularly for the cultivation of leafy vegetables, it is a real advantage to be able to make use of city suburbs. For difficult crops, it is valuable to introduce a crop machine and sorter. Sometimes, many hands are necessary to process a crop.

When a farmer employs a part-time worker, it is a precondition that

the farmland becomes either a designated agricultural plot or a controlled urbanization zone and receives a tax payment postponement. Neighborhood inhabitants and people who are trusted because of their birth and parentage are employed as part-time workers, part of a fixed workforce assembled by word of mouth. When these farmers need to sell products directly and ship farm products safely, they hire part-time workers from a network based on shared territorial bonding: blood relatives. In other words, it is difficult for new urban residents to become part-time agricultural workers.

Secondly, it is important for farmers to hire volubeiters in the Tokyo metropolitan area through private human resources-related companies. This structure allows urban residents with a strong interest in agriculture to connect with farmers who need assistance on a wide variety of farming tasks. New urban residents can begin to work as volubeiters whenever a farm recruits field hands through a private enterprise, even though volubeiters are flow-like workforce. Also, when a lot of labor is needed at one time, the farmer may contact the volubeiters who worked in the past and request work and complement the labor force.

In Hino city and Machida city, the sustainability of urban farming can be assessed through the role played by farming volunteers in supplementing the farming workforce (Funato 2013). However, the present study has shown that Farmer 7 hired farming volunteers at the request of the administration. Volunteers who gave interviews as a part of this survey felt that farmers preferred to manage their agricultural operations without employing agricultural workers. However, to build a good relationship with the administration, farmers hire urban residents who are interested in agriculture, on the understanding that they will not have to pay any transportation or labor costs. This suggests that urban residents are increasingly placing demands on agriculture. Interested urban residents investigate public information, fill in activity frequency forms, and hope that the administration will introduce them to farmers who will accept their application forms.

The farmers can strengthen their farms through the interchange with city inhabitants, while city inhabitants become involved in shipments, previous business, and post-harvest light work. Urban residents access an out-of-the ordinary experience by becoming involved in agriculture. The farmers determine which agricultural work to focus on, and which auxiliary worker to hire. As mentioned above, although it is possible to hire part-time workers in the green production and urbanization adjustment areas, in the case of urbanization area, it is difficult to pay labor costs while living by agricultural management alone only. As stated in Chapter II, urbanization areas have a fixed asset tax, similar to that in residential areas; they are not covered by the inheritance tax payment suspension system. Some farmers therefore continue to sustain urban farming by hiring volubeiters and farming volunteers with a strong interest in agriculture.

Farmers who operate agricultural experience farms can teach urban residents by offering farmland and teaching cultivation methods to maintain city farmland. As a result of this survey, it is clear that agricultural experience farm users have done more than just extend their interest in gardening, food, and agriculture. Some are from farming families and planning to return to farming when they retire. The interactions between farmers who manage agricultural experience farms and users are multi-faceted, during Saturday and Sunday classes; for some users, the chance to participate in agriculture is a pleasure, as well as work. Compared to a conventional allotment, agricultural experience farms have high usage costs and high competition rates. As farmers also interact with urban residents, their motivation to support agriculture is improving. In Nerima city, users of the agricultural experience farm have a variety of main occupations and past experience; their abilities are cultivated by working on the agricultural experience farm. agricultural experience farm users have pointed out that new communities will be formed in the area as the exchange between farmers (leaders) and other users becomes deeper (Miyachi 2006; 2015). Although the agricultural land attributes of agricultural experience farms in Nerima city are green

production spaces, the agricultural experience farms explored in this research are located in urbanization and urbanization control areas, so the tax system is different. For this reason, it is difficult for farmers to manage with a small family workforce. Introducing an agricultural experience farm reduces the farmland management burden, as every user does some crop work. In Tachikawa city, several agricultural experience farm users subsequently became farming volunteers (Kikuchi et al. 2016). Therefore, even in Niiza city, agricultural experience farm users may change and provide similar levels of support.

