

# **Edible Landscapes within the Urban Area of Beijing, China**

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# Zusammenfassung

Weltweit hat das Thema der essbaren Landschaften in urbanen Gebieten (ELWUA, aus dem Englischen: „edible landscapes within the urban area“) in den letzten Jahren ein großes Forschungsinteresse geweckt. Urbane Landwirtschaft kann hinsichtlich sozialer, wirtschaftlicher als auch ökologischer Aspekte zur Nachhaltigkeit unserer Städte beitragen (Deelstra and Giardet 2000). Mit Blick auf die beiden globalen Herausforderungen der zunehmenden Urbanisierung und der Nahrungsmittelsicherheit wird die Integration urbaner Landwirtschaft im Sinne einer produktiven grünen Infrastruktur als eine Strategie für eine nachhaltige und resiliente Stadtentwicklung vorgeschlagen (Giseke 2011). Und auch aktuell gewinnt die Landwirtschaft im modernen Stadtraum weltweit wieder an Popularität. In den letzten zwanzig Jahren hat die Zahl der Konzepte, Forschungsprojekte, Konferenzen und Lehrmethoden, die dieses Thema behandeln, vor allem in den westlichen Ländern stark zugenommen. Im Vergleich zu dem enormen Aufschwung der Forschung über ELWUA in den westlichen Ländern, fokussiert die Forschung über die essbaren Landschaften in China bisher vor allem die Frage der Integration der Landwirtschaft in den peri-urbanen Gebieten und im ländlichen Raum. Fallbeispiele im städtischen Kontext gibt es nur wenige. Während in China Projekte der urbanen Landwirtschaft eher informeller Art sind und ihr Mehrwert von der lokalen Planung und Politik nicht anerkannt wird, haben Fallbeispiele in den westlichen Ländern diesen informellen Status bereits überwunden. Sie werden mithilfe von Richtlinien und Programmen zunehmend auch von der Politik unterstützt. Obwohl essbare Landschaften maßgeblich zur städtischen Nachhaltigkeit beitragen könnten, gibt es in chinesischen Städten große Vorbehalte urbane Landwirtschaft wieder in die Städte zu integrieren. Diese Thematik wird auch in westlichen Ländern diskutiert, doch dort werden trotz allem zahlreiche Projekte umgesetzt. Diese gerade genannten Problematiken zeigen die dringende Notwendigkeit, die derzeitige Forschungslücke im Bereich der essbaren Landschaft in urbanen Gebieten (ELWUA) in China zu schließen und so zu einem besseren Verständnis der Kerngedanken und der Bedeutung der zeitgenössischen ELWUA im China des 21. Jahrhunderts beizutragen.

Um die nötige Wissensbasis zum Verständnis der zeitgenössischen ELWUA zu liefern, bespricht diese Arbeit zuerst Definitionen, die geschichtliche Entwicklung und den möglichen Mehrwert der Nahrungsmittelproduktion im urbanen Raum sowie unterschiedliche Arten der urbanen Landwirtschaft in Europa. Im nächsten Schritt wurde anhand von Peking als Forschungsgebiet und mithilfe eines empirischen Forschungsansatzes im Rahmen einer Feldstudie, versucht mehr über die physischen Eigenschaften der ELWUA (einschließlich der räumlichen Eigenschaften, Art der essbaren Pflanzen, Evolutionsprozess, Materialien und Technologien), die sozialen Merkmale (einschließlich der Information über die Teilnehmer, Organisationsformen und Motivationen), ELWUA Typen, ELWUA Dienstleistungen und die Wahrnehmungen der Menschen gegenüber ELWUA herauszufinden.

Während der Durchführung der Feldstudie wurden 38 Orte als Fallstudien ausgewählt (siehe Anhang E) und semi-strukturierte Interviews mit sechs Personengruppen, die sich mit ELWUA beschäftigen, von 2011 bis 2013 durchgeführt. Danach wurden die spezifischen Eigenschaften der ELWUA in Peking durch einen Vergleich mit europäischen Fallstudien definiert. Abschließend werden Empfehlungen gegeben, wie essbare Landschaften als Strategie verwendet werden können, um eine nachhaltige Entwicklung von Peking und anderen chinesischen Großstädten voran zu treiben.

Die wichtigsten Inhalte und Ergebnisse der empirischen Forschung beinhalten:

1. Essbare Landschaften im Stadtgebiet von Peking sind hauptsächlich im Rahmen der modernen Urbanisierung Chinas entstanden. Anhand ihrer physischen und sozialen Merkmale können sie in drei Hauptkategorien und neun Arten eingeteilt werden: 1) die Kategorie des urbanen Gärtnerns mit Lebensmittelproduktion, welche Familiengärten, Guerilla-Gärten, Gemeinschaftsgärten, landwirtschaftliche Gartenflächen zur Pacht (Projekt "Happy Farm"), Bildungs-/ Schaugärten und Danwei-Nutzgärten beinhaltet; 2) die Kategorie der städtischen Begrünung und Landschaftsgestaltung, die essbare Begrünung und Gestaltung mit Obstbäumen, Kulturpflanzen und Gemüse enthält; 3) die Kategorie der städtische Landwirtschaft, welche Selbsternte-Höfe und Versuchsfarmen umfasst. Die von der Öffentlichkeit kultivierten ELWUA entstanden hauptsächlich während der raschen Urbanisierung nach der chinesischen Wirtschaftsreform im Jahr 1978. Sie kann als eine Reaktion der Stadtbewohner angesehen werden, die weit von der ländlichen Landschaft und Natur entfernt leben, deren Absicht jedoch nicht ausschliesslich die Nahrungsmittelproduktion zur Selbstversorgung ist, sondern die vor allem ein gesundes (einschließlich Freizeit, Gesundheit, Nahrungsergänzungsmittel und gesündere Lebensmittel) und eher ländliches Leben führen wollen. Der Anbau von Nahrungsmitteln innerhalb des Stadtgebietes in Peking beruht hauptsächlich auf spontanen Aktivitäten der Stadtbewohner und ist untrennbar mit deren alltäglichen Lebensweisen verbunden. Da es Ausdruck des "Willen des Volkes" ist, ist es ein soziales Phänomen und ein kulturelles Produkt, eingebettet in der chinesischen Kultur und verwurzelt in der raschen Urbanisierung der chinesischen Städte. Essbare Landschaften können in Peking mehrere Leistungen für städtische Bürger erbringen, einschließlich 1) Bereitstellung von Verpflegung, 2), Umweltdienstleistungen, 3) soziale Dienste, 4) Gesundheitsdienstleistungen, 5) wirtschaftliche Dienstleistungen, 6) Freizeitdienstleistungen, 7) Bildungsleistungen und 8) Kulturdienstleistungen.

2. Der Vergleich von ELWUA in Peking mit ELWUA in europäischen Städten hat herausgestellt, dass die Entwicklung von essbaren Landschaften in China derzeit noch am Anfang steht und einige spezifische Eigenschaften aufweist: 1) Familiengärten und informelle Guerrilla-Gärten, die normalerweise von Einzelpersonen oder kleinen Gruppen initiiert werden, machen den Großteil der essbaren Landschaften in Peking aus, 2) die meisten essbaren Landschaften

befinden sich auf privaten oder halb-öffentlichen Grundstücken, 3) fast alle ELWUA-Projekte entstehen aus spontanen Aktivitäten der Bevölkerung (bottom-up), während nur einige wenige von offizieller Seite initiiert wurden, diese dienen dann ausschließlich zu Begrünungszwecken und nicht zur Bewirtschaftung durch die Bevölkerung, 4) der Anteil älterer Ruheständler unter den „urbanen Hobby-Gärtnern“ ist relativ hoch, 5) es gibt eine hohe Motivation Lebensmittelproduktion für den Eigenbedarf im städtischen Raum zu betreiben, jedoch herrscht eine Unstimmigkeit in Bezug auf die Wahrnehmung und Haltung hinsichtlich ELWUA zwischen der Bevölkerung und Regierung oder anderen Verwaltungsebenen der städtischen Landschaft, 6) viele der potentiellen Mehrwerte der ELWUA, die zu einer positiven Entwicklung von Gesundheit und Wohlbefinden beitragen könnten, werden derzeit nicht erkannt und müssen noch untersucht und angewendet werden.

3. Die Entwicklung von ELWUA in China ist derzeit mit einer Vielzahl an Herausforderungen konfrontiert, die folgende Aspekte beinhalten: 1) ELWUA wird von den städtischen Behörden im Rahmen der städtischen Landschaftsplanung vernachlässigt bzw. nicht berücksichtigt, 2) Landwirtschaft in der Stadt wird als unangemessen angesehen, es fehlt eine Vision, 3) Platzmangel und Unklarheiten hinsichtlich Besitzverhältnissen, 4) fehlende Organisation, Verwaltung und Instandhaltung, 5) mangelndes Wissen und technische Anleitung, und 6) die Herausforderung, den ästhetischen Wert von ELWUA in die urbane Landschaft zu integrieren. Basierend auf den Ergebnissen dieser Arbeit werden folgende Empfehlungen formuliert, wie ELWUA eine gesunde und nachhaltige Entwicklung chinesischer Städte vorantreiben können: 1) ELWUA sollte als gewöhnliche urbane Praxis gefördert und als Bestandteil der urbanen Landschaft wahrgenommen werden, 2) es sollten mehr Flächen für ELWUA zur Verfügung gestellt werden, 3) vor der Umsetzung von ELWUA sollte ein systematischer Handlungsleitfaden erstellt werden, der Empfehlungen zu a) Planung, b) Konstruktion, c) Instandhaltung und Verwaltung, und d) Monitoring, Evaluation und Feedback enthält, 4) ein Umweltinformations, Monitoring und Warnsystem sollte entwickelt werden.

## Abstract

In recent years, edible landscape within the urban area (ELWUA) has become a topic of intense study in the field of landscape research worldwide. Urban agriculture could contribute to the sustainability of cities in various ways: socially, economically and environmentally (Deelstra and Giardet 2000). Therefore, facing the two global challenges of urbanization and food security, the integration of urban agriculture is suggested to be used as a strategy for sustainable and resilient urban development and providing a productive green infrastructure for the future cities (Giseke 2011). Especially at the present, agriculture is being rediscovered for use in modern urban space and becoming more and more popular in cities all over the world. During the last twenty or so years, the number of related concepts, research projects, conferences and teaching practices has greatly increased, especially in western countries. However, compared with the tremendous upsurge of research on ELWUA in western countries, the research on edible landscapes in China so far has mainly evolved around the issue of integrating agriculture in the suburbs and rural area, but only a few mentioned cases within the urban area. Furthermore, at present, the number of practical projects on edible landscapes in urban built-up areas in western countries has greatly increased and gradually passed the stage of the informal mode of existence to the stage of being supported by policies, guidelines and programs, while in China edible landscaping within the urban area in China is now still in the informal mode of existence and has not yet been acknowledged by local planning and policy agendas. In addition, although edible landscapes could contribute to the urban sustainability, there are dilemmas of inviting edible landscape back into Chinese cities which also exist in western countries, although they already have a large number of practical projects. These contradictions above show there is an urgent need to fill in the research gap in the field of the edible landscape within the urban area (ELWUA) in China, thereby to contribute to the understanding of the essence and significance of the contemporary ELWUA in China in the 21<sup>st</sup> century.

First, this dissertation reviewed the relative definitions, history and services of growing food within urban area, and the types of urban agriculture in Europe as the knowledge foundation of understanding the contemporary ELWUA. Then, taking Beijing as the research area, the research used an empirical research approach (by means of field surveys) with the aim of finding out the ELWUA's physical characteristics (including spatial characteristics, type of edible plants, evolution process, materials and technology), social characteristics (including the information of the participants, organizational forms and motivations), ELWUA types, ELWUA services and people's perceptions towards ELWUA. During the process of carrying out the field surveys, 38 sites were selected as the research cases (see Appendix E) and semi-structured interviews to six groups of people who are related to ELWUA were completed from 2011 to 2013. After that, the characteristics of the ELWUA in Beijing were found through the comparison with European ELWUA cases. Finally, recommendations on

how to use edible landscapes as a strategy to serve the sustainable development of Beijing and other metropolitan cities in China were proposed.

The main contents and conclusions of the empirical research include:

1. The edible landscapes which exist within the urban area of Beijing are mainly a phenomenon that emerged along with the modern urbanization process of China. They could be classified into three main levels and nine types based on their comprehensive physical and social characteristics, which are: 1) the urban food gardening level, which includes family gardens, guerrilla gardens, community gardens, renting farming garden (called "Happy Farm"), educational/demonstration gardens and Danwei kitchen gardens; 2) the urban greening and landscaping level, which includes edible greening and landscaping with fruit trees and edible greening and landscaping with crops or vegetables; 3) the urban farming level, which includes agrotourists' picking farms and experimental farms. In which, the edible landscapes cultivated by the public mainly emerged during the rapid urbanization process since the Chinese economic reform was carried out in 1978. It is a response of the urban dwellers that are living away from the rural landscape and nature who wish to pursue a healthy life (including leisure, health, food supplement and healthier food) and a pastoral life, rather than only simply an initiative for food production. Growing food within the urban area in Beijing mainly consists of urban residents' spontaneous activities and it is inseparable from the daily life demands of the Chinese urban dwellers. Because it is an expression of the "people's will", it is a natural phenomenon and a cultural product embedded in the Chinese cultivation culture and rooted in the Chinese rapid urbanization process. The ELWUA in Beijing can supply multiple services for urban citizens, including 1) provision services, 2) environmental services, 3) social services, 4) health services, 5) economic services, 6) recreational services, 7) educational services and 8) cultural services.

2. The comparison of the ELWUA in Beijing and European cities indicated that to date the development of ELWUA in China is still in its infancy and has its own characteristics, which could be reflected in: 1) family gardens and informal guerrilla gardens, which are usually built by individuals, account for the majority of the total ELWUA in Beijing, 2) most of the ELWUA in Beijing is located in private space or semi-public space, 3) most of the ELWUA is bottom-up spontaneous activities of the urban dwellers, only a few were built under formal organization, in which, most of them were built only for public greening but not for people's cultivation, 4) there is a large proportion of aged retirees in the spontaneous "urban hobby farmers", 5) there is a high demand for growing food within the urban area from the urban residents, but there is a disparity of the perception and attitudes towards ELWUA between the public and the government or other administrations of urban landscape, 6) a lot of potential ELWUA services which could contribute to the urban healthy development and the well-being of people are still waiting to be recognized, explored and applied.



3. The development of ELWUA in China is currently facing a lot of challenges, which mainly include: 1) ELWUA is neglected even excluded from the urban landscape planning by urban authorities, 2) perception of agriculture being inappropriate in a city and lack of vision, 3) lack of space and land tenure uncertainties for ELWUA, 4) lack of organization, management and maintenance, 5) lack of knowledge and technical guide, and 6) the challenge of combining the aesthetic value of ELWUA into urban landscape. Based on the findings of this research, recommendations on how to use edible landscapes to promote the healthy and sustainable development of Chinese cities in the 21<sup>st</sup> century were proposed: 1) ELWUA should be supported as an ordinary urban practice and integrated as one component of the urban landscape, 2) more potential urban space should be excavated for ELWUA, 3) a systematic looped guide, which includes a) planning, b) building, c) maintenance and management, and d) monitoring and evaluation, should be formulated to support the implementation of ELWUA, 4) a publicly available environmental monitoring and information system on health security should be set up.

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# Chapter 1 Introduction

## 1.1 Context

### 1.1.1 Rapid urbanization and environmental problems in China

Since the Chinese reform and opening-up policy was initiated in 1978, China has entered a period of rapid urbanization. From 1978 to 2012, the urban population grew from about 170 million to over 710 million, and the proportion of China's urban population rose from 17.9% to 52.6%, and is forecasted to reach 70% in 2030 (UNDP China and Institute for Urban and Environmental Studies, Chinese Academy of Social Sciences 2013). China has achieved indubitable economic progress and urban development but at the same time faced inevitable problems, especially in its urban core. The rapid urbanization leads to many environmental problems, including air pollution, water pollution, waste disposal dilemma, excessive consumption of natural resources (energy, water, land), the loss of farmland and the decrease of green areas, etc., which threaten the health and daily lives of urban citizens (Figure 1.1). In 2008, the WHO listed seven Chinese cities, including Beijing, as among the 10 most polluted places in the world (Blacksmith Institute 2007). When air pollution standards were revised from including only coarse particulate matter, or PM10, to including finer PM2.5 particles<sup>1</sup> in February 2012, fourth-fifths of Chinese cities fall short of the minimum quality standards. In January 2012, the national average was 4.3 days of smog, the second highest value since 1961. The problem was particularly bad in the Beijing-Tianjin-Hubei region, the Yangtze River Delta and the Pearl River Delta. More than 40 cities there, with a population of about 600 million people, suffered from up to 10 days of smog that covered nearly 2.7 million square kilometers<sup>2</sup>. "Compliance with water quality standards remains low at 46%, with up to 90% of urban water areas and 65% of drinking water sources polluted by urban sewage, domestic garbage, industrial waste, fertilizers and pesticides" (ebd). By 2010, the Chinese mainland produced nearly one billion tons of garbage a year, the greatest national quantity in the world. Among more than 600 large and medium-sized cities, two-thirds of them face serious problems with the buildup of garbage, and a quarter of them have difficulties finding places to dump garbage<sup>3</sup>.

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<sup>1</sup> Atmospheric particulate matter—also known as particulates or particulate matter—are tiny pieces of solid or liquid matter in the earth's atmosphere. They are suspended in the atmosphere as atmospheric aerosol, a term that refers to the particulate/air mixture, as opposed to the particulate matter alone. Particularly, PM2.5 refers to particles smaller than 2.5 micrometers.

<sup>2</sup> According to detection statistics released by the National Weather Service on 31st January 2012.

<sup>3</sup> Source from China News. Retrieved June 2, 2012 from [www.chinanews.com/sh/2012/10-01/4224886.shtml](http://www.chinanews.com/sh/2012/10-01/4224886.shtml).



The series of environmental problems caused by the rapid urbanization in China have caused ecological construction and sustainable development to be in great demand in the cities. In April 2013 the government of China stated that “China will strengthen its ecological construction with more efforts towards green development, circular development and low-carbon development, and balance the industrial development and green, sustainable development.” Therefore, how to make Chinese cities more ecological and sustainable has already become an important and urgent research topic.



**Figure 1. 1 Environmental problems in Beijing (air pollution, water pollution, waste disposal dilemma, the rendering of Beijing’s CBD which are lack of green areas)**

Source: 1) news.163.com; 2) bjnews.com; 3) news.cn; 4) Beijing Planning Bureau

### 1.1.2 Challenge of food security in China

In its simplest terms, food security means “access to safe and fresh food at all times by every person” (Philips 2013). The United Nation’s Food and Agriculture Organization (FAO) has warned that, in the future, the 12 “mega-cities” (10 million plus population) will experience increasing difficulty in feeding themselves (Viljoen et al. 2005, cited in FAO, 1998). Urbanization leads to a centralization of needs for food in densely populated areas, and the provision for the food need of these densely populated areas is based on rural hinterlands. Chinese were “famous for their highly intensive urban cropping systems and, to this day, many of the large cities are largely self-sufficient in food produced on adjacent land areas administered by them” (Deelstra and Girardet 2000). However, during the process of rapid urbanization, many large cities in China such as Beijing started an urban spatial expansion mainly in a “pie”-style based on concentric circles (Li and Yang 2007). The rapidly expansion of the urban built-up area and the enormous increase of urban population led to a

decrease of the rural hinterland for the basic food supply. Because most cities in China do not have the ability of the food self-supply, a large quantities of food need to rely on the food import, which brings in risks for the food security. In 1994, the founder of the United States Worldwatch Institute Lester Russel Brown published the book *Who will feed China? Wake-UP Call for a Small Planet*. In this book he pointed out that the great success of China's rapid industrialization is of the greatest danger to agriculture, and "if a nation of 1.2 billion in China moves in this direction, it will quickly overwhelm the export capacity of the U.S. and other countries, driving up food prices everywhere". Moreover, this rapid urban expansion led to a separation between cities and agriculture in China. Because of the long physical distance between agricultural production and markets, a series of problems such as food price rising, energy shortages and food risks were caused (Shi 2012). Therefore, for the situation with a long distance, a smooth and efficient distribution chain is necessary in order to allow the citizens to normally buy enough food at a reasonable price and thereby improve the coefficient of the food security (Liu 2011). However, the current food distribution system in China is defective, which has led to a missing link between production and market. In addition, in the urban areas in China there are still many "populated areas with little or no food retail provision" (Cummins and Macintyre 1999), and therefore, many "areas of relative exclusion where people experience physical and economic barriers to accessing healthy foods" (Reising and Hobbiss 2000) still exist, which are called food deserts.

The challenge of food security comes not only in the aspect of food quantity but also in the food quality. China has 7% of the arable land in the world, but the use of chemical fertilizers and pesticides in China is 35% of the global total usage amount. The overuse of chemical products caused the reduction of food quality in aspects such as chemical residue. A survey of food safety carried out with 328 urban residents in Beijing shows that only 20% of the respondents think the vegetables they purchased is safe, reflecting the consumers' trepidation in food safety issues (Zhang 2013). Moreover, the food safety scandals, such as "poison bean sprouts", "sulfur ginger" and "cadmium rice", that in recent years frequently occurred in China have further worsened the already challenging food security situation.

All these food security problems suggest that "the energy used for producing, transporting, and processing food should be reduced." It is in this context that we should begin to consider edible landscapes' "potential contribution to food security and urban design as one neglected component of a city of short distances"(Viljoen 2011).

### **1.1.3 Biased pursuit of formal beauty in the urban construction**

Currently, the urban environmental construction in China is deeply affected by the "City Beautiful Movement" which over-pursues visual and formal beauty. Many varieties of ostentatious "image" and "administrative achievement" projects have sprung up in large numbers, which is manifested in the following ways: there are large

quantities of big urban squares which are uniform but lack of actual function, big lawns which are well manicured but do not allow people to enter, or large decorative baskets of flowers which costly in terms of water usage but wither away very fast, etc. (Figure 1.2).



Figure 1. 2 The large decorative baskets of flowers in Beijing

The biased pursuit of formal beauty in the landscape design in China brings about many urban problems and keeps the country off the target of sustainability. The city beautification process focuses on the window-dressing but ignores the underlying causes of urban problems. It costs a lot but only acts in a “make-up” role, and furthermore, it becomes an enormous burden of urban development (Yu and Ji 2000). Moreover, although city beautification costs a large amount of investment in construction and maintenance, it brings low ecological and social benefits, which will undermine the city’s capability of sustainable development in future. Therefore, a strategy that could contribute to the sustainability of our cities is really necessary to take the place to the current bias. Within this context, in 2010 a statement of intent of “returning to productive landscapes and the art of survival” was declared by a Chinese landscape architect with the aim of improving the health of people and ecosystems (Yu 2010) (Figure 1.3).



Figure 1. 3 Imagined productive landscape in future city

© Kongjian Yu, 2010

#### 1.1.4 Changing community relationships and indifferent neighborhoods

Good community relationships are one of the basic needs for healthy living. However, the urbanization in China greatly changed neighborhood relationships of urban

residents in communities: the disappearance of vitality of public life in communities, the appearance of community problems, nearly no activity and communication between neighbors, leaving only people unconcerned and stressed by each other (Figure 1.4).



Figure 1. 4 Indifferent neighborhood – “The most familiar stranger”

Source: iszed.com

This problematic development was caused by several aspects. First of all, the housing reform of housing commercialization at the end of the 20<sup>th</sup> century has dramatically changed the appearance of cities. A large number of urban residents moved from the traditional low-rise courtyard houses into high-rise residential buildings, which are greatly different especially in the aspects of use of public space. The change of community public space has a great impact on the existence of the traditional neighborhood relationships (Xie 2009), and the contact between residents has increasingly weakened. Secondly, under the dual push of China's one-child policy and industrialization, urbanization and modernization, the family structure of the Chinese society has undergone tremendous changes: The family size has become gradually smaller and the nuclear family is replacing the traditional big family model and becoming the major form of modern Chinese families. The traditional big family system with parents as the family authority is increasingly giving way to the small children-centered, especially single-child-centered family system, so the traditional neighborhood relationship which was based on blood relationship or family connection has tremendously changed (Tang 2005). Thirdly, the improper planning and design of residential area is also an important reason for the problem of indifferent neighborhoods. An urban residential area is the inhabited area of humans, and also an important place in a human's spiritual life. In an ideal living space, the residents can have a good living environment, a natural living experience, a harmonious interpersonal communication and varied public activities, etc. However, there are many practical mistakes in the public space and landscape design in China, such as the lack of communication space, the lack of care to meet the multiple needs of different populations, too much emphasis on decorative but non-functional landscapes, the pursuit of exotic flowers and rare plants, etc. (Yu 2002). For example, the related facilities and services cannot meet the rising needs from the increasing number of old people. Therefore, the contemporary community development urgently needs a second transformation into better neighborhood communities (Xie 2009). Studies have shown that the introduction of edible landscapes into communities can

play a positive role in improving the community relationships (e.g. Donova et al. 2011; Wise 2014; Jackson 2014; Nail 2015).

### **1.1.5 Urban agriculture as an emerging topic in China**

Growing edible plants in cities has a long history. From a historical perspective, human civilization originated in agriculture, and the agricultural landscape is also the initial prototype of the western garden (Lin and Wang 2005). Before the middle of 18<sup>th</sup> century, fruit gardens were a very important type of garden in many western countries, and orchards were an important feature of the English landscape throughout medieval and post-medieval times (Dallas, Barnes and Williammson 2015). At present, agriculture is being rediscovered to be used in modern urban space and becoming more and more popular in cities all over the world. For example, “there are now millions of people planting urban farms today in the United States” and 15 percent of the citizens of the United States now have a backyard garden (Philips 2013). As the Urban Land Institute in the United States estimates, in 2010 there were at least 200 projects in the United States that include agriculture as a key community component (Gorgolewski et al. 2011), and “more than one-third of the dollar value of agricultural produce is produced within urban metropolitan areas” (Heimlich et al. 1989). As Helen Castles said in 2005, “If clean drinking water and public sanitation were the main obstacles to social progress in the 19th century, a healthy diet and access to fresh food for all promises to be one of the hottest issues of the 21st century” (Castles 2005).

In China, agriculture has been the basis of the country since ancient times, and the history of farming is actually the history of Chinese civilization. When China was founded in 1949, 89.4% of the Chinese people were farmers, and in 2010 50.1% of the population was still farming<sup>4</sup>. That means that most of the Chinese people have farming experience because they have worked as farmers or helped their parents to work on the farms. Therefore the contemporary Chinese citizen still has a profound affection for agriculture. During the process of rapid urbanization, many people who have ever lived in the rural areas moved to urban areas which have higher population density and are farther away from nature. Therefore, many urban citizens who now live in the dense urban environment with high pollution and noise levels dream of returning to the nature and getting back to the rural life. Some investigations show that farming activities in the built-up areas already exist and could have great application potential in urban and landscape planning (e.g. Liu 2011). In addition, an increasing number of urban agriculture projects emerged in Hongkong and Taiwan in recent years have aroused people’s attention to the concept of growing food within cities.

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<sup>4</sup> Source comes from the *Statistical Yearbook of China 2014*, compiled by National Bureau of Statistics of China.

## 1.2 Problem statements and research needs

### 1.2.1 Research in western countries versus research in China

Edible landscape is a frontier topic in the field of current landscape research in western countries. From the end of the 19<sup>th</sup> century, edible landscapes were an important element of many famous urban planning models. Ebenezer Howard's Garden Cities of Tomorrow in the end of 19<sup>th</sup> century and Frank Lloyd Wright's Broadacre City in the 1930s are among the more well-known examples. The early urban agriculture research and dissemination originated in the late 1970s in the United States, mainly through the Canadian City farmer newsletter (started in 1978) and later website (started in 1994) (Bohn and Viljoen 2014, cited in City Farm n.d.; Levenston n.d.). ELWUA, as one component of urban agriculture, is always included in the research on urban agriculture. Since the development of USA community gardening in 1970s, two seminal publications originated: Smit et al.'s UNDP (United Nations Development Program) publication and the American Planning Association's Policy Guide on Food Planning (Bohn and Viljoen 2014). In the 1990s, as the significance of urban agriculture was gradually realized by scholars, a research upsurge on urban agriculture started. Several international agencies or organizations such as FAO (the Food and Agriculture Organization), UNDP, mentioned above, and RUAF (International network of Resource Centers on Urban Agriculture and Food Security) launched large quantities of research on urban agriculture in both developing and developed countries (mainly in developing countries). Some non-governmental sectors in Canada and Germany also started publish books on urban agriculture behavior research in developing countries, analyzing the functions of urban agriculture in various aspects, most of which were carried out through case studies (Sun 2013). During the last twenty or so years, the number of related concepts, research projects, conferences and teaching practices greatly increased, especially in western countries. Planning concepts such as the urban design concept of Continuous Productive Urban Landscapes (CUPL), which was proposed by *Bohn & Viljoen Architects* in 2005 (Viljoen et al. 2005), and Agriculture Urbanism, a planning, policy, and design framework for inviting food and agriculture back into our communities and lives, which was proposed in the book with the same name published in 2010 (de la Salle et al. 2010); research projects such as the international research programs - *COST Action Urban Agriculture Europe*, which was coordinated by one German landscape architect Frank Lohrberg in department Landscape Architecture at the RWTH Aachen University in 2012 (COST UAE 2012), the international workshop *Growing Cities, Growing Food* in Hanava, Cuba, which was launched in 1999 and resulted in the publication of the same name in 2000, bringing together writings by some of the most important experts in urban agriculture field of the time (*Bakker et al. 2000*), and the international research project of Urban Agriculture Casablanca, which was led by Undine Giseke at the Institute for Landscape Architecture and Environmental Planning at the Technical University Berlin



(Giseke 2011); conferences such as the AESOP Sustainable Food Planning Conference, which is an annual international conference progressing work on food planning bringing people together from a diverse range of backgrounds (AESOP n.d.), and the International Conference on Agriculture in An Urbanizing Society, which is an triennial conference with the aim of “advancing the scientific state of the art in research on multifunctional agriculture and urban-rural relations by bringing together scholars from a wide range of disciplines” worldwide (AUS n.d.), emerged in large quantities during this period. The current body of urban agriculture work “can be broadly grouped into either case studies” or “descriptive accounts of concepts” or theories associated with urban agriculture (Pearson 2010).

However, compared with the tremendous upsurge of research on edible landscapes in western countries, the research on edible landscapes in China has so far mainly evolved around the issue of integrating agriculture in the suburbs and rural area, but there are only few mentioned cases within the urban areas. This situation was partly caused by the unclear definition of urban agriculture. The term “urban agriculture” was introduced into China from Japan in the 1990s. From 1999 to 2005, Chinese scholars from varieties of field including agriculturists and sociologists, etc. have redefined the term and carried out abundant research on it (e.g. Yu 1999; Zhang 1999; Song 2005; Zhang 2005). However, as regards the geographical scope of urban agriculture, there is a big difference between western countries and China. The urban agriculture in western countries is more about the agriculture in urban or peri-urban area, while in China the definition of urban agriculture is still not clear, which is usually confused with suburban agriculture (Zhang et al. 2005) or the agriculture located in large and middle-sized cities (Han 2010).

Since 2009, the research on the edible landscape within the urban area gradually slightly increased in China, many of which were master or doctoral dissertation (e.g. Lin 2009; Yin 2010; Liu 2011; Xu 2011; Guo 2012; Zhang 2013; Wang 2013; Sun 2013; Fang 2013; Duan 2013; ). However, this research mainly focused on the application strategies of edible landscape or introducing edible landscape concepts abroad into China, but neglected to gather an understanding of the edible landscapes which exist in China. Furthermore, many of them only focus on involving food growing in single type of urban space, such as in residential areas and in public urban space. Therefore, currently there is still an urgent need to fill in the research gap on the edible landscapes within the urban areas in China.

### **1.2.2 Absence versus integration of edible landscapes into political and planning agendas**

Urban agriculture could contribute to the sustainability of cities in various ways: socially, economically and environmentally (Deelstra and Giardet 2000). Therefore, many western scholars in the landscape field suggest that the integration of urban

agriculture could be used as a strategy for more sustainable and resilient urban development and could provide a productive green infrastructure for future cities (Giseke 2011). Some scholars have even suggested that we should integrate urban agriculture into urban planning (Drescher 2001). At present, the number of practical projects on edible landscapes in urban built-up areas in western countries has greatly increased and gradually passed the stage of the informal mode of existence to the stage of being supported by policies, foundations and implementation/ design guidelines and programs. Many western countries started to realize that among the basic essentials for life- air, water, shelter and food- food has been absent from the urban planning agenda and they have moved it up the political and planning agenda (Morgan 2014). Since 2012, “productive landscape” has been included as a development aim in Berlin’s open space planning strategy (SenStadt 2012).“In the UK, the Capital Growth project gave the London community gardening scene an important boost in 2009 with the goal of creating 2,212 new projects in the three years to the 2012 Olympics”(Bohn and Viljoen 2014). In London, the report *Cultivating the Capital* was proposed by the London Assembly to call on the mayor to “integrate urban agriculture into waste, water and energy policies and empower boroughs to encourage growing spaces on housing developments, rooftops and vacant land” in the Green Belt (London Assembly 2010). In Leeds, the TRUG/Urban project recommended productive urban landscapes in cities (Bohn and Viljoen 2014). In the United States, 10 cities, including Chicago, Detroit, Boston, Portland and Austin, etc. have formulated urban agriculture ordinances allowing and inviting edible landscape to occur within the city limits (Seedstock 2014). In Japan, a host of governmental incentives were formulated to encourage the urban agriculture initiatives after the 1990s, and the Basic Law for Food, Agriculture and Rural Villages 1999 requested that “the government provides to agriculture in cities and its vicinity with necessary measures to promote agricultural production for meeting the needs of urban citizens” (Tsubota n.d.). The information above indicated that in many parts of the world, especially in western countries, urban agriculture has shifted from being a sign of social backwardness to becoming an instrument of political claims (Caggiano 2015).

However, the edible landscaping in urban built-up areas in China is now still in the informal mode of existence and has not yet been acknowledged by local planning and policy agendas. The on-site field investigation in Beijing shows that under the background of rapid urbanization, although the green plants used in the urban space are almost all ornamental plants, there is still a growing number of urban residents who have started to grow edible plants informally based on their own initiative, which is neither being organized nor supported. On the contrary, many activities of growing edible plants in the urban public space are considered to be illegal behavior because of its occupying public space, for the reason that many of the edible plants were hacked and cleared away by the property management companies or urban environmental management department. Therefore, the study of the status, the organization models and planning/ political support of the edible landscape in built-up area in western countries is a valuable reference for China.



### **1.2.3 Industrialization and globalization of agriculture versus developing local food systems**

Many scholars believe that edible landscapes in urban space could contribute to the sustainability of cities in various ways, environmentally, socially, and economically. However, there is a great difficulty inviting the edible landscape back into cities in China. Because of urbanization, people are so disconnected from where their food comes from, so the dilemma is that it is limited by people's inability to think of food systems as one essential part of our cities (Philips 2013). In the past few decades in China, edible landscapes have only been thought of as farmland and have been related to rural areas outside the city limits. Even if there are edible plants in the urban built-up areas, people tend to view edible plants growing as a temporary activity, not a permanent one. And such a dilemma also exists in western countries although they already have a large number of practical projects. "In most industrialized countries, edible landscapes have taken a secondary position to ornamental plants. Most families leaving the farm and moving to the city did not have outside open space to continue their family gardens. City regulations in many areas do not allow fruit and nut-producing trees along streets because fallen fruit, nuts, and husks create a "splat factor"; they could clog drains and create a hazardous ground surface"(Roley Jr.1993)

If we are going to create positive change, the disconnection between food and city life is the first hurdle to tackle. Therefore, the renewed understanding of the urban edible landscape and the relationship between the urban edible landscape and the city is needed. Through the study of the characteristics, types and services of the contemporary edible landscape in the urban built-up area in Beijing, the essence and the contemporary social and cultural significance of the urban edible landscape could be recognized by people.

## **1.3 Research object, aims and questions**

### **1.3.1 Research object**

The object of the research is the edible landscapes within the urban space (ELWUA), which can be defined as the growing of plants which can provides food products and medicinal products within cities.

ELWUA could be in any scale (macro, meso and micro), any type and in any location of cities. However, in this research, the greenhouse and interior food production, which rely more heavily on scientific technologies, is not included in the research.

### 1.3.2 Research aims

The objective of this research is help people to have a better understanding of the ELWUA in China through an explorative study in Beijing. There are three aims of this research:

- **Aim1:** Find out the status and services of the edible landscapes within the urban area (ELWUA) in Beijing, thereby helping people to understand the essence and significance of the ELWUA in the 21st century.
- **Aim 2:** By comparing the ELWUA in European cities and in Beijing, finding out the similarities and differences of ELWUA between the two contexts, and the particular characteristics of the ELWUA in Beijing.
- **Aim 3:** Proposing recommendations on how to use edible landscapes as a strategy to serve the sustainable development of Beijing and other metropolitan cities in China.

### 1.3.3 Research questions

Based on the research objectives, four main research questions are proposed as followed, in which, the second question could be divided into eight sub-questions.

**Question 1** What knowledge could be used as the foundation of this research on the edible landscapes within the urban space? (Chapter 2)

**Question 2** What are the current status and characteristics of the edible landscapes within the urban area (ELWUA) of Beijing (physical and social aspects)? (Chapter 4 and 5)

- Question 1-1 What are the spatial characteristics (including spatial distribution, location, size, spatial zoning and accessibility) of the ELWUA in Beijing?
- Question 1-2 Which edible plants are planted within the urban area?
- Question 1-3 What is the evolutionary process of the edible landscape within the urban area of Beijing?
- Question 1-4 Which materials and technologies have been used?
- Question 1-5 Who are the participants?
- Question 1-6 What are the organizational forms of the ELWUA of Beijing?
- Question 1-7 What is the impetus for the emergence of ELWUA in Beijing?
- Question 1-8 Which types of the edible landscape currently exist within the urban area of Beijing?

**Question 3** What services do the contemporary edible landscapes supply within the urban area of Beijing? (Chapter 6)

**Question 4** How do the urban citizens perceive the edible landscapes within the urban area (ELWUA) in Beijing? (Chapter 7)

**Question 5** What are the similarities and differences between the edible landscapes

within the urban area (ELWUA) in Beijing and European cities? (Chapter 8)

**Question 6** What are the strategic recommendations to support the edible landscape concept for the future sustainable urban development of Beijing and other metropolitan cities in China? (Chapter 9)

## 1.4 Structure of the dissertation

The dissertation is organized in 9 chapters as shown in Figure 1.5.

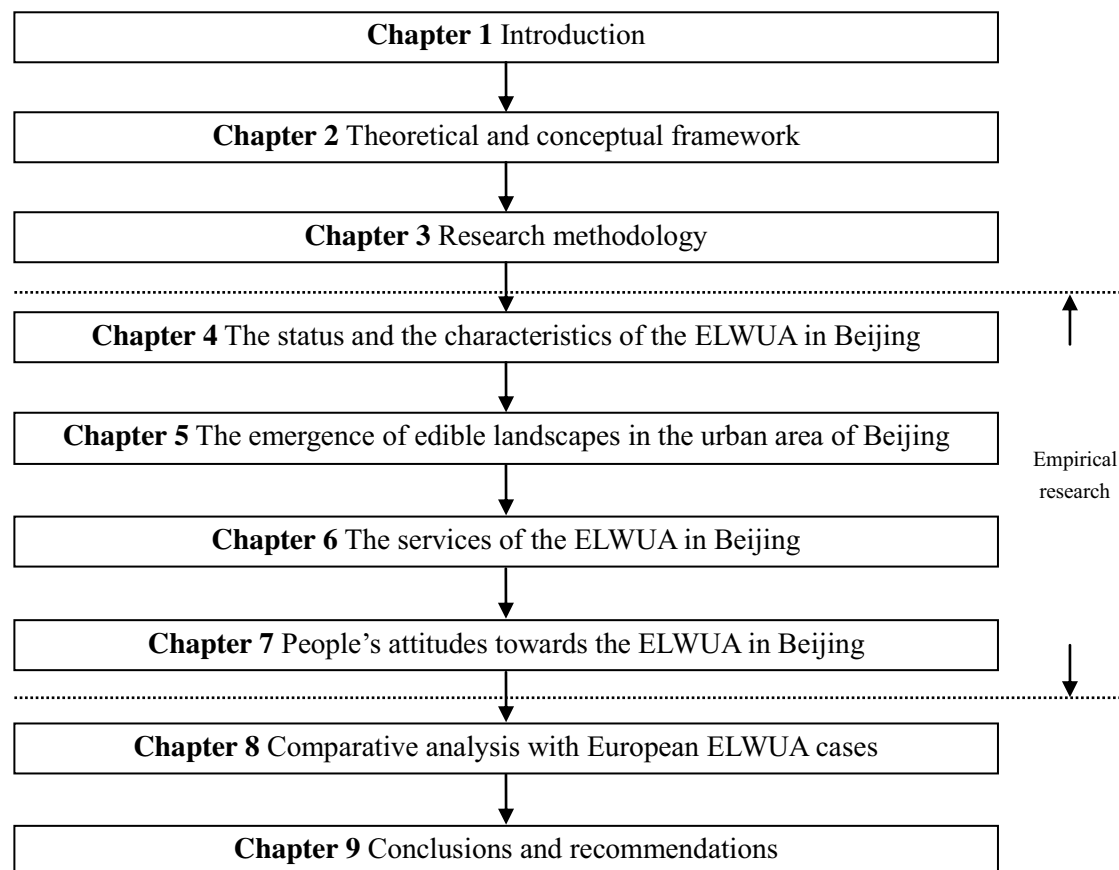


Figure 1. 5 Chapter's arrangement of the dissertation

### Chapter 1 – Introduction

Chapter 1 starts with the context setting of this research. Then, based on the contradictions between the previous research and current situations in China, the research gap and research needs are outlined. Finally, the research object, aims, research questions and structure of the research are defined.

### Chapter 2 - Theoretical and conceptual framework

Chapter 2 provides a review of the relative definitions and theories on ELWUA, and the history and services of growing food within urban area, as well as the types of urban

agriculture in Europe as the knowledge foundation of understanding the contemporary ELWUA.

### **Chapter 3 – Research methodology**

Chapter 3 proposes the methodology of this work. It introduces the research area from the aspects of geography, natural conditions and social-economic development, and then outlines the research design and methods based on the research process. Of these, 38 sites were selected as the research cases, and their basic information were described in Appendix E.

### **Chapter 4, 5, 6 and 7 – Content of the empirical research**

These four chapters describe the main findings of the empirical research and interpret them. Taking Beijing as the research area, the empirical research approach (by means of field surveys) is carried out with the aim of finding out the ELWUA's physical characteristics (including spatial characteristics, type of edible plants, evolution process, materials and technology), social characteristics (including the information of the participants, organizational forms and motivations), types, services and people's perceptions towards it.

Chapter 4 outlines the ELWUA's spatial characteristics, type of edible plants, materials and technology, information of the participants, organizational forms, and ELWUA types.

Chapter 5 focuses on the evolution process of the edible landscapes which exist within the urban area of Beijing and the impetus for its emergence.

Chapter 6 generalizes the services of the edible landscape within the urban area in Beijing and outlines them based on the theoretical framework of ELWUA services reviewed in Chapter 2.

Chapter 7 analyzes people's attitudes and perceptions towards the ELWUA in Beijing.

### **Chapter 8 - Comparative analysis with European ELWUA cases**

Chapter 8 compares the similarities and differences of the edible landscapes within the urban area in Beijing with the European cities in terms of types, spatial distribution, organizational forms, impetus and services, people's attitudes towards ELWUA and the historical evolution. Through the comparison with European ELWUA cases, the characteristics of the ELWUA in Beijing are highlighted. Combining with the findings achieved from the empirical research, the challenges of the development of ELWUA in China are outlined.

## **Chapter 9** Conclusions and recommendations

Chapter 9 contains four sections, which are summary, conclusion, recommendations, and limitations and prospects. In the section of summary, the major findings of this research are summarized. In the section of conclusion, the essence and significance of ELWUA in Beijing is discussed. Then, based on the findings of this research, recommendations on how to use edible landscapes to promote the healthy and sustainable development of Beijing and other metropolitan cities in China are provided. Finally, the limitation of this research is outlined and further works on the topic of edible landscape are proposed.

# Chapter 2 Theoretical and conceptual framework

## 2.1 Relative definitions

### 2.1.1 Definitions and key concepts

#### Edible Landscaping

The term “edible landscaping” appeared in the book of *The Complete Book of Edible Landscaping* which was published in 1982, written by Rosalind Creasy. This book started the edible landscaping revival (Beck and Quigley 2001).

Edible landscaping was defined as the “practical integration of food-producing plants within an ornamental or decorative setting” (Creasy 2009), “the use of food-producing plants in the residential landscape” (Beck and Quigley 2001) and “the use of food plants as design features in a landscape” (Shasta Master Gardeners 2012). It combines edible plants such as “fruit and nut trees, berry bushes, vegetables, herbs, edible flowers, and other ornamental plants into aesthetically pleasing designs” (Beck and Quigley 2001), and “the same design principles as for ornamental landscapes are used” (Creasy 2009). Edible landscaping “doesn’t have to be all edible” (Creasy 2009) and may “include anywhere from 1-100% edible specimens” (Beck and Quigley 2001). The edible plants are used both for aesthetic value as well as consumption. It can be used to “produce the highest quality food locally and in a resource-efficient manner throughout the year” (Roley Jr. 1993), and also can “enhance a garden by providing a unique ornamental component with additional health, aesthetic and economic benefits” (Creasy 2009). Edible landscapes could be in different types and scales but some people considered that it “do not include food items produced for sale” (Shasta Master Gardeners 2012).

#### Urban Agriculture (UA) and Urban and Peri-urban Agriculture (UPA)

There is no firm definition of urban agriculture. Many different definitions of urban agriculture, which “vary by the location, type, scope, scale of activities included, and the intended use of agricultural products, have been offered in the growing literature of UA, food policy and sustainable urban development” (Quon 1999). Three definitions of urban agriculture were selected as examples from mountains of definitions.

One is the traditional definition of urban agriculture created by the United Nations Development Programme (UNDP): “urban agriculture is an industry that produces, processes and markets food and fuel, largely in response to the daily demand of

consumers within a town, city, or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban wastes, to yield a diversity of crops and livestock” (Smit et al 1996).

The second definition was created by the Council on Agriculture, Science and Technology (CAST), which includes aspects of environmental health, remediation, and recreation: “urban agriculture is a complex system encompassing a spectrum of interests, from a traditional core of activities associated with the production, processing, marketing, distribution, and consumption, to a multiplicity of other benefits and services that are less widely acknowledged and documented. These include recreation and leisure; economic vitality and business entrepreneurship; individual health and well-being; community health and wellbeing; landscape beautification; and environmental restoration and remediation” (Butler and Moronek 2002).

The third definition comes from the project *COST Action Urban Agriculture Europe* which was launched since 2012. It is not a firm definition of urban agriculture, but it framed and defined the concept of urban agriculture more comprehensively from different aspects by describing different components, including the spatial component, functional component, market approach, origin component, actor component, stakeholder component and motivation component, and also compared it with the opposing concept of non-urban agriculture from wider aspects rather than its urban location only<sup>5</sup> (Table 2.1).

**Table 2. 1 Criteria for urban agriculture (UA) (opposed to non-urban agriculture)**

Component	Urban agriculture	Non-urban/other/”normal” agriculture
Spatial	Close to city, i.e. either profiting from proximity to local urban market or suffering from press through development of built-up areas	Distant from city
Functional	Food and non-food production (education, adventure, amenity, etc.)	Food production only (and “automatically” included non- consumer-oriented goods like ecosystem services)
Market	Mainly local consumers	Mainly non-local consumers (regional, national, international)
Origin	Introduced	Remnant
Actor	Hobby farmer	Professional farmer (both full- and part-time)
Stakeholder/ beneficiary	Food and non-food consumers	Food consumers only

Source: COST WIKI, retrieved from <http://www.urbanagricultureeurope.la.rwth-aachen.de/wiki.html>.

<sup>5</sup> “Definition of Urban Agriculture”. (n.d.). In: COST WIKI. Retrieved 2 July 2014 from [http://www.urbanagricultureeurope.la.rwth-aachen.de/mediawiki/index.php/Definition\\_of\\_Urban\\_Agriculture](http://www.urbanagricultureeurope.la.rwth-aachen.de/mediawiki/index.php/Definition_of_Urban_Agriculture).

Urban and Peri-Urban Agriculture (UPA) is an alternative term of UA, even though the 'peri-urban' is already contained in the original UNDP definition. It can be defined as "the growing of plants and the raising of animals within and around cities" (FAO n.d.). It denotes the food growing activities more precisely by location. UPA can provide "food products (e.g. grains, root crops, vegetables, mushrooms and fruits), animals (e.g. poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.) as well as non-food products (e.g. aromatic and medicinal herbs, ornamental plants and tree products)"(ebd).

Moreover, there are some other terms which have similar meanings as urban agriculture (UA), such as urban agriculture landscape and food landscapes. Of these, the term urban agriculture landscape, defined as "any landscapes that promote the integration of people, their living environments, and food", was proposed in the book of *Designing Urban Agriculture* written by April Philips (Philips 2013), which is a handbook which outlines strategies on how to design urban agriculture. Sometimes, these terms are used interchangeably.

Since the definition of urban agriculture was introduced in China in the 1990s, the term of urban agriculture gradually became popular in China. However, the definition of urban agriculture in China is still not clear, and the understanding to the term in China is different with those definitions mentioned above because of a different context. Because the term of urban agriculture in China was proposed by scholars and governmental administrative authorities through a top-down way, and it tends to mean suburban agriculture (Zhang et al. 2005) or the agriculture (rural, peri-urban and urban) located in large and middle-sized cities, which carries a pronounced stamp of administrative division (Han 2010).

### **Civic Agriculture**

Civic Agriculture is defined as the rebirth of locally based agriculture and food production that is tightly linked to a community's social and economic development by Thomas A. Lyson, an American scholar practitioner in Department of Development Sociology, Cornell University, in the field of community-based food systems, at the 1999 Rural Sociology Society Annual Meeting (Lyson 2004). Civic agriculture is a counter trend against the commercial American agriculture and food systems that follow the decades-old path of industrialization and globalization. "Civic agriculture embraces innovative ways to produce and distribute food, and it represents a sustainable alternative to the destructive practices associated with conventional, large-scale agriculture"(ebd).

### **Urban Gardening**

Although there is no firm definition, the term "Urban gardening", with the German translation "urbanes Gärtnern", is a popular word in Germany at present. According to



Frauke Hehl, a Berlin-based community garden activist, the term has circulated informally in Berlin (Bohn and Viljoen 2014, cited from personal communication Jun 2012). Since a book with the same name, *Urban Gardening* was published in 2011, combining articles by a range of authors focusing on the 'returning of productive gardens into cities' (Müller 2011), the term "urban gardening" was formally accepted by the masses.

### **Urban Horticulture**

"Horticulture is the science and art of growing fruits and vegetables and also flowers or ornamental plants"(Relf 1992). Urban horticulture is "the study of the relationship between plants and the urban environment," which "focuses on the functional use of horticulture so as to maintain and improve the surrounding urban area"(Tukey 1983). Numerous universities and research centers, especially in the USA and Germany, run courses and research in this subject, and the International Society for Horticultural Science (ISHS n.d.) also offers an international knowledge exchange network (Bohn and Viljoen 2014). This term could be used to represent the growing of vegetables, herbs and fruits within the urban realm, however, it tends to "encompass work focusing on horticultural practice and sciences rather than the integration of agriculture into urban spaces"(ebd).

### **Productive Landscape**

Productive landscape is a commonly used term but there is not a firm definition of it. Generally the definition of productive landscape is similar to agricultural landscape, which refers mainly to the landscape that formed by farming, forestry, animal husbandry and fishery (Lin 2009), while some other scholars consider space planted and managed in a way to be "environmentally and economically productive, such as providing food from urban agriculture, pollution absorption, the cooling effect of trees or increased biodiversity from wildlife corridor", as productive landscape (Viljoen and Bohn 2005). Furthermore, other scholars consider industrial landscapes as a kind of productive landscape, for example, in *Landscape Architecture China, No. 9* (February 2010), a well-known journal of landscape architecture in China, the windmills which can produce energy and the ecological infrastructure-pools which could produce multiple functions of production, habitat and recreation were considered as practices of productive landscape. Since the term of productive landscape was proposed by a Chinese landscape architect Kongjian Yu (Yu 2010), it has been commonly used in China.

### **Food Urbanism**

The term of food urbanism was proposed in 2011 under the background of more and more food production within the urban context which occurs at a different range of scales and with different constraints than those witnessed in the rural context. All the

production of food within and in close relationship to the urban context belongs to the range of food urbanism. This food production could be “performed by a variety of actors or units including private individuals, groups or associations, public administrations and professional farmers, and it is not limited to a closed circle of the economic entity of a professionally and fiscally established commercial enterprise” (Foodurbanism.org 2011). Based on the concept of food urbanism, an online platform of *Foodurbanism.org* was established with the aim of “building a dynamic, mesh-like connection with the global food urbanism activities and their actors working in the area of spatial development”. The main intention concentrates on “systematic investigations to discover, interpret, advance and develop ways in which the food cycles and urban development coalesce in the generative processes that impact urban life, city space, food production and all their overlaps and permutations”. Not only academic and professional teams but also individuals could participate in foodurbanism.org and “contribute to the growing discourse, share works and communicate with and learn from others working in the global Food Urbanism Movement”(ebd).

The reviews of the definitions above indicated that numerous terms on growing edible plants within the urban area have been formed and were frequently used in the related research and projects. The reasons why this research selected “edible landscape” as the title mainly include the following aspects: 1) this research only focuses on the growing of edible plants, while the term “agriculture”, such as “urban agriculture”, “urban and peri-urban agriculture” and “civic agriculture”, and also the term “productive landscape”, have included animals (e.g. poultry) and non-food products (e.g. ornamental plants and tree products) inside; 2) this research only focuses on the realm within the urban area, and base on the observations, many edible plants existing within the urban area of Beijing were planted for non-food production purposes, such as recreation and achieving greening, and many of them attach importance to the aesthetic functions, therefore, the word “landscape” is more precise than “food” to describe the research object; 3) the scale of this research is not limited on gardening level, therefore, “urban gardening” is not suitable to describe it; 4) the term of “urban horticulture” might be suitable to express the phenomenon of growing of vegetables, herbs and fruits within the urban realm; however, it tends to encompass work focusing on horticultural practice and sciences rather than the existing of growing edible plants. Based on the considerations above, the term edible landscape was selected in this research because it could more precisely describe the research object. Even so, the relative knowledge on other related definitions mentioned above also could be used as in the research of edible landscapes.

### **2.1.2 Planning and design theories**

Since the end of the 19<sup>th</sup> century, the importance of growing food close to where people lived was realized and embraced by urban planners and designers. Several visionary designers and planners proposed diverse theories and urban planning and

design concepts that focus on the integration of edible plants within the urban area.

## **Garden City**

The Garden City movement is an urban planning model that was initiated in 1898 by Sir Ebenezer Howard in the United Kingdom in his book *To-Morrow: a Peaceful Path to Real Reform*. At the heart of the Garden City ideal is the development of holistically planned new settlements which enhance the natural environment and provide high-quality affordable housing and locally accessible jobs in beautiful, healthy and sociable communities (tcpa, n.d.). Garden cities were intended to spark planned and self-contained communities surrounded by parks and green spaces, each of which contains proportionate areas of residences, industry and agriculture. The ideal 'garden city' favored a decentralized city layout sprinkled in a concentric pattern with an abundance of public parks and pastoral open space was laid out in a radial pattern with wide boulevards, extending from the centre (Figure 2.1). The ideal "garden city" would be about 2,400 hectares formed in concentric patterns with around 32,000 city population and would be linked by rail to form networks. The garden city would be self-sufficient. Within the centralized city, there would be parks, orchards, small dairy farms, and other types of productive landscapes. Residents could grow their own food, including generous allotments.

Although the concept of garden city was not well implemented and only considered as a utopian socialist ideal, it greatly influenced the contemporary modern urban planning theories in western countries. The garden city principles offer some insight into developing more sustainable communities and cities that incorporate urban agriculture into its open space infrastructure (Philips 2013). Influenced by Howard's ideas, a lot of garden cities which included spaces for food production were built not only in the United Kingdom but also in the United States, Canada, Australia, Brazil and Germany, etc.

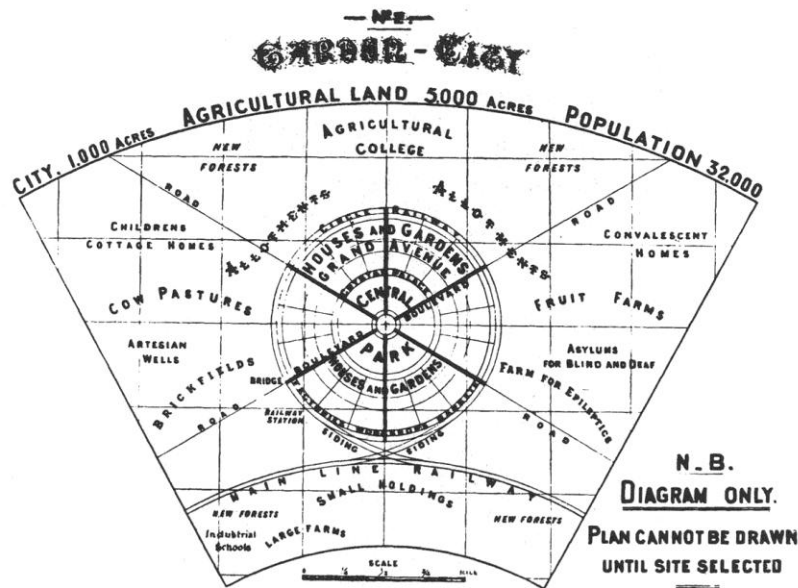


Figure 2. 1 Garden City developed by Ebenezer Howard in *Garden Cities of To-morrow* in 1902

Source: [https://commons.wikimedia.org/wiki/File:Garden\\_City\\_diagram.jpg](https://commons.wikimedia.org/wiki/File:Garden_City_diagram.jpg)

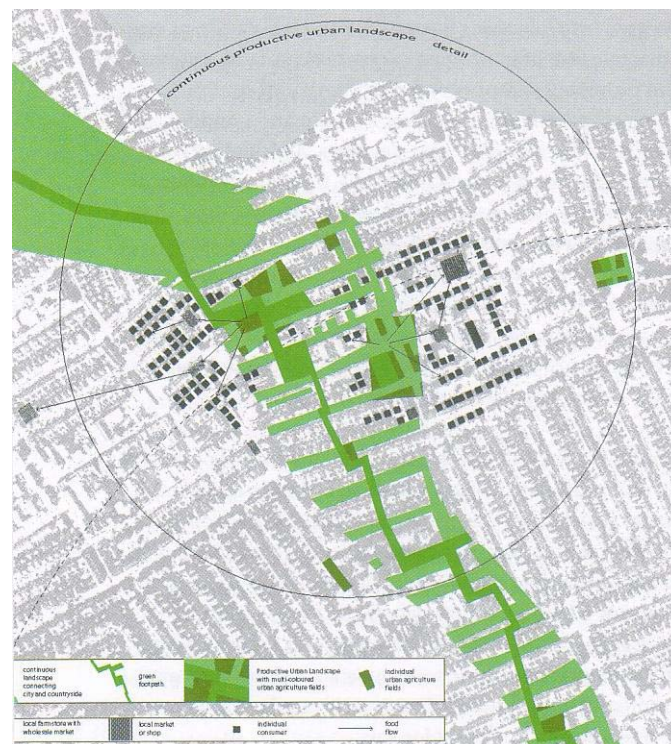
### Broadacre City

Broadacre City was an urban or suburban development concept first proposed by American architect Frank Lloyd Wright in his book *The Disappearing City* in 1932, but it was an idea he stuck with throughout most of his life time, which was refined in his later books and articles until his death in 1959. According to Wright, as the development of automobile and electricity, cities would no longer be centralized, no longer beholden to the pedestrian or the central business district, decentralization (including residence and working place) would become the principle of the future cities, with agriculture as the foundation, and with automobile as the way of transportation. In Wright's concept of Broadacre City, each U.S family would be given a one acre (4,000 m<sup>2</sup>) of land from federal land reserves, producing food for their own consumption; residential areas are connected by the superhighways, along which the infrastructures were arranged; the gas stations were set within the business centers which supply service for the whole area. It was estimated that there would be 500 people per square mile. Wright's ideal community was a complete rejection of the American cities of the first half of 20<sup>th</sup> century and a truly prophetic vision of modern America.

### Continuous Productive Urban Landscapes (CPUL)

The Continuous Productive Urban Landscapes (CPUL) is an urban design strategy integrating food growing into the design of cities through joining together existing open space and disused sites into a linear landscape that connects to the countryside (Bohn and Viljoen 2005) (Figure 2.2). Within the CPULs concept, urban agriculture

mainly refers to fruit and vegetable production, and the key features of CPUL are “outdoor spaces for food growing, shared leisure and commerce, natural habitats, non-vehicular circulation routes and ecological corridors”(Bohn and Viljoen 2014). The concept of CPULs proposes that “urban agriculture can contribute to more sustainable and resilient food systems” while “also benefitting the urban realm” (ebd). Therefore, urban agriculture could “be integrated into city-wide networks of open space, providing a coherent and multifunctional landscape,” and it was recommended being considered as an “essential, sustainable urban infrastructure”(ebd). In 2005, the CPUL concept was still “seen as interesting though utopian,” but since then much has changed in relation to the practice of urban agriculture and the creation of productive urban landscapes (ebd). For example, in 2011 commentators defined the Dutch City of Almere’s future plans for Agromere in Almere Oosterwold as a CPUL (Bohn and Viljoen 2014, cited from Jansma and Visser 2011). In Agromere, a virtual city district on 250 hectares was designed to blend living space for 5,000 inhabitants with urban agriculture (Bohn and Viljoen 2014, cited from Wageningen UR 2011).



**Figure 2. 2 The CPUL concept**

Source: Bohn and Viljoen 2014, pp.12

### **The social and self-sufficient garden concept**

The social and self-sufficient garden is an urban planning concept proposed by German landscape architect Leberecht Migge (1881-1935). He proposed a variety of settlement (‘Siedlung’ in German) plans which integrated the functions of living and gardening, aiming at family food self-sufficiency. He applied “biotechnic” principles to integrally link living and gardening, recycling household waste, including human waste,

to grow foodstuffs for consumption (Haney 2010). Within the concept of the self-sufficient garden, living and gardening were conceived of together as the basic planning unit, and the relationship of garden to settlement was inverted: the small house garden was no longer inserted into the plan as a mere amenity, the garden as planning unit and gardening as biological process determined the underlying order of the whole (ebd). In addition, he considered gardens as “a compatible means of improving life in a mechanized society.” He encouraged the construction of social gardens such as allotment gardens, which was considered as a place where people from different reform persuasions could meet and mix (ebd).

Although during the progressive era of the Weimar Republic (1891-1918), Migge’s designs were often criticized for being too functional and for ignoring the simple fact that many people would be unwilling to maintain the individual garden plots that were very crucial to his theoretical ideas, his *Everyman Self-Sufficient!* (Figure 2.3) represents an important early attempt to reconcile architectural planning with resource management (ebd), which prefigured the contemporary sustainable development trend as well as the resilient community development.



Figure 2. 3 Concept of *Everybody Self-Sufficient!* proposed by Leberecht Migge

Source: Haney 2010, pp.115

### **Agricultural Urbanism (AU)**

Agricultural Urbanism (AU) is “a planning, policy, and design framework for integrating a wide range of sustainable food and agriculture system elements into a community at a site-, neighborhood-, or on a city-wide scale.” It was proposed in the book *Agricultural Urbanism* published in 2010, which gathered together the goals, principles, strategies, insights and ideas developed by a group of academics, professionals, writers and activists working together on issues of food in cities (de la

Salle and Holland 2010). AU is a framework for inviting food and agriculture back into our communities, and back into our lives. In short, it is “a way of building a place around food”(ebd). AU was proposed as antidote to the the lack of connection between sustainable food system and planning and design practice on creating towns and cities. Here, a food system is a cyclical process consisting of eight basic components: growing and production, harvesting and processing, retail and markets, eating and celebrating, distribution and storage, waste and nutrient recycling, food education and outreach, and tying into policy and advocacy (Figure 2.4) (Philips 2013). “Food security and food justice are drivers of the systems in areas where the systems are broken down or lacking in the community”(Philips 2013, cited from de la Salle et al. 2010) AU is a larger, over-arching concept and framework to support a much broader and deeper approach to food in a city than gardens and markets. It not only encompasses the idea of productive urban landscapes, but also underpins them with grounded theoretical arguments drawn from all the aspects of the food system. AU has been described as the next big movement for new urbanism by a group of though leaders and practitioners in the southwest of Canada (Philips 2013).

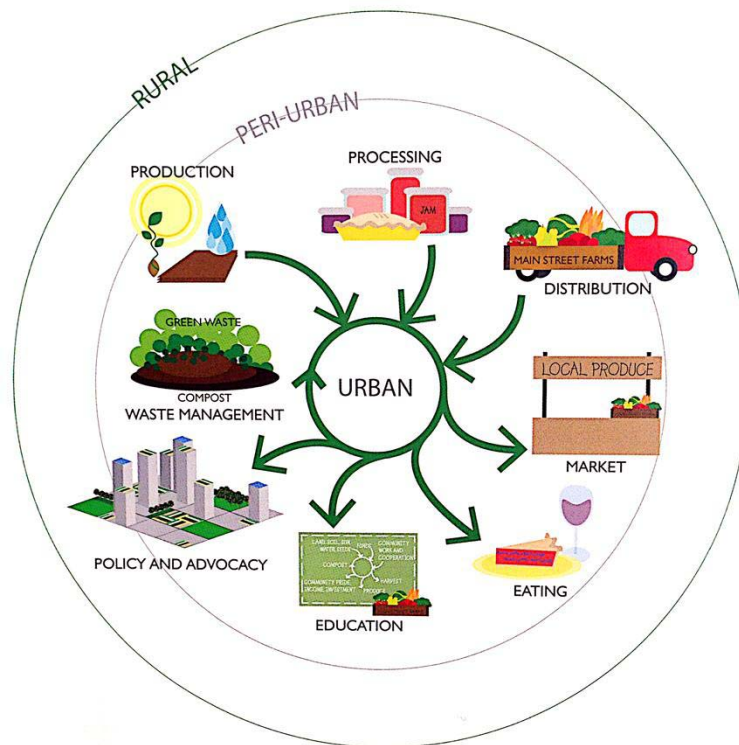


Figure 2. 4 An urban food system: a cyclical process consisting of eight basic components

Source: Philips 2013, pp.46

### The Big Foot Revolution: toward a new landscape aesthetic

The Big Foot Revolution was raised in the book of *The Art of Survival* written by Kongjian Yu in 2006, under the background of non-productive ornamentals as a measure of aesthetics. It provided an aesthetic theoretical support for the application of edible landscapes in urban public spaces. As Kongjian Yu said, “productive



landscapes are how human life began to prosper in our early beginnings. However, as society advanced, the upper class wanted a way to distinguish themselves from the lower classes and as a result ornament and artificial forms transformed into the upper echelon of beauty. Concerns of productivity and health were cast aside. The disfigurement of the human body, the city, and its surroundings has come to define aesthetics” (Yu 2010). He took the art of foot binding, a celebrated practice to make women more desirable, as an example. It was said that the art of foot binding “have been started by the last emperor of Nan Tang Dynasty (937-978 AD), because his favored concubine had tiny feet, and all other concubines and daughters of high rank officials and nobles were encouraged to bind theirs as a kind of primitive cosmetic surgery. This art then flourished until the collapse of the Qing Dynasty in 1911. The natural ‘big feet’ were considered inferior and marked a woman as belonging to the peasant class” (Yu 2006, cited from Xin Hua). Similarly, the same aesthetic criteria coinciding with disfigurement and being artificially has not evolved with the advancement of civilization. Instead, this tradition “has become the accepted practice around the world, and now proposes imminent harm to earth’s natural systems”. For example, “Crops are replaced with lawn and exotic flowers in the name of ‘beautification’, inbred dogs roam the streets, and mutated goldfish grown in ornamental ponds are touted as sophistication and beauty” (Yu 2010). Under this background, Kongjian Yu proposed that China need a “Big Foot Revolution”, and a “new criterion of aesthetics and value needs to be articulated to overturn the existing one.” Only in this way “can cities be sustainable and land be rejuvenated”(ebd). The terms like “productive landscape” and “the beauty of weeds” are reflections of this new landscape aesthetic concept.

## **2.2 A brief history of growing edible plants within the urban area**

The history of growing edible plants within the urban areas could contribute to the understanding of the edible landscapes within the urban area. Therefore, it was reviewed based on the previous research and literatures. Growing edible plants in cities has a long history, which could be generally divided into three stages based on the development process of human society: 1) in the agrarian society, 2) in the industrial age, and 3) in the post-industrial society.

### **2.2.1 Agrarian society**

The earliest historical indications show that agriculture goes back as far as around 11,500 years ago (Balter 2013). Agriculture, which changed human life from nomadic life to settled life, is what allowed societies to create cities and civilization (Smit et al. 2001). About 3500 BC to 3000 BC, the first cities in human history emerged first in the Nile Valley, then in Mesopotamia (Xu, Zhou and Ning 2009). The archaeological



record indicated that in many ancient countries, agriculture was manifested as a contained and controlled zone within the compounds and cities by thick, sturdy walls to keep out the untamed wilderness located outside the city walls (Philips 2013). In the agrarian society, the absence of transport systems and preservation techniques such as refrigeration forced people to grow food close to where they lived. Consequently, for thousands of years, food production and the built environment co-existed (Howe, Bohn and Viljoen 2005). Urban inhabitants possessed domestic animals and managed small farm or garden lots delivering food for the settlement's population, which was interspersed among residential buildings, markets and public buildings within the urban areas or were located in the immediate surroundings of cities all over the world. In agrarian society, where people lived was where people grew (ebd), and the farming activities were an integrated part of urban life.

Western landscapes originated from the agricultural landscape (Lin and Wang 2005). Evidence of Egyptian gardens from about 2200 BC are the earliest record of man's activity in landscape development. Both useful and ornamental plants were planted then (Carpenter et al. 1975). The ancient Egyptian paintings indicated that the earliest Egyptian gardens and courtyards are practical with cultivated field, fruit trees or fish ponds (Figure 2.5). In ancient Greece and Roma, the earliest gardens were mainly manicured and trim practical gardens, cultivated with varieties of fruits, vegetables, spices and condiments, etc. Although the ornamental value gradually became more important than the practicability of gardens as the high development of art in these two ancient countries, the practical and ornamental landscapes co-existed in the ancient western gardens for a long time (Guo, Lv and Ren 2007). In the medieval times, the practical gardens accounted for important position again in European countries. The courtyards attached to the castles of feudal lords and the churches of the monastery were usually built into practical gardens, coordinating with the function of architecture, such as the medicinal garden attached to a hospital and the vegetable garden attached to a cafeteria kitchen. In the European classic gardens, fruit orchards were commonly planted for nobles to see and pick, and the kitchen garden was usually one necessary component of the classic garden for not only culinary needs but also for pleasure as well. For example, the Kitchen Garden of the King in Versailles, France, was created in 1678 to meet the culinary needs of King Louis XIV (Figure 2.6). In addition, fruit orchards were also an important feature of the English landscape throughout medieval and post-medieval times (Dallas, Barnes and Williamson 2015). Before the middle of 18<sup>th</sup> century, fruit gardens were a very important type of garden in many western countries and America (Guo, Lv and Ren 2007).|



**Figure 2. 5 1) Tomb painting showing the garden estate of a wealthy Egyptian official, from the time of Amenhotep III (about 1400 BC), 2)Rectangular fishpond with ducks and lotus planted round with date palms and fruit trees, in a fresco from the Tomb of Nebamun, Thebes, 18th Dynasty**

Source: 1) Carpenter et al. 1975, pp. 15, 2) [https://en.wikipedia.org/wiki/Gardens\\_of\\_ancient\\_Egypt](https://en.wikipedia.org/wiki/Gardens_of_ancient_Egypt).



**Figure 2. 6 The Kitchen Garden of the King in Versailles, France**

Source: <http://www.paristoversailles.com/potager-du-roi/>,

<http://en.parisworldwide.com/trends/paris-behind-scene/le-potager-du-roi-secret-garden>

No matter in western countries and eastern countries, the earliest gardens were built primarily with practical applicability, although the practical gardens in China were changed into ornamental gardens very early. Based on the record of a Chinese ancient book The Rites of Zhou, the imperial parks and gardens of Zhou Dynasty (1046 BC-771 BC), which were built at the initial stage of the Chinese garden development, were cultivated with fruit trees such as peach, plum and papaya. In the later Chinese ancient garden constructions, fruit trees were also usually cultivated, such as loquat, pear, persimmon, apricot, plum, peach and pomegranate. Shanglin Park, one of the most important royal parks in Western Han Dynasty (202 BC-8 AC), was a grand view garden cultivated with varieties of fruit trees, such as apricots, plums, pears, apples, grapes, pomegranates, persimmons and walnuts. Since Tang (618 AC-907 AC) and Song (960 AC-1279 AC) Dynasty, many temple masters and squires developed chestnut orchards actively. Many place names with “chestnut” in Beijing today are related to the cultivation of chestnuts at that time, and some fruit trees existing in the urban courtyards or urban greening space in Beijing were

preserved from ancient times. In addition to the royal gardens, some Chinese literati gardens in the Ming (1368 AC-1644 AC) and Qing<sup>6</sup> (1616 AC-1912 AC) Dynasties were inspired by agricultural landscapes and cultivated with edible plants (Guo, Lv and Ren 2007).

### **2.2.2 Industrial age**

In agrarian society, the urban inhabitants managed small kitchen gardens, farms and stock farming land, but this changed with the industrial revolution in many parts of the world. During the industrialization process, the invention of the steam engine and the building of the railways brought the divorce between cities and food production. In some developed countries early into the era of industrialization such as England, Germany, France and the United States, large numbers of underemployed farm workers migrated from rural areas to the fast growing cities to find employment and better life (e.g. the well-known migration in 19th century in Europe). In many cases the urban workers with their rural identity and lifestyle “naturally” cultivated non-built areas and saved lands from urbanization (Caggiano 2015), and allotment gardens (or migrant gardens) for underprivileged people emerged, providing opportunities for them to produce part of their food themselves. The farmers’ fleeing into cities brought an urban population surge, and a lot of problems endured by urban factory workers such as housing shortage, food shortage, alienation from nature and other forms of social neglect, which were causes of mounting concern by varieties of social sectors. One attempt to solve these problems was the spread of urban allotments. For example, in the UK, “allotments were originally established in the early eighteenth century to compensate the landless rural poor for the enclosure of common land by wealthy landowners” (Crouch and Ward 1988), with the function of providing “a nutritional and economic safety net against unemployment or to supplement meager incomes”(Howe, Bohn and Viljoen 2005). In Germany, the so called “schrebergarten” or allotment garden movement started in the mid-nineteenth century, named in memory of Dr. Daniel Schreber of Leipzig, who had argued not only for the founding of gardens for the urban masses, but also for open exercise areas for children (Haney 2010, cited from Bertram and Gröning 1996). In order to improve the farmer workers’ overall situation and to allow them to grow their own food, the city administrations, the churches or their employers provided open spaces for building allotment gardens. In the United States, by 1895 allotment gardens of the poor had been built in 20 cities with purpose of producing food for poor (Sun 2013). In the late 19th century, “the growing power and responsibilities of local government were reflected in the allotments legislation.” In the UK, “acts of 1887 and 1892 required local authorities for the first time to provide allotments for the laboring poor where need was shown.” In Germany, the first legislation for allotment gardening was passed in 1919, providing security in land tenure and fixed leasing fees. Under this context, many famous urban planning and design theories on the integration of food growing into the city were

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<sup>6</sup> Qing dynasty was the last imperial dynasty of China, ruling from 1644 to 1912.

developed by architects and urban planners. Ebenezer Howard's Garden cities of Tomorrow in the end of 19<sup>th</sup> century and Frank Lloyd Wright's Broadacre City in the middle of the 20<sup>th</sup> century are among the more well-known examples. Although they were proved to be utopias later, their concepts greatly influenced the urban planning and construction at that time. In the UK, 33 new towns were built based on the concept of Howard's Garden City (Howe, Bohn and Viljoen 2005, cited from Ward 1993).

During World War I and II between 1900 and 1945, the biggest driving force to urban food production in Europe and America was war. In both World Wars, because of the threat of starvation, kitchen gardens, allotment and community gardens, sometimes called "war gardens" or "victory gardens", proliferated with the aim of reducing the pressure of public demand during the war years when foods were rationed and scarcer. In the UK, the number of allotments, each "roughly tripled from between 450,000 to 600,000 in 1913 to between 1,300,000 and 1,500,000 by late 1917, which together produced 2,000,000 tons of vegetables" (Howe, Bohn and Viljoen 2005, cited from Crouch and Ward 1988). At the outbreak of the Second World War, the famous "Dig for Victory" campaign was launched by the Minister of Agriculture in 1939 (Figure 2.7). "By the middle of the war, a survey showed that over half of all manual workers were producing food from either an allotment plot or garden, and by the war's end there were approximately 1,500,000 allotments." In 1944, the allotment gardens were meeting "10% of national food needs and around half the nation's fruit and vegetable requirements" (Howe, Bohn and Viljoen 2005, cited from Crouch and Ward 1988). In Germany, during World War I, food production within the city, especially fruit and vegetable production in home gardens and allotment gardens, became essential for the survival of the urban population. The first legislation for allotment gardening passed in 1919, one year after the end of World War I, indicated the obvious importance of allotment gardens for food security. In 1931, "the provision of allotment gardens for the unemployed was decreed by Germany's president" (Senate Department for Urban Development and the Environment n.d.). In 1933, the demonstration of the residential areas with standardized allotment garden rapidly spread in Germany (Chen and Feng 2008). In the United States, during World War I, president Herbert Hoover administered a policy of eliminating food waste and encouraging production to enable the shipment of food to American troops and allies overseas (Nasr et al. 2014). First Lady Eleanor Roosevelt planted on the White House lawn and encouraged their revival during World War II (NAi Publishers and Haag 2012). Victory gardens widely spread and "provided increased food supplies which required minimal transportation" during and after both world wars (ebd). The U.S Department of Agriculture (USDA) estimated that the "war gardens" and "war farms" within the urban area produced 40% of the nation's fresh vegetables needs during the war (Sun 2013, cited from Benevolo 1971).



**Figure 2. 7 “Dig for Victory” campaign in Britain: 1) 1939-1945, The Tower of London; 2) 1939-1945, Sunday Morning, Clapham Common, London; 3) Girton college students during the Second World War**

Source: Howe, Bohn and Viljoen 2005, pp.102-104.

However, in the post war period, along with the economic boom, gardening in cities gradually lost its importance (Caggiano 2015). For example, since 1950s after the “Dig for Victory” campaign in Britain, “there was a sharp decline in urban food production” because the power of supermarkets and the global transportation of food have increased (Howe, Bohn and Viljoen 2005). “Urban gardens became an element of landscape degradation and a symbol of poverty and sociocultural resistance owing to the modernization processes”(Caggiano 2015).

Different with the western countries, where densely populated urban area was usually clearly separated from surrounding rural areas, some Asia countries, such as Japan, have not “clear separation of urban and agricultural land uses, but a mixture of agricultural lands and urban fabrics even in the central core of the city”(Yokohari et al 2000). Therefore, a lot of edible landscapes which exist within the urban area in Japan were preserved from ancient times, and thereby have a long history.

Growing food in cities was also a common phenomenon in many developing countries such as Cuba, Chili and Kenya, but the impetuous for its emergence was different with that in the developed countries in Europe and North America. In these countries the prevalence of urban agriculture increased with increasing levels of economic hardship (Mbiba 2005). When the developed countries had basically completed their industrialization, many developing countries were still suffering from poverty and hunger. For example, the UN Food and Agriculture Organization estimated that 239 million people in sub-Saharan Africa were hungry or undernourished in 2010<sup>7</sup>. Therefore, the inhabitants usually informally used derelict urban spaces to produce food for subsistence under harsh economic conditions. Since the 1990s in some developing countries the urban agriculture within the boundaries of cities started getting support and encouragement from the government. For example, since the early 1990s the urban agriculture in Cuba was built using a combination of top-down and bottom-up approach. Since the collapse of the Soviet Union in 1991, Cuba lost its cheap oil supplies and suffered urban economic collapse. The nation’s agriculture and food industries, which were heavily dependent on imports, faced an immediate crisis.

<sup>7</sup> Source: [http://www.worldhunger.org/articles/Learn/africa\\_hunger\\_facts.htm](http://www.worldhunger.org/articles/Learn/africa_hunger_facts.htm).

Because of the fossil fuel shortage, the shipping of products and transportation by car become impossible for most Cubans, and the synthetic pesticides and fertilizers were also no longer available, which drove the traditional agricultural system into critical disruption. In order to cope with the threatened food security, the government made important policy to create a food system that could feed its people without the use of fossil fuels-based technologies. Hundreds of state-owned hectares of land were authorized to be used by citizens who were interested in cultivating them. The Ministry of Agriculture structured itself to “provide citizens with advice, material support and encouragement in the management of agricultural activities” (Díza and Harris 2005). Urban agriculture activities were done everywhere, covering the provincial, the municipal and the local levels (Díza and Harris 2005, cited from Cruz 2001). And finally, a sustainable food system was formed by transforming the highly centralized system that relied on fossil fuel-based transportation and distribution into the decentralized system with a diverse and local infrastructure: industrial farms became organic local urban ones; most things were produced and provided within walking distance; local markets thrived with local produce and products (Philips 2013). The urban agriculture model achieved great success in Cuba: recent statistics shows that 60% of the food eaten in Havana is grown in the city limits (ebd). The urban agriculture has been combined into the national land use planning in Cuba which was passed in 2000 (Sun 2013). The unique success and lessons of the urban agriculture model during the special period in Cuba were learnt worldwide, and many developed countries such as the United States started to rethink their highly centralized system of food production and to explore alternative sustainable food system. In the late 1990s, urban agriculture was adopted by the government of many developing countries such as Argentina and South Africa. However, urban agriculture was not encouraged by the governments in all the developing countries. For example, the Kenyan government formulated regulations in 1994, which clearly prohibited the presence of urban agriculture, mainly based on considerations of urban public health. Once the farming activities within urban area were found, the agricultural property might be confiscated by the government. Therefore, although farming activities carried out by the urban citizens within the urban areas in Kenya, mainly located along the highway, rivers or other vacancy space, were very common, they were usually informal (Sun 2013).

In the second half of the 1990s, the practical projects and research on urban agriculture greatly increased all over the world, not only in developing countries but also in developed countries. Some international organizations, such as the United Nations Development Program (UNDP) established in 1996 and the International network of Resource Centers on Urban Agriculture and Food Security (RUAF) established in 1999, have greatly improved the development of urban agriculture in developing countries.



### 2.2.3 Post-industrial era

As the industrialization process was completed in the developed countries, the society entered the post-industrial era<sup>8</sup>, especially in western countries. In the post-industrialized society, the service sector generates more wealth than the manufacturing sector of the economy, the society is marked by an increased valuation of knowledge, and people are increasingly environmentally aware. People started to pay more attention on the environmental issues, energy issues and health issues, and started to rethink the commercial agriculture mechanism. Against this background, several movements such as the environmental movement, community food-security movement<sup>9</sup>, the Slow Food movement<sup>10</sup> and local food movement were developed, which promoted a revival of urban food growing in many developed countries. In Britain, the decline in urban food production in 1950s was followed by a revival of urban food growing in the early 1970s (Howe, Bohn and Viljoen 2005). The burgeoning environmental awareness not only sharply increased the demand for allotments in many places, but also promoted new forms of urban food growing activity, such as urban farm and community gardens (ebd). The urban farms are usually established with multiple purposes, such as keeping livestock for food, for environmental education and for other products, operating markets or restaurants selling farm products or offering activities such as horse riding, and providing venues for public meetings and training courses, but environmental education is always a strong theme of an urban farm (ebd). In 1971, "the first urban farm was started in Kentish Town, North London," and by the 1990s "there existed more than 60 such farms all over the country" (Howe, Bohn and Viljoen 2005, cited from Hough 1995). The concept of community gardens was originated in the USA, as a role of focusing on the community regeneration through group farming activities, in the early 1970s, and it often emerged in deprived urban districts such as "The Bronx and Harlem in New York, where women, particularly black women, are especially prominent as activists and participants" (Howe, Bohn and Viljoen 2005, cited from Hynes 1996). In 1978, the American Community Gardening Association (ACGA) was formed, which has dramatically improved the development of community gardens. The ACGA reported that between 1990 and 1992, 523 new community gardens in 24 cities across the USA were set up (Howe, Bohn and Viljoen 2005, cited from Hynes 1996). "In New York alone, the Green Thumb Community Gardening Programme has developed from its inception in 1878 to encompass 700 community groups across the city by the mid-1990s" (Howe, Bohn and Viljoen 2005, cited from Garnett 1996). Community gardens quickly became popular worldwide.

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<sup>8</sup> The concept of post-industrial society was popularized by Daniel Bell through his 1974 work *The Coming of Post-Industrial Society* (Bell 1974). It is a particular concept towards the developed countries which have fully realized industrialization, thereby is highly western-centric.

<sup>9</sup> *Community Food Security (CFS) movement is an effort by thinkers, researchers, community activists, farmers, environmentalists, community development advocates and others across sectors and disciplines to move toward sustainable, regional food systems* (McCullough n.d.).

<sup>10</sup> The Slow Food movement, which originated in Italy, is a response to homogenous, mass-produced food production, and the "fast" nature of people's lives, by encouraging traditional ways of growing, producing, and preparing food (Gaytan, 2003).

In 1990s, the concept of sustainability made the environmental benefits of urban agriculture gradually be identified and acknowledged by people. Large quantities of urban agriculture emerged or were preserved in developed countries in response to social or recreational needs and desires. In Germany, there were about 1.4 million allotment gardens covering an area of 470 km<sup>2</sup> (Gröning and Wolschke-Bulmahn 1995), the functions of which have changed over the course of time from the economic utility to leisure-time and recreational function (Senate Department for Urban Development and the Environment n.d.).