Urban farmers hire urban residents to assist them in harvesting and shipping small quantities of many different types of vegetables, including leafy vegetables. In addition, other urban farmers consider urban residents to be a type of workforce. In particular, those running agricultural experience farms engage local people in helping to maintain city farmland. For their part, urban residents have many different reasons for engaging with urban farming. Urban farming in South Saitama is sustained through the continuing agricultural participation of urban residents. Farm work provides residents them with a valuable experience while securing a workforce for city farms.

## V Conclusion

Urban farming exhibits unique properties, exemplified by the residential land in the metropolis rim area. Thus, for this study, I analyzed the characteristics of urban farming in South Saitama and the management form of each farmhouse. Specifically, I focused on the management form of each farmhouse and the changes that occurred with the farming strategies, the agriculture workforce, and the induction of the supporting worker, paying close attention to the conditions necessary for the continuation of the contingent farming styles. The results are summarized in following four points.

① For the agricultural houses in the Tokyo metropolis, managed cultivated areas largely decreased from the postwar period until 2015. Reasons include detrimental laws and policies about managing urban farming farmland and workforce, associating the receiver-of-goods with the progress of the urbanization and the changing crops. The family workforce did the farming for the main constituents, whereas the ratio of full-time farmers was high for the traditional agriculture period (~1960's). It was important to rotate soft vegetables and harvesting times to manage labor, to strategically provide said crops to the market, to supplement the work force when appropriate. In the 1960s, urbanization continued rapidly throughout the country due to high economic recovery, leading to the establishment of the Urban Planning Law in 1968. Thus, agriculture in the suburbs of the city became complicated and diversified. The proportion of farmers with a side job increased remarkably from the 1970s to the 1990s. Simultaneously, the proportion of mom-and-pop farmhouse operations grew. Changing the management form to farming for maximize cultivation of many items small-quantity vegetables, including delicacy vegetables, while intensively using narrow family farmland, raising high profit. Organic vegetables cultivation and new approaches, such as direct sale, became popular. The demand for

allotment increased during the 2000s, and urban residents began viewing agriculture positively. Basic Law for Urban Farming Promotion was enforced in April, 2015, and maintenance of the city farmland came into demand.

② Family workforce farmers in South Saitama work on a status quo scale. This type of farmer is reluctant to go into agricultural management, because the head of household was forced to farm suddenly, because of family circumstances and tax problems. Yet, farms are similar, as are their labor and agricultural management policies. With farm cooperation, agriculture continues. Family workforce-limited farmers wish to focus on real-estate management in the future, but due to the emergence of successors, it may be possible to hire a labor force or to open agricultural experience farms. To consider the sustainability of urban farming, it is necessary to keep an eye on this type of farmer for the future. Supporting-worker employment provides agriculture with energetic diversification and scale expansion. The city farmhouse employs urban residents part-time based on a network of shared territorial bonding and blood relatives to ship farm products stably. Part-timers typically work in an urbanization adjustment area or production green space. Because of the tax system, personnel expenses can be deducted. In the case of part-time employment farmers, successors between ages 20 and 30 are grasping the benefits of consumers via garden-selling, crop adjustments, variety gardening, and new shipping destinations. The private enterprise firm, Volubeiters, recruits urban residents in South Kanto for employment. They send labor to farmhouses where they cultivate organic vegetables in small quantities for many receivers. Many farms need this kind of labor for weeding and cultivation of organic vegetables, and to perform careful shipments. Because farmers ask Volubeiters for this work, the farming family can make money. With the Volubeiters employment firm, an interchange with urban residents having a strong interest in agriculture is enabled, and those urban residents partake in a wide array of farming. Urban residents can often find work by

responding to offers on the Web. However, Volubeiters provide a fluid workforce. Additionally, during the busy season, farmers contact Volubeiters directly, attracting eager labor. Citizens can also volunteer by following instructions on their administrative homepage. Volunteers supply information about their activity frequency and work preferences, and the administration matches them with a farmhouse in need of temporary inhabitants. The farming volunteer then accepts harvested vegetables for their assistance, which includes weeding and tidying after harvest. Farmers also offer private home delivery and can freely set the price of seasonal organic vegetables. Some self-support farmers run an Agricultural Experience Farm to effectively utilize unused farmland. Urban residents pay a fee to receive agricultural education from a neighborhood farmer, using the Agricultural Experience Farm. Like a conventional allotment, retired people and families with children use Agricultural Experience Farm as private-use plots. Agricultural Experience Farms also serve as a place to prepare rural farmers and non-agricultural workers for post-retirement. In the Agricultural Experience Farm, the interchange between users is planned through the periodical enforcement of an interchange event. These farmers adjust to change effectively and benefit tax-wise from running the Agricultural Experience Farm.

③ Major consumers of agricultural products in the southern part of Saitama Prefecture are the neighboring residents. Thus, it is important for farmers to establish good relations with them. By providing fresh, high-quality local agricultural products to neighboring residents, farmers can mitigate issues, such as dust caused by farming, by educating and relaxing the neighboring residents. Alternatively, at pick-your-own farms, a farmer gives urban residents a chance to harvest fruit trees. At the Agricultural Experience Farm, urban residents work for a certain period, gaining agriculture experience. In the former case, urban farmers are hosts and urban residents become guests. In the latter case, urban farmers become agricultural leaders and urban residents become

learners. Although farmers provide a place for agricultural experiences to urban residents, long-term relationships between urban residents and urban farmers is uncommon. In study areas in the urban fringe, farmers hire urban residents who are interested in agriculture as support workers, affordable in terms of time and money. Thus, urban residents gain agricultural experience. Thus, some of these urban agricultural beginners may become farmers as agricultural technology improves. Urban farmers also play a role of fostering other urban residents to become farmers, or even to marry a farmer after a beneficial agricultural experience. Urban residents participate in agriculture with a variety of purposes. First, supporting workers who live within the Tokyo metropolitan area, having an extant life base, become engaged in agriculture as flexible part-time workers so that they can freely select working days and times. Additionally, urban residents recognize this opportunity as an important leisure activity. Supporting workers who place emphasis on leisure activities tend to enjoy a stable occupation and are characterized by enjoying refreshing nature immersion on holidays. They also tend to interact with farmers and other supporting workers. Alternatively, they use Agricultural Experience Farms as a place of preparation for farming after the retirement. People tend to be concerned with agriculture passively during childhood, but become engaged in agriculture actively at the neighborhood Agricultural Experience Farms. They learn cultivation methods of small-quantity vegetables from a neighborhood farmer on duty at an Agricultural Experience Farm.

④ Family workforce-limited farmers in the study area consider urban residents to be simple consumers. On the other hand, the supporting workers farm mainly the soft vegetables for personal use in the city and suburbs. Crop machines and sorters have difficulty with soft vegetables. Thus, many hands are necessary. Therefore, farmers induct urban residents as a temporary agricultural workforce. Farmers deepen interaction between urban farmers and urban residents as they do light work, such as pre-shipment and post-harvest cleaning. Whenever a city

resident has hands-on experience with agriculture, they tend to have extraordinary experiences. In other words, urban farmers connect urban residents to their strong interest in agriculture to help sustain urban farming. Agricultural Experience Farms provide farmland to urban residents for maintenance and initiate them on cultivation methods. Agricultural Experience Farm users are not only are concerned about gardening and food, but also become interested in farming after retirement. Agricultural Experience Farms are busy on Saturdays and Sundays, because of the population that participates in agriculture for pleasure. The Agricultural Experience Farm has higher use costs than a conventional allotment, and the competition is high. Yet, they inspire a special feeling for urban residents. Via interchange with urban residents, the Agricultural Experience Farm improves the general motivation for agriculture.