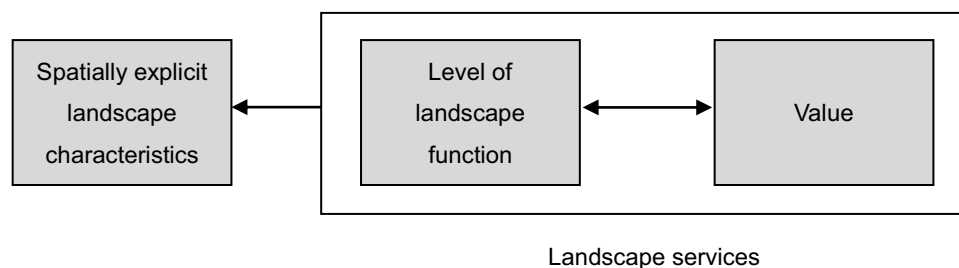
Especially after 2000s, growing food within cities has been spreading across vacant and marginal land worldwide, responding to different and multifaceted needs. In Europe, “interest in allotment holding, urban farming or community gardening” has constantly increased in recent years (Howe, Bohn and Viljoen 2005). In Germany since about 2005, urban food growers have steadily gained ground, especially, but not only, in more socially oriented urban agriculture activities” (Bohn and Viljoen 2014). “In Berlin alone there are 833 allotment garden complexes” (Senate Department for Urban Development and the Environment n.d.). “The number of community gardens in Berlin has doubled” since about 2005 and “is now about 90” (Bohn and Viljoen 2014, cited from Rosol 2006; TUB 2011). In the UK, there were “around 30,000 active allotment holders gardening on 831 ha of land, of which 111 ha are in inner London” (Van Leeuwen et al. 2010). “The Capital Growth project gave the London community gardening scene an important boost in 2009 with the goal of creating 2,212 new projects in the three years to the 2012 Olympics” (Bohn and Viljoen 2014). Several British cities have developed “strong dedicated food-growing networks and programmes” (ebd). In the United States, as the Urban Land Institute in the United States estimates, in 2010 there were at least 200 projects in the United States that include agriculture as a key community component (Gorgolewski et al. 2011). “During the Depression, city lands were made available to the unemployed and impoverished by the Work Projects Administration; nearly 5000 gardens on 700 acres were cultivated in New York City through this programme” (Van Leeuwen et al. 2010). In Netherlands, there were “around 250,000 community and allotment gardens, which account for around 4000 ha of land.” In Amsterdam, “about 350 ha of land were used for urban gardens” (Van Leeuwen et al. 2010, cited from CBS 2007). As the increasing concerns on ecology, health and regeneration, urban agriculture has become an increasing common feature of many urban areas in the Global North during the last twenty or so years (Bohn and Viljoen 2014). In addition to the greatly emerging practical initiatives and projects, urban food growing has been moved up to the political and planning agenda (Morgan 2014), which have been mentioned above.

### **2.3 Services of the edible landscape within the urban area**

The “services concepts”, for example ecosystem services, landscape services, and environmental services, emphasizes the “connection between physical systems



(ecosystems or landscapes) and human values.” “Services” (which is shorthand for “goods and services”) are essential for the existence and convenience of humanity (Daily 1997; De Groot et al. 2002; Millennium Ecosystem Assessment 2005). Examples of services are energy, flood prevention, and recreational activities (De Groot 2006). The difference between “functions” and “services” includes the following points, “functions” can be translated into “services” when they are valued by people (Figure 2.8); one function can offer several services; functions continue to exist in the absence of people, whereas services exist because people use and value the landscape (Termorshuizen and Opdam 2008).



**Figure 2. 8 The structure–function–value chain as a framework for landscape ecological knowledge, which gives meaning to the term “landscape services” for collaborative landscape development (Termorshuizen and Opdam 2008)**

In this research, the service of the edible landscape within the urban area (ELWUA service) is defined as the benefits human populations obtain from ELWUA. These services are the outputs of the ELWUA that most directly affect the quality of life (or life satisfaction) and the well-being of people.

ELWUA can supply multiple services to urban residents. It is not only producing food within the urban area, but is also a mechanism that connects people and businesses, that creates jobs, awareness, and a sense of place, and that contributes to improved public health and a more resilient environment (Miazzo and Minkjan 2013). Since the abundant emerging literatures on urban agriculture from the 21<sup>st</sup> century, much has been discussed and written about the various benefits of (re)accommodating food growing in urban centers (Bohn and Viljoen 2014). This section provides a review of the previous existing literatures regarding ELWUA services, which could support the later structural establishment of the ELWUA services in Beijing. The reviewed ELWUA service could be generally divided into eight subaspects: provision services, environmental amenities and services, social services, recreational services, health services, economic services, cultural services and educational services (Table 2.2). The summarized ELWUA services covered both developed and developing countries, but most of them are from the literatures of the developed economies.

**Provision services:** the provision services consist of all the products obtained from the edible landscapes within the urban area, such as crops, fruits and vegetables. ELWUA could not only contribute to the yield of food production, but also provide food

in higher qualities, such as nutritious, fresh and tastier food.

**Environmental amenities and services:** the proper operated ELWUA is beneficial to the environment amenities and could supply environmental services in the form of ecosystem service. Edible landscapes within the urban area could supply nearly all the ecosystem services that the normal vegetation can, which mainly include waste recycling, transforming the urban form into ecosystems, biodiversity increasing, reduction of city's ecological footprint, fossil fuel energy saving (for heating and cooling, food transportation), urban microclimate regulation (at street and city level), flooding regulation, city noise attenuation, reduction of urban glare, and windbreak.

**Social services:** ELWUA could create or strengthen communities and social ties. The social services of the ELWUA mainly include enhancement of food security and food justice, social connection, social justice, foundation of the sense of place, renovation of derelict urban sites, sustainable community building and amenity, reducing community crime, connection of urban and rural territories, urban lifestyle improvement, influencing and improving urban planning, gender equity, supplying opportunities for special population group, and increasing self-esteem.

**Recreational services:** ELWUA could provide leisure and recreational service through supplying edible green space or creating opportunities of interacting with edible plants (i.e. cultivation opportunities) for urban residents.

**Health services:** Natural green spaces have been found to possess various positive effects on human well-being (Aldous 2007, Tzoulas et al. 2007). ELWUA could not only bring inhabitants the health benefits which the normal ornamental landscape also can, such as improving mental wellbeing, but also supply the particular service which the ornamental landscape cannot. The health services of the ELWUA mainly include improving physical health and improving mental health, in which, the services of improving physical might include offering nutrition, reducing chronic diseases, supplying medicinal properties and supplying exercise opportunities, and the services of improving mental wellbeing might include generating happiness, mental health, reducing stress, accelerating healing process and therapeutic effects of gardening.

**Economic services:** ELWUA could create jobs, support local economic activities, and also might stimulate local economies. The economic services of the ELWUA mainly include job/employment opportunities creation, income or income patching in food production and cost saving in food consuming, promoting local economic development, diversifying industry base in cities, investment attraction and increasing real-estate value, cost saving on heating/cooling and "food miles".

**Cultural services:** ELWUA could provide non-material services in the cultural aspect for the urban residents through reconnecting city life with food, emphasizing cultural heritage value of agriculture, bringing inspiration and providing aesthetic experience.

**Educational services:** ELWUA could not only provide opportunities to teach urban citizens food skills, but also promote awareness about food, health, and the environment through popularizing environmental, agricultural and ecological science. It also could be used as teaching, research and experimental materials.

**Table 2. 2 Literature reviews of the services of the edible landscape within the urban area**

ELWUA Services		References
Provision services	Food provision ( include fresh and tastier food provision)	It is estimated that as early as 2000, about 30% of the US agricultural production came from metropolitan areas (Adeyemi 2000). Use of community gardens to grow food for individual consumption has received significant consideration within the academic literature (Baker 2004; McCormack et al. 2010; Guitart et al. 2012; Svendsen et al. 2012). Taste is a great driver for Australian households to grow their own food (Wise 2014).
Environmental amenities and services	Waste recycling	Food waste contributes 30%-40% of municipal solid wastes (Forkes 2007; Lee et al 2007). Composting and recycling in agriculture, gardens reduces nutrient losses (e.g. Forkes 2007), many lead to soil nutrient accumulation (Khai et al 2007), and reduces greenhouse gas emissions (e.g. Tsai 2008).
	Transforming urban form into ecosystems	In the cities of developed countries as well as in those of developing ones, urban agriculture can durably contribute to transforming the urban form into complete ecosystems, fertile and viable (Nail 2015). The primary motivation of community gardeners in Montréal, Canada, was to establish direct contact with nature (Bouvier-Daclon and Sénécal 2001). Surfaces used for urban agriculture have the potential, like other green spaces, to influence the attractiveness of the city, to reinforce its identity and to enhance the population's quality of life (van Leeuwen et al. 2010).
	Biodiversity increasing	Urban agriculture is an effective tool to slow down the loss of biodiversity. Urban agriculture occurs on small sites and typically has a more diverse/integrated crop mix. As urban agriculture grew in the Washington USA metropolis from 1978 to 1998, the variety of tomatoes available in the market increased from eight to seventy-four (Smit 2000).
	Reduction of city's ecological footprint	Home and community gardens have the potential for environmental improvement through reduced environmental impacts of transporting and distributing food, e.g. reducing "food mile", minimizing transport emissions (Wise 2014). Vegetation (crop UA) sequesters carbon (Pearson et al. 2010). Food-sensitive planning and urban design (FSPUD) creates opportunities for significant reductions in the environmental footprint of urban settlements, by taking advantage of the spaces and resources (such as water and nutrients, including food wastes) that are abundant in urban areas, and by reducing the transport and storage requirements associated with food (Donovan, Larsen and McWhinnie 2011). Urban agriculture closes open nutrient and energy loops (Smit 2000).

Fossil energy saving for heating and cooling, and food transportation	In the transition process from a dependence on fossil energies to local resilience, food is a core issue and urban agriculture has a central role to play (Nail 2015).
Urban microclimate regulation (at street and city level)	Urban heat island (UHI) and air pollution, e.g. ozone, can be mitigated by vegetation. UHI over vegetation/parks c. 4-5°C cooler than built environment (e.g. Taha 1997; Wong and Yu 2005; Strathopoulos and Cartalio 2007) (Pearson et al. 2010). Trees and other landscaping plants absorb heat and sunlight, reducing cooling costs and creating a much more enjoyable urban environment for residents of a community (Bowler et al. 2010; Bradshaw and Tozer 1993; Gallo et al. 1993; MacDonald 2007; Nowak et al. 1996; Spronken-Smith, Oke and Lowry 2000; Xian and Crane 2006). Farmland as a part of urban green infrastructure plays an important role in regulating urban microclimate, especially a reduction of the urban heat island effect (Lee, Ahern and Yeh 2015).
Flooding regulating	By absorbing water, trees and plants reduce the amount of runoff that the city has to deal with, pump out, or purify after significant rainfall events (Baron et al. 2002; Endreny 2004; Jackson et al. 2001; Panno et al. 1999; Shuster, Gehring and Gerken 2007; Tyrvaainen 1997; Xiao and McPherson 2002; Xiao et al. 2007). The paddy rice field which is located nearby rivers or canals can play a significant role in flood remediation (Lee, Ahern and Yeh 2015)
City noise attenuation	Vegetation is significant in attenuating city noise (Kumar et al. 2008). By installing natural landscaping, noise pollution levels can be significantly reduced. This improves the quality of life for both the human population in a community and the local wildlife who may be affected by unwanted noise (Bolund and Hunhammar 1999; Elmquist et al. 2004; Younis, Qasim and Riaz 2008).
Reduction of urban glare	Green spaces reduce urban glare in cities by absorbing light, strategically placed landscaping becomes an important tool for city planners to capture the light and deflect it so that the light is not so harsh and unpleasant for residents and drivers, improving the quality of life in the community (Smardon 1988).
Windbreak	Urban green spaces can reduce the harmful effects of wind in cities by slowing the wind and greatly diminishing its strength, helping to preserve delicate natural environments which could be harmed by high speed winds (Lehvavirta 2007; Long and Ramachandran Nair 1999; MacDonald 2007).
Social services	“Urban penalty” in access to sufficient and healthy (quality) food for urban poor, thought to be addressed by micro urban agriculture (Islam 2004; Zezza and Tascotiu 2008).

Social connection	Over the past 20 years, urban agriculture has included among its objectives the creation of social connections in often anonymous cities (Waliczek et al. 1996). Organization through UA (micro and meso level) leads to enhanced development; i.e. information flow, neighbourhood watch, community cohesion (Mudimu 1996; Armstrong 2000; Brown and Jameon 2000). Strong social connections can be formed through the garden (Wise 2014). In areas of mixed ethnicities and socioeconomic status, UA projects provide an opportunity to bring individuals together that may not, under other circumstances, socialize and form groups (Jackson 2014). Being a member in a community garden fosters social interactions and exchange. This is particularly important for members of the population who are at risk of being isolated due to old age or because they are part of a minority group (Duchemin et al. 2008).
Social justice	UA can alleviate symptoms of injustice, such as disparate access to food or environmental amenities (Nail 2015).
Foundation of the sense of place	Food systems can play an important role in shaping a community's sense of itself, the relationship between community members and the connection with the land (Holland Barrs Planning Group et al. 2002). Farming protected in urban greenbelts of capital cities preserves national rural image (Pearson et al. 2010).
Renovation of derelict urban sites	Urban and peri-urban agriculture (UPA) in Britain has benefit of renovation of derelict urban sites (Cook, Lee and Perez-Vazquez 2005).
Sustainable community building and amenity	UA, if managed as a participatory planning process, can lead to community development and so to the revitalization of a city (Mougeot 2006). The literature provides significant evidence of community development benefits brought by community gardens such as building social relationships, promoting active citizenship and reaffirming community identity (Wise 2014). The strength of a community and of a common interest leading to increased resilience, cohesion and happiness (Nail 2015). UA produces the opportunity to recognize commonality through shared values, a fascination with nature and making things grow, and a mutual commitment to making communities better (Jackson 2014). UA projects can be utilized to bridge the divide between racially disparate communities (Jackson 2014). Public spaces incorporate food (e.g. street fruit and nut trees, herbs and productive shrubs and perennials) provide amenity through shade and cooling, demonstrate seasonal variation in the landscape, and create opportunities for social interaction and inclusion (Donovan, Larsen and McWhinnie 2011).
Reducing community crime	UA helps combat discrimination as well as reducing crime in residential neighborhoods, particularly poor inner-city neighborhoods (Kuo and Sullivan 2001). New York City gardens had a statistically significant positive impact on

		residential property within 1000 feet of the garden, an impact that increased over time, especially in the poorest neighborhoods (Voicu and Been 2008). Urban green spaces inspire people to come together and fight for what they know is holding them together as a community (Chon and Shafer 2009; Donovan and Prestemon 2010; Gorham et al. 2009; Kuo 2003; Kuo 2004; Kuo, Bacaicoa and Sullivan 1998; Kuo and Sullivan 2001; Kuo et al. 1998; Landscape and Human Health Laboratory 2003; Sullivan, Kuo and DePooter 2004).
	Connection of urban and rural territories	UA translate new relationships between urban and rural territories (Nail 2015).
	Urban lifestyle improvement	UA changed the lifestyles of urban residents, making farming activities become part of urban life, which provide new concept for urban development (Sun 2013).
	Influencing and improving urban planning	Buffer zones, greenbelts, heritage values, social identity and economic infrastructure of UA influence urban planning in Ile-de-France (Fleury 2002).
	Gender equity	In developing countries, e.g. Zimbabwe, it is predominately women who undertake UA, ensuring they have greater input and self-determination of household resources (Mudimu 1996)
	Supplying opportunities for special population group	Some type of urban agriculture (e.g. social farming) could provide social or educational care services for vulnerable groups of people (Petrics 2014)
	Increasing self-esteem	The involvement in the provision of food (growing, cooking or social eating), can increase opportunities for social engagement and connection to nature and help foster increased self-esteem and a sense of achievement (Barker-Reid and Faggian 2008; Bell and Standish 2009; Donovan, Larsen and McWhinnie 2011).
Recreation services	Leisure space and recreational opportunities supply	Community gardens offer leisure spaces to individuals of diverse races (Jackson 2014).
Health services	Improve physical health	Nutrition Food access Garden projects in low income, black neighborhoods provide a source for nutritious fresh food that would otherwise be unattainable (Jackson 2014). Access to fresh food is rated as the highest benefit from micro urban agriculture by English allotment holders (Perez-Vazquez et al. 2005). UA should be able to address specific deficiencies in micronutrients and vitamins (now recognized as more important than gross dietary energy or protein (Gibney and Strain

1999; Allen 2003) which is particularly constrained in poor societies (Seinfeld 2003).

Improving dietary diversity and dietary habits	Residential or community food production increased the urban gardeners' intake of fresh produce in terms of volume, frequency and variety. Growing food at home also increases practical experience and exposure to fresh food in terms of cooking, preserving and understanding seasonality, which all have the potential to impact dietary habits positively (Wise 2014). Numerous cities in Europe, among which Nantes and Strasbourg in France, have promoted healthy diets by planting fruit trees in the city centre, inviting urban dwellers to help themselves to the fruits, thus encouraging them to look at food production in a different way and to change their eating habits (Nail 2015). There is a statistical difference between the vegetable intakes of community gardeners and non-gardeners (Litt et al. 2011). Including a garden component will increase the likelihood of vegetable intake (Parmer 2009).
Better quality (fresh, tasty) food intake	Increased availability and access to fresh (and less processed) food such as vegetables and fruit from local food networks offers health benefits to the community (Wakefield et al. 2007). Home growers can produce foods that are tastier, fresher, and less altered than commercially grown foods, and can preserve more of their vitamin content (Creasy 1982).
Reducing chronic disease	Nutritionally appropriate food offers protection from illness and chronic disease, increases life expectancy and provides people with greater vitality (Donovan, Larsen and McWhinnie 2011). "Gardening has been connected to reducing risks of obesity, coronary heart disease, glycemic control and diabetes, and occupational injuries" (Bellows, Brown and Smit n.d.).
Medicinal properties	Many edible plants have valuable medicinal properties. Natural herbal remedies are simple and holistic methods for treating common illnesses and maladies (Warber, Fatters and Kaufmann 2003).
Exercise	Gardening is a good form of exercise (Rindels 1993). Agricultural activity may offset decline in physical activity with ageing after childhood, especially in women (Perason et al. 2010).



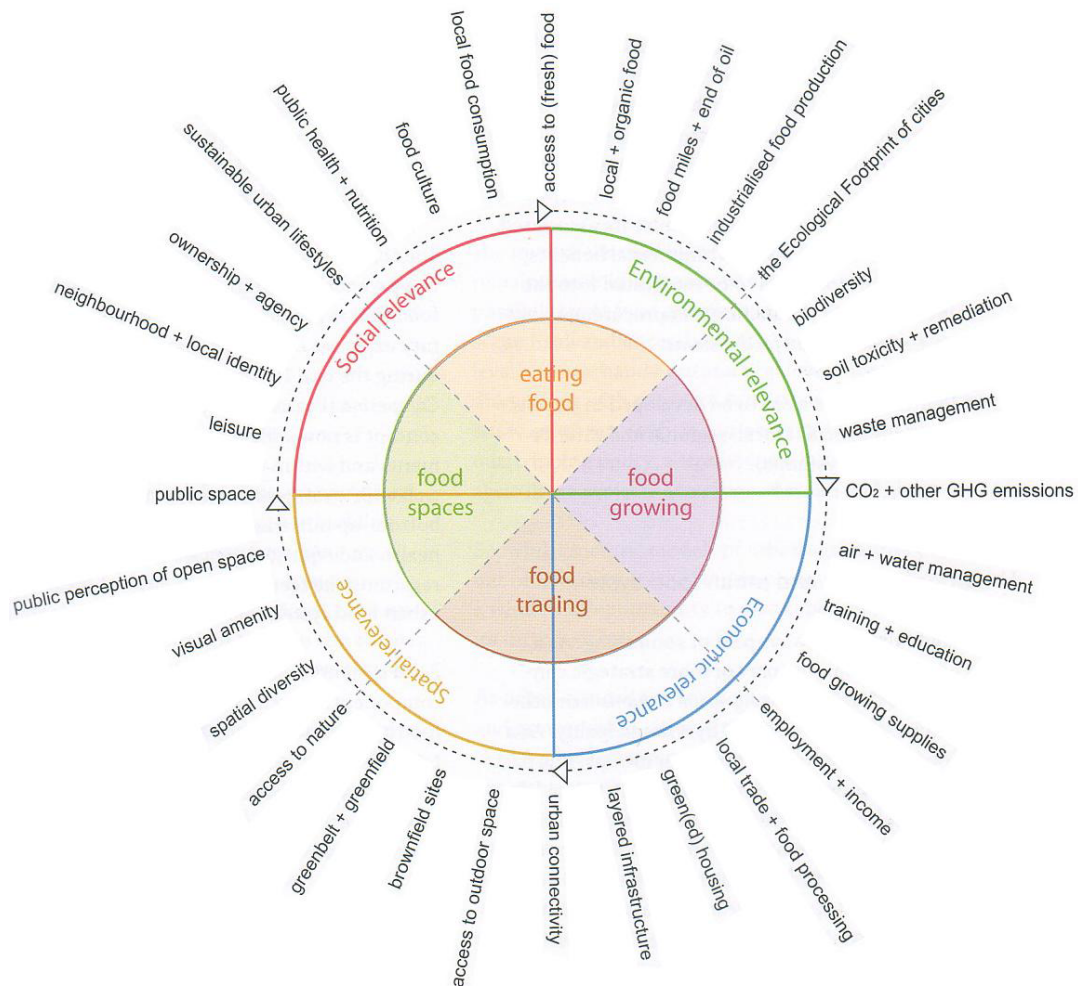
Improve mental health	Generating happiness	Natural aesthetic beauty is soothing to people, and people who keep flowers in their home feel happier and more relaxed (Collins and O'Callaghan 2008; Dunnett and Gasim 2000; Taylor and Kuo 2009; Taylor, Kuo and Sullivan 2001; Taylor, Kuo and Sullivan 2002; Taylor et al. 1998). Gardening provides people with a positive way to channel their stress and frustration into something beautiful that provides them with comfort and joy. Part of the effects of gardening come from the satisfaction people get from nurturing and helping a living thing grow. Plants and gardening soothe people because they help them turn their stressful feelings into something positive which gives them pleasure (Adachi, Rohde and Kendle 2000; Bringslimark, Hartig and Patil 2007; Criley 2008; Iles 2003; Kweon et al. 2008).
	Mental health	Physical, intellectual and psychological benefits can occur from direct involvement in UA (micro-meso scale) related to issue of "gardening" (McBey 1985). The mental health benefit is the first one that most gardeners themselves underline in relation to this activity, even in underdeveloped countries where food supply might be expected to come first (Nail 2015). People who spend more time outside in nature have a significantly more positive outlook on life than people who spend a great deal of time indoors. Living in naturalized settings increases people's feelings of vitality and energy, and consequently has a large positive effect on their overall mental health (Adachi, Rohde and Kendle 2000; Bringslimark, Hartig and Patil 2009; Dravigne et al. 2008; Evers, Linden and Rappe 2000; Hartig, Mang and Evans 1991; Haviland-Jones et al. 2005; Kuo 2004; Lewis 1996; Ulrich et al. 1991).
	Reduce stress	Apart from institutional settings, caring for plants can help people on a daily basis to put up with stress (Kweon et al 2008; Iles 2003) and deal with negative emotions (Hall and Dickson 2011). Exposure to natural environments has been found to promote stress recovery and to stimulate positive feelings and creativity (Tyrväinen et al. 2014; Saarikoski et al. 2015). Participation in gardening and landscaping activities is an effective way to reduce levels of stress. People who nurture plants and garden have less mental distress than others (Adachi, Rohde and Kendle 2000; Bringslimark, Hartig and Patil 2007; Criley 2008; Iles 2003; Kweon et al. 2008).
	Accelerating healing process	The presence of plants in patient recovery rooms has been shown to reduce the time necessary to heal. Many patients who physically interact with plants through caring for and nurturing plants themselves experience a significantly reduced recovery time after medical procedures (Kwack and Reif 2002; Park and Mattson 2009; Raanaas, Patil and Hartig 2010; Sherman et al. 2005).

Therapeutic effects of gardening	Gardening can have therapeutic effects on people who have undergone either mental or physical trauma. The act of nurturing a plant can provide victims with a way to work through difficult issues and heal their wounds. Gardening is a therapeutic tool that can be used to help put people in a better psychological state during recovery and help them to work past the mental barriers that could impede their healing (Adachi, Rohde and Kendle 2000; Aldous 2000; Bringslimark, Hartig and Patil 2009; Flagler 1992; Fried and Wichrowski 2008; Jarrott, Kwack and Reif 2002; Predny and Reif 2000; Raanaas, Patil and Hartig 2010; Stoneham, Kendle and Thoday 1995).
Economic services	<p>Job/ employment opportunities creation</p> <p>Income or income patching in food production, cost saving in food consuming</p> <p>Promoting local economic development</p> <p>Diversifying industry base in cities</p> <p>Investment attraction, real-estate value increasing</p> <p>Energy saving on "food mile", heating and cooling</p>
	<p>UA could promote significant employment creation of the underemployed for both income (meso-macro level) and subsistence (micro level) livelihoods (van Veenhuizen and Danso 2007).</p> <p>Food production represents a source of income for socially weaker urban residents if they have access to the market (Hilscher 2012). In 1991 researchers at Pennsylvania State University surveyed 144 urban gardeners of Philadelphia and found that garden sites yielded an average of \$ 160 worth of produce (Blair, Giesecke, and Sherman 1991).</p> <p>In developed economies, government estimates that UA contributes 12-18% of value of vegetable industry for Australian states; Cuba 60% (Premat 2005).</p> <p>Micro and meso level UA (Sawio 1998; Larsen et al. 2008) can have significant enterprise development and value-adding potential to UA production, e.g. retail (local food markets), marketing and supply chain opportunities, although no scientific study of impacts has been estimated (Pearson et al. 2010, cited from Nugent 2003).</p> <p>Once the communal gardening in poor communities flourish, the beauty and transformative equality of garden neighborhoods engenders interest to developers. Urban farming projects have the added advantage of beautifying urban communities and curtailling crime, all of which has positive effects on a neighborhood's real-estate value (Jackson 2014).</p> <p>Food may account for 40% of all road freight; fossil fuel used in food transport "In most cases exceeds the energy consumed in production" (Jones 2002). Locally grown food results in decreased energy needs and costs associated with long distance travel, refrigeration and storing as well as lower to zero packaging costs. Food grown in backyards close to the consumer and the initiation of local produce markets within walking/cycling distance could also lessen the need for car-based shopping trips (Barrs 2002). Planting trees and other ornamental plants around</p>

		a building can significantly reduce the sun's radiation effect on the temperature of the outer walls and lower the associated cost of energy for heating and cooling (Hall and Dickson 2011).
Cultural services	Reconnect city life with food	The long ongoing strict distinction between rural and urban areas has led to a disconnection and alienation of urban residents from their food. UA returns the means of local production to urban populations and reconnects individuals with their perception of the natural surrounding (McClintock 2010).
	Emphasizing cultural heritage value of agriculture	UA create rural landscape characteristics in cities. UA supply the possibilities for human beings to receive more agricultural scenery and experience recreational or cultural activities (Lee, Ahern and Yeh 2015)
	Bring inspiration	UA is one part of ecosystem; therefore, it could provide a source of inspiration for art, folklore, national symbols, architecture and advertising (Millennium Ecosystem Assessment 2005).
	Providing aesthetic experience	Some specific fruiting varieties such as plum, pear, peach, and apple trees that are particularly beautiful in bloom and provide sweet, juicy, sun-ripened fruit (Creasy 1982). Gardening often viewed as a "harmonious human-nature interaction" (Brady 2006). UA can serve more related to the finer scale of human perception (Lee, Ahern and Yeh 2015).
Education services	Providing teaching, research and experiment materials	Urban food projects can also have an educational purpose for members of the community in terms of learning gardening or farming skills, and healthy lifestyles (Delind, 2006; Stagl, 2002). Home community garden could educate at-risk children about the importance of a healthy diet and lifestyle (Jackson 2014). Insights into the practices of agriculture should be included in environmental education on all levels (Van Bonsdorff 2005). Micro UA can develop horticultural and communication skills (Perez-Vazquez et al. 2005)
	Promoting awareness about food, health and the environment	
	Improving personal skills	

However, it should be pointed out that these services of ELWUA sometimes overlap and impact each other. There is no set boundary where one service ends and the next begins. For example, ELWUA might impacts people’s health by providing them with an inexpensive and convenient recreational service. The popularizing of the agricultural and ecological science might naturally contribute to a sustainable environment by promoting awareness about environment.

Furthermore, planners and designers have summarized services of growing food within the urban area combing the food system cycle process from an architectural and urban design perspective (Figure 2.9). They emphasized the ‘space’, which is important for bridging the gap between urban food system planning and urban planning and designing with urban agriculture. However, “the tools to evaluate the quality of different urban green spaces are still being developed”(Haller et al. 2013). For example, “the aesthetic function of urban agriculture is an issue that has received little attention in previous research”(Perason et al.. 2010).



**Figure 2. 9 The urban food systems star**

Source: Bohn and Viljoen 2014, pp.9.

Incorporating new forms of urban agriculture into the urban environment will “greatly improve the sustainability of cities, taking advantage of the multiple services they can provide”(Rosa et al. 2014). However, improperly conducted ELWUA could also have

negative impacts on urban residents and the environment. For example, toxins from polluted urban air, water, soil, and waste recycling systems may affect the quality of food products and can be a risk to human health. If too many agricultural chemicals and pesticides are used in an edible landscape the urban environment may become polluted. Urban agriculture conducted according to organic standards can avoid this threat (Hilscher 2012). In addition, from the aesthetic aspect, the micro ELWUA often viewed as “nuisance, trivial, unsightly” (Mbiba 1994). Therefore, usually a proper education and management are necessary to avoid these problems.

## 2.4 Types and scales of urban agriculture in Europe

### 2.4.1 Typologies of urban agriculture in Europe

The research on the types of ELWUA in Europe could help to build on the framework of ELWUA types in Beijing and contribute to the later comparison analysis between the two contexts. The types of ELWUA (more often use the term of urban agriculture) could be found in large quantities of literatures of concepts or theories associated with urban agriculture, and the classification method varies with different criteria in accordance with specific conditions. From the large quantities of previous research on urban agriculture types, a comprehensive classification of urban agriculture used in the project of *COST ACTION Urban Agriculture Europe (2011-2015)* was selected as a reference. Urban agriculture in Europe can be unfolded in two levels (farming and gardening level) and within three main categories: urban food gardening, urban farming and non urban adapted farming, of these, the former two categories are subdivided in a number of categories as follows<sup>11</sup>.

#### Urban Food Gardening

Urban food gardening refers to gardening activities with mostly low economic dependence on material outputs but making use of agricultural procedures for achieving other, mostly social goals, which mainly include:

- **Family Gardens:** Family gardens are developed as individual activities and are not on the political agenda. It might be located in an intra-urban, sub-urban or peri-urban area.

- **Allotment Gardens:** a plot of land in medium size which was subdivided in small plots that are rented under a tenancy agreement for individual, non-commercial gardening or growing food plants. It might be located within the city or on the urban fringe. In some European cities allotment gardens are widespread and have a long

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<sup>11</sup> “Types of Urban Agriculture”. (n.d.). In: COST WIKI. Retrieved 2 July 2014 from [http://www.urbanagricultureeurope.la.rwth-aachen.de/mediawiki/index.php/Types\\_of\\_Urban\\_Agriculture](http://www.urbanagricultureeurope.la.rwth-aachen.de/mediawiki/index.php/Types_of_Urban_Agriculture).

tradition since World War 1. In general the functions have shifted from self-provision to recreational function, although legislation may establish minimum criteria for food production.

- **Educational Gardens:** gardens developed by an educational institution, which include two subtypes: gardens located in educational institutions such as school and kindergartens, and gardens for educational purposes which are open to visitors. The location of the educational gardens depends on the hosting institutions, which might be within the city or on the urban fringe.

- **Therapeutic Gardens:** gardens which are usually located at health care institutions such as hospitals or homes for elderly people.

- **Community Gardens:** a piece of land gardened collectively by a group of people. Community gardens are usually in small size and mostly located within a city. They are relatively recent phenomenon, which usually emerge as bottom up initiatives, and are tended collectively. Community gardens are usually located in public spaces, and an agreement with the authorities or property must to be negotiated. Rules and organization are established by the community, which are open and usually (not always) integrated in a network to share experiences and learn together. Community gardens are usually built for social functions such as building a meeting place and a sense of community, and the educational and cultural activities are also usually involved in.

- **Squatter Gardens:** Use idle land for growing fresh food, which may be driven by individuals or by social communities. It might be located within the city or on the urban fringe.

- **Others.**

## **Urban Farming**

Urban farming is the intentionally materialized business models taking advantage of the proximity to the city by offering local or regional agricultural products or services. Their location may be suburban or peri-urban. In most cases they develop new farming models on previously rural agrarian land that has turned urban or peri-urban because of urban growth. Urban farms usually produce food or offer services or combine that in the sense of a multifunctional agriculture. It includes several subtypes as following:

- **Local Food Farms:** farms intentionally orientate their production to local markets and foster a more direct relationship between producers and consumers. Its organizational forms might range from direct retail to cooperatives of consumers-producers or community-supported-agriculture (CSA).

- **Leisure Farms:** agrotourism or gastronomic tourism or equestrian activities in the suburban or peri-urban area, which intended to meet the urban demand for leisure and wellness.

- **Educational Farms:** Educational farms might include farms-schools, pedagogic centers or training centers. They often offer specific learning programs for visiting schools.

- **Experimental Farms:** Experimental farms might include agricultural experimental or research centers in and around the city which are intentionally located in proximity to the city, to utilize the pool of expert knowledge in academic institutions.

- **Social Farms:** “farming practices aim at promoting disadvantaged people’s rehabilitation and care and/or towards the integration of people with ‘low contractual capacity’ (i.e. psychophysical disabilities, convicts, drug addicts, minors, emigrants)”. They are intended to solve deep social problems, and are often driven by social engagement.

- **Therapeutic Farms:** Farms with proper physical or mental treatment facilities. “The animals, the plants, the garden, the forest, and the landscape are used in recreational or work-related activities, for psychiatric patients, mentally disabled persons, and people with learning disabilities, etc.”

- **Agri-Environmental Farms:** Farms that contribute to biodiversity conservation and have some kind of interaction with the urban (i.e. they are considered as part of the urban green infrastructure), that are involved in streamlining material flows from cities (i.e. organic waste), or that are integrated in schemes for flood prevention and climate change adaptation, etc.

- **Cultural heritage farms:** farms that intentionally contribute to preserve and transmit the tangible and intangible cultural heritage related to agricultural practices. It carry out activities of awareness raising and promotion of the cultural heritage and activities of conservation of tangible heritage and of innovation of farming practices in a way appropriate to the features of the places.

- **Others.**

### **Non-Urban Oriented Farming**

Non-urban oriented farming includes farms being located in urban areas, but whose business models have not been (yet) deliberately adapted to the proximity of the city.

Although parts of the urban agriculture in Europe mentioned above don’t belong to the

range of ELWUA because of their locations in suburban or peri-urban, almost each type of the urban agriculture have contained the ELWUA inside, therefore, the classification could be used as a reference of the ELWUA types in Europe. However, the typology of the urban agriculture in Europe formulated in the COST Action only concentrated on types that are widespread in a European perspective. Therefore, some other types such as guerrilla gardening were not considered, although they are also prevalent in Europe.

- **Guerrilla gardening:** the act of gardening, frequently focusing on food crops or plants intended for aesthetic purposes, on land that the gardeners do not have the legal rights to utilize, such as an abandoned site, an area that is neglected by its legal owner, or private property. A guerrilla garden might be initiated by a diverse range of people for different motivations, such as for seeking to provoke change of land use, for making the area more attractive, or for publicity of something as a form of activism<sup>12</sup>.

#### 2.4.2 Scales of urban agriculture

The urban agriculture can be generally divided into three scales: micro, meso and macro (Pearson et al. 2010) (Table 2.3).

Table 2. 3 Scale of different types of urban agriculture (adapt from Pearson *et al.* 2010))

Scale	Examples of scale
Micro	<ul style="list-style-type: none"> <li>• Green roofs, walls, courtyards</li> <li>• Backyards</li> <li>• Street verges</li> </ul>
Meso	<ul style="list-style-type: none"> <li>• Community gardens</li> <li>• Individual collective gardens (allotments)</li> <li>• Urban parks</li> </ul>
Macro	<ul style="list-style-type: none"> <li>• Commercial-scale farms, e.g., turf, dairy, orchard, grazing (e.g. horses)</li> <li>• Nurseries</li> <li>• Greenhouses: floriculture and vegetables</li> </ul>

<sup>12</sup> "Guerrilla gardening", In: Wikipedia, the free encyclopedia Wikimedia Foundation. Retrieved 21 May 2014 from [https://en.wikipedia.org/wiki/Guerrilla\\_gardening](https://en.wikipedia.org/wiki/Guerrilla_gardening).



# Chapter 3 Research methodology

## 3.1 Research area of Beijing

To explore the objective of understanding the edible landscape within the urban area (ELWUA), the research designates the built-up area (or called urbanized area) within or adjacent to the urban central area in Beijing (China) as the research area (Figure 3.1).

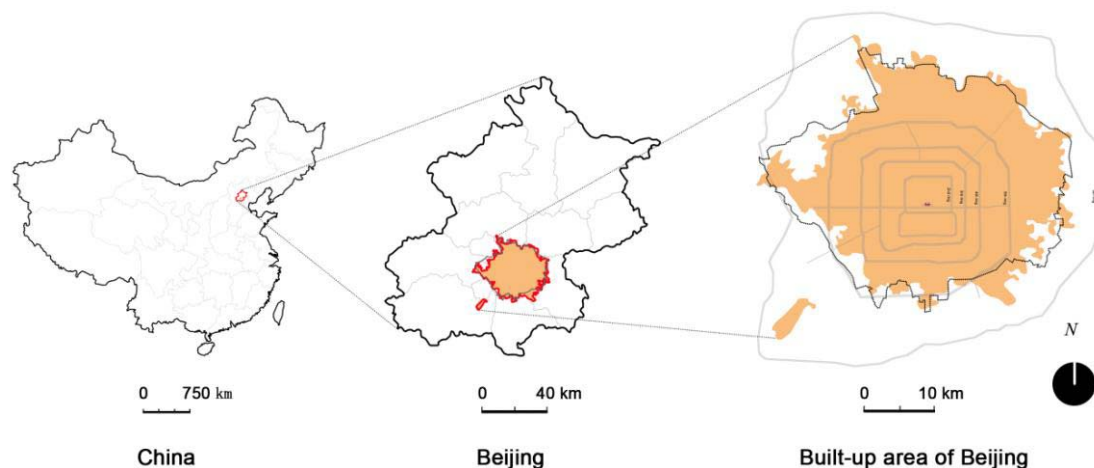


Figure 3. 1 Geographical location of the research area

### 3.1.1 Geography and natural conditions of Beijing

#### Geography

China's capital Beijing is located in northern China with the geographic location of  $39^{\circ} 26' \sim 41^{\circ} 03' N$ ,  $115^{\circ} 25' \sim 117^{\circ} 30' E$ . It is situated in the southeast on the northwestern edge of the North China Plain, about 150 km away from Bohai Sea in the southeast, and backed by the Taihang Mountain in the west and northwest and the Yanshan Mountain in the north, which shield the city from the encroaching desert steppes. The terrains of Beijing are composed of northwestern hills and southeastern plains, so there is an elevation gradient. The average elevation of Beijing is 43.5 m. The total area of Beijing is 16411 km<sup>2</sup>, among which the plains occupy 6338 km<sup>2</sup> (38.6%), and the hills occupy 10072 km<sup>2</sup> (61.4%). It neighbors Tianjin Municipality in the east, and borders Hebei Province on three sides- the north, west and south. The urban area of Beijing, on the plains in the south-central area with elevation of 40-60 meters, occupies a relatively small but expanding portion of the city.

The urban built-up area in Beijing is located in plains, where there is no limitation of

gradient to the cultivation. The research area measures around 49.1 km from east to west and 42.1 km from north to south between the two most distant points. The reason for using this definition of urban built-up area is that it is a concept of actual landscape, not the one of administration; therefore, it can most exactly describe the boundary of a city's actual entity<sup>13</sup>, while other existing geographical boundaries usually difficult to do in such a way. The "urban central area" here refers to the designated boundary of "urban central area" in the *Overall City Plan of Beijing (2004-2020)*. The urban built-up area refers to the area where there is a great stretch of development and construction within the urban administrative districts, where the municipal utilities and public facilities are available (Ministry of Construction of the People's Republic of China 1998). In the near suburban area there are also some built-up areas, although these areas are not adjacent to the urban area, but they have a close relationship with the urban district, and have become an integral part of the city, and therefore also could be regarded as the urban built-up area. However, because of the rapid urbanization, the boundaries between the rural and the urban are becoming increasingly blurred, and the boundaries of the built-up area are also apt to change, therefore it is relative difficult to obtain the precise information of the urban built-up area in each year (Zhou 1995). In this research, the built-up area as shown in Figure 3.1 was delineated as the research area.

### **Climate, hydrology and soil**

Beijing belongs to the warm temperate zone with a monsoon-influenced semi-humid continental climate. It has four clearly distinctive seasons, with short springs and autumns (which last about two months and one and a half months respectively) while summers and winters are relatively long (which last three months and more than five months respectively). In which, summers are always hot and humid due to the East Asian monsoon; winters are always cold, windy and dry influenced by the vast Siberian anticyclone; springs are always dry and windy, and warm rapidly accompanied by sandstorms blowing in from Gobi Desert across the Mongolian steppe; and autumns are always crisp and short with little rain. The sandstorms likely happen when the ground is bare, therefore, special attention need to paid to prevent the occurrence of sandstorms, especially in spring and winter with bare ground. Beijing has an annual average temperature of 12.9 °C and a frost-free period of 180 to 200 days (Zhang et al. 2007). Therefore, only one cycle of the crops can be cultivated annually, whereas the climate is insufficient for two growth periods of the crops (Cheng 1991). January is the coldest month with an average temperature of – 3.7°C, and July is the hottest with an average temperature of 26.2°C. The average annual precipitation is about 571.8 mm, but it is unevenly distributed, with 85% of the rainfall in the flood season from June to September, while the climate in other seasons is very

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<sup>13</sup> City's actual entity originated from the description of city by Yixing Zhou in his book *urban geography* in 1992. He said, "If you observe a city in flight patterns of birds, you can see an entity of the urban settlement which is completely different from the rural landscape- it is the built-up area which composed of a dense population, varieties of artificial buildings, constructions and infrastructures".

dry. During the water peak usage in spring the precipitation is only 5% of the annual rainfall, which often cause droughts during this period (Yan 2000).