In other words, urban farmers are interested in agriculture, and hiring urban residents with a basic infrastructure as supporting workers leads to more efficient harvesting and shipping operations of multi-item small-volume vegetables. Additionally, some farmers manage Agricultural Experience Farms, identify urban residents as an important workforce, and they help conserve urban farmland. Meanwhile, urban residents become engaged in urban farming as a tourism element for the purpose of obtaining labor wages, leisure activities, and preparation for farming. Urban farming is sustained in the southern part of Saitama Prefecture due to the necessity of ensuring the labor of urban farmers and the willingness of urban residents to participate in agriculture.

## Acknowledgements

I can write this dissertation on “Sustainability of Urban Farming”, thanks to Yudai Fujisaki(Shiki-city government office civic life region industrial tourism section), Tomomi Kinoshita(Niiza-city government office economy sightseeing region economy promotion section), Tatsuya Sugano(Wako-city government office citizen environment region industry support section), Eigo Shimizu(JA Asakano field instruction Economic Department economy section), Kazushi Yamamoto and Tetsuya Yamamoto(Sanka network), farmers in South Saitama etc, who cooperated and taught me.

Prof. Masaaki Kureha (University of Tsukuba, Graduate School of Life and Environmental Sciences) gives painstaking instruction to me on making this dissertation; thank you very much. Dr. Jun Tsutsumi, Dr. Akio Yamashita and Dr. Takehiro Morimoto served as assistant to the doctoral dissertation review and gave me a lot of guidance. In addition, I received valuable advice from graduate students.

I am deeply grateful to preceding all.

## Notes

- 1) Chichibu is Chichibu-city, Ogano-town, Yokoze-town, Minano-town, Nagatoro-town, Higashichichibu-village, and Boso is Kamogawa-city, Tateyama-city, Kyonan-town, Minamiboso-city.
- 2) The concept of "City area agriculture" was used with "urban Urban Farming" (Inui 1985).
- 3) It was mediated in area designated for urbanization (the area where city should plan becoming it with precedence and premeditatedly within about ten years) and the controlled urbanization zone (city doing a review in a district holding becoming it in check city every five years a spare area of making it it), and residential land was strong in conversion to becoming it, and the former farmland was required early by a city planning enactment. It was assigned to taxation on farmland equivalent to that on housing land in 1970 without being considered to be farmland even if the farmland in the area designated for urbanization was cultivated, and farmland conversion changed from conversion permission by the Agricultural Land Law into a report system.
- 4) Farmers Markets are held in Shiki city, "Saturday Market of Shiki " once a month, "Agri-ship-Shiki" on weekdays in July and December, in Ninza city every week Wednesday in August to September direct sales of grapes, in Asaka city 1 in the morning market of the times once a month, in Wako city, Thursday city once a month.
- 5) When the farmers ship it to the direct sale place, the farmers pay 17% of sales as a fee. The sales of the consumers' cooperative and sales of the direct sale place are almost the same amount.
- 6) By the opinion of Farmer 2, the consumers of the direct sale place purchase vegetables of around 500 yen, and there is the most number of the visitors Saturday.
- 7) Because unit price is low, and it costs box charges for the shipment in the case of market shipment, only several farmhouses in Wako-city ship a market.
- 8)As of 2016, four strawberry farmhouses are in Wako-city, but two

strawberry farmhouses of those run the pick-your-own farm.

- 9) Mr. t's working hours are from 7:30 to 16:00, and workers other than t are from 7:30 to 14:00. Four people work six days a week, and regular holiday is every Monday.
- 10) Because the farmhouse of South Saitama did not have collection of cargo ground of the agricultural cooperative, market shipment became mainstream.
- 11) The place that serves as a warehouse, and works on sorting, and performs work such as bagging or the boxing
- 12) In vegetables farmhouse of South Saitama, it is common that a workshop is established in the home that the JA Asakano does not have collection of cargo ground and ships it to a market and the retail store.
- 13) There are meeting protecting the earth to the delivery to home supplier who is specialized in organic vegetables, radish boud shop, Oisix ,Inc.
- 14) By the recommendation of the acquaintance (farmhouse) of Saitama-city, I became able to ship farmhouse 6 to supplier. The system is such that I cannot join the producer group of delivery to home supplier a when it is not a recommendation by others.
- 15) The farm of the strawberry is in front of home, but, as of 2016, is readjusting the division of land.
- 16) Farmers in the vicinity of the farmer 8 are managing real estate such as detached houses and apartments and tend to be regarded as self-sufficiency farmers.
- 17) They started an agriculture experience farm on April 3 in 2016. Preparations were carried out only in applicants the day before (April 2). There were 11 bicycles in the bicycle parking lot at the time of the investigation, and around 15 people worked on the cause of the instructions of the leader on the day.
- 18) Each user can take the vegetables which they cultivated by oneself at an agriculture experience farm to go freely. According to the agriculture experience farm user, they can harvest approximately 20 items of vegetables surely in one year, and it is said that it was not

necessary to purchase vegetables at a retail store.

19) Because they exceeded the number of the shipment of the standard foreign merchant product or sale with the surplus product, they point to the farm products which remained.

## References

- Arai, Y. 1993. Multi-Purpose Land Utilization of Fruit-Growing Farmers in Tanaka Area, Isehara City, and the New Urban Planning Act. *Geographical Review of Japan* 66A:217-234. (JE)
- Birukawa, S., Yamamoto, S., Sasaki, H., Kinto, Y., Asano, Y., Takahashi, N. and Saito, I. 1967. Ecology of Inner-Suburban Agriculture in a Metropolitan Region – the case of Koganei-shi in a western suburb of Tokyo –. *Journal of Geography* 76(5):13-40. (J)
- Bowler, I.R. 1981. Self-service down on the farm. *Geography* 66(2):147-150. (E)
- Bryant, C.R. 1982. *The Rural Real Estate Market: An Analysis of Geographic Patterns of Structure and Change within an Urban Fringe Environment*. Department of Geography, University of Waterloo, Publication 18. (E)
- Bryant, C.R. and Johnston, T.R.R. 1992. *Agriculture in the city's countryside*. Belhaven Press. (E)
- Butler, R. 1998. Rural recreation and tourism. 211-232. (In *The geography of rural change*, ed. B. Ilbery, Harlow: Longman. ) (E)
- Ebato, A. 1972. Alteration of farming village near mega-city - Case of Kasuya-cho, Setagaya-ku, Tokyo -. (Nishikawa, D. Noguchi, Y. Okuda, Y. edited *Japan Islands Rural Fishing Village That Reality*.) Keisoshobo. (J)
- Fukase, K. 2013. Urban agriculture and volunteer assistance in Tokyo. *New Geography* 60(7):82-88. (J)
- Fukase, K. 2015. Farmer volunteers as a new player in urban agriculture. *Geography* 60(7):42-49. (J)
- Funato, S. 2013. Sustainability of Urban Agriculture by "Farm Volunteers" - Case Study of Hino City and Machida City -. *Sustainability research* 3: 75-83. (J)
- Goto, M. 2003. Citizen use of urban farmland Exploring "agriculture" of maturing society. Japan Economic Review Company. (J)
- Halfacree, K. 1995. Talking about rurality : Social representation of the rural as expressed by residents of six English parishes. *Journal of*