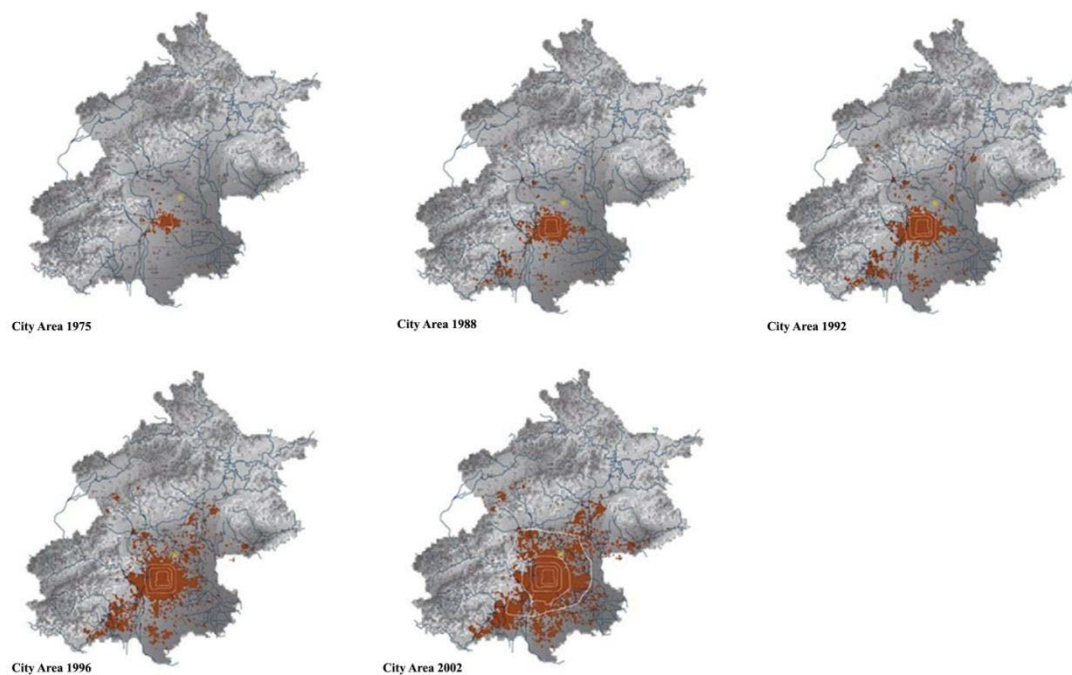
Beijing has more than 100 rivers and streams, which belong to five major rivers, including the Daqing River, Yongding River, North Canal River, Chaobai River and Ji Canal River, among which only the North Canal River starts in Beijing, while the other four are crossing rivers. However, impacted by the monsoon-influenced rainfall, coupled with the interception of the water by the reservoirs upstream rivers, most of these rivers are seasonal, and some tributaries are even perennially without water, therefore, for the irrigation of farmland one can only rely on the exploitation of groundwater. The groundwater is taken from the quaternary aquifer (ebd), however, due to continuous over-exploitation of the groundwater table is constantly falling. There are 84 large, medium and small reservoirs in Beijing, and the total surface area is 14066.7 hectares, which is the most important industrial, agricultural and domestic water source in addition to the groundwater. Beijing is one of the most highly water-deficient areas; the amount of water resources per capita of Beijing is less than 300m<sup>3</sup>, which is only one-eighth of the national average, 1/32 of the world's average (Zhang 2000).

According to the second soil general survey, there are a total of seven categories and 17 subcategories of soil in Beijing. The soil in the plain area is mainly light soil, which is suitable for cultivation. However, soil pollution is a very serious problem in Beijing, in addition to pesticides and municipal waste, urban sewage found in irrigation water is the main soil pollutant.

### **3.1.2 Social-economic development**

Beijing is a historic and cultural city with a history of more than 3,000 years. It originated in the State of Ji in the Dynasty of West Zhou (c. 11<sup>th</sup> century BC- c. 7<sup>th</sup> century BC); was first built in the Sui and Tang Dynasties (581 AC-907 AC), developed quickly in the Liao (907 AC-1125 AC), Jin (1115 AC-1234 AC) and Yuan (1271 AC-1368 AC) Dynasties, flourished in Ming (1368 AC-1644 AC) and Qing (1644 AC-1912 AC) Dynasties, and declined during the years of the Republic of China (1912-1949). It has a history of being the capital of the country for over 860 years. The Liao, Jin, Yuan, Ming, Qing and the Republic of China (the Northern Warlords Government Period), the six dynasties established the capital in Beijing, and several political regimes have established the political power here, therefore Beijing is the aggregation of the Chinese culture, and with Xi'an, Nanjing, Luoyang together, is one of what is called the Four Great Ancient Capitals of China. In 1949, Beijing became the capital of the People's Republic of China. In the preceding 500 years, Beijing had hardly any dramatic change to its urban outline and main framework, with the urban built area covering around 62.5 km<sup>2</sup> from the Ming Dynasty from 1420 (Stokman et al. 2008, cited in Gan 1990) to the foundation of the People's Republic (Deng et al. 2004). However, since the establishment of the People's Republic of China in 1949,

especially after the open door policy was carried out in 1978, economic progress and urban development was stimulated with an unrivalled speed and dimension along with the expansion of industrialization. Rapid population growth and the rapid increase of housing and economic activities has expanded the inner city's built up area to cover more than 700 km<sup>2</sup> with a typical expansion pattern based on concentric ring roads (Li et al. 2005). The second ring road was built in the 1980s tracing the old city walls, the third ring road was built in 1990s, and since then three more ring roads have been completed, with the sixth ring road comprising around 130 km of expressway connecting the satellite towns in the surrounding suburbs of Beijing (Stokman et al. 2008) (Figure 3.2). Beijing has become one of the most dynamic and rapidly developing cities in the world.



**Figure 3. 2 Rapid expansion of Beijing's urban area and ring shaped infrastructure system from 1975 to 2002**

Source: Master Plan of Beijing 2003-2020 (Stokman et al. 2008, pp.20)

Beijing is not only the capital of China, it is also the nation's political, cultural, educational, transportation and international center. In 2013, the population in Beijing was 21.15 million; of which 18.25 million residents (86.3%) are of the urban population and 2.9 million (13.7%) are of the rural population<sup>14</sup>. And 38% of the population in Beijing are migrants from other cities<sup>15</sup>. The registered population of Beijing Municipality consists of people holding either Beijing permanent residence permits (hukou permits) or temporary residence permits. The latter group who have no Beijing hukou permits are not eligible to receive some social benefits provided by the Beijing municipal government. By the end of 2013, about 13.16 million of the

<sup>14</sup> Source comes from the *Statistical Yearbook of China 2014*, compiled by National Bureau of Statistics of China.

<sup>15</sup> Source: <http://news.sina.com.cn/c/2014-06-19/024030385585.shtml>

population had permanent residence hukou permits<sup>16</sup>.

Beijing is among the most developed cities in China. In 2013, Beijing's gross domestic product (GDP) reached 1.95 trillion RMB. Its per capita GDP ranked second among province-level administrative units following Tianjin<sup>17</sup>. The city has a post-industrial economy that is dominated by the tertiary sector (services), which generated 76.9% of its output, followed by the secondary sector (manufacturing, construction) at 22.2% and the primary sector (agriculture, mining) at 0.8%. In recent years Beijing's real estate and automobile sectors have continued to boom. In 2005, a total of 28,032,000 square meters of housing real estate was sold, for a total of 175.88 billion RMB. The total number of cars registered in Beijing in 2009 was more than 4,000,000, which increased from 3,000,000 inside of only using two year and seven months.<sup>18</sup>

The farmland of Beijing is located outside the city with wheat and corn as the main crop (People's Daily 2001). Vegetables and fruits have displaced grain as the primary crops under cultivation<sup>6</sup>. However, the rapidly expansion of the urban built-up area and the enormous increase of urban population has led to a decrease of the rural hinterland for the basic food supply, which are still going on. The decrease of the farmland could be reflected from the Land Use Map in 2004 and the Land Use Plan (2004-2020) of Beijing and its central area (Figure 3.3, 3.4).

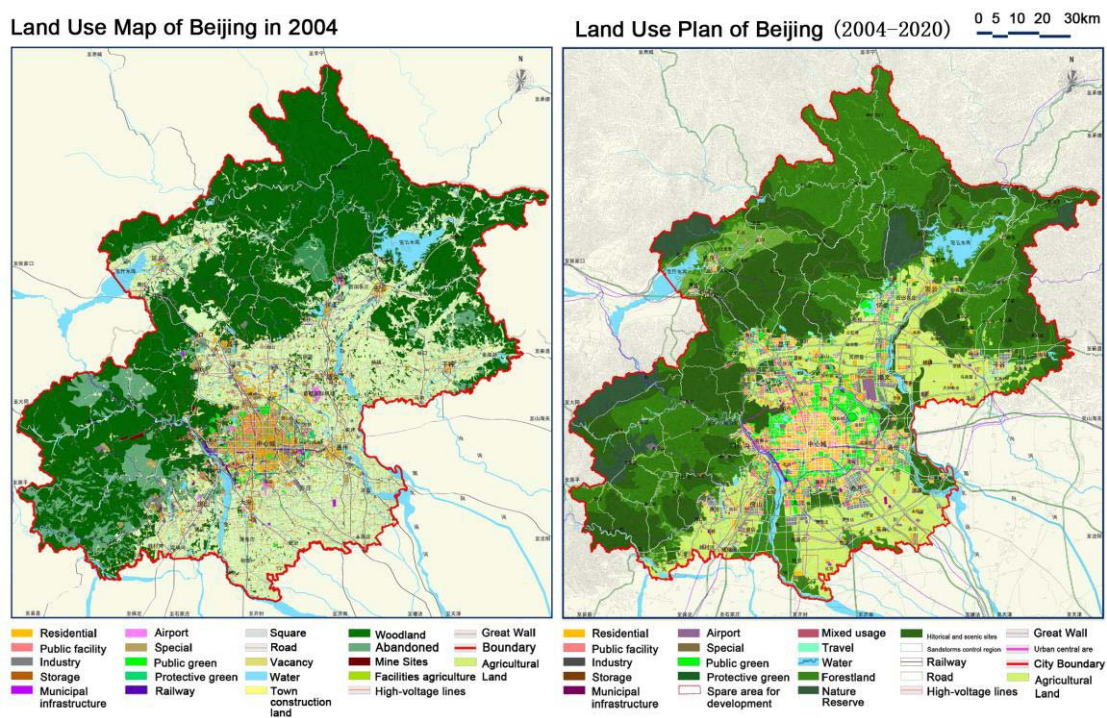


Figure 3. 3 Land use map in 2004 and the land-use plan (2004-2020) of Beijing

<sup>16</sup> Source comes from *Beijing Statistical Information Net*, retrieved from [http://www.bjstats.gov.cn/xwgb/tjgb/ndgb/201402/t20140213\\_267744.htm](http://www.bjstats.gov.cn/xwgb/tjgb/ndgb/201402/t20140213_267744.htm).

<sup>17</sup> Source comes from National Bureau of Statistics of China, retrieved from <http://data.stats.gov.cn/>.

<sup>18</sup> Source comes from WWW.NEWS.CN, retrieved from [http://news.xinhuanet.com/auto/2009-12/18/content\\_12668015.htm](http://news.xinhuanet.com/auto/2009-12/18/content_12668015.htm).



Source: Master Plan of Beijing 2004-2020

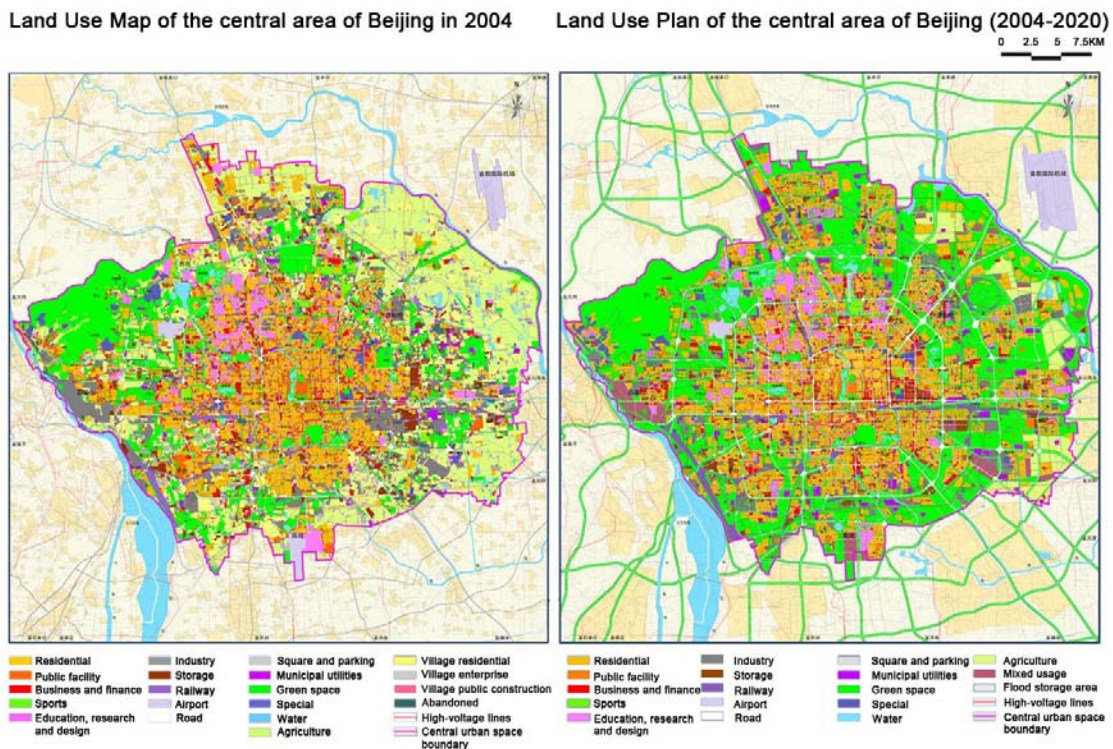


Figure 3. 4 Land use map in 2004 and the land-use plan (2004-2020) of the urban central area of Beijing

Source: Master Plan of Beijing 2004-2020

### 3.2 Research design and methods

The research process mainly includes seven steps, which are 1) theoretical research, 2) pre-field survey and internet survey, 3) selection of research sites, 4) field survey, 5) analysis and interpretation of the empirical data, 6) comparison with European cases, and 7) proposing recommendations (Figure 3.5). To obtain an improved understanding of the essence and significance of the contemporary ELWUA in Beijing, this research used an empirical research approach by means of field surveys (step 2, 3, 4 and 5) with the aim of finding out the ELWUA's physical characteristics (including spatial characteristics, type of edible plants, evolution process, materials and technology), social characteristics (including the information of the participants, organizational forms, motivations), ELWUA types, ELWUA services and people's attitudes towards ELWUA.

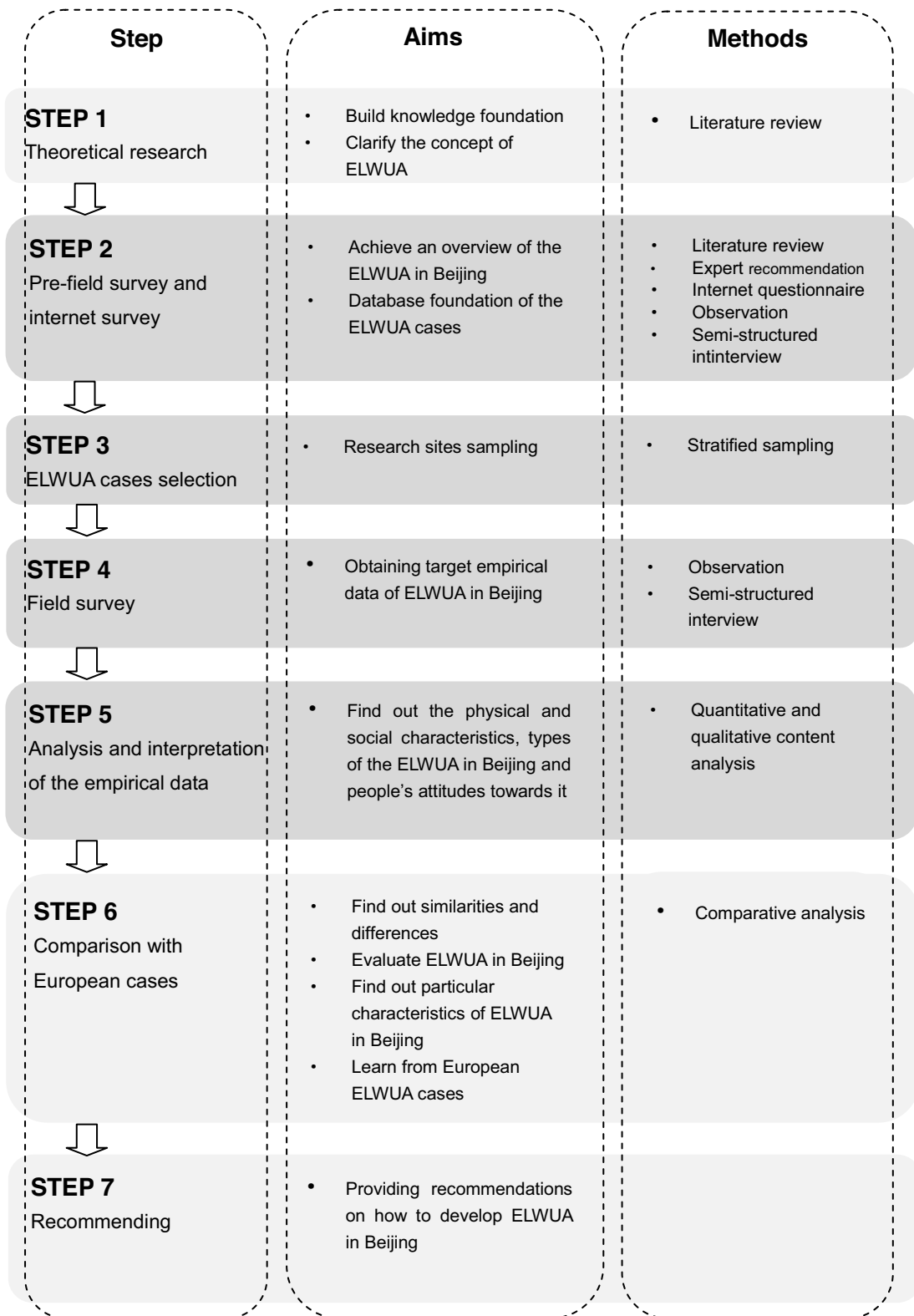


Figure 3. 5 The main steps and research methods

### **3.2.1 Theoretical research**

Through the method of literature review, the relative definitions and theories on ELWUA, the history and services of growing food within urban area, as well as the types of urban agriculture in Europe were reviewed as the knowledge foundation of this research. Moreover, through the theoretical research, the definition of edible landscape was clarified.

### **3.2.2 Pre-field survey and internet survey**

Since literature on ELWUA in Beijing is very rare and maps of ELWUA cases do not exist, the second research step, i.e. the first step of the empirical research was two pre-field surveys and one internet survey, which were conducted in April, 2011, October, 2012 and September, 2013 respectively. The first pre-field survey aimed to achieve an overview of the ELWUA in Beijing, including whether and where the ELWUA exist, the planting scale, the appearance of the ELWUA, and the participants, etc. The second pre-field survey was carried out with the aim of collecting ELWUA cases to get a general classification of the ELWUA types, and testing the question outline of the semi-structured interview. Before starting the pre-field survey, the methods of literature review and expert recommendation were used in order to collect the ELWUA cases in Beijing beforehand. During the process of pre-field survey, the method of observation and semi-public interviews were used for gathering data.

The internet survey was carried out in order to collect as many of the ELWUA cases in Beijing as possible and set up a database of ELWUA cases to support the later further sampling from it. In September, 2013, the internet questionnaire was sent digitally to the people at different ages that are living in Beijing. In addition, as a side-purpose, the internet questionnaire was also used to study peoples' general attitudes towards the ELWUA in Beijing. Based on these two purposes for which the internet questionnaire was made, the questions mainly include three parts: 1) the ELWUA cases in Beijing, including whether the respondent has seen any edible landscape in the urban space of Beijing, what kind of edible plants are there and the address of the edible landscapes, 2) People's perceptions of ELWUA in Beijing, including whether the respondents like the edible landscapes in the urban space in Beijing, whether they will grow food themselves if they have a chance, 3) Basic information of the respondents, including gender, age, education level, career, email and the time they have lived in Beijing<sup>19</sup>. The data on people's attitudes towards ELWUA was material for quantitative analysis, and the other data was used for understanding the general situation and collecting ELWUA cases.

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<sup>19</sup> Details regarding the internet questionnaire can be found in Appendix A.



### 3.2.3 Selection of research sites (cases)

STEP 3 was the selection of research sites. This research regards the “ELWUA located in one site” as one “case”. Through the analysis to the database of the ELWUA cases built through the pre-field surveys and internet survey in step 2, the location of the ELWUA cases were grouped in five types, which are: 1) the space in or around the residential areas, the Danwei<sup>20</sup> precinct, 3) traffic space (street space, space along rivers and space along the rail network, space around the car park, etc.), 4) urban parks, and 5) multifunctional leisure farms at the edge of the urban area. Therefore, a stratified sampling was employed respectively from each of the five types of urban space where edible landscapes are located with the criteria of covering different forms of ELWUA to the greatest extent. Of these, the residential area is the place where ELWUA most commonly existed, and the residential area has different varieties. Therefore, the stratified sampling was applied again to select ELWUA cases from the residential area. The criterion of selecting samples from the residential area is covering different 1) dwelling forms and styles, 2) residents groups, and 3) construction date to the greatest extent. The list of the selected cases in (or around) the residential area and the selecting reasons are detailed in Appendix B. In addition, the cases were selected to the greatest extent from various ring-regions which is located different distances from the city center. Moreover, the pre-field surveys revealed that some activities of growing food are spontaneous, and some are organized or under unified planning, therefore, attentions were also paid to select cases covering the two types. Moreover, because of the concentric circle structure of the urban space of Beijing, the urban morphology in one quadrant of the urban area has similarities with other three. Therefore, most of the cases were selected from one quadrant (northwest one), and only for the special types of ELWUA cases which do not exist in this quadrant were selected from other quadrants. Finally, 38 representative ELWUA cases were selected as the samples, including 22 cases in or around the residential area, 4 in the Danwei precinct, 6 in traffic space, 2 in urban parks and 2 in multifunctional leisure farms at the edge of the urban area (Figure 3.6). Table 3.1 is the list of the selected cases.

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<sup>20</sup> Danwei, also called “work unit”, is a unique term in China, which is the name given to a place of employment in the People’s Republic of China.

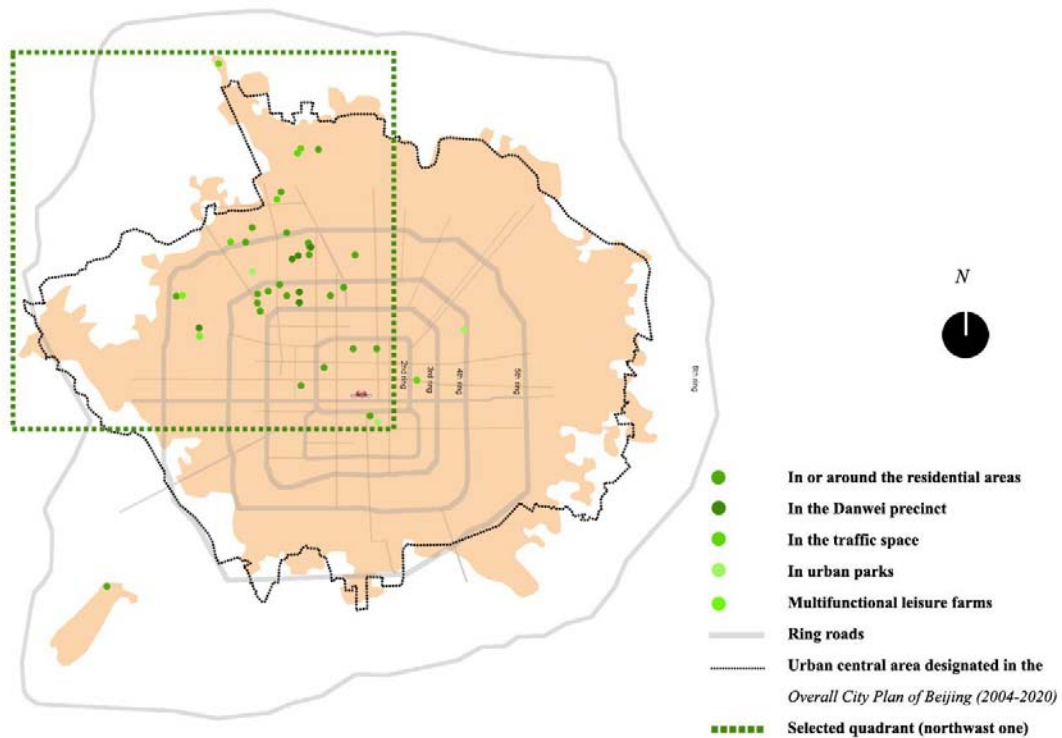


Figure 3. 6 Field survey sites of edible landscapes

Table 3. 1 List of the selected cases in the urban space of Beijing

Type of urban space	Name	
A. Edible landscape cases in or around residential areas	Traditional Chinese courtyard	A1 Roof Garden of Guichun Zhang
	Multi-storey or medium high-rise residential buildings	A2 The Tenement Courtyard House in Shi Cha Hai Hutong
		A3 The Courtyard House in South Luogu Lane
		A4 Dormitory of the Recorder Factory
		A5 20 m2 Courtyard Garden Experiment
		A6 Dormitory of the ISCAS
		A7 Military Residential Area
		A8 San Li He 3 Qu Residential Area
		A9 Mu Dan Yuan Residential Area
		A10 Yan Bei Yuan Residential Area
		A11 Shuang Yu Shu Residential Area
		A12 No.6 Haidian South Road Dwelling
		A13 Dong Wang Zhuang Residential Area
		A14 Minkang Residential Area No.30
		A15 Modern City Homeland Residential Area
		A16 Jia Zhou Shui Jun Residential Area
		A17 Long Yue Yuan 3 <sup>rd</sup> Residential Area
		A18 Hui Xin Homeland Residential Area
		A19 Balcony Garden in Brown Stone Apartment

	A20 Feng Shang International Apartment
	A21 Wan Quan Xin Xin Residential Area
	A22 Yuan Ming Yuan Villa District
	Modern villa A23 Xiang Shan Qing Qin Villa District
B. Edible landscapes in the territory of “Danwei”	B1 Si Bo Lian Hua Neng Electromechanical Factory
	B2 The Institute of Semiconductor, Chinese Academy of sciences
	B3 Roof Farm in Tsinghua University
	B4 The Experimental Farmland of CAAC*
C. Edible landscape cases in the traffic space (street space, space along rivers, space along the rail link)	C1 Vegetable Field along the Street adjacent to Shang Di Flower Market
	C2 The Vegetable Field along Shang He Road
	C3 River Revetment and Public Green Space along Sha River
	C4 The Public Space along Subway 13
	C5 The Public Space around a Parking Lot
	C6 The Avenue Trees in the Embassy District
D. Edible landscape cases in urban parks	D1 One Acre Paddy Field in Hai Dian Park
	D2 Fruit Trees in the Temple of Heaven Park
	D3 The Landscape of Sun Flower in Chao Yang Park
E. Leisure Farm	E1 Xi Shan “Happy Farm”
	E2 Si Ji Qing Agrotourists’ Picking and Sightseeing Farm

Note: The Detailed description of the cases A1-A16 is in the Appendix B.

\* Stared item CAAC refers to the Chinese Academy of Agricultural Sciences.

### 3.2.4 Field survey

After completing the selection of the research sites, a formal field survey was scientifically and systematically designed based on the results of STEP 2 and 3. The field survey was conducted in October and November, 2013 with the aim of obtaining the target data of the ELWUA in Beijing, including the physical characteristics (spatial characteristics, type of edible plants, evolution process, materials and technology), social characteristics (including the information of the participants, organizational forms, motivations and services), types and people’s attitudes. The detailed methods of the field survey mainly include observations and semi-structured interviews, which will be detailed as following. Some skills such as recording, photography, measuring were also used.

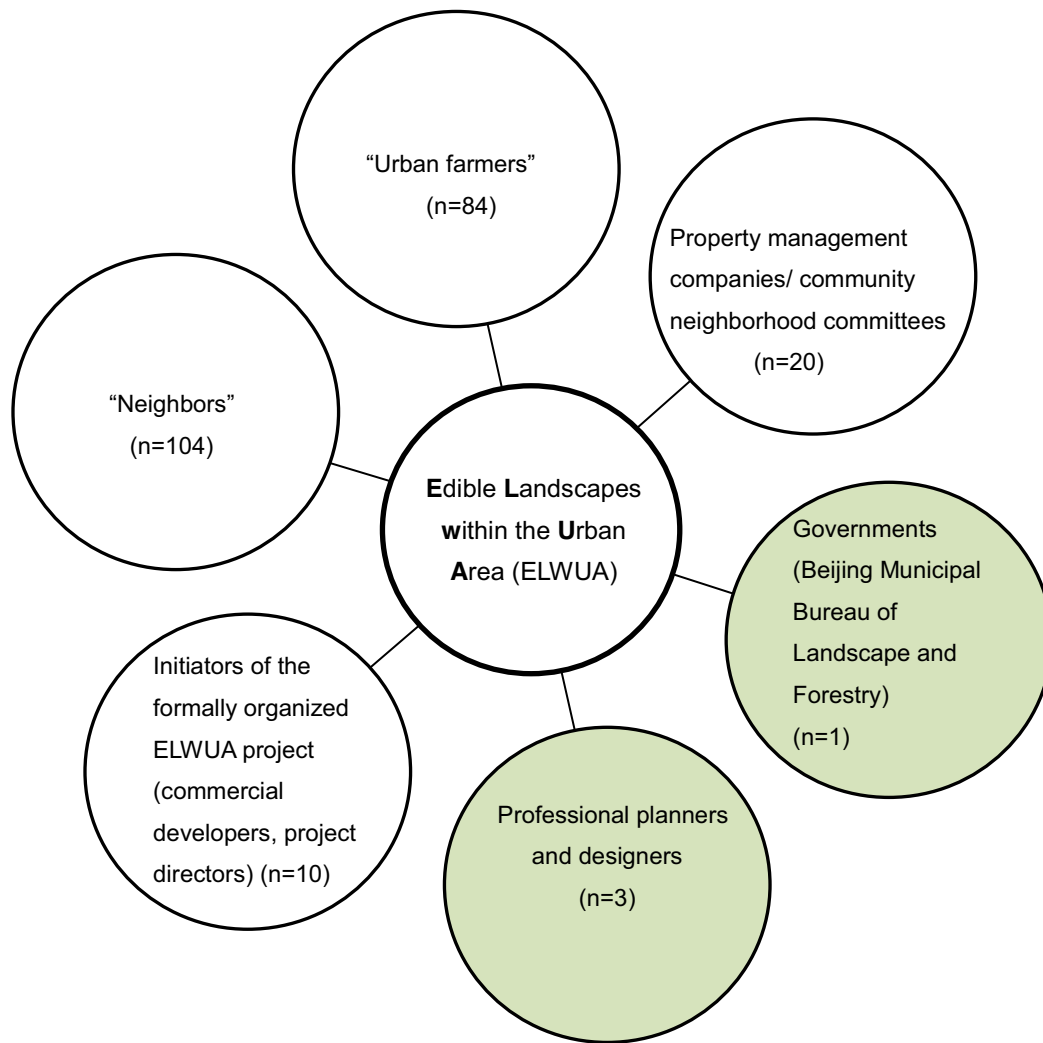
### Observation

Large quantities of information about the physical characteristics of the ELWUA in Beijing were collected through observation, such as the spatial characteristics (distribution, location, size, spatial zoning and accessibility), the types of edible plants, and the number of participants. In addition, this method was also used to complement data and understand the context of the EUWLA in Beijing. During the process of observation, large quantities of photos about the edible landscapes were taken from

the investigation sites, which show the environment where the edible landscapes are located, the appearance of edible landscapes, the types and the growth process of the vegetation, the working process of the urban gardeners and the cultivating tools and materials, etc.

### **Semi-structured interview**

Semi-structured interview is an informal interview to gain information face to face from an individual or small group, using a broad question outline to guide the conversations, but allowing for new questions to arise as result of the discussion (IFAD 2008). During the process of a semi-structured interview, the interviewer can flexibly make the necessary adjustments to the questions according to the actual situation of the interviews, and there is no specific requirement to the manner and order of questioning, the way of answering the questions, the way of recording, and the time and place of interviews, therefore, the respondents can talk open-end, which make the responds being more close to people's real perception. In this research, six types of the stakeholders who are related to the ELWUA in Beijing were sampled as the interviewees through a stratified sampling. The six groups of people include 1) "urban farmers" (urban residents who plant edible plants), 2) "neighbors" (urban residents who live or move around the edible landscapes), 3) initiators of formally organized ELWUA projects (commercial developers and directors of ELWUA project), 4) the staff in property management companies and community neighborhood committees, 5) professional planners and designers, as well as 6) the governmental official (Figure 3.7). The first four groups of people were interviewed during the process of the field survey, using random sampling and snowball sampling. The numbers of the interviewees and their corresponding sites is summarized in Appendix C. For the last two groups of people, who might greatly impact the development of the urban edible landscapes, an appointment was made beforehand for an expert interview. In the process of the field survey, 84 "urban farmers", 104 "neighbors", 20 staff members in property management companies or community neighborhood committees, 10 initiators including commercial developers and project directors, 3 professional planners and designers including two landscape architects and one planner, and 1 governmental official in Beijing Municipal Bureau of Landscape and Forestry were interviewed.



**Figure 3. 7 Six groups of interviewees and the numbers**

Note: the people in light green color circles are interviewed by expert interview

The semi-structured interview was carried out based on the interview guideline prepared beforehand<sup>21</sup>, and the main issues of the semi-structured interviews with the six different groups of stakeholders were summarized in the following tables (Table 3.2, 3.3, 3.4, 3.5, 3.6, 3.7).

**Table 3. 2 The main contents of the semi-structured interview to "urban farmers"**

<b>Aspects</b>		<b>Concrete issues</b>
<b>Basic situation of the edible landscape</b>	<b>Physical</b>	Origin and evolution, size and accessibility, types of the edible plants , materials, technology (the source and cost of seeds, soil, irrigation water, fertilizer and tools, the source of agricultural knowledge and skills), labor input (labor time, activities on the site), planning and design

<sup>21</sup> Details regarding the semi-structured interview guideline can be found in Appendix D.

	<b>Social</b>	Organizational forms, motivations, relative policies,
<b>Service</b>		Reasons for cultivating edible plants, use of the harvested products, yield, whether sharing with neighbors and friends, benefits of edible plants, whether know new friends, whether facilitate encounters of the neighbors, interesting or impressive story, change of life and the impacts to the life
<b>Attitude</b>		Attitude towards the ELWUA, attitude towards the beauty of the ELWUA, attitudes from family, neighbors and friends, attitude towards to replacing part of the ornamental landscape to edible landscape
<b>Existing problems and suggestions</b>		The conflicts with the city or citizens/neighbors, problems in the management process, adopted measures and suggestions
<b>Personal information</b>		Age, occupation, farming experience, living time in Beijing

Table 3. 3 The main contents of the semi-structured interview to "neighbors"

<b>Aspects</b>	<b>Concrete issues</b>
<b>Attitude</b>	Attitude towards the ELWUA, attitude towards the beauty of the edible landscapes, the willing of growing food , attitude towards to replacing part of the ornamental landscape to edible landscape,
<b>Service</b>	Benefits of edible plants, whether get to know new friends, whether facilitate encounters of the neighbors, interesting or impressive story, change of life and the impacts to the life
<b>Existing problems and suggestions</b>	The conflicts with the city or citizens/neighbors, suggestions
<b>Personal information</b>	Age, occupation, farming experience, living time in Beijing

Table 3. 4 The main contents of the semi-structured interview to "initiators of the formally organized ELWUA project (commercial developers, project directors)"

<b>Aspects</b>	<b>Concrete issues</b>	
<b>Basic situation of edible landscapes</b>	<b>Physical</b>	Origin and evolution, size and accessibility, types of the edible plants, materials, technology (the source and cost of seeds, soil, irrigation water, fertilizer and tools, the source of agricultural knowledge and skills), invest and cost of maintenance, labor input (labor time, activities on the site), planning and design
	<b>Social</b>	Aims of projects, organizational forms, relative policies, services (Benefits of the project, use of the harvested products, yield, benefits of edible plants, whether facilitate encounters of the neighbors, interesting or impressive story, change of life and the impacts to the life, changes and impacts brought by the projects)
<b>Attitude</b>	Attitude towards the ELWUA (like/dislike, support/non	

	support), attitude towards the edible landscapes under a unified planning, attitude towards the beauty of the edible landscapes, the willing and reasons of organizing the cultivation of edible plants
<b>Existing problems and suggestions</b>	The conflicts with the city or citizens/neighbors, problems in the management process, whether need supports from the government, suggestions to the development model

Table 3. 5 The main contents of the semi-structured interview to “the staff in property management companies and community neighborhood committees”

<b>Aspects</b>	<b>Concrete issues</b>
<b>Perception and attitude</b>	Perception of the existence of the edible landscapes in the residential area, attitude towards the edible landscapes in the residential area, attitude towards the edible landscapes under a unified planning, attitude towards the beauty of the edible landscapes, the willing and reasons of organizing the cultivation of edible plants, attitude towards to replacing part of the ornamental landscape to edible landscape
<b>Policy</b>	Regulation for the public green space and the vegetation planting in the residential area
<b>Service</b>	Benefits of the edible landscapes
<b>Existing problems and suggestions</b>	The conflicts with the city or citizens/neighbors, problems in the management process, suggestions

Table 3. 6 The main contents of the semi-structured interview to “professional planners and designers”

<b>Aspects</b>	<b>Concrete issues</b>
<b>Perception and attitude</b>	Perception to the existence of edible landscapes within the urban area, attitude towards the edible landscapes within the urban area, attitude towards the beauty of the edible landscapes, relative policy, attitude towards to replacing part of the ornamental landscape to edible landscape, opinions about whether need supports from the government
<b>Service</b>	Benefits of edible landscapes
<b>Existing problems and suggestions</b>	The conflicts with the city or citizens, problems in the management process, prediction of the future development model, suggestions of advocacy and promoting

Table 3. 7 The main contents of the semi-structured interview to “the governmental official”

<b>Aspects</b>	<b>Concrete issues</b>
<b>Perception and attitude</b>	Understanding to the definition of “urban agriculture” “edible landscape within the urban area”, perception to the existing of the ELWUA, whether have relative policy support the ELWUA, attitude towards the ELWUA and the reason,

	attitude towards the beauty of the edible landscapes, attitude towards to replacing part of the ornamental landscape to edible landscape, opinions about
<b>Service</b>	Benefits of edible landscapes
<b>Existing problems and suggestions</b>	The conflicts with the city or citizens, problems in the management process, prediction of the future development model, suggestions

The method of semi-structured interviewing was employed as both a quantitative strategy and a qualitative strategy as well. Some questions in the semi-structured interview aim to find out the general situation of ELWUA through the quantitative data from the masses, for example, the demographic characteristics of the “urban farmers”, the general attitudes towards ELWUA, the degrees of supporting ELWUA, the percentage of different motivations of growing food, etc. The replies to these questions were used for quantitative analysis. While some questions related to ELWUA tend to be better studied by applying a qualitative strategy, such as the “motivation of growing food”, “evolution process of the ELWUA”, “ELWUA services”, “argument and problems of ELWUA”, therefore, focus group participants were chosen from the first four groups to answer these questions. The focus group participants were chosen from the interviewees who had indicated at the beginning of the semi-structured interview that they had time and were willing to continue answering the questions for the qualitative analysis. In addition, some valuable additional information behind people’s understanding of ELWUA could also be obtained through the narratives supplied by the interviewees.

Before the formal interview, several pre-tests of the interview were conducted, which were used to make sure the questions are in a logical sequence and are appropriate and accurate enough. The content of each interview was audio-recorded and then subsequently transcribed and summarized for later quantitative and qualitative content analysis.

### **3.2.5 Analysis and interpretation of the empirical data**

The next step is the analysis and interpretation of the collected empirical data. In this step, the collected empirical materials of every research site (ELWUA case) were firstly documented and coded respectively based on different research themes which could help to understand the ELWUA, such as “spatial distribution”, “demographic characteristics of the participants”, “general attitudes towards ELWUA” and “motivation of growing food”. Then, the contents belong to different themes of each ELWUA case were interpreted. Finally, by applying the inductive approach to the 38 case studies, the general characteristics of the ELWUA in Beijing could be obtained

In the process of analysis and interpretation, a mixed method combining both quantitative and qualitative content analysis was employed, which has been



mentioned in STEP 4. The quantitative analysis emphasized quantification in the general status of ELWUA in Beijing and embodied the view of ELWUA as an external, objective reality. While the qualitative analysis emphasizes words rather than quantification in the collection and analysis of data, and prefers an emphasis on the ways in which individuals interpret the ELWUA. The information obtained through qualitative research is closer to the social reality than the quantitative numbers alone, and thereby it could help to understand the essence of ELWUA more precisely. Therefore, combining different research strategies can provide a more comprehensive understanding of the ELWUA than can any one strategy alone.

### **3.2.6 Comparison with European cases**

In order to assess the ELWUA in Beijing and find out its particular characteristics, following the analysis and interpretation in STEP 5, a cross-national comparative research was carried out between the ELWUA in Beijing and in European cities. The comparative aspects on ELWUA covered the type, spatial distribution, organizational form, service, people's attitudes, and historical evolution. Through comparing the similarities and differences of the ELWUA in the European cities, we could understand the ELWUA in Beijing under a broader context, and thereby summarize its own particular characteristics. Furthermore, the contemporary development of the ELWUA in Beijing could be assessed by finding out its limitations through regarding the European situation as a reference. Moreover, during the process of the comparative research, some strategies of the European ELWUA cases were found and translated into general recommendations which could be adapted for Beijing or other cities in China.

The data of the ELWUA in Beijing used for comparison mainly comes from the empirical research, while most of the data relating to the ELWUA in European cities were mainly from the already existing findings in the literature. However, most of the European cases which were collected from literature were also visited through the field survey, which benefited by obtaining a comprehensive understanding of the real status quo of the European ELWUA through observing and perceiving the real edible landscape sites, and communicating with different stakeholders.

### **3.2.7 Recommending**

In the last step, the recommendations on how to use edible landscapes to promote the healthy and sustainable development of Beijing and other metropolitan cities in China was proposed based on the findings of this research.

# **Chapter 4 Status and characteristics of edible landscapes within the urban area of Beijing**

## **4.1 Spatial characteristics**

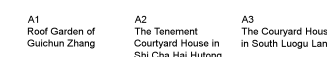
### **4.1.1 General spatial distribution and their characteristics**

Although there are rarely any reports or articles about the edible landscapes within the urban area of Beijing, the field survey in Beijing indicated that farming activities within the urban space of Beijing have existed and are quickly increasing at present. Through mapping the general spatial distribution of the visited ELWUA cases that were selected as the samples (Figure 4.1), it was found that the edible landscapes exist in every zone of the built-up areas of Beijing that were divided by the ring roads. In the urban space within the 3<sup>rd</sup> ring road, the edible landscapes usually presented in point or linear shaped distributions in small sizes (except for the experimental farm of CAAS), while starting from the 4<sup>th</sup> ring to the edge of the city, the planar shaped edible landscapes of a relatively larger size emerged. This phenomenon could be explained by the fact that the further from the city center, the less densely constructed area exists, which makes it possible to have a larger-sized space for the development of edible landscapes.