- Rural Studies 11:1-20. (E)
- Hanzawa,S., Sugiura,Y. and Harayama,M. 2010. Development of blueberry picking gardens as a tourist farm in Nerima Ward, Tokyo. Tourism Science Research 3: 155-168. (J)
- Hayashi,T. 2010. Regional Characteristics of Pick-your-own Farm Management Viewed from the Entrance Fee. Tourism Science Research 3:143-154. (J)
- Hayashi,T. 2013. Farmers' Adaptation Strategies to Changes in Agri-tourism in the Nishino Area, Minami-Alps City, Yamanashi Prefecture. Journal of Geography 122(3):418-437. (JE)
- Higuchi,M. 1999. Analysis of the Present Condition of an Allotment Garden in Japan : A Case Study of the Minuma Fureai Garden in Kawaguchi City. Japanese Journal of Human Geography 51(3):75-88. (JE)
- Ikeda,M. and Nagayama,I. and Oishi,T. 2013. The Development of Urban-Rural Exchange in Iida City : A Case Study of the Working Holiday Program. Annals of Human and Regional Geography 35:121-145. (J)
- Ilbery,B.W. 1985. Agricultural geography. Oxford : Oxford University Press. (E)
- Ilbery,B.W., Holloway,L. and Arber,R. 1999. The geography of Organic farming in England and Wales in the 1990's. Tijdschrift voor Economische en Sociale Geografie 90:285-295. (E)
- Inui,T. 1985. An Aspect of the Open-Air Cultivation of vegetables in Urbanized Agricultural Region : A Case Study of Higashikurume-City in the Western Suburbs of Tokyo. New Geography 33(2):11-27. (J)
- Inui,T. 1992. Plain forest in Kanto plain. Kokonshoin. (J)
- Inui,T. 1993. People and green culture magazine. Miyoshi town School Board of Education. (J)
- Ito,T. 1993. Regional Characteristics of Garnish Cultivation in Toyohashi City, Aichi Prefecture. Geographical Review of Japan 66A 303-326. (JE)
- Kasama,S. 1980. Farmer's transformation in urban agricultural area - case study in Higashiyodogawa Ward, Osaka city -. Japanese Journal of Human Geography 32(4):79-91. (J)

- Kikuchi,T. 2002. Agricultural land use change and its sustainable character in rural areas around the urban area of Sydney - Case study of Castleray District, Penrith City. *Journal of Geography* 111:81-99. (JE)
- Kikuchi,T. 2008. Development and possibilities of rural tourism research in geography. *Geographical Space*1:32-51. (J)
- Kikuchi,T. 2012. Food system of organic vegetables and its possibilities for its food tourism – Challenge of rural reorganization in the suburbs of Tokyo metropolis. *Bulletin of Rikkyo University School of Tourism* 14:43-60. (J)
- Kikuchi,T. and TABAYASHI,A. 2016. Development Mechanism of Urban Farming with the Commodification of Rural Space in the Urban Fringe of Tokyo Metropolis : Case Study of the Sunagawa Area, Tachikawa City.*E-journal GEO* 11(2):460-475. (J)
- Kobayashi,K. 1979. Aspects of Suburban Agriculture and Research Subjects. *Japanese Journal of Human Geography* 31(4):51-66. (JE)
- Kodama,E. 2017. The Responses to and Challenges for the Branding in the Fukaya Green Onion Production Area. *Geographical Review of Japan* 90(3):241-256. (JE)
- Miyachi,T., Morozumi,M. and Mizusima,K. 2003. The significance of development of organic vegetable production in Kodaira city, Tokyo - New development of agricultural management under revised production green space system -. *Nihon University College of Letters Faculty of Natural Sciences "Research bulletin"* 38: 35-54. (J)
- Miyachi,T. 2006. Dynamics of Urban Agriculture under the Revised Production Green Area – Case Study of Tokyo -. *Geographical report* 103:1-16. (J)
- Miyachi,T. 2015. The social role of agricultural experience farms in Nerima Ward, Tokyo – The fetal movement of urban agriculture creating the value of the community -. *Geography* 60 (7): 24-33. (J)
- Miyachi,T., Kikuchi,T. and Yamamoto,M. 2015. Commodification of Rurality in the agriculture experience farm of Nerima-ku, Tokyo. (TABAYASHI,A(editor)).*Commodification of the farm village space as*