The edible landscapes in Beijing are mainly located in five types of urban space, which are: 1) the space in or around a residential area, 2) the Danwei precinct, 3) traffic space (street space, space along rivers, space along the rail network, space around a car park, etc.), 4) urban parks, 5) multifunctional leisure farms at the edge of the urban area. Of these, the ELWUA cases in or around the residential area account for the majority of the total ELWUA in Beijing. The spatial characteristics of the edible landscapes in the five urban space mentioned above will be detailed respectively in the next section from four aspects, including the spatial distribution and form, the spatial size, the spatial zoning and accessibility, and the legal land use right.



A. Edible Landscape Cases in or around the Residential Area



A1 Roof Garden of Guotun Zhong



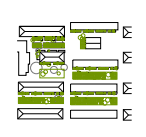
A2 The Tenement Courtyard House in Shi Cha Hai Hutong



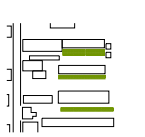
A3 The Courtyard House in South Longji Lane



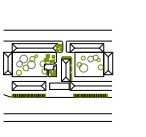
A14 Mining Residential Area No. 20



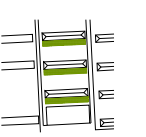
A8 San Li He 3 Qu Residential Area



A7 Military Residential Area



A9 Mu Dan Yuan Residential Area



A11 Shuang Yu Shu Residential Area



A12 No.6 Hai Dan South Road Dwelling



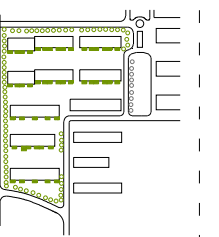
A4 Dormitory of the Receptor Factory



A20 Fang Shang International Apartment



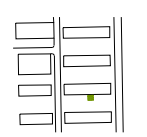
A18 Hu Xin Homeland Residential Area



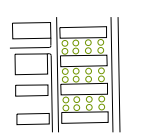
A21 Wen Quan Xin Xin Residential Area



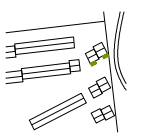
A13 Dong Wang Zhong Residential Area



A5 20 Square Meters Courtyard Garden Experiment



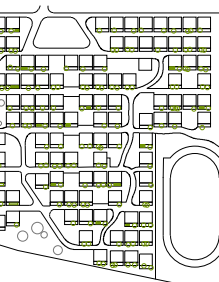
A6 Dormitory of the ITCAS



A19 Balcony Garden in Bowen Green Apartment



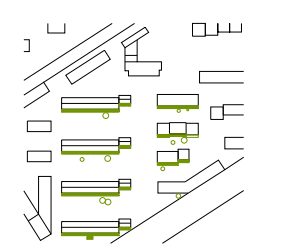
A10 Yan Bei Yuan Residential Area



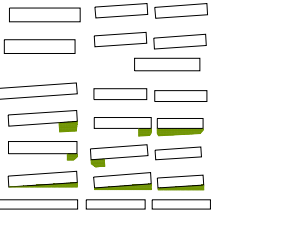
A23 Xiang Shan Qing Qin Villa Estate



A22 Yuan Ming Yuan Villa District



A15 Modern City Homeland Residential Area



A17 Long Yue Yuan 3rd Residential Area



A16 Jia Zhou Shu Jun Residential Area

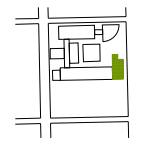
B. Edible Landscape Cases in the Danwei precinct



B4-2 The Experimental Farmlet of CAAC (Chinese Academy of Agricultural Sciences)



B4-1



B3 Roof Farm in Tsinghua University

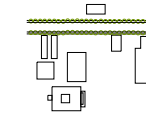


B2 The Institute of Semiconductor, Chinese Academy of Sciences (ICTCAS)

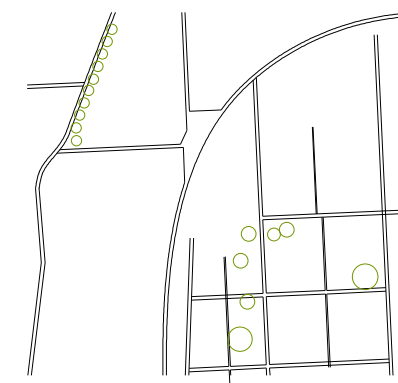


B1 Si Bo Lian Hua Hong Biotechnological Factory

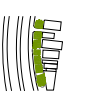
C. Edible Landscape Cases in Traffic Space (Street Space, Space along Rivers, Space along the Rail Network, Space around the car park)



C6 The Avenue Trees around the Embassy District



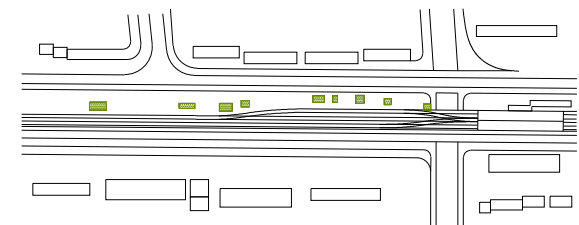
D2 Fruit Trees in the Temple of Heaven Park



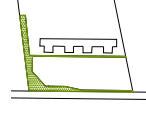
C2 The Vegetable Field along Shang He Road



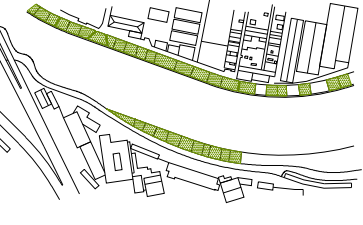
C1 Vegetable Field along the Street adjacent to Sheng Di Flower Market



C4 The Public Space along Subway 15



C5 The Public Space around a Parking Lot



C3 River Treatment and Public Green Space along Sha River

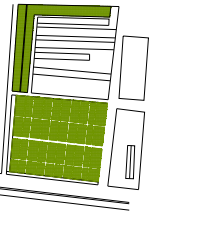
D. Edible Landscape Cases in Urban Parks



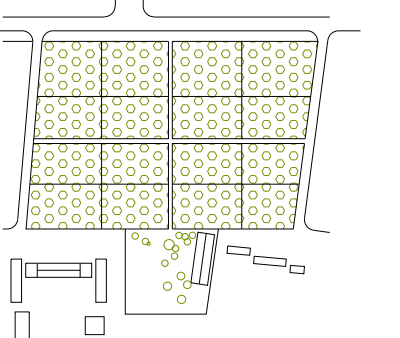
D1 One Acre Paddy Field in Haidian Park



D3 The Landscape of Sun Flower in Chen Yang Park



E1 Xi Shan 'Happy Farm'



E2 Si Ji Qing Agricultural Picking and Sightseeing Farm

E. Multifunctional leisure farms at the edge of the urban area

Figure 4.1 Plans and the general spatial distributions of the investigated cases in the built-up area of Beijing

## 4.1.2 Spatial typologies and their characteristics

### 4.1.2.1 Edible landscapes in or around the residential area

#### (1) Spatial distribution and its characteristics

The edible landscapes in or around the residential area are the most common edible landscape within the urban space of Beijing and they exist in each zone of the built-up areas. In this research, 23 ELWUA cases in different types of residential areas from six different zones were selected as the samples (Figure 4.1). Generally the space where these cases are located can be divided into two categories: one is the space in or on the buildings, including the roof, the balcony and the façade of buildings (the interior is not included in this research), and the other one is the open space between or next to the buildings, just like a "backyard space", for example, the private courtyard, the public (green) space between or adjacent to the residential buildings in residential areas, the special "Happy Farm" attached to the residential area, etc. There are also a few individual cases located outside but close to the residential area, for example, the edible gardens spontaneously built outside the residential areas by the urban residents (Case A22) (Figure 4.2).

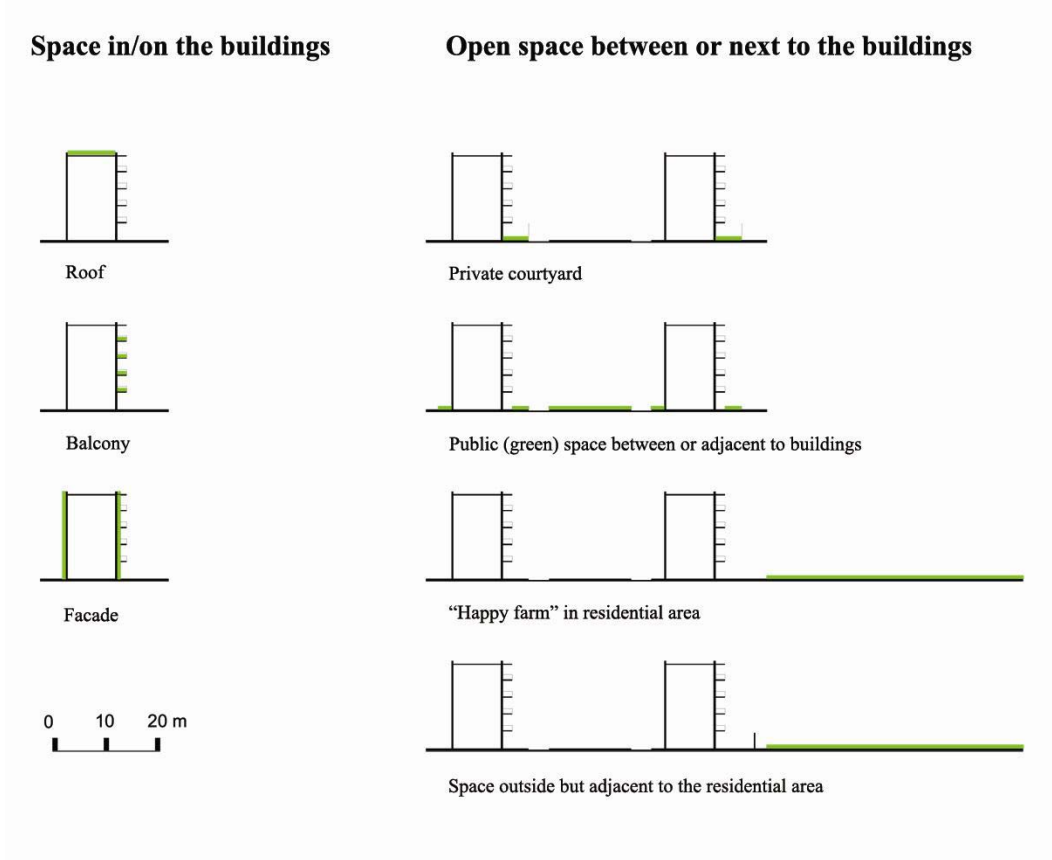
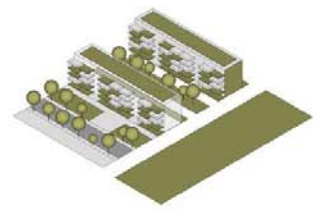


Figure 4. 2 The schematic diagram of the edible landscapes' location in or around residential areas

The spatial distribution of the edible landscapes in or around the residential area varies with the types of the residential buildings. The residents who live in the multi-storied or medium high-rise residential buildings might make use of the roof, the balcony, the private courtyard on the earth floor, the public (green) space in or adjacent to the residential area or the special “Happy Farm” for growing edible plants; the people who lived in dense traditional Chinese courtyard or tenement courtyard buildings might grow fruit trees or vegetables in the courtyards or in the scrap plots adjacent to the buildings, and also might make use of building’s façade to sustain the growth of the edible climbing plants, and they also might use the reconstructed flat roofs as edible roof gardens; the residents living in the modern villas, who are usually rich, might plant fruit trees or vegetables on the roofs or in their own private courtyards; moreover, the fruit trees often can be found in the public space of the villa area as greening trees (Figure 4.3).

The edible landscapes located in the public space of the residential area usually present two different spatial patterns based on different organizations. The edible landscapes which were built informally by the residents usually present a random and scattered pattern, because the elements including the site selection, the size of enclosure and the types of edible plants always differ based on the personal wishes of the urban gardeners, while the edible landscapes built under united planning usually show a spatial pattern with certain regularities, such as the divided plots of a similar size and uniformly designated species of edible plants (Figure 4.4).

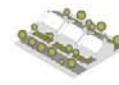
In densely-populated Beijing, space for growing edible landscapes within the urban area is limited, therefore, in addition to planting edible plants directly in the earth in the open air, containers such as flower pots are commonly used by urban residents for growing food, especially in those smaller-size urban spaces, for example, the roof gardens, the balconies and the traditional Chinese courtyards, etc. In addition, because the containers have good characteristics such as being easily obtained (using recycled materials), easily and flexibly moved, inexpensive, etc., the form of growing food in containers could be easily found in any space in or around the residential area (Figure 4.5).



Multi-storey residential building  
Medium high-rise residential building



Chinese traditional courtyard  
Tenement courtyard



Modern villa



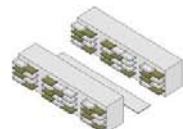
Roof



Roof



Roof



Balcony



Facade



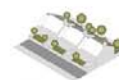
Facade



Facade



Private courtyard



Private courtyard



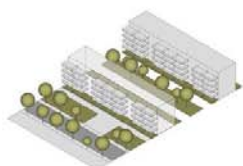
Private courtyard/Backyard



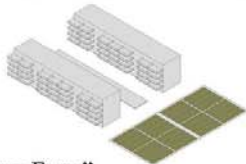
Public space adjacent  
to the courtyard



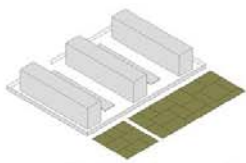
Public green space



Public (green) space, wall verges, street verges

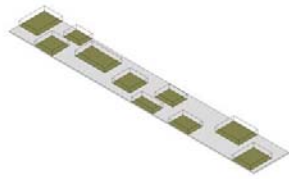


"Happy Farm"



Space outside but close to dwelling area

Figure 4. 3 Spatial distributions of the edible landscapes in different types of residential area

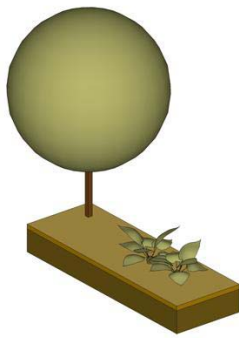


The randomly scattered spatial pattern



The regular spatial pattern based on uniform plannings

**Figure 4. 4 Spatial patterns of the edible landscapes in the public space in or around the residential area**



Growing edible plants directly in the earth field









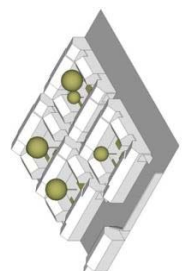


Growing edible plants in containers

**Figure 4. 5 Two different methods for growing edible plants**

The spatial distributions and their characteristics of the edible landscapes in or around the residential area within the urban area of Beijing could be summarized in the following diagram (Table 4.1-1, 4.1-2, 4.1-3), including the type of the residential buildings, the location of the edible landscapes, the spatial pattern of the edible landscapes, the growing methods of edible plants, photos and the general descriptions.

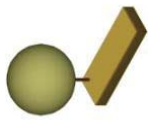


**Table 4.1- 1 The diagram of the spatial distribution and its characteristics of the edible landscapes in or around the residential area - Traditional courtyard /Tenement courtyard**

Location of the edible landscapes	Spatial pattern	Planting method	Photo	Descriptions
 <p>Roof</p>	--			<p>Residents might put the containers (e.g. flower pots, recycled Styrofoam box or washbowl, etc.) or construct new plant beds on the roof, and fill up them with soil for growing edible plants such as herbs, vegetables and fruits. The frameworks built with bamboos or other materials are commonly used for sustaining the climbing plants.</p>
 <p>Facade</p>	--			<p>Residents might put the containers (e.g. flower pots, recycled Styrofoam box or washbowl, etc.) filled with soil adjacent to buildings or the walls of courtyards for growing edible plants, especially the climbing plants, and make use of the façade of buildings or the courtyard wall to sustain the plants.</p>
 <p>Private courtyard</p>	--			<p>Residents might put the containers (e.g. flower pots, recycled Styrofoam box or washbowl, etc.) filled with soil in their private courtyard for growing common herbs, vegetables and fruits.</p>



Fruit trees (e.g. persimmon tree, Jujube) or other edible trees (e.g. Chinese toon) are commonly planted in the traditional Chinese courtyard or the tenement courtyard.



Residents might plant common herbs, vegetables and fruits crops directly in the earth in the space of the traditional Chinese courtyard or the tenement courtyard.

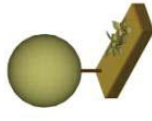


Residents might put the containers filled with soil outside but adjacent to the courtyard wall for growing common herbs, vegetables and fruits.



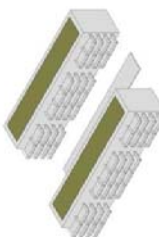



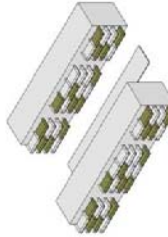


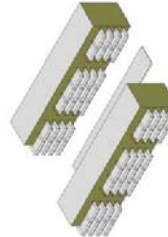






Public space adjacent to the courtyard

Residents might plant common vegetables or edible trees directly in the earth in the public space outside but adjacent to the courtyard wall.



Source of photo "1": bbstaobao.com.

**Table 4.1- 2 The diagram of the spatial distribution and its characteristics of the edible landscapes of the residential area - Multi-storey/ medium-rise/ high-rise residential buildings**

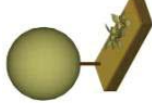
Location of the edible landscapes	Spatial pattern	Planting method	Photo	Descriptions
 <p><b>Roofs</b></p>				<p>Residents might make use of the roof of the multi-storey/medium-rise/high-rise residential buildings to plant common herbs, vegetables and fruits informally although they have no land use rights.</p>
 <p><b>Balconies</b></p>	<p>--</p>			<p>Residents might make use of the balcony for growing common herbs, vegetables, fruits and flowers, which is becoming more and more popular in China. The cases which were built using professional designs usually use sustainable strategies, e.g. a rainwater collection system for irrigation, etc.</p>
 <p><b>Balconies</b></p>	<p>--</p>			<p>Residents might put the containers (e.g. flower pots) filled with soil adjacent to buildings or on the periphery of the balconies for growing edible climbing plants, and the façade of the building could be used to sustain the plants.</p>
 <p><b>Facades</b></p>				<p>Residents might grow edible climbing plants directly in the earth field adjacent to buildings, and make use of the façade to sustain the plants.</p>

Residents might make use of the containers with soil for growing common herbs, vegetables and fruits in private courtyards.



Private courtyards/  
Backyards

Residents might grow common herbs, vegetables, fruit trees or other edible trees directly in the earth of the private courtyard.



Residents might put the containers filled with soil in the public (green) space of the residential area which are usually close to their own houses for growing common herbs, vegetables and fruits.



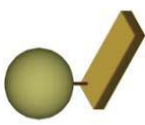
Public (green) space,  
wall verges, street  
verges, usually close to  
the urban gardeners'  
houses

Residents might make use of the public (green) space which is adjacent to or close to their own houses or private courtyards for growing common herbs, vegetables and fruits directly in the earth field.





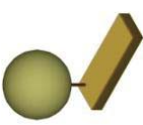
Residents might plant fruit trees or other edible trees directly in the earth of the public green space or the street verges in the residential area.



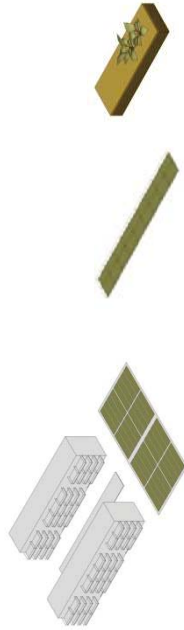
Residents or the staff in property management companies/neighborhood communities might grow edible plants directly in the earth of the public green space under uniform organizations (e.g. uniform distribution of the public space).



Under a unified planning of the residential area, fruit trees might be planted in the public green space or in the verges along the street as the greening trees of the residential area.



"Happy Farm" attached to the residential area, which is a special commercial garden built by developers or certain organizations for the residents to grow vegetables or fruits. Normally only the residents who have paid the registering fees can enter it.



"Happy Farm"



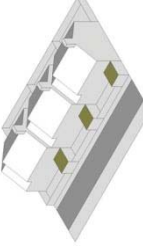


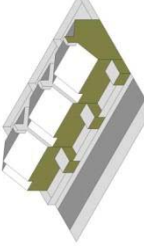


Space outside but close to dwelling area



Residents might randomly enclose a piece of land which is located in the space outside but close to their residential area as their own gardens for growing food.

Source of photo "1": Turenscape.

Table 4.1- 3 The diagram of the spatial distribution and its characteristics of the edible landscapes in or around the residential area - Modern villas

Location of the edible landscapes	Spatial pattern	Planting method	Photo	Descriptions
 Roofs	--			Residents might make use of the roof of the villa (e.g. the roof of the garage) for growing common herbs, vegetables and fruits.
 Facades	--			Residents might grow edible climbing plants directly in the earth adjacent to their villas or adjacent to the courtyard walls, and make use of the façade to sustain the plants.

Residents might use containers filled with soil for growing common herbs, vegetables and fruits in their private courtyards.

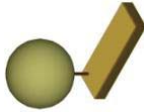


Private courtyards

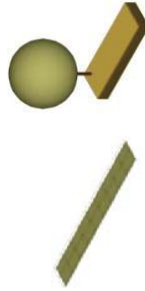
Residents might grow common herbs, vegetables and fruits directly in the earth of their private courtyards.



Residents might grow fruit trees or other edible trees directly in the earth of their private courtyards.



In villa areas, it is very common to use fruit trees as the greening trees in the public green space and along the street verges.



Public green space

## **(2) Spatial size**

The edible landscape in or around the residential areas are usually in micro or meso scales, which is much smaller than traditional agriculture, because it is limited by the high densities of buildings and populations within the urban area. The size of the edible landscapes varies with different situations. Normally the edible landscapes built by the individuals for self use usually are in micro scale, such as the ones on the roof, balcony, facade, courtyards, street verges, public space verges. The results of the field survey implied that the size of the edible landscape belong to each individual in or around the residential area might vary from around less than 1 m<sup>2</sup> (e.g. flower pots, Case A2) to about 100m<sup>2</sup> (e.g. roof garden in the traditional courtyard house area, Case A1), and it depends much on the types of the residential area, the organizational forms and the individual wishes of residents, while the edible landscapes built for public greening might be in meso scale, such as the fruit groves or avenue fruit trees.

## **(3) Spatial zoning and accessibility**

The edible landscapes in or around the residential area have three types of spatial zoning, which are private, semi-public and public, which varies with the comprehensive factors including the location of edible landscape, organizational form of the edible landscape and planters' individual wishes. The edible landscapes located in the residents' private space, such as the private roof gardens, balconies and the private courtyards, are still private and only accessible for the owners; the edible landscapes located in the public (green) space can be divided into two categories, one is the edible gardens informally cultivated by the residents, the other is the edible landscapes formally built under a uniform organization. For the former category, the accessibility of the edible space is determined by the planters' individual wishes, if they enclose the edible space with fences to prevent other residents entering it, then it is private, otherwise, it is public. For the second category, the edible landscapes are normally built with the permission of the residents, thereby the productive space are still public to the residents in the residential area; the "Happy Farm" attached to the residential area belongs to semi-public space, because only the residents who have paid the registering fees can enter the "Happy Farm" based on the its rules, but very often, other residents who didn't pay are also allowed entering for a visit; the accessibility of the productive space outside but close to the residential area is determined by the planters' individual wishes, if they enclose the edible space with fences to prevent other individuals entering it, then it is private space, otherwise, it is public space (Table 4. 2).



**Table 4. 1 The spatial zoning and accessibility of the edible landscapes in or around the residential area**

Type of the edible landscape			Spatial zoning
Location	Organization	With fence or not	
Private roof	individual	-	<b>Private</b>
Private balcony	individual	-	<b>Private</b>
Private courtyard	individual	-	<b>Private</b>
Public (green) space	Informal	With fence	<b>Private</b>
		Without fence	<b>Semi-public</b>
	Formally organized	-	<b>Public</b>
Attached “Happy Farm”	Formally Organized	-	<b>Semi-public</b>
Space outside but adjacent to residential area	Informal	With fence	<b>Private</b>
		Without fence	<b>Public</b>

Note: The spatial zoning is categorized as private when the space is only open to the individuals; as public when it is open to the public; as semi-public when the space is open to the residents living in the residential area or only open to some people in the residential area who meet a certain requirements (In this form, the requirement is that only the residents who have paid the registration fee can enter the “Happy Farm”).

The field survey indicated that most of the informally built ELWUA cases in the public (green space) in or around the residential areas are still public to the residents, but there are also many residents tending to enclose one piece of land with high fences and doors to define and mark the space as their own territories (Figure 4. 6).



**Figure 4. 6 Two ELWUA cases in the public green space in the residential area- without fences and with fences**

#### **(4) Legal land use rights for edible landscapes**

The Article 2 of *The Law of Land Administration of the People’s Republic of China* states the land ownership in the People’s Republic China implements the socialist public ownership, which includes the national ownership or the collective ownership of peasants. That is to say, there are two forms of land ownership in China, one is the land possessed by the state, and the other is the land possessed by peasant collectives. Furthermore, the state may requisition land owned by peasant collectives for public interests according to law, and proper compensation should be given to the



land owners and land users based on the standard in law in one lump sum. Except for the two land owners mentioned above, other people cannot possess the land but may only achieve the land use rights through certain ways such as a purchase. Therefore, any people who want to formally use the land in China must obtain the land use rights from the state or the peasant collectives before using it for any use. This rule also applies to the edible landscapes in this research. If the urban residents cultivate land without land use rights, the farming activity is actually informal, and even illegal.

After the housing commercialization in 1980s, most of the residential areas in China were developed by real-estate developers. Before the construction of the housing estates, developers need to buy development rights of the land from the state first. With development rights, during the construction of the residential area, developers have legal right to build edible landscapes such as fruit groves and “Happy Farm” as attached facilities of the residential area. Then when the housing estates are completed and sold, the purchasers of the houses (i.e. house owners) obtain the use rights of their own housing estate, including the house and attached roof, courtyard, etc., and the public (green) space. However, according to the Property Law in China, the use rights of the two types of space are different: the former one is a personal item which could be used freely by the house owners or their tenants, while the latter one is public item shared by all the house owners in the residential area, therefore, its usage need to be determined by the housing co-operative rather than individuals. Therefore, the urban residents have the right to grow food in their private roof gardens, balconies and courtyards, but they have no legal land use right to do that in the public (green) spaces in the residential area, which means that the enclosed edible landscape gardens in the public (green) space of the residential area for private use are actually informal and not legal. While the community neighborhood committee or the property management companies, as the representative of the common desire of all the housing owners, have legal land use rights to build the edible landscapes after obtaining agreements from the housing owners, and the edible landscaping is usually launched around the aims of beautifying the environment, achieving greening, or creating productive space, etc. For the space outside the residential area, the residents do not have right to cultivate in the space unless they have obtained the legal land use rights from the owner of the land use right, who might be the state, developers, Danwei, etc.

Therefore, the legal status of land use right for edible landscaping in or around the residential area could be summarized in the following form (Table 4.3).

Table 4. 2 The legal status of land use right for edible landscaping in or around the residential area

Type of the edible landscapes		Legal status of land use rights *
Location	Organization	
Private roof	Individual	+
Private balcony	Individual	+
Private courtyard	Individual	+
Semi-public (green) space	Informal	-
	Formally organized	+
Attached “Happy Farm”	Formally organized	+
Space outside but adjacent to residential area	Informal	-

Note: \* The column “Legal status of land use rights” expresses “have legal land use rights for edible landscaping” (+) and “do not have legal land use rights for edible landscaping” (-). The texts which are marked with grey background means the edible landscapes are built without the land use right.

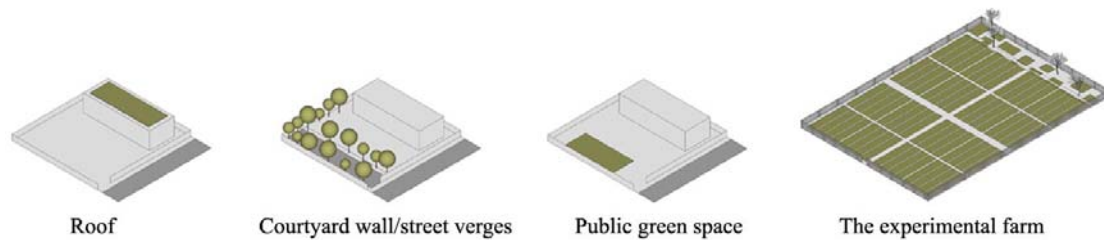
The field survey indicated that except for the edible landscapes built under formal organizations or plans, most of the edible landscapes located in the public space in or around the residential area are informal activities without land use rights.

#### 4.1.2.2 Edible landscapes in the Danwei precinct

##### (1) Spatial distribution and its characteristics

The term “Danwei”, with its full name “Gongzuo Danwei”, literally means “work unit”, is the name given to a place of employment in the People’s Republic of China. It might refer to any social institutions and organizations where people work, such as the independent sectors of enterprises, schools and government agencies. A large enterprise can be called a “Big Danwei”, and a small organization can be called a “Small Danwei”. Most of the big Danwei in China have their own territories (i.e. the Danwei precinct), which is usually composed of a working building zone and courtyard zone. The Danwei precinct is usually enclosed by enclosures and gates, and normally only the people who have permission can enter. The field survey in Beijing indicated that the edible landscapes might easily be found in a Danwei precinct in each zone of the built-up area in Beijing. The edible landscapes in the Danwei precinct might be located in two types of space; one is the roof of buildings, and the other one is the courtyard of the Danwei, which is mainly in the courtyard wall verges or street verges, and in the public green space (Figure 4.7). In this research, three cases that are separately located in the 3<sup>rd</sup>, the 4<sup>th</sup> and the 5<sup>th</sup>-ring zone were selected as the samples (Figure 3.1), and they are also three representative demonstrations of the edible landscapes which separately located on three different types of space in the territory of “Danwei”. In addition, there is one special type of edible landscape which is built particularly for carrying out agricultural experiments and only located in the precinct of agricultural research institutions----the experimental farm (Figure 4.7). In

this research, the experimental farm of the CAAC (Chinese Academy of Agricultural Science) which is located in both the 3<sup>rd</sup>-ring-zone and the 4<sup>th</sup>-ring-zone was selected as the sample (Figure 4.1). This is the only preserved farmland in the city center of Beijing.



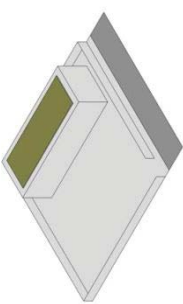


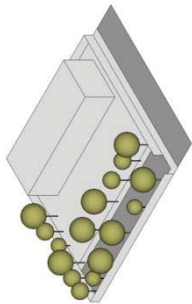
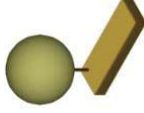

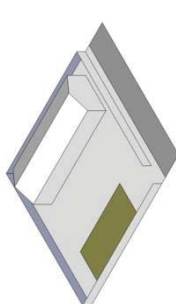


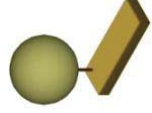

**Figure 4. 7 Spatial distributions of the edible landscapes in the Danwei precinct**

The spatial pattern of the edible landscapes in the Danwei precinct is usually regular, because the edible plants are usually planted under a uniform organization, or based on a general or master plan. In these, the spatial pattern of the experimental farm is similar with the traditional farmland, which covers large areas and is cultivated with plants in regular pattern. Besides, in addition to the main experimental farmland, in the leftover space there are some vegetables which were planted informally by the employed farmers and the gatekeeper for self use.

The edible plants on the roof of buildings in the Danwei precinct are normally planted in containers or newly constructed plant beds, while those in the courtyard and in the experimental farm are usually planted directly in the earth in the open air.

The spatial distributions and their characteristics of the edible landscapes in the Danwei precinct within the urban area of Beijing can be summarized in the following diagram (Table 4.4).

Table 4. 3 The diagram of the spatial distribution and its characteristics of the edible landscapes in the Danwei precinct

Location of the edible landscapes	Spatial pattern	Planting method	Photo	Descriptions
Roof				Edible plants (e.g. common herbs, vegetables and fruits trees) might be planted in containers filled with soil and being arranged in a regular pattern on the roof of buildings in the Danwei precinct. The possible aims might be achieving greening, education and producing food, etc.
Courtyard wall verges, street verges				Fruit trees or other edible trees might be regularly planted along the courtyard wall verges or the street verges of the Danwei precinct under a united planning which has been officially authorized by the Danwei, the possible aims of which might be achieving greening, producing food and education, etc.
Public green space				Edible plants (e.g. common herbs, vegetables) might be regularly planted in the public green space under a united planning which has been authorized by the Danwei, the aim of which is not only greening the environment but producing food as well.
				Fruit trees or other edible trees might be selected to be planted in the public green space of a Danwei because of their multifunction, such as achieving public greening, production and education.



Experimental farm with a similar pattern of the traditional agriculture, which was built for scientific research of agriculture, existed within the urban area of Beijing.



The verges space of the experimental farm was cultivated informally by the employed farmers and gatekeepers with vegetables for self use.

Experimental farm

Source of photo "1": Zixin Lv.

## (2) Spatial size

The field survey implied that the edible landscapes in the Danwei precinct are usually in micro or meso scales (except for the experimental farm in macro scale), and the size is much related to both the size of the Danwei precinct and the plans which have been approved by the Danwei. For example, the Sibohua Neng Electromechanical Factory built a kitchen garden of around 400 m<sup>2</sup> to provide food to the staff canteen (Case B1); the Roof Farm in Tsinghua University (Case B3) was around 50 m<sup>2</sup> and it is still being continuously expanded.

## (3) Spatial zoning and accessibility

The edible landscapes in the Danwei precinct (except for experimental farm) are usually public to all the staff members, because normally the premier aims of creating the edible landscapes in the Danwei were achieving greening, improving and beautifying environment or producing food for the staff who work here. The experimental farm is only accessible to the scientists, researchers and employees who are related with the agricultural research. The experimental field is only open to the people who work on the agricultural research, such as the scientists, researchers, employed farmers and gatekeepers.

## (4) Legal land use right for edible landscapes

Danwei owns the land use right of the Danwei precinct. Therefore, the edible landscapes which have been formally authorized by the Danwei are legal, otherwise they are informal and even illegal. For example, the greening department of a Danwei has legal rights to plant fruit trees in the Danwei precinct for achieving greening when the plan has been authorized by Danwei (Case B2); while the employed farmers and gatekeepers in the CAAS (Chinese Academy of Agricultural Science) who have grown food in the verges space of the experimental farm for private use actually didn't have legal land use rights to cultivate there, although the CAAS usually acquiesced their farming activities there (Case B4). The legal status of land use rights for edible landscapes in the Danwei precinct could be summarized as following (Table 4.5).

Table 4. 4 The legal status of land use right for edible landscaping in or around the residential area

Type of the edible landscapes		Legal status of land use rights *
Location	Organization	
Normal Danwei precinct	Formally organized	+
Experimental farm	Formally organized	+
	Informal	-

Note: \* The column "Legal status of land use rights" expresses "have legal land use rights for edible landscaping" (+) and "do not have legal land use rights for edible landscaping" (-). The texts which are marked with grey background means the edible landscapes are built without the land use right.



### 4.1.2.3 Edible landscapes in traffic space

#### (1) Spatial distribution and its characteristics

The edible landscapes also exist in traffic spaces, such as the street verges, space along rivers, space along the rail network and space around the car park (Figure 4.8). Among which, the edible landscapes in the street verges might exist in each zone of the 6-ring zones within the urban space of Beijing, while the edible landscapes in other traffic spaces are more often seen in the outer zones away from the city center, such as 5<sup>th</sup>-ring zone and 6<sup>th</sup>-ring zone (Figure 4.1). In this research, six cases were selected as the samples, among which, one is in the 4<sup>th</sup>-ring zone, one is in the 5<sup>th</sup>-ring zone and four cases are located in the 6<sup>th</sup>-ring zone, furthermore, they are also the demonstrations of the edible landscapes which separately located in the four different types of traffic space, in which, three cases are in street verges, one case is in space along the railway, one case is in space around a public car park and the last one is in space along a river bank.

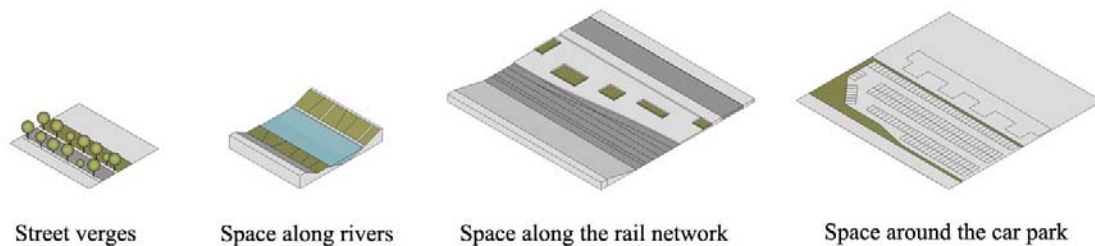
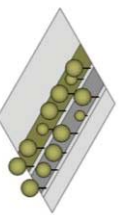

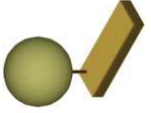




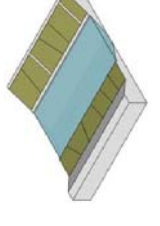



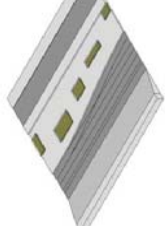





Figure 4. 8 Spatial distributions of the edible landscapes in traffic space

The spatial patterns of the edible landscapes in traffic space also can be divided into 1) regular pattern and 2) random and scattered pattern, which are usually determined by the organizational form of the cultivating activities. Take the case of the public avenue fruit trees as an example, the governmental greening departments plant the edible trees along the avenue equidistantly and only the specified species can be used, therefore, its spatial pattern is regular. While if the cultivation is the individual activities of the urban residents, its spatial pattern usually presents an appearance of random and scattered features. Moreover, the edible plants in the traffic space are usually planted directly in the earth in open air.

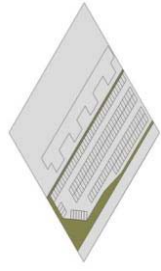
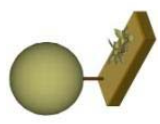
The spatial distributions and their characteristics of the edible landscapes in traffic space within the urban area of Beijing can be summarized in the following diagram (Table 4.6).

Table 4. 5 The diagrams of the spatial distributions and their characteristics of the edible landscapes in traffic space

Location of the edible landscapes	Spatial usage pattern	Planting method	Photo	Descriptions
 <p>Street verges</p>				<p>Edible trees (e.g. persimmon tree, ginkgo) might be planted regularly along the urban street as the greening avenue trees.</p>
				<p>Common grain crops, herbs and vegetables were found planted informally in the street corner and space along the street.</p>
 <p>Along river bank</p>				<p>Common grain crops, herbs and vegetables were found being planted informally in the space along the river bank.</p>
 <p>Along the rail network</p>				<p>Common grain crops, herbs and vegetables were found being planted informally in the space along the rail network.</p>



Common grain crops, herbs, vegetables and edible trees were found planted informally in the space around the car park.



Around the car park

## (2) Spatial size

The field investigation implies that the edible landscapes in traffic spaces might be in micro or meso scale, in which, many of them could reach a meso scale. Examples of this include the avenue of fruit trees in the public space (Case C6); the informally cultivated urban space in the street verges, along the rivers, rail networks, and the car parks (Case C3, C4, C5). One 81-year-old man has cultivated more than 2000 m<sup>2</sup> urban space in the street verges, along the rail network, and the car park for growing food (Case C4, C5).

## (3) Spatial zoning and accessibility

There are two types of spatial zoning of the edible landscapes in traffic space, which are private and public. The spatial zoning is much related to the organizational form of the cultivation activities. For the edible landscapes that are formally developed under a uniform organization by certain departments, they are usually public, such as the edible avenue trees. While for the edible landscapes which are built informally by individuals, their spatial zoning and accessibility will depend on the cultivators' personal wishes. The edible landscapes built without fences are public to everybody, while those enclosed by fences are private (Table 4.7).

Table 4. 6 The spatial openness of the edible landscapes in the traffic space

Type of the edible landscape			Spatial zoning
Location	Organization	With fence or not	
Street verges	Formally organized	-	<b>Public</b>
	Informal	With fence	<b>Private</b>
		Without fence	<b>Public</b>
Along river bank	Informal	With fence	<b>Private</b>
		Without fence	<b>Public</b>
Along the rail link	Informal	With fence	<b>Private</b>
		Without fence	<b>Public</b>
Around public parking lot	Informal	With fence	<b>Private</b>
		Without fence	<b>Public</b>

Note: The spatial zoning is categorized as private when the space is only open to the individuals; as public when it is open to everybody.

## (4) Legal land use rights for edible landscapes

The land use rights of the urban traffic space are normally owned by the state. Therefore, the governmental greening departments have legal land use rights for planting edible plants for the public benefits such as achieving urban greening and

beautifying the urban environment after the plan has been authorized by the state, while those people who have grown edible plants informally in traffic space for individual use actually didn't have the rights to use the land. The legal status of land use rights for edible landscapes in traffic space could be summarized as following (Table 4.8).

Table 4. 7 The legal status of land use right for edible landscaping in traffic space

Type of the edible landscapes		Legal status of land use rights *
Location	Organization	
Street verges	Formally organized	+
	Informal	-
Along river bank	Informal	-
Along the rail link		-
Around public parking lot		-

Note: \* The column "Legal status of land use rights" expresses "have legal land use rights for edible landscaping" (+) and "do not have legal land use rights for edible landscaping" (-). The texts which are marked with grey background means the edible landscapes are built without the land use right.

#### 4.1.2.4 Edible landscapes in urban parks

##### (1) Spatial pattern and its characteristics

Edible landscapes also exist in urban parks. In this research, two urban parks were selected as samples, which are separately located in the 2<sup>nd</sup>-ring-zone and 5<sup>th</sup>-ring-zone (Figure 4.1).

The spatial pattern of the edible landscapes in urban parks is usually based on the master plan of the urban park, which might be the regularly patterned fields of edible plants, such as the paddy field and the grove of the edible shrubs or trees, might be the edible trees planted in lines with a same distance with each other, such as the edible avenue trees, also might be the edible trees randomly and scatteredly planted in green space (Figure 4.9). The edible plants are normally planted directly in the earth in the open air.

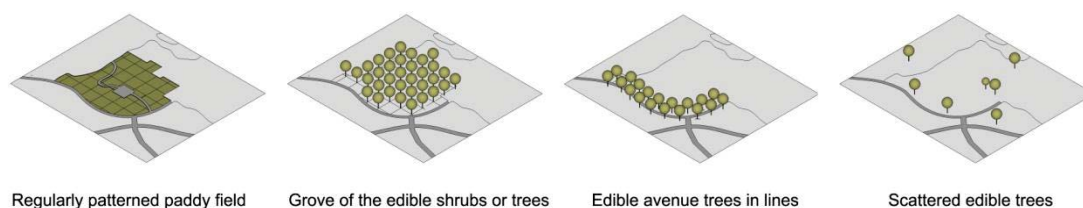

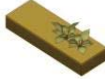

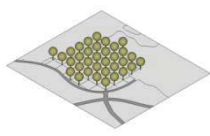
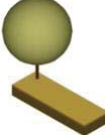

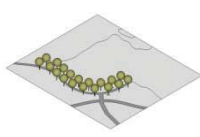
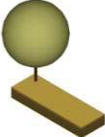

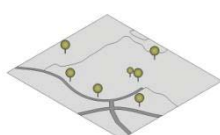
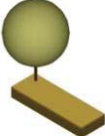



Figure 4. 9 Spatial patterns of the edible landscapes in urban parks within the urban area of Beijing

The spatial patterns and their characteristics of the edible landscapes in urban parks

within the urban area of Beijing can be summarized in the following diagram (Table 4.9).

**Table 4. 8 The diagrams of the spatial patterns and their characteristics of the edible landscapes in urban parks**

Spatial pattern	Planting method	Photo	Description
			<p>Edible herbaceous plants such as grain crops and cash crops might be planted in urban parks in regular pattern.</p>
			<p>Edible shrubs or trees might be planted in the urban parks as groves in regular pattern.</p>
			<p>Edible trees might be planted in the urban parks in lines with a same distance with each other, such as the edible avenue trees.</p>
			<p>Edible trees might be scattered-planted in urban parks.</p>

## (2) Spatial size

The spatial size of the edible landscapes in urban parks is much related to the master plan of the park. It might be in micro or meso scale, and usually in meso scale. For example, the one acre paddy field in Haidian Park (around 666.7 m<sup>2</sup>) (Case D1), and the rows of edible greening plants in Tiantan park (Case D2).

## (3) Spatial zoning and accessibility

There are two types of spatial zoning of the edible landscapes in urban parks, which are public and semi-public, which depends on the management regulation of the urban park. If the urban park is open to the public for free, then the edible landscapes

in the urban park is usually also public; if the urban park is a pay park or the edible landscape is a pay site, which means that only the people who have paid can enter, then the edible landscape is semi-public (Table 4.10).

**Table 4.9 The spatial openness of the edible landscapes in the urban parks**

<b>Location</b>	<b>Management regulation</b>	<b>Spatial openness</b>
Urban park	Pay park	<b><i>Semi-public</i></b>
	Free-pay park	<b><i>Public</i></b>

#### **(4) Legal land use right for edible landscapes**

A park is an area of open space provided for recreational use, usually owned and maintained by a local government, so a urban park has legal land use rights obtained from the state to build edible landscapes to supply a recreational service to the public, and normally the edible landscapes are built based on professional master plans.

#### **4.1.2.5 Multifunctional leisure farms at the edge of the urban area**

##### **(1) Spatial distribution and its characteristics**

Some edible landscapes exist at the edge of the urban area of Beijing in the form of multifunctional leisure farms, which are usually located outside the 4<sup>th</sup>-ring zone. There are two common forms of leisure farms in the current urban area of Beijing, which are “Happy Farm” and Agrotourists’ Picking and Sightseeing Farm. In this research, two cases located in the 5<sup>th</sup>-ring-zone, which separately represented the two different forms of leisure farms were selected as samples (Figure 4.1).

The name of “Happy Farm” in China originally comes from a virtual social network game which was developed by Chinese social game developer 5 Minutes and released in late 2008. The game was designed based on the farm management simulation; it allows players to grow crops, trade with others, sell produce, and steal from neighbors online<sup>22</sup>. The game became very popular in China. Hereafter, as the prevalence and the popularity of the game grew, some Chinese developers turned the virtual “Happy Farm” into reality. With the aim of creating a place for the citizens to experience and enjoy the fun of farming and country life, they divide a piece of original farmland at the edge the urban area into small plots and rent them to urban citizens, meanwhile, they supply seeds, seedlings, tools, agricultural knowledge supports and also the basic service facilities. The sitting tenants can grow and harvest food such as grain crops, vegetables, fruits by themselves. This kind of edible landscape is called “Happy Farm” or “Citizens’ Farm” in China. The Agrotourists’ Picking and Sightseeing Garden is a type of leisure farm which sprang up in the late 1980s. The tourists can

<sup>22</sup> Source: [http://readwrite.com/2010/03/25/china\\_social\\_gaming\\_landscape\\_whats\\_coming\\_next](http://readwrite.com/2010/03/25/china_social_gaming_landscape_whats_coming_next).

not only visit the farmland fields or orchards there but also taste and pick up vegetables or fruits which they want to buy themselves.

The leisure farm is usually a separate field enclosed with a protected wall, and it was usually transformed from the traditional farmland, orchard or vegetable field. The spatial pattern of a “Happy Farm” is usually based on a master plan, which normally includes the farming plots consisting of modular-sized units and the basic service facilities such as office buildings, tool houses, green houses and even barns. The spatial pattern of the Agrotourists’ Picking and Sightseeing Garden is similar to the traditional agriculture, which usually appear to be regular and of a relatively large size (Figure 4.10). The edible plants in leisure farms at the edge of the urban area of Beijing are usually planted directly in earth in the open air (a few also might be planted in green house), while in the Agrotourists’ Picking and Sightseeing Garden the edible plants grown in green houses are very common.

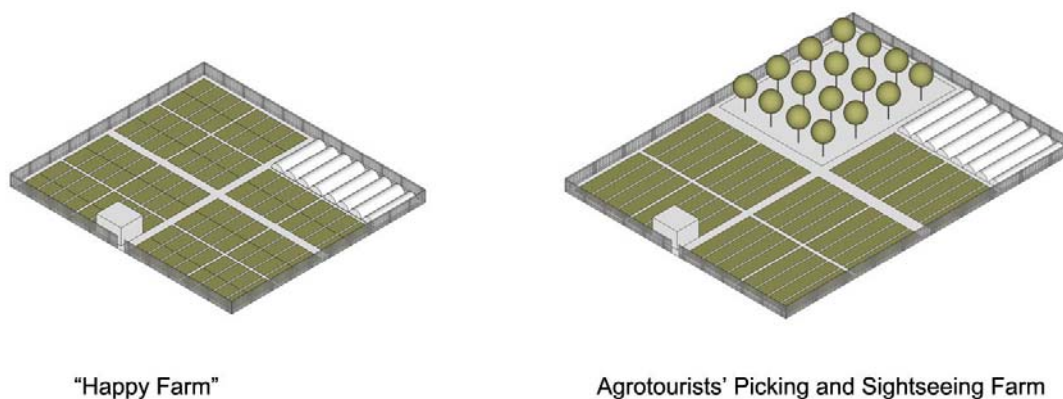
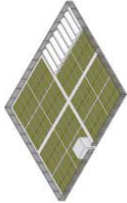







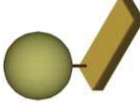





Figure 4. 10 The schematic diagrams of the multifunctional leisure farms at the edge of Beijing’s urban area

The spatial patterns and their characteristics of the multifunctional leisure farms at the edge of the urban area of Beijing can be summarized in the following diagram (Table 4.11).



Table 4. 10 Spatial patterns and their characteristics of the multifunctional leisure farms at the edge of the urban area

Diagram of leisure farms	Spatial pattern	Planting method	Photo	Descriptions
				Urban citizens can grow and harvest food by themselves, mostly the common vegetables, by renting a small plot in the open air of "Happy Farm".
"Happy Farm"				Urban citizens can grow and harvest food by themselves, mostly the common vegetables, by renting a small plot in the green house of "Happy Farm".
				Orchards are common in the Agrotourists' Picking and Sightseeing Farm. The tourists can not only visit the orchards but also taste and pick up the fruits which they want to buy themselves.
Agrotourists' Picking and Sightseeing Garden				Green houses where vegetables or fruits grow are common in Agrotourists' Picking and Sightseeing Farms. Tourists can not only visit the green houses but also taste and pick up the edible plants which they want to buy themselves.

## (2) Spatial size

The edible landscapes in the multifunctional leisure farms at the edge of the urban area might be in meso or macro scale. For example, Xi Shan “Happy Picking Garden” is around 26,680 m<sup>2</sup> (Case E1), and the Si Ji Qing Agrotourists’ Picking and Sightseeing Farm is around 140,000 m<sup>2</sup> (Case E2).

## (3) Spatial zoning and accessibility

Normally the “Happy Farm” and Agrotourists’ Picking and Sightseeing Farm are semi-public space, because only the people who have paid the registration fees of the “Happy Farm” or will buy the picked agricultural products in the Agrotourists’ Picking and Sightseeing Garden can enter. However, these two types of leisure farms might allow the people who have interests in farming activities to get inside for a visit, because normally they wish to let more people know the concept of the leisure farm and it is also good advertising for their business. These visitors are only allowed to visit the farm but not allowed to pick the vegetables. There are staff members who are specially working on guarding and maintaining farms, and protecting the farms from damage and theft.

## (4) Legal land use rights for leisure farms

The leisure farms were usually transformed from the traditional farmland and operated by the original peasants. The land use rights of the farmland was originally held by peasants collectively, therefore, they have the legal right to operate leisure farms there officially if they all reach an agreement on the plan. Sometimes, the leisure farms were developed by certain developers or by developers and the original peasants together. In this situation, as long as the developers have purchased land use rights from the peasants and the farmland will be not converted to other purposes such as residential or commercial areas, then they have legal right to operate leisure farms there, otherwise they don’t have. The legal status of land use right for leisure farms in Beijing could be summarized as following (Table 4.12).

Table 4. 11 The legal status of land use right for the leisure farms

Type of the edible landscapes		Legal status of land use rights*
Location	Organization	
Leisure farms at the edge of the urban area	Operated by peasant collectives	+
	Operated by developers with permission from peasant collectives	+

Note: \* The column “Legal status of land use rights” expresses “have legal land use rights for edible landscaping” (+).



## **4.2 Types of edible landscapes within the urban area in Beijing**

According to the comprehensive characteristics of edible landscapes such as location, scale and function, the edible landscapes within the urban area (ELWUA) in Beijing can be divided into three main levels: urban food gardening, urban greening and landscaping with edible plants, and urban farming. Each level of the ELWUA includes several ELWUA types, and their definitions and distribution characteristics have been summarized in Table 4.13 and Table 4.14.

### **4.2.1 Urban food gardening**

Urban food gardening are farming activities at a garden level, which can produce food but are not dependent on the economic production of food. Urban food gardens could be divided into six types, which are family gardens, guerrilla gardens, community gardens, renting farming gardens (called "Happy Farm"), educational/demonstration gardens and Danwei kitchen gardens. Of these, family garden and guerrilla garden are usually spontaneously built by individuals, which account for the majority of the total ELUWA in Beijing, while the other types of urban food gardens are usually built in uniform organization, which are still very few.




### **4.2.2 Urban greening and landscaping with edible plants**




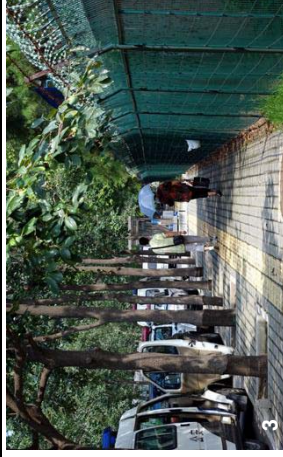
Urban greening and landscaping with edible plants are the activities of using edible plants such as fruit trees and crops for achieving urban (semi-)public greening and landscaping. Urban greening and landscaping with edible plants could be generally divided into two types, which are edible trees (e.g. fruit trees) and other edible plants (shrubs, climbing plants, herbaceous plants). The edible landscapes in this level are usually organized by certain organizations.

### **4.2.3 Urban farming**

Urban farming is the agricultural business or activities of a farmland scale which takes advantage of the proximity to city. The urban farms within the urban area of Beijing could be divided into two types, which are the agrotourists' picking farm and experimental farm. Both of them are built in a uniform organization.

Table 4. 12 The definitions and examples of different ELWUA categories in Beijing

Categories of ELWUA in Beijing	Definition	Examples	Cases (in appendix D)
Urban food gardening	Family garden Urban residents' individual activities of food growing in their own private space (such as roof, balcony, private courtyard).		A1, A5, A19, A21
Guerrilla garden	Urban residents' individual activities of food growing on land that they do not have legal rights to utilize.		A2, A3, A4, A6, A7, A8, A9, A10, A11, A17, A18, C1, C2, C3, C4, C5
Community garden	Collectively activities of food growing in or around the residential areas. The rules and organization are established by the community neighborhood committee or property management companies of the residential area.		A14, A22

<p>Renting farming garden (called "Happy Farm")</p>	<p>A special commercial model of renting land to the urban residents for vegetable growing, which is usually transformed from the original farmland and developed by developers.</p>		<p>A16, E1</p>
<p>Educational/demonstration garden</p>	<p>The food growing activities organized by an educational institution or municipal organization with the education purpose. Educational garden is usually also a demonstration garden.</p>		<p>B3, D1</p>
<p>Danwei kitchen garden</p>	<p>A special food garden in the Danwei precinct, which is usually maintained by or a group of (designated) staff members, with the purpose of both providing food to the staff canteens of Danwei and achieving greening as well.</p>		<p>B1</p>
<p>Urban greening and landscaping with edible plants</p>	<p>The fruit trees which are uniformly planted by governmental, commercial and other organizations in (semi-)public space for achieving urban greening and landscapes.</p>		<p>A6, A16, A20, A21, A23, B2, C6, D2</p>

<p>Shrubs, climbing plants and herbaceous plants (e.g. crops, vegetables)</p>	<p>The edible plants in forms of herbaceous plants, climbing plants and shrubs which are uniformly planted in (semi-) public space for achieving urban greening and landscapes by certain organizations.</p>		<p>D3</p>
<p>Urban farming Agrotourists' picking farm</p>	<p>A leisure farm, which is usually located at the edge of city, serves agricultural tourism and self-picking experience for urban residents.</p>		<p>E2</p>
<p>Experimental farm</p>	<p>The agricultural experimental field of certain agricultural research institutions within the urban boundaries.</p>		<p>B4</p>

Source: 1) Minkang community committee; 2) Zixin Lv; 3) <http://www.panoramio.com/photo/57233935>; 4) Turenscape.

Table 4. 13 Distribution of different categories of ELWUA in Beijing

Categories of ELWUA in Beijing	Residential area	Danwei precinct	Traffic space	Urban parks	Leisure farms at the edge of city
Urban food gardening	Family garden	×			
	Guerrilla garden	×	×		
	Community garden	×			
	Renting farming garden (called "Happy Farm")	×			×
Urban greening and landscaping with edible plants	Educational/demonstration garden	×		×	
	Danwei kitchen garden				
	Edible trees (e.g. Fruit trees)	×	×	×	
Urban farming	Shrubs, climbing plants and herbaceous plants	×		×	
	Agrotourists' picking farm				×
	Experimental farm	×			

### **4.3 Organizational forms and the characteristics**

The field survey indicated that the organization forms of the ELWUA in Beijing can be divided into five types, which are the individual mode, self-managed mode of group organization, professional organization by urban environment or community related departments or social organizations, scientific organization by research institutes, and commercial organization by companies. In these five types of organizational forms, the first two modes are bottom-up organizations, because the ELWUA built in these two organizations are usually spontaneous activities by individuals or self-help groups. The last three organizational forms are top-down modes, because the ELWUA built in these three organizational forms are usually formally initiated by certain social institutions, associations and municipalities. In addition, professional designers are a special type of participants, which might be involved in any of the five modes above. In this section, the five types of organization forms will be interpreted from two aspects, including the stakeholders (actors) and the operation process.

#### **4.3.1 Individual mode**

The individual mode is the most common organization form of the ELWUA in Beijing, which means that the edible landscape is initiated and built by the individuals of the urban residents (one or several members in one family) spontaneously, personally and independently. With the individual mode, the whole farming process, including sowing, cultivation, maintenance, management and harvest, is completed independently by the urban citizens (called “urban hobby farmers”) themselves, and the harvested food belong to the “urban hobby farmers” themselves (Figure 4.11). The edible landscape built in an individual mode within the urban area of Beijing might include family gardens, which are located in the private space (e.g. private roof, balcony or courtyard) of the cultivators, and guerrilla gardens, which are usually located in (semi-)public space (e.g. the public green space of the residential area, and the urban traffic space). Of these, the edible landscaping in family gardens is formal because the “urban hobby farmers” process land use rights for cultivation, while the edible landscaping in guerrilla gardens are usually informal, because the “urban hobby farmers” usually have no land use rights for cultivation. For the edible landscapes built in individual mode, especially those guerrilla gardens, the decisions on building the edible landscape, such as the type of the edible plants, the spatial pattern and the planting method, are all determined by the “urban hobby farmers” individually according to their own wishes and preference, therefore, the edible landscape which was built by different individuals usually have its own characteristics and looks different with others. This is also the reason why the edible landscapes which are composed by guerrilla gardens usually give people a “chaos” impression on the whole. The field survey indicated that most of the ELWUA in Beijing are built in the individual mode.



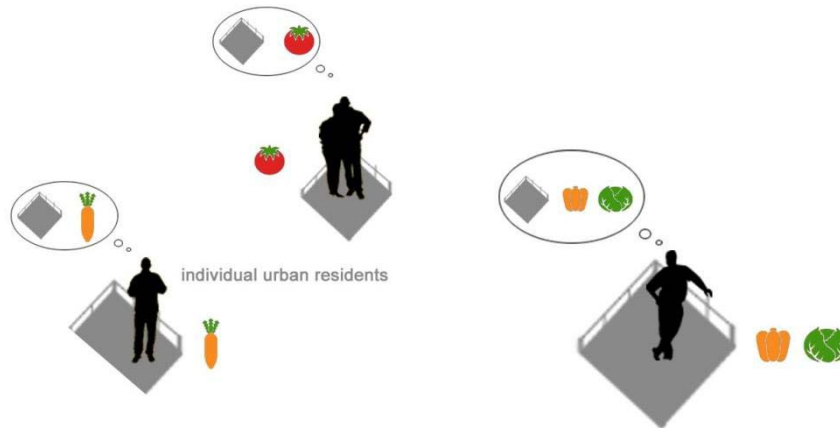


Figure 4. 11 Individual mode of the ELWUA organization in Beijing

### 4.3.2 Self-managed mode of group organization

Some edible landscapes are also spontaneously established by the urban residents, but they are initiated and built by a group of urban residents collectively. This type of organizational form can be called a self-managed mode of group organization. For example, some urban residents living in the same residential area or working together might have the same idea of growing vegetables in the public space of their residential area or around their working place for achieving public greening and producing food as well, or the tenants living in the same apartment might have the same idea of beautifying the private courtyard by edible landscaping, and then they just start farming activities together. The field survey indicated that family gardens shared by several tenants (e.g. Case A5) and guerrilla gardens (e.g. Case C1) in Beijing might be built in self-managed mode of group organization. Of these, the family gardens built in this mode in Beijing are usually formal because usually the cultivators have obtained the land use rights before starting edible landscaping, while the guerrilla gardens without legal land use rights are informal. The cultivators in the group might cultivate a piece of land, maintain it and share the harvested food together (e.g. Case A5, C1), and also might designate their own garden boundaries in the land, and then work separately (Case A22) (Figure 4.12). The harvested food in family gardens and guerilla gardens belong to the group members. The edible landscapes which are built in self-management mode of group, especially those built and maintained by the members together, might look neater and more uniform than the edible landscapes composed of components in individual mode, since the appearance including the type of the edible plant, the spatial pattern and the planting method, etc. is usually built on the common decisions of the group members. However, the field survey in Beijing shows that the edible landscapes built in self-managed mode of group organization are still very rare.

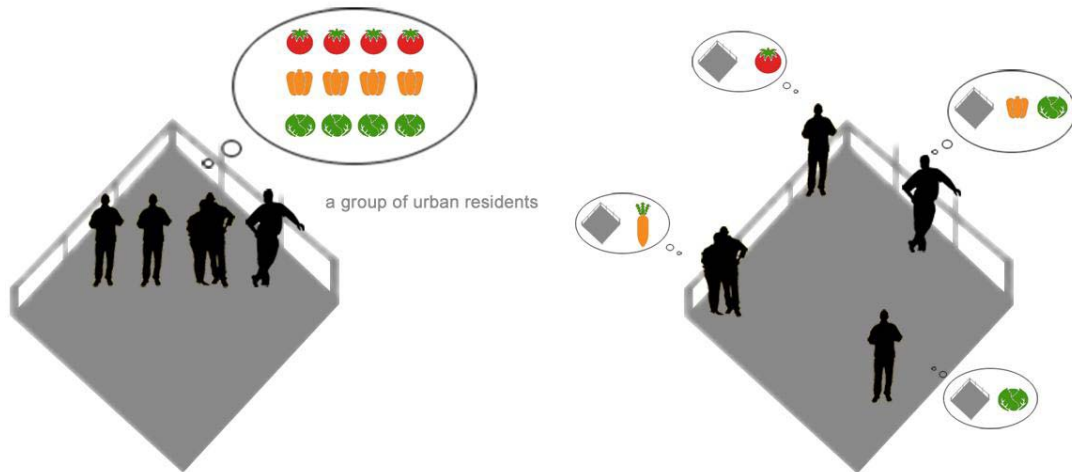


Figure 4. 12 Self-managed mode of group organization of the ELWUA in Beijing

### 4.3.3 Professional organization by Danwei or social organizations

Some ELWUA in Beijing were officially organized by the community or urban environment-related departments or social organizations, such as the community neighborhood committees or property management in residential areas, the governmental institutions of urban greening, the greening related departments in Danwei and the volunteer associations. The professionally organized edible landscapes are usually located in the urban public space, such as urban streets and urban parks, or in the semi-public space, such as the Danwei precinct and the public (green) space in the residential area. The urban public greening with edible plants, the educational/demonstration gardens and the community gardens in residential areas are usually built in this mode. The field survey shows that all the construction of the professionally organized ELWUA in Beijing belongs to formal activities, because the cultivators have obtained official authorization before building them. Since the professionally organized edible landscapes are usually built under a uniform organization or a professional plan, which is built on the organizers' common judgement, therefore, they usually give people an impression of neat, uniform or designer-look (Figure 4.13).

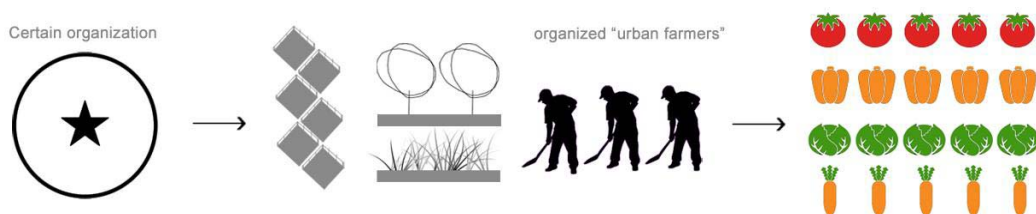


Figure 4. 13 Professional organization by Danwei or social organizations of the ELWUA in Beijing



### **(1) Professional organization by the community neighborhood committees or property management companies of the residential area**

The form of professional organization by the community neighborhood committees or property management of the residential areas was found being used in organizing the edible landscapes in some residential areas. The family gardens, community gardens, demonstration gardens and the public greening with edible plants in the residential area might be organized in this form. This organizational form might be carried on in three different ways (Figure 4.14): 1) The community neighborhood committee regularly distributes seeds to the residents to encourage them to plant edible plants for achieving greening. This way is usually used in the traditional Chinese courtyard areas, and the harvested foods belong to the residents themselves. For example, the community neighborhood committee of South Luogu Lane (Case A3) uses this model. 2) The community neighborhood committee or the property management companies of a residential area divides the public green space of the residential area into small plots and then distributes them to the residents for growing edible plants. Under this form, the harvested foods belong to the residents themselves. For example, Minkang residential area No.30 (Case A14) used this model from 2006 to 2012. 3) The staff in the property management of the residential area grows edible plants in the public green space based on a plan that aims to achieve greening. In some cases, the harvested foods were distributed to the residents and staff members by the property management companies, however, in many times the foods were thrown away as garbage because the residents rarely accept them. Therefore, many times the staff even adopt some special measures to prevent the edible plants from fruiting because of the problems which might be caused by the fruits, for example, throwing the fruits annually is a heavy burden for the property management companies, there are potential safety hazards caused by climbing up a tree for picking up fruits, the edible trees might be damaged by the barbarous picking behavior thereby affect the landscape efficiency, etc. In addition, the organized edible landscapes sometimes are built with financial or technological support from certain institutions. In this case, parts of the harvested foods were usually distributed to those institutions as presents for giving their support. For example, Minkang residential area No.30 (Case A14) started using this model in 2013.

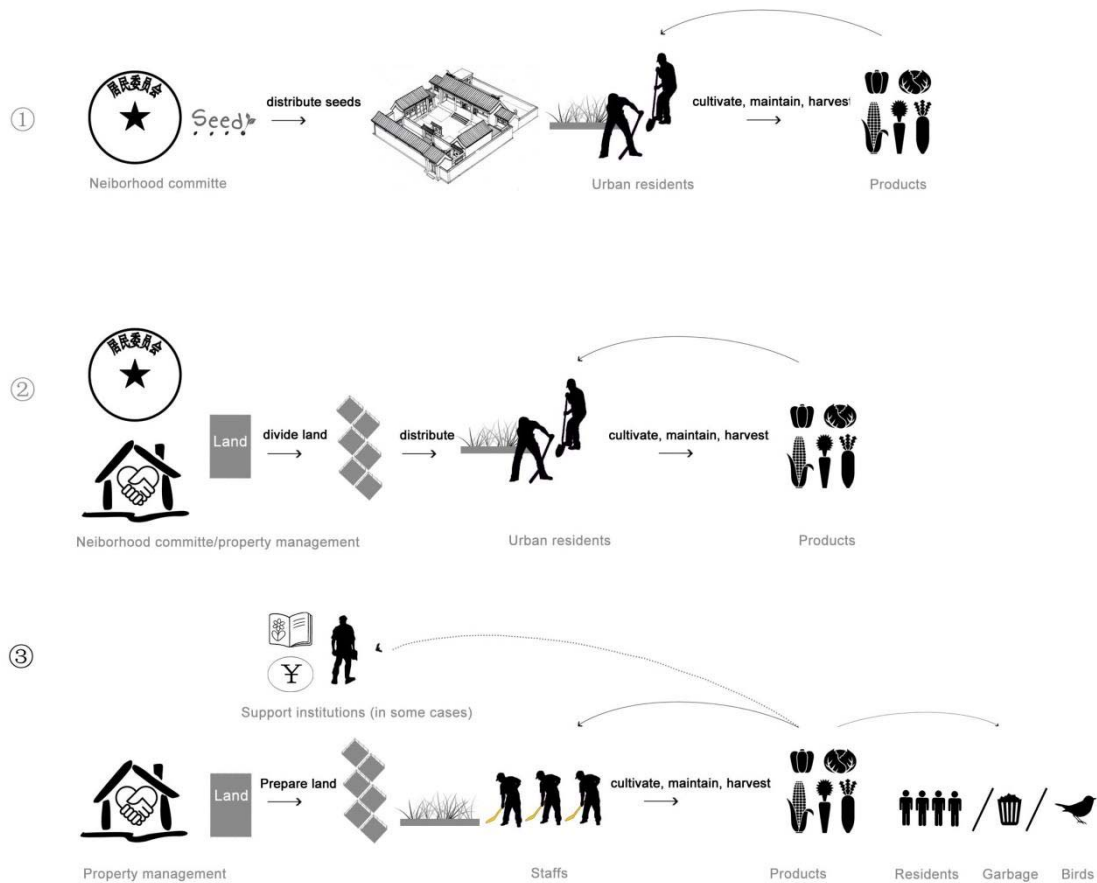


Figure 4. 14 The professional organization by the community neighborhood committees or property management companies of the residential area

## (2) Professional organization by the governmental institutions

Some ELWUA in Beijing were organized and maintained by the urban environmentally-related governmental institutions, such as the administrative office of urban parks and the municipal bureau of landscape and forestry (Figure 4.15). The edible landscapes which are built under this model are normally located in the urban public space, such as in the urban street space and urban parks, and the possible aims might be 1) achieving greening and supplying entertainment (e.g. the urban public greening and landscaping with edible plants), or 2) creating a farming experience for urban citizens (e.g. the educational/demonstration gardens in urban parks). For the first type, the whole cultivation and maintenance process are completed by the governmental institutions. The produced foods in some situations are cleared away by the staff members and the employed laborers of the governmental institutions, and sometimes are picked randomly by the passersby. The fruit tree in the Temple of Heaven Park (Case D2) is such an example. For the second type, the urban residents can participate in some organized short-time farming activities as an experience, in which the produced foods might be harvested by the urban citizens. For example, every year the rice in Haidian Park (Case D1) is harvested by young students during the rice harvesting event, which is organized by

the greening department of Haidian Park, and the produced rice is usually processed into presents later by the organizers for the people who have given supports to the farming events. The field survey shows that the edible landscapes built by the governmental institutions for urban citizen's participation and experience are very few, and most of them are only for urban greening.

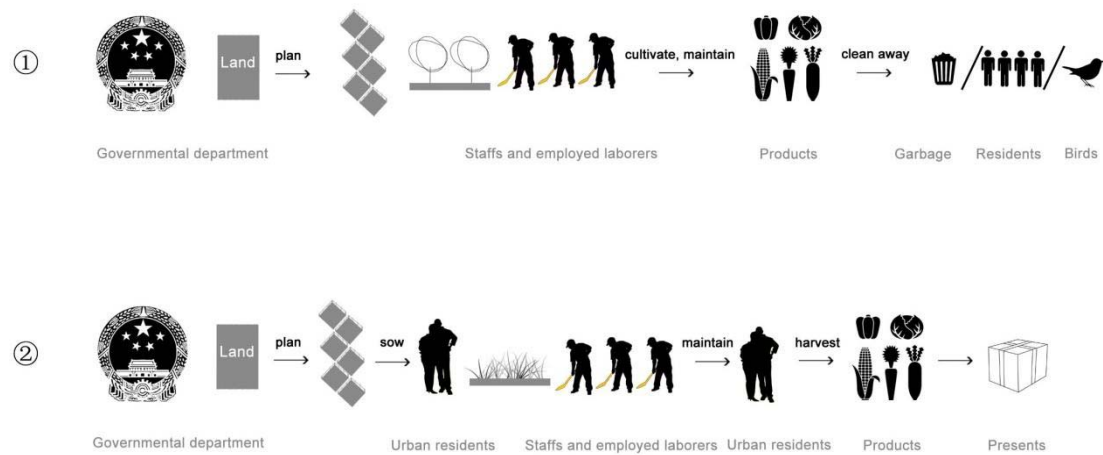


Figure 4. 15 The professional organization by the governmental institutions

### (3) Professional organization by the greening related departments or staff in Danwei

Some edible landscapes in the Danwei precinct were built and organized by the greening departments or designated staff members of a Danwei. The field survey indicated that the edible landscapes built in this organization form can be divided into two types: 1) edible landscapes for achieving greening (e.g. public greening with fruit trees in Danwei), 2) edible landscapes for participation (e.g. educational/demonstration gardens in schools), and 3) Danwei kitchen garden, which is built for producing food and achieving greening as well (Figure 4.16). For the first type, normally a special department of the Danwei, such as the greening department, is responsible for the gardening activities. For example, the staff of the greening department of the institute of semiconductor in Chinese academy of sciences (Case B2) planted varieties of fruit trees in their public courtyard as greening trees. The harvested fruits sometimes are picked up by the staff members who maintain the plants, sometimes are picked up by people who work there and are interested in the fruits (such as researchers and students), sometimes are left to the animals (such as birds) for food, but very often are just cleaned away by the greening department as rubbish. For the second type, in addition to the staff in the greening related departments in Danwei, other people also can participate in the farming activities. Take the educational gardens in schools as an example, the students can care the edible plants and harvest food by themselves. Danwei kitchen garden is usually located in private companies, usually certain designated staff members of the Danwei are responsible for maintaining it, and sometimes other staff members also join in the

farming activities. The harvested foods are usually used as cooking materials in the kitchen of staff canteen. For example, Si Bo Lian Hua Neng Electromechanical Factory (Case B1) built its kitchen garden in this organization form.

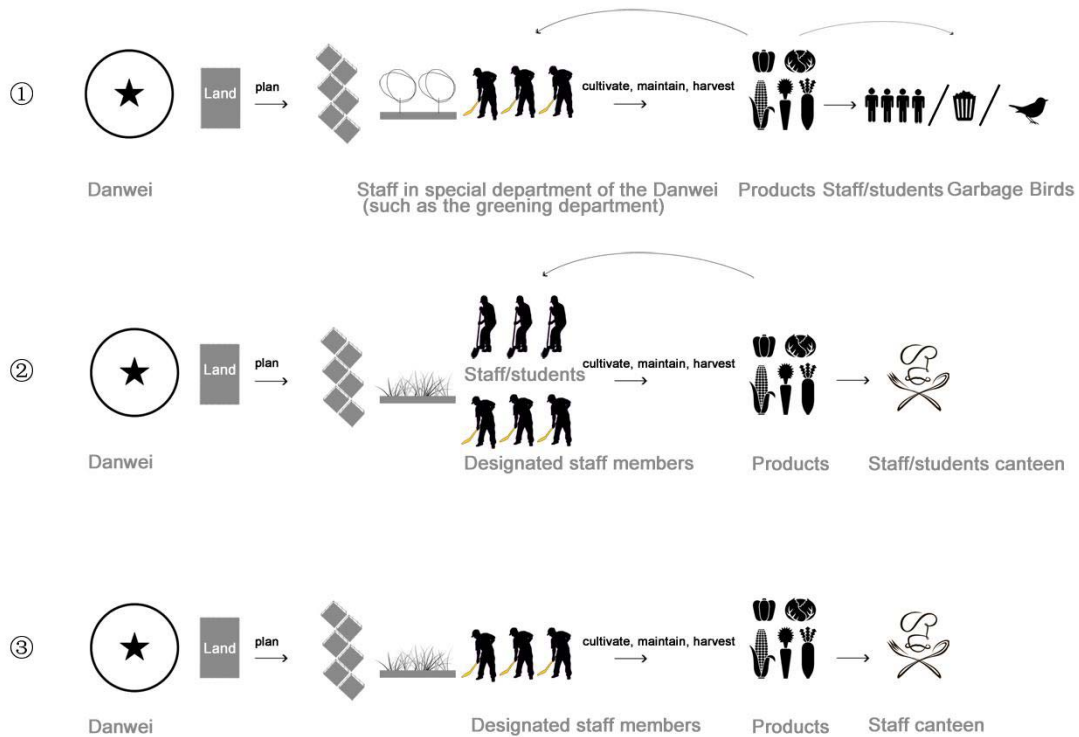


Figure 4. 16 The professional organization by the greening related departments in Danwei

#### (4) Organization by the volunteer associations

The volunteer activities of building the edible landscapes are usually started in the old residential areas with the aim of improving the poor environmental conditions of the old and blighted communities. For example, one social organization named Sino-Ocean Land Holdings Limited started a social activity about environmental protection with the topic “Old community, new green”<sup>23</sup>. The farming activities were organized with the cooperation of the social organization and the community neighborhood committees/the property management companies in those old residential areas and meanwhile, volunteers were recruited to help the residents to create the greening through planting edible plants in the public space of the residential area. Moreover, the social organization also invited some agricultural experts to guide the residents on how to cultivate. The harvested food belongs to the residents themselves (Figure 4.17).

<sup>23</sup> Source: <http://laoshequxinlvse.sinooceanland.com/end.asp?ID=2209>

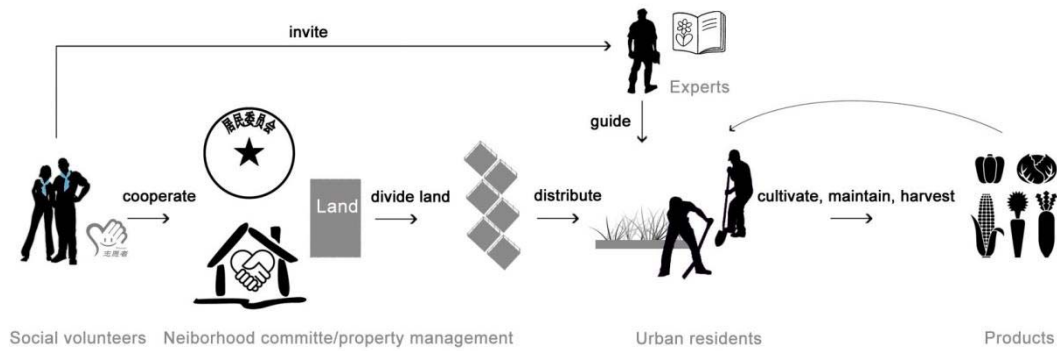


Figure 4. 17 The professional organization by the volunteer associations

#### 4.3.4 Scientific organization by research institutes

The scientific organization by research institutes is an organizational form of the ELWUA which is built for agricultural or environmental research. Usually the organizers of this organization form consist of scientists, researchers, teachers or students in research institutions (Figure 4.18).



Figure 4. 18 Scientific organization by research institutes of the ELWUA in Beijing

The field survey indicated that the edible landscapes which are built in scientific organizations by research institutes existing within the urban area of Beijing could be divided into two types: 1) edible landscapes for carrying out scientific agricultural experiments and 2) edible landscapes for exploring and demonstrating possible sustainable ways of urban life by cultivating the edible plants (Figure 4.19). For the first type, the farming work is usually completed by the scientific researchers and the employed farmers together based on the requirements of the research, and the experimental farmland of the Chinese Academy of Agricultural Sciences (Case B4) is such an example. For the second type, the research/ demonstration projects are usually initiated by research/educational institutions, such as universities. Before the start of the project the originators need to apply for the approval and funding from relative institutions and also need to apply for the legal land use rights of the project site from its owner. Volunteers are usually recruited to help doing the farming work, and they are also responsible for guiding the visitors and explaining the significance of the project to them. Normally part of the harvested foods are distributed to the project organizers and volunteers as rewards for their work, and the others are usually

distributed to the urban visitors. For example, the roof farm project in the High School affiliated with Tsinghua University (Case B3) applied this organization form with the aim of studying and demonstrating the harmonious community and low-carbon life.

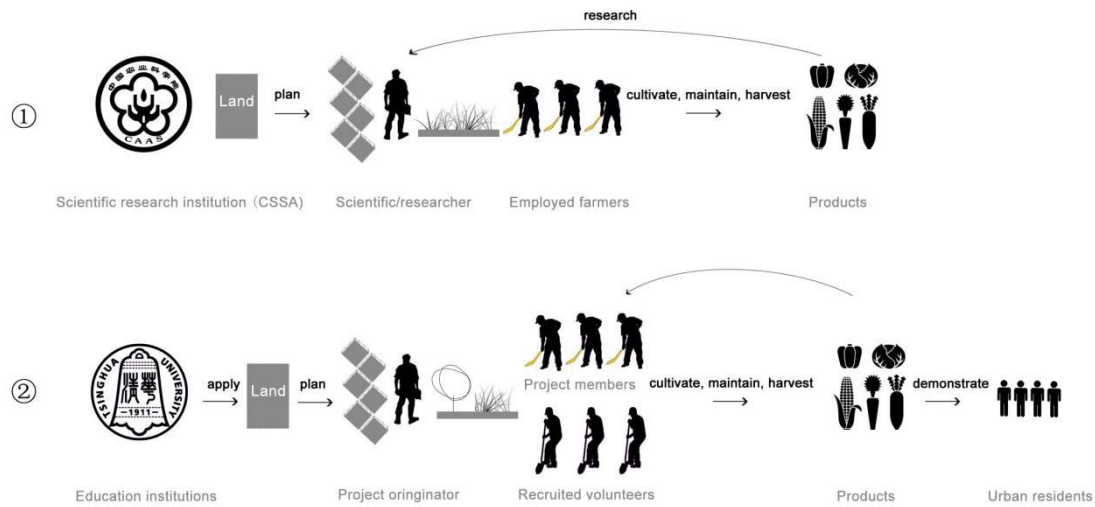


Figure 4. 19 Scientific organization by research institutes

### 4.3.5 Commercial organization by companies

The commercial organization by companies is the organizational form of the edible landscape built with a commercial purpose (Figure 4.20). Three types of edible landscapes might be developed in a commercial organization: 1) multifunctional leisure farms at the edge of city, 2) urban greening landscapes with edible plants built by the real-estate developers, and 3) renting farming garden in residential area.

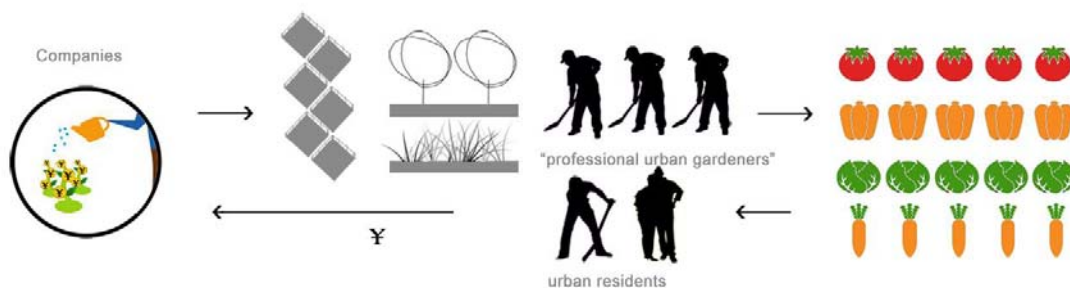


Figure 4. 20 Organizational form of ELWUA-commercial organization by companies

The field survey in Beijing indicated that the multifunctional leisure farms at the edge of Beijing city could generally be divided into two types: “Happy Farm” and “Agrotourists’ Picking and Sightseeing Farm”. Both of two types of leisure farms were usually transformed agricultural enterprises developed by the original farmers, or developers, or the cooperation between them. Before the foundation of the leisure farms, the legal land use rights must be gained from the peasant collectives who own the land. In the “Happy Farm”, the land is divided into small plots and rented to the

urban citizens for growing edible plants. During the cultivation process, the operators supply the necessary supports to assist the “urban farmers”, including sale of the seeds and seedlings, water supply, tool supply and necessary agricultural knowledge guide, etc. The Agrotourists’ Picking and Sightseeing Farm is also a type of leisure farm built for the urban residents, but the difference from the “Happy Farm” is that the urban residents only pick the fruits or vegetables and buy them, and all the other farming work is completed by the (employed) farmers who work there (Figure 4.21). In addition to the two forms of leisure farms mentioned above, there is another organizational form of leisure farms, which is CSA (Community Supported Agriculture), however, the field survey shows that, at present the organizational form of CSA was only applied in the leisure farms in the suburbs of Beijing rather than within cities, therefore, it was not detailed in this research.

Developing urban greening landscapes with edible plants in real estate is the second type of commercial organization of ELWUA. In some wealthy residential estates such as some villa areas, the estate developers usually select fruit trees as a portion of the landscape trees, or plant fruit trees in the private courtyard for the residents’ own maintenance to form a unique pastoral characteristic to improve the environmental quality and attract potential house buyers. The persimmon trees planted in Xiang Shan Qing Qin Villa District (Case A23) is such an example.

“Happy Farm” attached to residential areas is the third type of ELWUA built in commercial organization form. In some newly built residential areas especially those located at the edge of city or in satellite towns, part of the public space might be developed into “Happy Farm” by developers or property management companies. The operating mode is similar to the “Happy Farm” of the multifunctional leisure farms at the edge of cities. The “Happy Farm” attached to Jia Zhou Shui Jun Residential Area (Case A16) is such an example.