- the local promotion.) Agriculture and Forestry Statistics Publishing Inc. (J)
- Miyata, Y. 2001. What measures are needed to prevent urban agriculture from being interrupted. 1999-2000 Ritsumeikan University Faculty of Economics Yamai seminar report 1-8. (J)
- Morozumi, M. 2000. Existence form of the dwarf tree production corporation in Fukaya City, Saitama. Geographical journal 41(1・2):44-59. (J)
- Nagai, N. and Hoshi, M. 2007. Development of Umesato Kleingarten in Kai City, Yamanashi Prefecture. Annals of Human and Regional Geography 29:99-110. (J)
- Nagashima, H. 1972. Non-Agricultural Land Use by Farmers in Sôka City. Japanese Journal of Human Geography 24:38-58. (JE)
- Nakazawa, T. 2014. Economic geography of labour. Nihon Keizai Hyouronsha. (J)
- Namai, S., Harada, T., Matsuzawa, T and Yamazaki, K. 1986. Conservation of Agricultural land use in Metropolitan YOKOHAMA. Geographical Review of Japan 60A:301-322. (JE)
- Namai, S., Harada, T., Matsuzawa, T and Yamazaki, K. 1991. The Development of Vegetable Farming in Miura City, a Suburb of Tokyo. Geographical Review of Japan 64A(7):472-492. (JE)
- Niiza Economic Promotion Section. 2014. Agricultural Experience Farm <http://www.city.niiza.lg.jp/site/nougyoutaiken/nougyoutaikennouen.html> (last accessed 6 December 2017) (J)
- Noguchi, K. 2013. Difficulties with Entry into Farming : Focusing on the Discrepancy in “Views on Farming” of Agricultural Corporations and New Farmers. Rural community research 19(2):14-24. (J)
- Ministry of Agriculture, Forestry and Fisheries Ministry of Agriculture. 2015. An overview of the Basic Act on Urban Agriculture Promotion. [http://www.maff.go.jp/j/nousin/kouryu/tosi\\_nougyo/pdf/kihon\\_hou\\_aramasi\\_3.pdf](http://www.maff.go.jp/j/nousin/kouryu/tosi_nougyo/pdf/kihon_hou_aramasi_3.pdf) (last accessed 6 December 2017) (J)
- Ministry of Agriculture, Forestry and Fisheries Ministry of Agriculture.

2016. Green tourism.  
[http://www.maff.go.jp/j/nousin/kouryu/kyose\\_tairyu/k\\_gt/index.html](http://www.maff.go.jp/j/nousin/kouryu/kyose_tairyu/k_gt/index.html)  
 (last accessed 6 December 2017) (J)
- Oba,R. 1999. Future tasks of improvement of citizen farms in cities where Production Green Law is applied. Urban planning paper collection 34:133-138. (J)
- Obara,N. 2004. Development of Full-time Farms and Their Sustainability in the Takabatake Area, Saitama City, in the Urban Fringe of the Tokyo Metropolitan Area. Geographical Review of Japan 77-8:563-586. (JE)
- Omori,Y. 2001. Regional expansion of agricultural labor force replenishment in apple cultivation area - Case study of Matsumoto-shi Imai. Regional research report 23:57-64. (J)
- Ono,A., Matsuzawa,R. and Motoki,K. 2016. Urban agriculture essential guide citizen farming · new farming · entering enterprises to create a city with agriculture. Agriculture mountain fishing village culture association. (J)
- Saito,I., Sasaki,M. and Omori,Y. 2001. Propagation and contract cultivation of tuna vegetables to the southern part of Ibaraki prefecture - transition phenomenon of suburban agriculture -. Human geography research 15:101-123. (J)
- Sakamoto,H. 1992. Vegetable Production by Women and Elderly Men in the Seba District, Shiojiri City. Geographical Review of Japan 65:603-618. (JE)
- Sakamoto,H. 1993. Possibility of vegetable origin by conglomerate farmers, elderly people and ladies. Bulletin of Nara University 21:107-117. (J)
- Sakamoto,H. 1995. Vegetable Growers and Labor Management in Kitanocho, Fukuoka Prefecture, Japan. Japanese Journal of Human Geography 47:23-41. (JE)
- Sasaki,H. 1969. Alteration of Agriculture in Jiangbei District - From Suburban Agriculture to Urban Agriculture -. Rissho University Humanities Institute Annual Report 7:67-77. (J)
- Sawada,H. 1995. Regional change of agricultural production in the Kanto