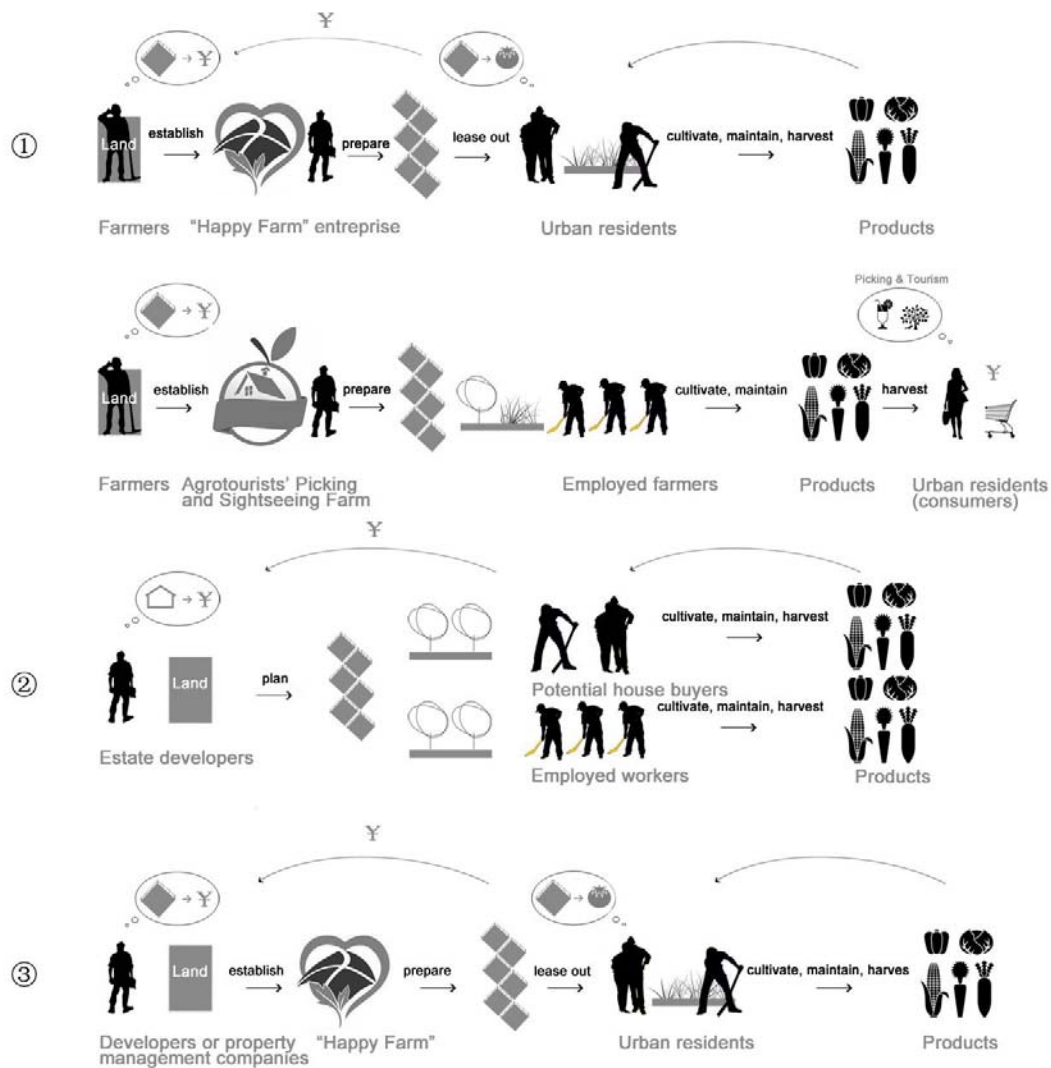


Figure 4. 21 Three types of commercial organization by companies

#### 4.3.6 The role of professional designers

The professional designers, such as architects, landscape architects and planners, are important actors in the organization process of the ELWUA. The professional designers usually have more professional knowledge of ecology, planning, design and aesthetics, therefore, their presence during the planning process usually could make the edible landscapes more sustainable and more beautiful. The field survey in Beijing indicated that professional designers might appear in any type of the organizational forms of formal ELWUA mentioned above. Some professional designers involved ELWUA cases are shown in Figure 4.22, which are 1) a balcony vegetable garden combing rain water collection for irrigation (individual mode) (Case A19), 2) a private edible courtyard designed and used by five designers together (self-managed mode of group organization) (Case A5), 3) an organic farm (educational garden, kitchen garden) on the roof-top of the upper building in Fangshan Campus of Beijing No.4 High School designed by OPEN Architecture (professional organization), 4) the grove



of Chinese pearleaf crabapple trees in Fengshang International Apartment estate which was planned by a Singapore planner and American designers (commercial organization) (Case A20).



Figure 4. 22 Some ELWUA cases involving professional designers' participation: 1) Beijing Brown Stone Terrace Garden (Case A19) - professional designers involved in individual mode; 2) 20 m2 Courtyard Garden Experiment (Case 5) - professional designers involved in self - managed mode of group organization; 3) Roof Farm in Fangshan Campus of Beijing No.4 High School - professional designers involved in the form of professional organization; 4) Pearleaf Crabapple Grove in Feng Shang International Apartment (Case A20) - professional designers involved in commercial organization

Source: 1) Turenscape; 2) Fu et al. 2012; 3) Wechat: yirenyicheng01

#### 4.3.7 Summary

The five types of organization forms of the ELWUA, which were found through the field survey in Beijing, can be summarized as the following (Table 4.15). The field survey indicates that there are large quantities of ELWUA in Beijing which were built in individual mode, however, the ELWUA built in other four organized mode (self-managed group organization, professional organization, scientific organization and commercial organization) are very few.

**Table 4. 14 The participants and characteristics of the organization forms of the ELWUA in Beijing**

Organizational form	Stakeholders/participants		Characteristics
Individual mode	Urban gardening initiated by individuals	Formal Urban residents, i.e. "urban farmers"	<ul style="list-style-type: none"> <li>▪ Urban citizens are the only stakeholders (in a few cases the "urban farmers" are professional designers)</li> <li>▪ Urban citizen's spontaneous behaviors (bottom-up)</li> <li>▪ exist in private, semi-public and public space</li> <li>▪ include both formal and informal activities</li> </ul>
	Urban gardening initiated by a group of people	Informal Urban residents	
Self-managed mode of groups	Urban gardening initiated by a group of urban residents	Formal Group of urban residents	<ul style="list-style-type: none"> <li>▪ Besides urban citizens, there are other involved stakeholders</li> <li>▪ Under official organizations (sometimes involve professional designers)</li> <li>▪ Usually located in public or semi-public space</li> <li>▪ Formal activities</li> </ul>
	Urban gardening initiated by a group of people	Informal Group of urban residents	
Professional organization	Initiated by community neighborhood committees/property management	Formal Community neighborhood committee/property management, urban residents, (experts)	<ul style="list-style-type: none"> <li>▪ Besides urban citizens, there are other involved stakeholders</li> <li>▪ Under official organizations (sometimes involve professional designers)</li> <li>▪ Usually located in public or semi-public space</li> <li>▪ Formal activities</li> </ul>
	Initiated by volunteer associations	Formal Social volunteers, community neighborhood committees/property management, urban residents, (experts)	
Initiated by governmental institutions	Initiated by governmental institutions	Formal Governmental institutions, employed urban gardeners, urban citizens, (designers)	<ul style="list-style-type: none"> <li>▪ Researchers in research/educational institutes are the necessary stakeholders</li> <li>▪ Under official organizations (formal)</li> <li>▪ Usually located in semi-public space</li> </ul>
	Initiated by the greening related departments in Danwei	Formal Decision-makers, staff, designated greening departments/urban gardeners of the work unit	
Scientific organization	Initiated by agricultural research institute for scientific research	Formal Researchers, employed farmers	<ul style="list-style-type: none"> <li>▪ Researchers in research/educational institutes are the necessary stakeholders</li> <li>▪ Under official organizations (formal)</li> <li>▪ Usually located in semi-public space</li> </ul>
	Initiated by research institutes for scientific research and demonstration	Formal Participants of research projects (e.g. the professors, teachers and students in universities), volunteers, urban citizens	
Commercial organization	Initiated by entrepreneurs for commercial benefits	Formal Farmers, (Developers) , urban citizens	<ul style="list-style-type: none"> <li>▪ Usually under official organizations (formal)</li> <li>▪ Usually located in semi-public space or private space</li> </ul>
	Initiated by entrepreneurs for commercial benefits	Formal Developers, property management, (urban citizens)	

Note: The stakeholders/participants with "( )" means they exist in some cases but not all the cases.

## 4.4 Characteristics of “urban farmers”

### 4.4.1 “Urban hobby farmers”

In the built up area of Beijing, very few residents are doing professional farming activities, but many may be involved in edible gardening as their hobbies. Therefore, the term “urban hobby farmers” refers to the people living in the city who grow edible plants in urban area as their avocation for individual use. Being an “urban hobby farmer” or not does not necessarily relate to people’s profession, origins (rural or urban), gender and whether they have farming experience or not. But the age and work status of the “urban hobby farmers” have a certain regularity, which is that older retired citizens constitute a high proportion of the “urban hobby farmers”. The conclusion above results from the interviews of the 72 “urban hobby farmers” in the context of this research, of which, 63 of them are involved in the spontaneous edible landscapes which were built in individual mode and self-managed mode of groups organization, and 9 of them are involved in the formally organized edible landscapes.

The “urban hobby farmers” come from a wide range of professions. Among the 72 interviewed “urban hobby farmers”, there are 26 workers (36%), 6 retired farmers (8%), 4 unemployed people (6%), 3 freelance (4%), 3 teachers (4%), 2 businessmen (3%), 3 administrative officials (4%), 3 researchers (4%), 2 landscape architects (3%), 2 staffs in publishing house (3%), 2 doorkeepers (3%), 2 company employee (3%), 1 administration staffs in hospital (1%), 1 business managers (1%) and 1 financial executives (1%), and 11 people’s (15%) professions were not obtained (Figure 4.23).

Older people occupy a large proportion of the “urban hobby farmers”. Among the 72 “urban hobby farmers”, the young people below 44 years old accounted for 10% (7 people), the middle-aged between 45 and 59 years old accounted for 33% (24 people), the old people between 60 to 74 accounted for 35% (25 people), the very old people above 75 years old accounted for 21% (15 people), and also there is one person whose age (1%) was not obtained. There are a large proportion of retired people of the “urban hobby farmers”. Among the 72 interviewed “urban hobby farmers”, the retired people are 67% (48 people), the unretired people are 25% (18 people), the people who doesn’t work are 6% (4 people), and still two people’s (3%) working status was not obtained. There is no significant gender preference of the “urban hobby farmers”. The female-to-male ratio of the 72 interviewed “urban hobby farmers” is 35:37, or about 1:1 (Figure 4.24).

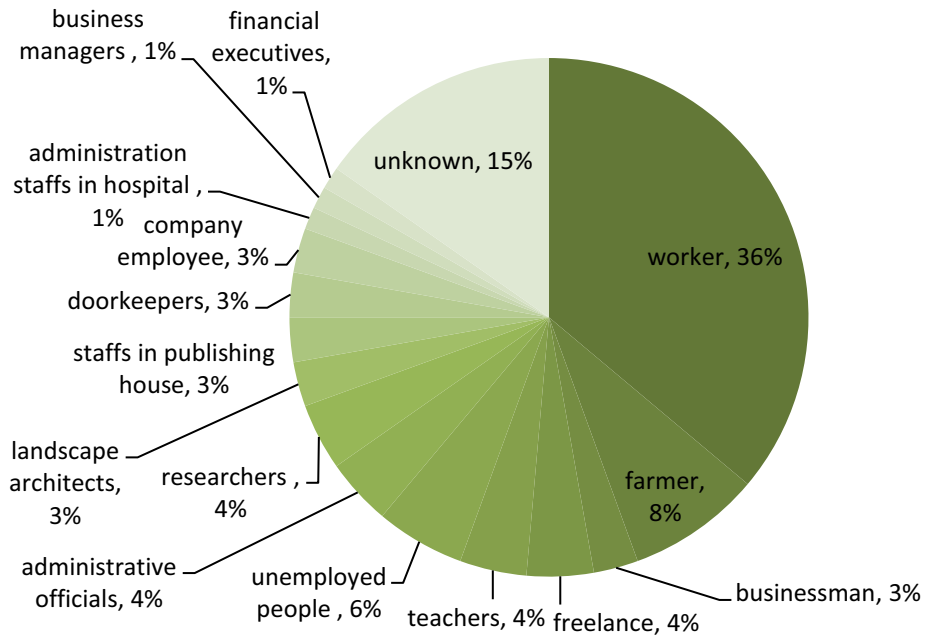


Figure 4. 23 Professions of the interviewed "urban hobby farmers" in Beijing (n=72)

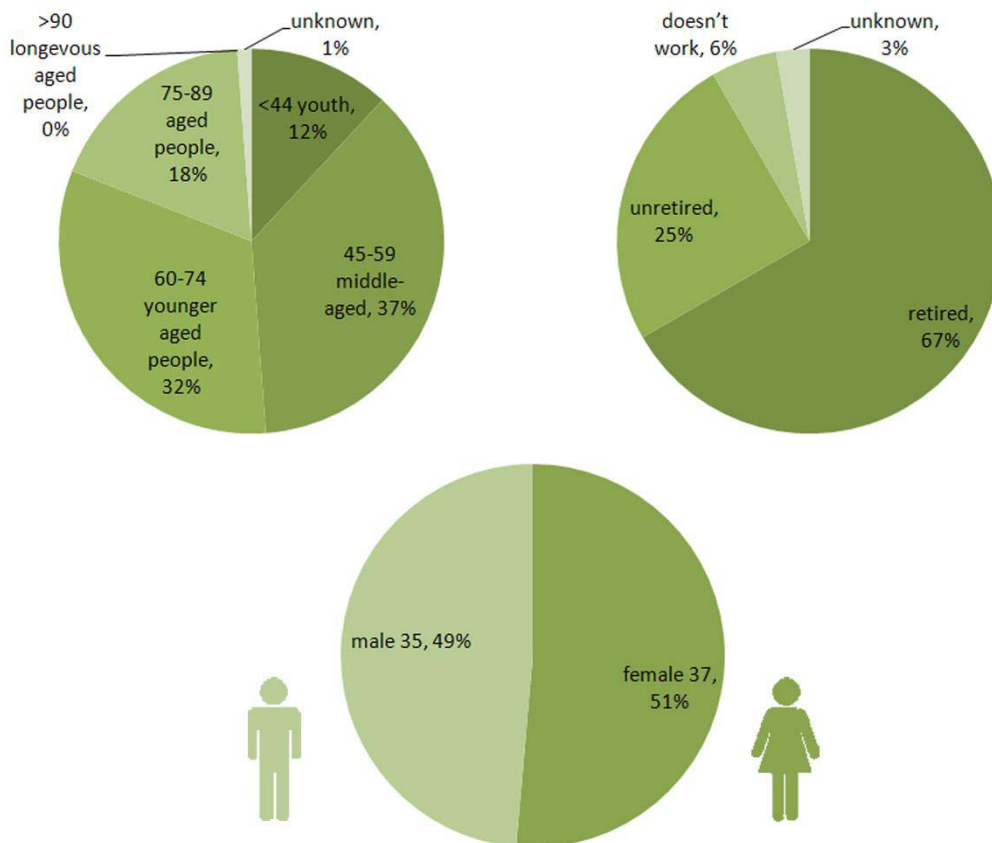


Figure 4. 24 Age distribution, working status and female-to-male ratio of the interviewed "urban hobby farmers" in Beijing (n=72)

#### 4.4.2 “Professional urban gardeners” and “experiential urban farmers”

In addition to the “urban hobby farmers”, there are two other types of “urban farmers”, which are the “professional urban gardeners” and “experiential urban farmers”. For the urban gardeners, cultivating and maintaining the edible plants are their job. The urban gardeners might work for different institutions, for example, the property management company, the greening department of urban parks, the leisure farm or the governmental greening department, etc., and they also might work for certain projects temporarily. The “experiential urban farmers” refers to the people who do not engage with urban farming activity regularly but only participate in selected activities as an experience. For example, the urban residents who participate in the sowing and harvesting events in urban parks, the urban residents who pick up fruits in the Agrotourists’ Picking and Sightseeing Garden, etc. The professions and the ages of the “experiential urban farmers” vary with different experiential farming events. For example, there is a high proportion of primary and middle school children involved in the sowing and harvesting events in Haidian Park. The people who pick fruits in the Agrotourists’ Picking and Sightseeing Garden might come from a wide range of professions and ages.

### 4.5 Types of edible plants and characteristics

#### 4.5.1 Types of edible plants

Through the responses to the internet questionnaire and the field survey, more than 100 edible plant species were found planted within the urban area of Beijing. These edible plants could be generally categorized into the following species based on different functions, which are the grain crops, the oil crops, the herbs/spices/condiments, the vegetables, the fruits and the medicinal plants (Table 4.16).

Table 4. 15 Edible plants which were found planted within the urban area of Beijing

SPECIES	NAME (LATIN NAME*)
Grain crops	Wheat ( <i>Triticum aestivum</i> ), Corn( <i>Zea Mays L.</i> ), Rice ( <i>Oryza sativa</i> ), Foxtail millet ( <i>Setaria italica</i> )
Oil crops	Sunflower ( <i>Helianthus annuus</i> ), Peanut ( <i>Arachis hypogaea</i> ), Castor oil plant ( <i>Ricinus communis L.</i> ), Soya bean ( <i>Glycine max (L.) Merr</i> )
Herbs, spices and condiments	Sichuan pepper ( <i>Zanthoxylum bungeanum Maxim</i> ), Chili pepper ( <i>Capsicum species</i> ), Coriander ( <i>Coriandrum sativum</i> ), Ginger ( <i>Zingiber officinale Rosc.</i> ), Chinese wolfberry ( <i>Lycium chinense Mill.</i> ), Mint ( <i>Mentha haplocalyx Briq.</i> ), Purple perilla ( <i>Perilla frutescens (L.) Britt.</i> ), Fennel ( <i>Foeniculum vulgare Mill.</i> ), Garlic/Garlic sprouts ( <i>Allium sativum L.</i> ), Common nasturtium ( <i>Tropaeolum majus L.</i> ), Green Chinese onion ( <i>Allium fistulosum L.</i> )

		<i>var. giganteum Makino</i> ), Chive ( <i>Allium schoenoprasum L.</i> )
Vegetables	Leafy and salad vegetables	Chinese cabbage ( <i>Brassica Rapa L. ssp. Pekinensis Group</i> ), Edible rape ( <i>Brassica campestris L.</i> ), Spinach ( <i>Spinacia oleracea L.</i> ), Chinese chive ( <i>Allium spp.</i> ), Shepherd's-purse ( <i>Capsella bursa-pastoris (L.) Medic.</i> ), Celery ( <i>Apium graveolens L. var. dulce DC.</i> ), Water spinach ( <i>Ipornoea aquatic Forsk.</i> ), Garland chrysanthemum ( <i>Chrysanthernum spp.</i> ), Leaf lettuce ( <i>Lactuca sativa var longifoliaf. Lam</i> ), Yellow heart cabbage ( <i>Brassica pekinensis (Lour.) Rupr.</i> ), Edible amaranth ( <i>Amaranthus mangostanus L. (A. tricolor L.)</i> ), Ceylon spinach ( <i>Basella spp.</i> ), Endive ( <i>Cichorium endivia L.</i> ), Lettuce ( <i>Lactuca sativa L.</i> ), Pig thigh ( <i>Houttuynia cordata Thunb</i> ), Leaf beet ( <i>Beta vulgaris L. var. cicla L.</i> ), Wuta-tsai ( <i>Brassica campestris L. ssp. Chinensis (L.) Makino var. rosulars Tsen et Lee</i> ), Mongolian dandelion ( <i>Taraxacum mongolicum Hand.-Mazz.</i> ), Brussels sprouts ( <i>Brassica oleracea L. var. gemmifera Zenk.</i> ), Chinese aloe ( <i>Aloe vera L. var. chinensis (Haw.) Berg.</i> ), Purslane ( <i>Portulaca oleracea L.</i> ), Cabbage ( <i>Brassica oleracea L. var. capitata L.</i> ), Chinese kale ( <i>Brassica alboglabra L. H. Bailey</i> ), Leaf beet ( <i>Beta vulgaris L. var. cicla L.</i> )
	Solanaceous vegetables	Luffa ( <i>Luffa spp.</i> ), Tomato ( <i>Solanum lycopersicum L.</i> ), Red cherry tomato ( <i>Solanum lycopersicum var. cerasiforme</i> ), Summer squash ( <i>Cucurbita pepo L.</i> ), Eggplant ( <i>Solanum melongena L.</i> ), Melon pear ( <i>Solanum muricatum Ait.</i> ), Cucumber ( <i>Cucumis sativus L.</i> ), Pumpkin ( <i>Cucurbita moschata Duch. Ex Poir.</i> ), Wax gourd ( <i>Benincasa hispida Cogn.</i> ), Bottle gourd ( <i>Lagenaria siceraria (Molina) Standl.</i> ), Bitter gourd ( <i>Momordica charantia L.</i> ), Bell pepper ( <i>Capsicum species</i> ), Snake gourd ( <i>Trichosanthes anguina L.</i> )
	Flowers and flower buds	Broccoli ( <i>Brassica oleracea L. var. italic Plenck</i> ), Cauliflower ( <i>Brassica oleracea L. var. botrytis L.</i> ), Day lily ( <i>Hemerocallis citrine Baroni</i> )
	Podded vegetables	Yard-long bean ( <i>Vigna unguiculata (L.) Walp. ssp. sesquipedalis (L.) Verdc.</i> ), Kidney bean ( <i>Phaseolus vulgaris L.</i> ), Lablab ( <i>Lablab purpureus (L.) Sweet</i> ), Vegetable soybean ( <i>Glycine max (L.) Merr.</i> ), Vegetable pea/Vegetable pea seedling ( <i>Pisum sativum L.</i> )
	Root and tuberous vegetables	Jerusalem artichoke ( <i>Helianthus tuberosus</i> ), Potato ( <i>Solanum tuberosum L.</i> ), Taro( <i>Colocasia esculenta (L.) Schott</i> ), Radish/Radish seedling ( <i>Raphanus sativus L.</i> ), Carrot ( <i>Daucus Carota var. sativus</i> ), Sweet potato ( <i>Ipomoea batatas Lamk.</i> ), Chinese yam ( <i>Dioscorea spp.</i> ), Root mustard ( <i>Brassica juncea var. megarrhiza Tsen et Lee</i> ),
	Bulb and stem vegetables	Stem lettuce ( <i>Lactuca sativa var augustana</i> ), Kohlrabi ( <i>Brassica oleracea L. var. caulorapa DC.</i> ), Lotus root ( <i>Nelumbo nucifera Gaertn.</i> ), Water bamboo ( <i>Zizania latifolia Turcz.</i> ), Water caltrop ( <i>Trapa spp.</i> ), Stem mustard ( <i>Brassica juncea var. tumida Tsen el Lee</i> )
	Others	Chinese toon ( <i>Toona sinensis Roem.</i> ), Siberian Elm ( <i>Ulmus pumila</i> )

		<i>L.</i> ), Lotus root ( <i>Nelumbo nucifera Gaertn</i> )
Fruit	Climbing plants	Watermelon ( <i>Citrullus lanatus (Thunb.) Matsum et Nakai</i> ), Grape ( <i>Vitis vinifera</i> ), Melon ( <i>Cucumis melo L.</i> )
	Herbaceous	Strawberry ( <i>Fragaria species</i> )
	Tree	Persimmon tree ( <i>Diospyros Kaki</i> ), White Mulberry ( <i>Morus alba L.</i> ), Pomegranate tree ( <i>Punica granatum L.</i> ), Jujube ( <i>Ziziphus jujuba</i> ), Walnut tree ( <i>Juglans</i> ), Chinese pearleaf crabapple tree ( <i>Malus asiatica</i> ), Chinese hawthorn tree ( <i>Crataegus</i> ), Peach tree ( <i>Prunus persica</i> ), Cherry Plum ( <i>Prunus cerasifera</i> ), Apricot tree ( <i>Prunus armeniaca</i> ), Fig tree ( <i>Ficus carica</i> ), Plum-leaf crabapple tree ( <i>Malus prunifolia species</i> ), Apple tree ( <i>Malus domestica</i> ), Pear tree ( <i>Pyrus pyrifolia</i> ), Cherry tree ( <i>Prunus avium/ Prunus cerasus</i> ), Lemon ( <i>Citrus Limon</i> ), Chinese Wingnut ( <i>Diospyros lotus L.</i> )
Medicinal plants	Herbaceous	Foxglove ( <i>Digitalis species</i> ), Snakegourd Fruit ( <i>Fructus Trichosanthis</i> ), DAUN NGOKILO ( <i>Gynura procumbens (Lour.) Merr.</i> ), Panax notoginseng ( <i>Panax pseudo-ginseng var. notoginseng</i> )
	Tree	Eucommia Bark ( <i>Eucommia ulmoides Oliver</i> ), Ginkgo ( <i>Ginkgo biloba</i> )

**Note:** \* LATIN NAMES are quoted from *Pictorial Handbook of Vegetable Crops in China* (Fang and Zhang 2011), Baidubaik

In the statistics to the frequency of the edible plants in the 38 different research sites, the most commonly used edible plants (the frequency is more than 10%, three times) within the urban area of Beijing and their basic characters are summarized as follows (Table 4.17). From the aspect of the outward appearance, the forms of the edible plants can be divided into herbaceous plants, climbing plants, shrubs and trees. The herbaceous plants are generally low and small-sized, which include annual herb, biennial herb, triennial herb and perennial herb. The climbing plants usually have a variety of climbing structures on the stalks or have a voluble vine, which can help the plants climb up along other objects, such as the façades of buildings, the window bars of the balcony, the fences, the built framework on the ground and other plants, therefore, they can make good use of the vertical space and save horizontal ground space, thereby are suitable to be planted in the limited space. Shrubs and trees are both perennial woody plants, in which the shrubs have no big trunk but the trees do have, and normally shrubs are shorter than trees, usually shorter than two to three meters high, but trees are normally big and high, even as high as ten meters or more.



**Table 4. 16 The most common edible plants within the urban space of Beijing (sequenced by frequency)**

<b>COMMON NAME (FREQUENCY)</b>	<b>FUNCTION</b>	<b>FORM</b>	<b>AGE</b>	<b>FOLIAGE SIZE</b>	<b>CAN ESPALIER OR TRAIN ON FENCE</b>	<b>GROWTH TIME (PLANT; HARVEST)</b>	<b>EDIBLE PART</b>
Chili pepper (28)	Spices	Herb	Annual	Medium	No	3-5, 7-8; 6-12	Fruit
Chinese cabbage (26)	Vegetable	Herb	Annual	Medium	No	3-4, 7-8; 6-7, 10-11 (small one: timely)	Leaf
Green Chinese onion (23)	Spice/ Vegetable	Herb	Biennial/ triennial	Small	No	4-5, 8-9; timely	Leaf, stalk,
Luffa (23)	Vegetable	Vine	Annual	Large	Espalier or train	3-5; 6-10	Fruit
Pumpkin (23)	Vegetable	Vine	Annual	Large	Espalier or train	4-5; 7-9	Fruit
Chinese chive (22)	Vegetable	Herb	Perennial	Small	No	3-5, 8-9; timely	Leaf, stalk, and flower
Lablab (22)	Vegetable	Vine	Annual	Medium	Train	4-5, 7-8; timely	Pod
Bottle gourd (20)	Vegetable	Herb	Annual	Large	Espalier or train	4-5; 7-9	Fruit
Chinese toon (19)	Vegetable	Tree	Perennial	Medium	No	-	Young sprout and leaf
Coriander (17)	Herb	Herb	Annual	Small	No	3, 7; timely	Leaf, seed
Edible rape (16)	Vegetable	Herb	Biennial	Small	No	Almost any time; timely	Leaf
Tomato (16)	Vegetable	Herb	Annual	Medium	Train	3-4; 6-10	Fruit
Eggplant (16)	Vegetable	Herb	Annual	Medium	No	4-7; 10-12	Fruit
Radish (16)	Vegetable	Herb	Commonly treated as annual	Small	No	3-4, 7-8; 5-7, 10-11	Root, young leaf
Persimmon tree (16)	Fruit	Tree	Perennial	Medium	Yes	-	Fruit
Spinach (15)	Vegetable	Herb	Annual	Small	No	3-4, 8; timely	All
Cucumber (12)	Vegetable	Vine	Annual	Medium	Train	4-5, 7-8; 6-7, 10-11	Fruit
Kidney bean (12)	Vegetable	Vine	Annual	Medium	Train	4-5, 7-8; timely	Pod
Corn (11)	Grain	Herb	Annual	Medium	No	4-6; 7-9	Seed
Garlic (11)	Spice	Herb	Annual	Small	No	3-8; timely	Bulb, leaf
Pomegranate	Fruit	Tree	Perennial	Medium	Yes	-	Fruit



tree (11)							
Purple perilla (10)	Spice/ vegetable	Herb	Annual	Medium	No	3-4; 6-9	Leaf, flower
Edible amaranth (9)	Vegetable	Herb	Annual	Small	No	3-9; timely	Leaf, stalk
Jujube (9)	Fruit	Tree	Perennial	Medium	Yes	-	Fruit
Parsley (7)	Vegetable	Herb	Commonly treated as annual	Small	No	4-8; 8-11	Leaf
Lettuce (7)	Vegetable	Herb	Annual	Small	No	3-4, 7-8; 6-7, 9-10	Leaf
Carrot (7)	Vegetable	Herb	Commonly treated as annual	Small	No	3-4, 7-8; 6-7, 10-11	Root
Grape (7)	Fruit	Vine	Perennial	Large	Espalier or train	-	Fruit
Fig tree (7)	Fruit	Tree	Perennial	Medium	Yes	-	Fruit
Yard-long bean (7)	Vegetable	Vine	Annual	Medium	Train	4-5, 7-8; timely	Pod
Chive (6)	Spice	Herb	Annual/bie nnale	Small	No	3-9; 5-11	Leaf
Garland chrysanthemum (6)	Vegetable	Herb	Commonly treated as annual	Small	No	3-4, 8-9; timely	Leaf, stalk
Red cherry tomato (6)	Vegetable	Herb	Annual	Medium	Train	3-4; 5-7	Fruit
Bitter gourd (6)	Vegetable	Vine	Annual	Large	Espalier or train	3-5; 6-10	
Chinese yam (6)	Vegetable	Vine	Annual/ Perennial	Large	Espalier	2-3; 10-12	Tuber
Water spinach (5)	Vegetable	Herb	Annual	Small	No	4-7; timely	Leaf
Bell pepper (5)	Vegetable	Herb	Annual	Medium	No	3-5, 7-8; 6-12	Fruit
Summer squash (5)	Vegetable	Vine	Annual	Medium	No		Fruit
Sweet potato (5)	Vegetable	Herb	Annual/ Perennial	Large	No	5-7; 10-12	Tuber, young stalk and leaf
Chinese hawthorn tree (5)	Fruit	Tree	Perennial	Medium	Yes	-	Fruit
Plum-leaf	Fruit	Tree	Perennial	Medium	Yes	-	Fruit

crabapple tree (5)							
Chinese	Spice	Shrub	Perennial	Medium	No	-; 6-10	Leaf, fruit
wolfberry (4)							
Leaf lettuce (4)	Vegetable	Herb	Annual	Small	No	4-5,8; 5-6, 9	Leaf
Ceylon spinach (4)	Vegetable	Herb	Perennial	Medium	Espalier	4-9; timely	Leaf, stalk
Apricot tree (4)	Fruit	Tree	Perennial	Medium	Yes	-	Fruit
Ginkgo (4)	Medicine	Tree	Perennial	Medium	Yes	-	Seed
Sichuan pepper (4)	Spice	Tree/ Shrub	Perennial	Medium	No	-; summer or autumn	Fruit
Leaf beet (3)	Vegetable	Herb	Biennale	Small	No	3-9; harvest timely	Leaf
Sunflower(3)	Oil	Herb	Annual	Medium	No	4-5; 8-10	Seed
Peanut (3)	Oil	Herb	Annual	Small	No	4-5; 8-10	Seed
Mint (3)	Herb	Herb	Perennial	Small	No	-; timely	Leaf
Yellow heart cabbage (3)	Vegetable	Herb	Annual	Medium	No	4-6; 6-9	Leaf, stalk
Winter squash (3)	Vegetable	Vine	Annual	Large	Espalier or train	3-4; 6-7	Fruit
Snake gourd (3)	Vegetable	Vine	Annual	Large	Espalier or train	4-5; 7-9	Fruit
Vegetable soybean (3)	Vegetable	Vine	Annual	Medium	No	4-5; 8-9	Seed, sprout
Lettuce (3)	Vegetable	Herb	Annual/bie nnale	Small	No	3-4, 7-8; 6-7, 9-10	Rhizome,
Kohlrabi (3)	Vegetable	Herb	Commonly treated as annual	Medium	No	3-5, 7; 6-9, 10	Stem
White Mulberry (3)	Fruit	Tree	Perennial	Medium	Yes	-	Fruit
Peach tree (3)	Fruit	Tree	Perennial	Medium	Yes	-	Fruit
Chinese Wingnut (3)	Fruit	Tree	Perennial	Medium	Yes	-	Fruit

#### 4.5.2 Characteristics of the selection of edible plants

Usually the edible plant species area selected flexibly based on the functional requirement of the particular urban area.

For the edible landscapes related to daily food consumption, such as the family garden, guerrilla garden, renting farming garden, Danwei kitchen garden and agrotourists' picking farm, the common herbs, spices, vegetables, fruits, grain crops

and medicinal plants are the commonly used edible plants, and the forms of these edible plants might be made up of the low herbaceous plants, such as chili pepper, green Chinese onion, coriander, garlic, Chinese cabbage, edible rape, spinach, Chinese chive, tomato, eggplant, radish and purple perilla; high herbaceous plants, such as corn; climbing plants which can make full use of the vertical space, such as luffa, pumpkin, bottle gourd, lablab, kidney bean and cucumber; shrubs, such as Chinese wolfberry; and trees, such as persimmon tree, pomegranate tree and Chinese toon, etc.(Figure 4.25). The specific plants species usually depend on the individual preferences and needs of the cultivators.



Note: The plants with name in black are low herbaceous plants, in blue are high herbaceous plants, in purple are climbing plants, in orange are shrubs, and in green are trees. All the photos were taken during the field survey in Beijing.

**Figure 4. 25 Some commonly planted edible plants related to daily food consumption within the urban area of Beijing**

For the edible landscape built for urban (semi-)public space greening, fruit trees or other edible trees are the mainly selected edible plants, such as the persimmon tree, the ginkgo tree and plum-leaf crabapple tree, etc., but in a few cases common crops, fruits, vegetables or oil crops, such as rice, Chinese cabbage and sun flowers, also



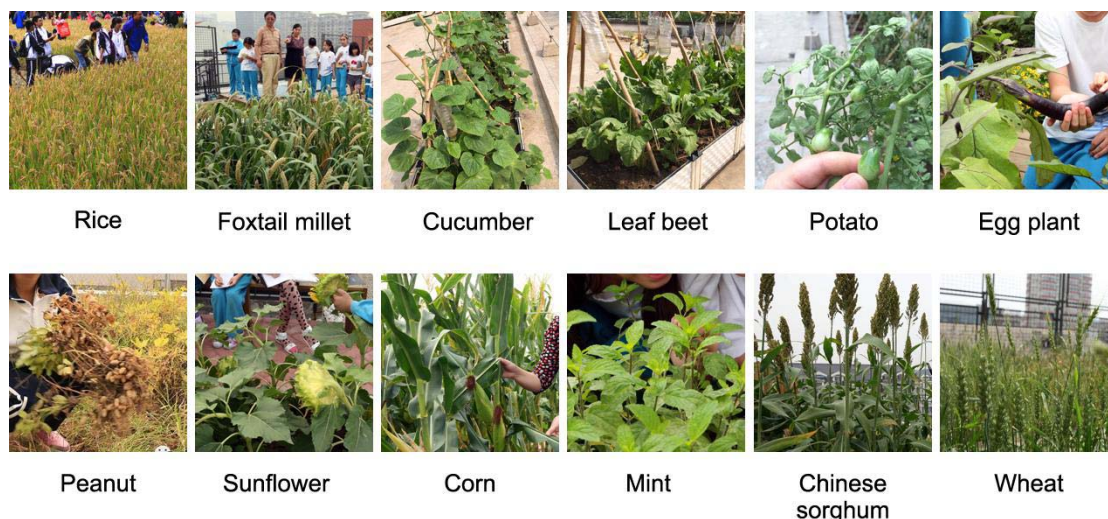
might be used as the decoration plants (Figure 4.26).



Persimmon tree    Ginkgo tree    Plum-leaf crabapple tree    Rice    Chinese cabbage    Sun flower

**Figure 4. 26 Some edible plants used for urban (semi-)public space greening within the urban area of Beijing**

For the edible landscapes meant for demonstration and education, such as the educational/demonstration garden, a wide range of edible plants including grain crops, oil crops, herbs, spices, vegetables, fruits and medicinal plants all might be selected. In addition to the common edible plants such as corn, chili pepper and sun flower, some uncommon plant species such as panax notoginseng and small potato also might be planted for education purposes. Some edible plants for education and demonstration which were found in the field survey are shown in Figure 4.27.



Rice    Foxtail millet    Cucumber    Leaf beet    Potato    Egg plant  
 Peanut    Sunflower    Corn    Mint    Chinese sorghum    Wheat

**Figure 4. 27 Some edible plants used for demonstration and education within the urban area of Beijing**

For the edible landscape for scientific research, such as the experimental farm, all types of agricultural plants, which can meet the agricultural scientific needs, could be selected. For the national experimental farm, usually main grain crops and oil crops, such as wheat, corn and soya bean, are the most common edible plants (Figure 4.28).



Wheat    Corn    Soya bean

**Figure 4. 28 Some edible plants used for agricultural scientific research within the urban area of Beijing**

Based on the law of selection of edible plants selection above, different types of edible plants are preferred in different types of urban space with different needs. The species of the edible plants in the five types of urban space in Beijing, which were found in the field survey, can be summarized as following (Table 4.18):

### **Edible landscapes in or around a residential area**

The residential area is the one that is the closest to daily life. Therefore, the edible plants which are closely related to daily food consumption, such as herbs, spices, vegetables, fruits and medicinal herbs, are usually planted by the residents individually. In addition, for the edible landscapes built for achieving public greening of a residential area, fruit trees are the most commonly used edible plants. For example, the property management companies of residential areas might plant rows of fruit trees or fruit groves for achieving greening and beautification. In a few cases common herbs, vegetables and fruits in the forms of herbaceous plants and climbing plants also might be selected as the greening plants.

### **Edible landscapes in the Danwei precinct**

In the Danwei precinct fruit trees and other edible trees, such as persimmon trees, ginkgo and Chinese hawthorn trees, might be planted for achieving public greening. In a few cases the edible landscapes are built for supplying food for the staff or for education and demonstration (in a limited number of cases), then the crops, herbs, spices, vegetables and fruits also might be selected. The edible plants which can meet the demands of the multiple functions (achieving greening, producing food and education) are particularly preferred. On experimental farms, where the edible plants are planted for the agricultural scientific needs, grain crops and oil crops such as wheat, corn, rice and soybean are the common experimental plants in the open-air experimental field within the urban area of Beijing.

### **Edible landscapes in traffic space**

In traffic spaces, fruit trees or other edible trees might be preferred by the governmental greening department for achieving public greening officially, such as the edible avenue trees. In addition, similar to the residential area, the edible plants which are planted informally by individuals in the traffic space are mainly the plant species which can meet the demands of people's daily life, including herbs, vegetables and medicinal herbs, etc., and normally, the edible plants which have good landscape efficiency are more preferred by the cultivators. The edible plants are mainly annual herbaceous plants and annual climbing plants, while the perennial edible trees, which are relatively expensive, are not often planted informally in the traffic spaces, because the plants which are planted in the public space without authorization are at risk of being uprooted by the administrative staff at any time.

## Edible landscapes in the urban parks

The edible landscapes in urban parks are usually built under a unified plan, therefore, the types of the edible plants there are usually certain specific species based on the plan of the park. The edible landscapes in urban parks might be planted for purposes of achieving greening, decoration, experience, education and demonstration. The field survey in Beijing shows that a variety of fruit trees or other edible trees, such as persimmon trees, mulberry trees, walnut trees and ginkgo, and the oil crops such as sunflowers, which have a favorable response from the urban citizens, are commonly used in urban parks for achieving greening and decoration. And some grain crops such as rice might be planted in urban parks with an aim of education, experience and demonstration.

## Edible landscapes in multifunctional leisure farms at the edge of the urban area

The multifunctional leisure farms are built with the special aims of not only supplying the urban citizens with experience of farming but harvesting organic food as well, therefore, the common agricultural plants which are needed in the daily food consumption by the urban citizens, such as the vegetables, herbs, fruits, which might be in the form of herbaceous plants, climbing plants and trees, are usually planted.

**Table 4. 17 The Species of the edible plants found in different types of urban area in Beijing**

Location	Function	Species	Form
Residential area	Daily food consumption	Herbs, spices, vegetables, fruits, grain crops, medicinal herbs	Herbaceous plants, vines, shrubs, trees
	Semi-public space greening	Fruit trees (common)	Trees (common)
Danwei precinct	(Semi-)public space greening	Fruit trees	Trees
	Daily food consumption (few)	Herbs, spices, vegetables, fruits	Herbaceous plants, climbing plants, shrubs, trees
	Education and demonstration	Herbs, spices, vegetables, fruits	Herbaceous plants, climbing plants, shrubs, trees
	Scientific research	Grain crops, oil crops	Herbaceous plants
Traffic space	Public space greening	Fruit trees	Trees
	Daily food consumption	Herbs, spices, vegetables, fruits, medicinal herbs	Herbaceous plants, climbing plants, shrubs, trees
Urban parks	(Semi-)public space greening and decoration	Fruit trees, oil crops	Trees, herbaceous plants

	Education, experience and demonstration	Grain crops, fruits	Herbaceous plants, trees
Leisure farms	Food consumption and farming experience	Herbs, vegetables, fruits	Herbaceous plants, climbing plants, trees

## 4.6 Labor input, materials and technologies

### 4.6.1 Labor input

#### Cultivation activities

The 72 interviewed “urban hobby farmers” were asked to describe their growing and maintenance activities. The farming activities mainly include plowing the soil, sowing, irrigation, harvesting, loosening soil, catching insects, fertilizing, pruning, weeding, making compost and spraying pesticides (Table 4.19). Of the 72 interviewed “urban hobby farmers”, all of them did the farming work of sowing, irrigation and harvesting, which shows that they are carrying on the basic farming activities; at least 85% of them plowed the soil, 58% of them loosened soil and 72% fertilized, which shows that the “urban hobby farmers” hope the edible plants could grow better through these activities; at least 65% of them did the farming work of pruning, which shows that “urban hobby farmers” paid attention to the visual effect of the edible landscapes; at least 82% of them weeded and 46% of them caught insects, and only 6 people (8 %) sprayed pesticides, which shows that most of the “urban farmers” refused to use chemicals and preferred using environmental friendly measures to grow edible plants; only 4 people (6 %) made compost, which shows that the homemade organic fertilizer was still not commonly used by the “urban hobby farmers”.

Table 4. 18 Cultivation activities of the interviewed “urban hobby farmers” in Beijing (n=72)

Activities	Number (capita)	Proportion (%)	Activities	Number (capita)	Proportion (%)
plow the soil	61	85	sow	72	100
irrigate	72	100	harvest	72	100
loosen soil	42	58	catch insects	33	46
fertilize	52	72	prune	47	65
weed	59	82	Make/use compost	4	6
Spray pesticide	6	8			

Note: Two interviewees’ answers to this question were not completed, the proportion of which is 3%.