- region during the period of high economic growth. *Rissho University Humanities Institute Annual Report* 7:63-83. (J)
- Simpō,N. and Saito,K. 2015. A study on the change of ‘urban gardening’ for planners and users. *Landscape study* 78(5):629-634. (J)
- Sone,Y. 2014. Conservation of urban farmland through improvement and improvement of citizen farm. Master 's thesis from the Policy Research Graduate School of Policy Research, 2013 1-42. (J)
- Stefano,O. 2013. Landscape polarization, hobby farmers and a valuable hill in Tuscany:understanding landscape dynamics in a peri-urban context. *Geografisk Tidsskrift-Danish Journal of Geography* 113:53-64. (E)
- Takatori,Y. 2000. The Multi-Functional system of Urban Agriculture in the Suburbs of Tokyo : A Case Study in the Nishi-Ooizumi Area of Nerima Ward, Tokyo. *Journal of Geography* 109(3):401-417. (JE)
- Tanaka,K. 1982. Changes in landownership and land use of former farms in Nakano-ku and Musashino-shi, Tokyo. *Geographical Review of Japan* 55(7):453-471. (JE)
- Tashiro,Y. 2016. Exploring the case of the sustainable system 48 of regional agriculture Generation inheritance. Agriculture mountain fishing village culture association. (J)
- Thomas,L. 2012. Civic Agriculture Reconnecting Farm, Food, Community. Agriculture and forestry publication. (E)
- Tsutaya,E. 2009. National design to protect urban agriculture and Japanese agriculture. Ie-No-Hikari Association. (J)
- Yagi,H. and Murakami,M. 2003. A Study for Clarifying the Effect of Farm Volunteers to the Urban Farm — Case Study of a Multi-Cropping Farm —. *Farming study* 41(1):100-103. (J)
- Yagi,H., Murakami,M., Aizaki,H. and Fukuyo,N. 2005. Management Strategy of Farm Volunteers on Peer Tree Farms in Urban Ares. *Farming study* 43(1):116-119. (J)
- Yagi,H. 2008. Business analysis of the experience-based farm in the city farmland— Targeting at examples in Tokyo—. *Farming study* 45(4):109-118. (J)

- Yamaga,S. 1960. Urbanization in the Suburban Areas of Large Cities — Case of the Western Suburb of Tokyo—. *Journal of Geography* 719:1-13. (JE)
- Yamamoto,S., Kitabayashi,Y. and Tabayashi,A. 1987. Farm village space of Japan—Local structure of the Japanese farm village undergoing a complete change—. *Kokonshoin*. (J)
- Yamamoto,S., Yamamoto,M., Morimoto,T., Kureha,M. and Ito,T. 1990. Movement of the vegetables production center in the sector in northern metropolitan area. *Local survey* 12:1-46. (J)
- Yokohari,M. and Shimpo,N. 2013. New age of the agriculture of the city —to think about the way of the agriculture open to the city—. *Land general study* 21(3):1-7. (J)

(J): written in Japanese

(JE): written in Japanese with English abstract

(E): written in English

(last accessed 6 December 2017) (J)