The “professional urban gardeners” normally need to do some of the cultivation activities mentioned above as their jobs, including irrigation, harvesting, fertilizing, pruning and weeding, besides, some “professional urban gardeners” made compost and breed seedlings for the participants, such as those work in renting farming

gardens. In addition, for the officially organized edible landscapes with the purpose of achieving public greening, spraying pesticides and fertilizing with chemical fertilizers are usually the regular work activities of the “professional urban gardeners”.

### Labor frequency and labor time

For the “urban hobby farmers”, the labor frequency and labor time of their farming activities vary from individual to individual. Of the 72 interviewed “urban hobby farmers”, 38 people (53%) did the farming work at least once per day, 19 people (26%) did the farming work once per two or three days, 13 people (18%) did the farming work once per week or several weeks, and 2 people’s replies (3%) were not obtained (Table 4.20). The calculation shows that in the 72 interviewees, the people who invested less than 5 hours per week in edible landscaping were 49% (35 people), 5-10 hours were 37% (27 people), more than 10 hours were 11% (8 people) (Table 4.21). The data above indicated that the urban citizens have a high labor frequency for cultivating the edible plants. Many interviewees regard the edible plants cultivation as a hobby, and they often do it as soon as they have leisure time. But generally this hobby does not cost too much time to complete.

**Table 4. 19 Labor frequency of the interviewed “urban hobby farmers” in Beijing (n=72)**

Labor frequency	Number(capita)	proportion (%)
at least once per day	38	53
once per two or three days	19	26
once per week or several weeks	13	18

Note: Two interviewees’ answers to this question were not completed, the proportion of which is 3%..

**Table 4. 20 Labor time per week of the interviewed “urban hobby farmers” in Beijing (n=72)**

Labor time per week	Number(capita)	proportion (%)
Less than 5 hours	35	49
5-10 hours	26	36
More than 10 hours	9	12

Note: Two interviewees’ answers to this question were not completed, the proportion of which is 3%.

For the “experiential urban farmers”, their labor frequency and labor time vary with the experiential programs. For example, the “urban farmers” who participate in the activities of the rice seedlings transplanting and harvesting in Haidian Park only have two chances to do the farming work in one year, and the working time might last several hours, which depends on the program plan of the activity. Take the “experiential urban farmers” who visit the Agrotourists’ Picking and Sightseeing Garden as another example, their labor frequency and the labor time vary with the different individuals, and also with the distance away from the leisure farm. They may visit and pick up products once or several times every year, usually at weekends or on holidays during the harvesting seasons, the frequency of which is usually not great



For the “professional urban gardeners”, planting and maintaining the edible plants are their job, therefore, normally they work 8 hours every working day, but sometimes the working time might vary with the particular demands of the job.

#### 4.6.2 Installation and materials

##### Farming tools

The “urban hobby farmers” who grow edible plants spontaneously usually use simplified farming tools which they bought or recycled. The lower-priced tools, such as spades and buckets, are the basic tools which almost every planter was equipped with (Figure 4.29). Some planters bought special garden spades, watering cans and pruning shears as their farming tools, and a few planters were equipped with hoes and harrows. Most of the planters said that spades and buckets are enough for the small-sized cultivation in urban space and the big tools are not necessary. While the “urban farmers” involved in the formally organized edible landscapes usually were equipped with professional tools, which is necessary for the farming activities, supplied by the organizers. For example, in “Happy Farms”, a special tool house is usually used to store the necessary farming tools, including spades, buckets, sprinkling cans, pruning shears and rakes, etc. (Figure 4.30).



Figure 4. 29 Some commonly used farming tools by the spontaneous “urban hobby farmers”



Figure 4. 30 A tool house of Xi Shan “Happy Farm” (Case E1)

##### Plant containers

The flower pots are the most commonly used plant containers by the “urban hobby farmers” involved in the spontaneous edible landscapes. Besides flower pots, many “urban hobby farmers” often recycled articles of daily use as plant containers, such as recycled ceramic basins, bubble chambers, aquariums, plastic or metal washbasins,

packing boxes and plastic drinking bottles. In addition, some cultivators, especially the residents who grow edible plants on their balcony, also usually buy professional planting containers from the market for growing vegetables (Figure 4.31). In addition, the professional planting containers are often used in the construction of the formally organized edible landscapes by the “professional urban gardeners”, if they need them (Figure 4.32).



Figure 4. 31 Some commonly used plant containers by the spontaneous “urban hobby farmers”



Figure 4. 32 Professional planting containers used in an organized roof garden (Case B3) © Zixin Lv

## Fences

Fences are commonly used to protect the edible landscapes, especially those related to food consumption, no matter if they are built in individual mode or organized mode. The residents who grow edible plants in their private yards usually use the original iron fence and gate as the protector (Figure 4.33). Those who grow edible plants spontaneously and informally in the public space often use self-made fences as the protector, which were usually made from the recycled materials, such as the obsolete wooden planks, bamboo poles, iron pipes and the picked up branches (Figure 4.34). While in the formally organized edible landscapes, fences with uniform appearance which were made from the same materials were often built (Figure 4.35).





Figure 4. 33 Original iron fence and gate of private courtyards as the protector of the edible landscape



Figure 4. 34 Fences of the informal edible landscape



Figure 4. 35 Fences of the formally organized ELWUA

### Climbing facility

Trellises, fences, bamboos, branches, tightened ropes and metal pipes are the commonly used climbing facilities to support the climbing edible plants (Figure 4.36). In the 72 interviewed “urban hobby farmers”, 69% of them (50 people) used the climbing facilities.



Figure 4. 36 Climbing facilities of ELWUA

### Enclosing facility

The areas of the edible landscape were usually enclosed with certain materials to

designate the boundaries. The residents who spontaneously grow edible plants usually use bricks, paving bricks, tiles, gravels or small wooden branches to build the enclosing facilities. Some residents just used the raised soil to designate the bordering (Figure 4.37). In the formally organized edible landscapes, in addition to using raised soil, designed fences with uniform appearance were often used to show the boundaries of the edible landscapes.



Figure 4. 37 Enclosing facilities of ELWUA

### 4.6.3 Technologies

#### Seeds

The “urban hobby farmers” who plant edible plants spontaneously might obtain the seeds or seedlings through the following approaches.

- Purchasing from the seeds market. Almost all of the 63 interviewed spontaneous “urban farmers” (98%) bought seeds from the seeds market. One small package of the vegetable seeds costs 2-3 Chinese yuan<sup>24</sup>, and one edible seedling normally costs 5-20 yuan. Normally one planter might spend around 10-300 yuan to buy the seeds and seedlings in one year.
- Reserving seeds, roots or seedlings for planting. 38% (24 people) of the 63 spontaneous “urban farmers” used the seeds which were harvested last year or obtained from the mature vegetables, or used the leftover roots or seedlings from the vegetables for planting.
- Getting seeds from neighbors or friends. 13% (8 people) of the 63 spontaneous “urban farmers” obtained seeds or seedlings from the neighbors, and a few of them exchange seeds with friends who they knew from the flower and vegetable cultivation club.

Seeds and seedlings used in the formally organized edible landscapes usually come from:

- Seeds market
- Own nursery

<sup>24</sup> The yuan is the primary unit of account of the renminbi, the currency of the People's Republic of China. 1 Yuan equals about 0,151 Euro on 16<sup>th</sup> March, 2015.

- Preserved seeds

## **Soils**

The “urban hobby farmers” who plant the edible plants spontaneously might obtain soil through the following approaches.

- Using the original soil on the site. 89% of the 63 interviewed “urban hobby farmers” who cultivated edible plants spontaneously used this way to obtain soil.
- Carrying soils from the public green space or urban parks close to where they live. 10% of the 63 interviewed “urban hobby farmers” had used this way to obtain soil. In order to sterilize the carried soil, some “urban hobby farmers” exposed the carried soils to the sun or steamed it before using it.
- Purchasing the artificial soils or humus from market. 3% of the 63 interviewed “urban hobby farmers” had used this way to obtain soil.
- Carrying/purchasing soils from suburban farmland or vegetable fields. 2% of the 63 interviewed “urban hobby farmers” used this way to obtain soil.

Soil used in the formally organized edible landscapes usually derives from:

- The original farmland or vegetable field on site.
- The suburban farmland or vegetable fields.
- Purchased the artificial soils or humus from market.

## **Irrigation water**

The “urban hobby farmers” who grow edible plants spontaneously might use grey water containing no sodium soap and personal care products, tap water, collected rain water or river water to irrigate edible plants. Of these, 67 % of the interviewed 63 “urban hobby farmers” used tap water combined with grey water, such as the water that has been used for washing rice, vegetables and meat, the water that has been used for breeding fishes, and tea water. These people believed that using grey water could not only save water but also make full use of the organic substances contained in it as natural organic fertilizers. In addition, 3 % of the 63 “urban hobby farmers” only used the tap water, which is not cheap (4 yuan per cubic meter); 8 % of them used collected rain water, which was usually collected with recycled containers in different sizes, such as buckets, tanks and bottles, or the simplified hand-made rain water collectors; those “urban hobby farmers” who grow edible plants along rivers usually use river water for irrigation; and moreover, there were also a few people who informally used public landscape water for self irrigation. Normally, the “urban hobby farmers” who planted the edible plants spontaneously can flexibly control the water consumption and the watering frequency according to different weather conditions. Most of the “urban hobby farmers” (80%) irrigated the plants every two or three days when there was no rain, a few people (10%), especially those fans of edible gardening,

irrigated once even several times every day, there were also a few people (10%), who mainly planted those drought-enduring plants such as lablab and carrot, almost didn't irrigate and mainly depended on natural precipitation except for when meeting drought.

The "urban farmers" involved in the organized edible landscapes more often use treated grey water (Case A14), tap water (Case E1), collected rain water (Case B1) or municipal landscape water (Case A 16, Case C6) for irrigation.

## **Fertilizer**

Almost all of the "urban hobby farmers" who grow edible plants spontaneously refused to use chemical fertilizers and only use organic fertilizers when they need fertilizers.

In the 63 interviewed spontaneous "urban hobby farmers", only five persons (8%) used chemical fertilizers, mainly compound chemical fertilizers, and the others used organic fertilizers (71%, 45 people) or simply didn't use fertilizers (21%, 13 people) at all. The organic fertilizers mainly include the following types:

- Organic compound;
- Farmyard manure, such as the self-breeding pigeons' manure, horse manure picked up from the suburbs, chicken manure and the worm casts bought from the raisers or market in suburbs;
- Cake fertilizer bought from market, such as the bean cakes, rapeseed cakes, sesame seed cakes and tea seed cakes;
- Compost made from kitchen waste, such as the skin of the fruit, vegetable leaves and the leftover foods, etc.;
- Waterlogged compost, which were usually made from the sesame butters and the bean dregs;
- Burying meat or the organs of the edible animals directly in the soil as fertilizer.

The organic fertilizers were also commonly used in the formally organized edible landscapes which were built both for urban residents' participants and for food consumption. The "urban farmers" usually use farmyard manure, organic compound fertilizers or compost as fertilizers, which are usually unified bought or made by the organizers. However, chemical fertilizers are still commonly used in the formally organized edible landscapes which were built only for achieving urban greening.

## **Plant diseases and insect pests**

The interviews indicated that the plants diseases and the insect pests always are a factor (Table 4.22, 4.23). Facing the problem, most of the cultivators were optimistic, for example, some of them thought that the insect pests are unavoidable and just



allowed them to come naturally as long as they are not serious, but there were also a few cultivators feeling complete helplessness because of their relative lack of knowledge.

In order to control the plant diseases, people usually plucked the infected leaves off the plant or even plucked the whole infected plant. For the insect pests, most of them used physical methods to control them: some of them caught the pests by hand to control their invasions; some of them control the insect pests through spraying the leaves with the water mixed with the juices of plants, such as the garlic water. In the 63 spontaneous “urban hobby farmers”, only 8% of them (5 people) used relative “safe” pesticides to control pests. These people usually had farming experience and they believed that it was not possible to resist insect pests without pesticides.

The “urban hobby farmers”, who registered in the “Happy Farms”, usually could get professional advising on insect pests control without chemicals from the “professional urban gardeners”.

For the edible landscapes built with purpose of achieving urban greening, chemicals are usually regularly used to protect the landscape from being attacked by plant diseases and insect pests.

**Table 4. 21 The common plant diseases and the commonly used physical control methods**

<b>Name of the plant diseases</b>	<b>Damage</b>	<b>Control methods</b>
Powdery mildew	Leaves shrivel	<ul style="list-style-type: none"> <li>• Pick off the infected leaves by hands</li> <li>• Wash leaves with diluted Chinese spirits</li> </ul>
Leaf spots	Leaves shrivel	<ul style="list-style-type: none"> <li>• Pick off the infected leaves by hands</li> <li>• Spray the leaves with the garlic water</li> </ul>

**Table 4. 22 The common insect pests and the commonly used physical control methods**

<b>Name of the insect pests</b>	<b>Damage</b>	<b>Control methods</b>
Cabbage caterpillar	Eat leaves	<ul style="list-style-type: none"> <li>• Catch by hands</li> </ul>
Cotton bollworm	Damage tomato, corn	<ul style="list-style-type: none"> <li>• Plough the earth</li> <li>• Scatter plant ash</li> </ul>
Aphids	Suck juices from leaves	<ul style="list-style-type: none"> <li>• Rinse the insects from the plants with water</li> </ul>
Red mite	Suck juices from leaves	<ul style="list-style-type: none"> <li>• Spray the leaves with mixed water with spicy, garlic and soap</li> </ul>
Snail	Eat leaves	<ul style="list-style-type: none"> <li>• Scatter coarse sands or pulverized limes around the plants</li> <li>• Spray leaves with soap water</li> </ul>
Euxoasegetum Schiffer-muller	Vegetable seedlings	<ul style="list-style-type: none"> <li>• Plough the earth</li> <li>• Scatter plant ash</li> </ul>
Grubs	Eat seeds, tubers and roots underground, also eat	<ul style="list-style-type: none"> <li>• Plough the earth</li> <li>• Scatter plant ash</li> </ul>

	seedlings	
Acanthococcus kaki kuw	Suck juices from leaves and fruits	-

### **Agricultural knowledge and skill**

The “urban hobby farmers” involved in the formally organized edible landscapes normally could obtain agricultural knowledge and skills from the “professional urban gardeners”, while those involved in the spontaneous edible landscapes could only obtain agricultural knowledge and skills by self study.

In the 63 interviewed spontaneous “urban hobby farmers”, 35 % (22 people) of them have accumulated the agricultural knowledge and skill through the former farming experience. For example, some people were professional farmers before; some had been sent to the countryside during the political movement of the Up to the Mountains and Down to the Countryside Movement<sup>25</sup> and worked in the farmland for several years; some had accumulated experience through helping their parents doing farm work, etc. The other “urban hobby farmers” who had no farming experience mainly obtained agricultural knowledge and skills through the following ways:

- Accumulating practical experiences in their direct growing practices;
- Consulting other experienced people, such as their more experienced parents, neighbors, sellers of the horticultural products, and members in clubs of vegetable cultivation, etc.;
- Learning from the internet.

<sup>25</sup> The **Up to the Mountains and Down to the Countryside Movement** was a political campaign of the People’s Republic of China during the Cultural Revolution in the late 1960s and early 1970s. The president Mao Zedong declared certain privileged urban youth would be sent to mountainous areas or farming villages to learn from the workers and farmers there.



# **Chapter 5 Emergence of the edible landscapes in urban area of Beijing**

## **5.1 The emergence of edible landscapes in different urban spaces of Beijing**

### **5.5.1 The emergence of edible landscapes in or around residential areas**

The residential area in China could be generally divided into traditional courtyard residential areas (Seheyuan) and modern residential areas based on their construction date. The emergence process of the edible landscapes which exist in these two types of residential areas will be introduced for each kind of area.

#### **The emergence of edible landscapes in traditional courtyard area (Siheyuan)/tenement courtyard area**

The residents of Beijing have the tradition of greening their courtyards (i.e. family garden). They usually plant trees, grass, flowers, fruits and vegetables to beautify and improve their living environment. Planting edible plants in the traditional courtyards (Siheyuan) of Beijing is a historical tradition, which could be traced back to the Ming Dynasty and Qing Dynasty. Some preserved edible trees which now exist there were planted long time ago, and a few of them even had a history of over hundreds of years. In addition to these old trees, the tradition of growing edible plants in Siheyuan was also inherited.

Before the foundation of the People's Republic of China in 1949, the bungalows with the forms of traditional courtyard, most of which are legacies of Ming Dynasty and Qing Dynasty, were the main dwellings types in Beijing. A siheyuan is a historical type of residence that was commonly found throughout China, most famously in Beijing. A simplest siheyuan is composed of four buildings and a surrounding courtyard. Some large siheyuan compounds have two or more layers of courtyards and even private gardens attached to them, which was a sign of status and wealth in ancient times. The main courtyard of a siheyuan is normally a square and in a typical layout, in addition to the cross-shaped brick path leading to the four houses, the rest of the space is bare land, which is usually used for cultivating plants (Figure 5.1). The greening of the courtyard of the siheyuan was paid much attention to, especially in the rich and influential families. The residents usually plant trees in the courtyard, normally in front of the main building, and the fruit trees such as crabapple trees, persimmon trees,

jujube and pomegranate trees are commonly planted. With the edible plants, the residents could enjoy the blossoms in spring, the coolness in summer and harvesting fresh fruits in autumn. The residents also would plant vegetables in the backyard, or in the verges around the houses. This tradition of growing edible plants in the courtyard also was prevalent among ordinary families.

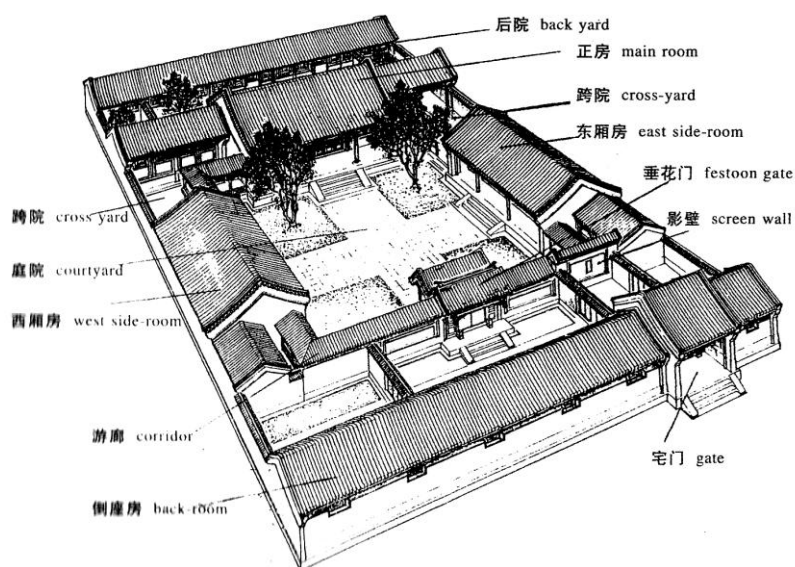


Figure 5. 1 Schematic diagram of a traditional Chinese courtyard

Source: <http://www.internet.org.cn/upload/2011/12/12/13/77842048419172.jpg>

Studies indicate that in 1949 the total cumulative area of the siheyuan in the city of Beijing was around 13,000,000 m<sup>2</sup> (Feng 2011); since the 1990s, along with the rapid urban development, a systematic demolition and renovation of old urban buildings took place in Beijing, and a vast amount of the siheyuan in Beijing, not only the shabby ones but also the ones of high historical value, were demolished and rapidly replaced by the modern storied apartment blocks. In 2010, only less than a quarter of the siheyuans were left (Huang and Xu 2010). As the historical value of the Beijing siheyuan was realized by scholars and government, the preservation of the siheyuan started in 1990s; until 2004, 33 left historical areas of the old Beijing have been designated for historical and cultural protection, therefore, some edible trees were preserved, and meanwhile, the tradition of growing edible plants in the courtyard of siheyuan were also handed down by the residents and their posterities. In some traditional courtyard areas, the community neighborhood committees annually distribute seeds of edible plant to the residents to encourage their cultivation for achieving greening (e.g. Case A3). Influenced by the cultivation tradition in siheyuan, some residents even carried over the habit of growing edible plants when they have moved out.

The tenement courtyard, which literally means “big and messy yard”, is one of the main dwelling types in old Beijing. In fact, the tenement courtyard was originally

siheyuan, which normally only contains one family. After the 1950s, along with the rapid urban population growth in Beijing, more and more people squeezed into siheyuan, and built bunches of small huts next to the original buildings, which formed the so-called “tenement courtyard” (Figure 5.2). Generally it includes from several to dozens of householders, who have different occupations, identities, economic conditions, and even nations, living in one tenement courtyard. Although the courtyard space in tenement courtyards, which is shared by several householders, is very small, people still usually make use of the limited space of the shared courtyard, or in the verges around the houses, to grow fruit trees and vegetables (i.e. guerrilla gardens) (Figure 5.3).



**Figure 5. 2 A photo of a tenement courtyard**

Source: [http://img.ivsky.com/img/tupian/img/201104/06/beijing\\_hutong\\_tese-001.jpg](http://img.ivsky.com/img/tupian/img/201104/06/beijing_hutong_tese-001.jpg)



**Figure 5. 3 Guerrilla gardens in a traditional tenement courtyard area (Case A3)**

In the 2000s, a new form of edible landscape – the roof garden - emerged in the traditional courtyard area. A typical example is the roof garden built by Mr. Guichun Zhang (Case A1). In 2012, the story of Mr. Zhang with his roof garden was broadcast in a documentary film produced by CCTV, called "A Bite of China", which publicized his edible roof garden. Since then, roof gardens have appeared in traditional residential areas one after another, and a stirring of interest in growing edible plants

spread rapidly not only in the traditional residential areas in Beijing but even across the whole country.

The fruit trees also existed in the street space (called a hutong) of the traditional courtyard area. Hutong refers to the alleys spread inside the traditional courtyard area, which allow people to pass through. Therefore, the traditional courtyard area is also called a hutong area. Many hutong areas were named by the characteristics of the plants there, for example, the South Cherry Garden District acquired its name from its large garden growing cherry trees. Similarly, the Jujube Plantation Street and the Chinese Toon Tree Hutong were named for the large quantities of jujube trees and Chinese toon trees planted there. These names of hutong indicated that planting edible trees in the street space of hutong area was very common in history. In the early days of the foundation of People's Republic of China, most of the trees in hutong areas were privately owned. In 1955 the afforestation team of the municipal garden department started to take over the management of the trees in hutong areas. In the 1950s and 1960s, the unified greening campaigns in hutong areas were carried out, and many edible trees were planted during that time, but because of the idealistic campaign of the Great Leap Forward<sup>26</sup> in 1958 and the Cultural Revolution (1966-1976), many trees were cut down or seriously damaged. In 1980s, the National Tree Planting Movement led to an upsurge of greening hutong areas. For example, more than 1000 jujube trees were planted in the "Jujube Forest Street" in 1983 by local residents and staff of Danwei together, which made the street not just in name only. Many edible trees which currently exist in the street space of hutong areas were planted at that time.

### **The emergence of edible landscapes in modern residential areas**

In order to meet the housing demands and improve the living conditions of the rapidly increasing population, after the foundation of People's Republic of China in 1949, a large number of new residential buildings were constructed. Since then, the large quantities of courtyard bungalows which formerly dominated the city were gradually replaced by modern residential areas with storied buildings, which were built under unified planning. In the modern residential areas, public green space is usually planned and designed as one necessary attached supporting facility for the residents. In the modern residential areas which were built before the 1980s, fruit trees were commonly used as the unified greening landscapes in the modern residential area. Therefore, fruit trees in modern residential areas emerged in this way. The Dormitory District of the Institute of Semiconductor, Chinese Academy of Sciences (Case A6), which was built in the 1970s, is an example. Since China's reform and opening-up policy was carried out in 1978, the economic progress and urban development were

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<sup>26</sup> The "Great Leap Forward", was an economic and social campaign by the Communist Party of China (CPC) from 1958 to 1961. The campaign was led by Mao Zedong and aimed to rapidly transform the country from an agrarian economy into a socialist society through rapid industrialization and collectivization. The campaign caused the Great Chinese Famine. During this campaign, many trees were cut down for making steel. In: Wikipedia, the free encyclopedia Wikimedia Foundation. Retrieved 5 April, 2014 from [http://en.wikipedia.org/wiki/Great\\_Leap\\_Forward](http://en.wikipedia.org/wiki/Great_Leap_Forward).

greatly stimulated, and the standard for the construction of the residential areas was also improved: more and more completed service facilities were included in the residential areas, such as the commercial facilities, hygiene facilities and property management. However, since then, ornamental plants became the preferred plants for the public greening in the residential area, and fruit trees were rarely used. The situation hasn't changed until today except for in some wealthy residential areas. In the 2000s, some estate developers preferred to use fruit trees as landscaping trees and use them as a symbol of the pastoral life in some wealthy residential areas such as the villa areas (e.g. Case A23). In addition, since the 2000s, some new types of edible landscapes such as community gardens and demonstration gardens emerged in the relatively older modern residential areas, which usually aim to achieve greening and improve the living environment. The Minkang Residential Area No.30 (Case A14) is such an example.

Since implementing the reform and opening up policy in 1978, large numbers of people moved from traditional courtyard areas to the modern residential areas with multi-story buildings, which were usually designed with a uniform landscaping tone with ornamental plants for the whole residential area. The urban residents with a courtyard cultivation tradition or rural identity "naturally" made use of the private courtyards in their first floor or balconies for growing edible plants, therefore, family gardens in modern residential areas emerged in this way. People living in the first floor usually had private courtyards for cultivation, but most of the urban residents who live in other floors did not have outside open space for cultivation although many of them really wanted to. Therefore, some of them began to cultivate in the public space of the residential area where it was bare or the original greening plants had degraded because of the lack of maintenance, and some residents even uprooted the original greening plants in the public green space and grew food there instead. In addition to the space inside the residential area, in some cases, the wasteland outside the residential area, which lacked management temporarily, also became the cultivation objects of the urban residents (Case A22). This is the process of how the guerrilla gardens in or around the modern residential areas emerged. In the 21st century, along with the food safety risks during the rapid urbanization in China, and also with the influence of international urban agriculture concepts, more and more Chinese urban residents started realizing the multiple benefits of ELWUA, and started their farming activities in every possible space of the residential area such as on the roof and balcony, in the private courtyard and in the public space next to buildings, of which most of them are informal guerrilla gardens. In the 2010s, a new type of edible landscape - "Happy Farm" attached to the residential area emerged (e.g. Case A16), but it is usually located in the modern residential areas at the edge of city or in the satellite towns.

### **5.5.2 The emergence of edible landscapes in the Danwei precinct**

The greening landscapes with fruit trees emerged in multitude in the Danwei precinct

in the 1950s. Since 1955, with the support of the municipal garden department, large-scale afforestation was carried out in the Danwei precinct of Beijing, including factories, government departments, schools, hospitals and embassies, etc. During this time, fruit trees were massively used as the greening trees. A lot of fruit trees currently growing in the Danwei precinct are those preserved from that time. According to the records in the *Beijing Annals • Municipal Administration Volume • Gardens and Afforestation Annals*, in 1955 a number of seedlings were planted in the major hospitals, of which most of the seedlings were fruit seedlings; in 1959 a total of 7860 trees were planted in the embassies, in which 242 were fruit trees; in 1962, 232,693 various fruit trees were planted in some governmental precincts in Haidian District, and in 1963 73,341 more trees were planted, of which 23,721 of them were fruit trees. However, since the "Cultural Revolution"<sup>27</sup> in 1966, almost all the greening in Danwei stagnated, and many of the original greening achievement was also destroyed. Since 1978, the greening in Danwei restarted, but the ornamental plants became the main greening plants at that time. In spite of this, in 1980s there were still a few Danwei using fruit trees for greening. The fruit trees in the campus of the institute of Semiconductor, Chinese Academy of Sciences (Case B2) which were planted in 1980 for achieving greening by the greening departments, is such an example.

In addition to the fruit trees for achieving greening, in the 2000s some new types of edible landscapes, such as Danwei kitchen gardens and educational/demonstration gardens, emerged in the Danwei precinct. For example, in 2010, one private enterprise started growing vegetables and fruit trees in their courtyard for providing food materials to the staff canteen (Case B1); in 2014 an edible roof garden for purposes of research, education and demonstration was built in the High School affiliated with Tsinghua University (Case B3).

The agricultural experimental farm is a very special type of edible landscape in the precinct of agricultural institutions, and the experimental farmland of CAAC (Case B4) is the only experimental farm within the urban area of Beijing. This experimental farm was established in 1938 by Japanese, and mainly grew crops, vegetable and pastures. After the Chinese people's victory in the war against Japanese aggression in 1945, it was taken over by the Kuomintang government. After the founding of People's Republic of China in 1949, it was expanded into the Chinese Academy of Agricultural Sciences (CAAS) in 1957, about 4,000 acres. At that time, the location of the experimental farm still belonged to the suburbs of Beijing. However, along with the continuous urban expansion, more and more original experimental farm was

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<sup>27</sup> The "Cultural Revolution" was a social-political movement that took place in the People's Republic of China from 1966 until 1976. Its stated goal was to preserve 'true' Communist ideology in the country by purging remnants of capitalist and traditional elements from Chinese society, and to re-impose Maoist thought as the dominant ideology within the Party. The movement paralyzed China politically and significantly affected the country economically and socially. Millions of people were persecuted in the violent struggles that ensued across the country, and suffered a wide range of abuses. A large segment of the population was forcibly displaced, most notably the transfer of urban youth to rural regions during the Down to the Countryside Movement. Historical relics and artifacts were destroyed. Cultural and religious sites were ransacked. In: Wikipedia, the free encyclopedia Wikimedia Foundation. Retrieved May 5, 2014 from [https://en.wikipedia.org/wiki/Cultural\\_Revolution](https://en.wikipedia.org/wiki/Cultural_Revolution).

encroached on by the urban construction. Today, only 400 acres are preserved and continuously used for agricultural research.

### **5.5.3 The emergence of edible landscapes in the traffic space**

The street greening with fruit trees also emerged in multitudes in the 1950s. The street greening of Beijing started from the Qin Dynasty, but the large-scale unified urban street greening emerged in the Yuan Dynasty (Commission of the Beijing Local Chronicles 2000). Trees, mainly locust trees, were planted along the main roads within the Imperial City. During the periods of the Qing Dynasty and the Republic of China, the decorative trees, such as Chinese scholar trees, locust trees and willows, were the main street greening trees. After the founding of People's Republic of China, since 1955, new large-scale traffic space afforestation was carried out in Beijing, in which fruit trees started being widely used. According to the records in the *Beijing Annals •Municipal Administration Volume •Gardens and Afforestation Annals*, in 1957 a wide green belt of fruit trees was built along the high-voltage corridor in Yuetanbei Street and Kexueyuan Road (currently Sanlihe Road); in 1958 large numbers of streets were planted with fruit trees on both sides. A lot of fruit trees which currently exist in the traffic space are the preserved greening trees from that time. However, since the "Cultural Revolution" in 1966, the greening trees in the traffic area suffered a tragic catastrophe. Since 1978, street greening restarted, but ornamental plants have become the main greening plants since then.

In addition to the fruit trees used for traffic space greening, the guerrilla garden is another type of edible landscape which exists in the urban traffic space. Along with the economic development and urbanization since the Chinese economic reform in 1978, especially after entering the phase of rapid urbanization since 1992, large quantities of migrants have moved from rural areas to urban areas. The migrants with rural identity and lifestyle usually "naturally" cultivated the non-built area in traffic spaces, such as the street verges, the space along the railway and the space along the riverbank for growing food. Usually these places still lack management temporarily. Some inhabitants even uprooted the original greening plants in the public green space along the river or on the embankment, and planted their own edible plants there instead. In addition to the migrants with rural origins, some local urban residents who have interest of growing food also joined in the group. Large quantities of guerrilla gardens emerged in traffic space in this way. The field survey indicated that some guerrilla gardens in the traffic space which were built after the 2000s could be easily found existed within the urban area. The public space along Subway 13 (Case C4) and the vegetable field along the street adjacent to Shang Di Flower Market (Case C1) are such examples.

### **5.5.4 The emergence of edible landscapes in urban parks**

Some fruit trees which exist in the urban parks were planted from the 1950s to the



1980s. Take the fruit trees in the Temple of Heaven as an example (Case D2); in the late 1950s, about ten thousand edible trees, including apple trees, peach trees, pear trees, walnut trees, plum-leaf crabapple trees, apricot trees, etc., were planted in the Temple of Heaven. The whole temple complex, with a total size of 273 hectares, is surrounded by two cordons of walls; the part surrounded by the inside wall is called Inner Altar, which is composed of the Altar of Prayer for Good Harvests in the north and the Circular Mound Altar in the south, and the part between the two walls is called Outer Altar (Figure 5.4). During that time, the whole Outer Altar was used as orchard, and most of the space in the Circular Mound Altar was also planted with fruit trees. In the early 1980s, the Temple of Heaven didn't plant fruit trees any more, and the fruit trees were gradually replaced by evergreen trees in the next few years, but there are still some fruit trees preserved until today.

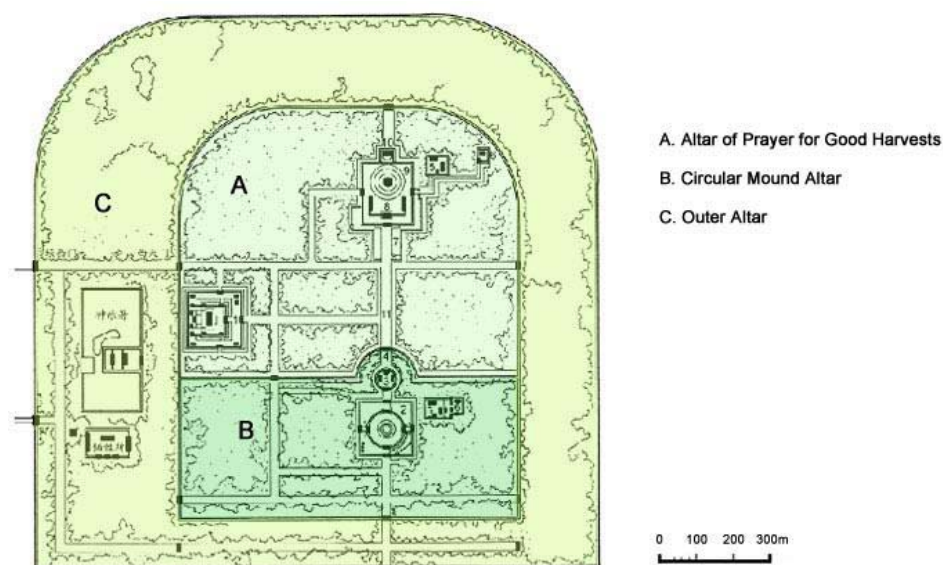


Figure 5. 4 Plan of the Temple of Heaven

Adapt from the source: <http://www.china.com.cn/chinese/ch-gujian/ymq/images/P188.jpg>

Since 1978, especially since 1992, modern urban parks developed rapidly in China. Some edible landscapes which exist in the urban parks of Beijing, especially in the newly built modern urban parks in the 2000s, were usually built under professional design. For example, the landscape of sunflower in Chao Yang Park (Case D3), which was completed in 2007, the “sunflower garden” in Olympic forest park, which was completed in 2008, and the “one acre paddy field” in Haidian Park (Case D1), which was completed in 2003, were all designed by landscape architects. In which, the “one acre paddy field” in Haidian Park was a scenic attraction transformed from the preserved original farmland.

### 5.5.5 The emergence of multifunctional leisure farms

The leisure farms which exist in the urban area of Beijing are usually transformed from the original farmland that was swallowed by the expanding city during the rapid

urbanization. Chinese were famous for their highly intensive urban cropping systems and were largely self-sufficient in food produced on adjacent land area administered by them (Deelstra and Girardet 2000). Since the implementation of reform and opening to the outside world in 1978, especially after entering the stage of rapid urbanization since 1992, the central urban area expanded rapidly, and the urbanization of the suburban areas and the development of the satellite towns of Beijing were intense. Along with the process of the rapid urbanization of Beijing, large quantities of high-yield farmland and vegetable fields outside but adjacent to the urban area were occupied by urban and suburban construction, and only a few were preserved in the urbanized area. In the 2000s, most of these preserved farmlands have changed the nature of their property from pure farmland to multifunctional leisure farmland. For example, the reserved orchard and vegetable field in Sijiqing have been respectively transformed into “Agrotourists’ Picking Garden” (Case E2) and “Happy Farm” (Case E1).

## 5.2 The emergence of edible landscapes in the urban area of Beijing based on different benefits

The edible landscapes which exist within the urban area of Beijing can be divided into three types according to the properties of their benefits (Table 5.1). The first type is the edible landscapes for the self-use. This type of edible landscape is usually built by the “urban hobby farmers” in individual mode or self-managed mode of group organization, which mainly include family gardens and guerrilla gardens. This type of edible landscape might be located in or around the residential areas and in traffic areas. The second type is the edible landscapes for public or collective benefits. This type of edible landscape is mainly initiated and organized by Danwei or social organizations in professional organization form or scientific organization form with the aim of offering benefits for the public, which mainly include educational/demonstration gardens, urban (semi-) public greening landscapes with edible plants and experimental farms, etc. This type of edible landscape might be located in or around the residential area, in the Danwei precinct, in traffic area and in urban parks. The third type is the edible landscapes for commercial benefits. It was initiated in a commercial organization by companies with the aim of producing commercial benefits, the forms of which mainly include agrotourists’ picking farm, rental farming garden and the greening landscape with edible plants in residential areas, especially wealthy ones.

**Table 5. 1 The classification of the ELWUA in Beijing according to the property of benefits**

<b>Property of the ELWUA benefits</b>	<b>Examples</b>	<b>Location</b>
Edible landscape for self-use	Family garden	Residential area
	Guerrilla garden	Residential area, traffic area
Edible landscape for	Educational/demonstration garden	Danwei precinct, urban park

public or collective benefits	Urban (semi-) public greening landscapes with edible plants Experimental farm	Residential area, Danwei precinct, traffic space, urban park Danwei precinct
Edible landscape for commercial benefits	Agrotourists' picking farm Renting farming garden Greening landscapes with edible plants	Leisure farms at the edge of city, Leisure farms at the edge of city, residential area (Wealthy) residential area

### 5.2.1 The impetus of edible landscapes for self-use

The semi-structured interview of the 63 “urban hobby farmers” who grew edible plants in individual mode and self-managed mode of group organization allows us to identify the cultivators’ motivations for growing edible plants in the urban area. The interviewees’ responses indicated that the motivations appear to be quite different and tend to be driven by the urban residents’ individual needs such as for leisure, health, food supplement, healthier food and connection with nature, rather than for subsistence (Table 5.2).

**Table 5. 2 The interviewees’ representations of their motivations of growing edible plants (n=63)**

Question: What are your main reasons to grow edible plants?	Number (63 people)
Fun, entertainment	28
Enrich life, cultivate the mind	22
Physical exercise	20
Produce green, organic or fresh food	17
Food supplement, bring convenience and pleasure to daily life	15
Hobby and habit	14
Achieving green, connect with plants and nature	10
Appreciating the edible plants - both flower and fruits	10
Beautify and improve the environment	9
Food supplement, saving money for vegetables consumption	7
Building shade	3
Cultivate edible plants imitating other people	2
For relaxing and thinking	1
For recreation with friends	1

Through the interviewees’ responses, the urban hobby farmers’ main motivations of growing edible landscape can be roughly grouped into the following categories.

#### Recreation and enriching life

In the 63 interviewees, 28 (44 %) people said that they plant vegetables, herbs or fruit trees for fun and recreation, and 22 (35%) people mentioned that they do it for

enriching life and cultivate their mind. The Chinese rapid urbanization has lead to an unbalanced urban entertainment development, which could be reflected in the lack of urban leisure activities and entertainment space, especially for elderly people. China has rapidly become an aging society since 1999. At the end of 2004, the older people aged 60 and over were about 143 million, accounting for over 13.7% of the total population, and this number was predicted to reach 200 million in 2014<sup>28</sup>. During the interviews, many elderly interviewees expressed their depressed mood and loneliness after retiring. For example, such kind of response is very common, "There was nothing to do after my retiring. I had a sense of great sadness and loss." Therefore, farming activities became entertainment, which could enrich their lives, improve their mood and help them have a sense of accomplishment. Beside, some interviewees said that they grow edible plants for cultivating their temperament thereby improving their quality of life.

### **Health: physical exercise and mental relaxation**

Many urban citizens consider cultivation to be a good way of pursuing health, both physically and mentally. In the interview, 20 (32%) interviewees said that they planted edible plants for physical exercise.

*'I grow vegetables only for physical exercise, for sweating.'* ---- A man aged 40, one "urban hobby farmer" of renting vegetable garden, Case A16

*'The people over 60 are old people, I'm an old person almost aged 70, I need to do some physical exercise to keep strong and healthy.'* ---- A man aged 62, one guerrilla gardener, Case A9

Besides physical exercise, some interviewees mentioned that farming activities could bring a good mood and relieve them from the anxiety and tiredness, which could naturally improve physical health.

### **For connecting with nature**

The urban citizens who live in the modern concrete jungle have little chance to get close to the natural space and interact with nature. In the interview, 10 (16%) interviewees mentioned growing edible plants for achieving greening, connecting with plants, and 9 (14%) interviewees mentioned beautifying and improving their environment, which all ultimately come from the urban residents' desire for rebuilding the relationship between people and nature.

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<sup>28</sup> Statistics comes from the *Research Report of the Prediction of the Aged Tendency of Chinese Population* published by China National Committee on Aging (CNCA) in 2006.

## Food supplement

The interviews indicated that due to the improvement of the economic situation since the implementation of Chinese economic reform in 1978, urban citizens primarily did not grow edible plants for subsistence, but more for pursuing leisure, health and for contact with nature, which have already been mentioned previously. However, the interviewees still usually mentioned “food supplementation” as a secondary reason of having an edible garden, but this is suggested to be associated with bring pleasure or convenience to their daily life.

*‘Through planting edible plants, I can save a small sum of money on buying vegetables, which bring me pleasure and a sense of achievement.’ ---- A woman aged 61, one “urban hobby farmer” in guerrilla garden, Case C3*

*‘The edible plants can be used as a food supplement in wet weather, which brought conveniences of life, because I don’t need to go out to buy vegetables.’ ---- A man aged 70, one “urban hobby farmer” in family garden, Case A15*

## The influence of a cultivating tradition

Agriculture is one of the most deeply rooted activities in Chinese history. When China was founded in 1949, 89.4% of the Chinese people were farmers, and in 2010 50.1% of the population were still farmers. This means that most of the Chinese people have farming experience because they either worked as farmers or helped their parents to work on the farms, therefore, the tradition of farming is deeply rooted in Chinese minds. Although the rapid urbanization lead to the alienation of the urban citizens and the land, a large number of urban citizens still had profound affection for the land and farming traditions. Some urban citizens cherished the memory of previous lives of living in bungalows and growing vegetables in the gardens in front of their houses, therefore, after moving to the multi-story buildings, they still acted as “urban hobby farmers” and did everything possible to find a piece of land close to their houses for growing food. Besides, some urban citizens said that growing edible plants is just their habit, which was formed by seeing their parents’ cultivation from childhood.

*‘Growing edible plants is just my habit; it was formed by seeing my parents’ cultivation from childhood.’ ---- A man aged 62, one “urban hobby farmer” in family garden, Case A2*

## Organic and fresh food

Due to the increasing occurrence of scandals involving food safety in China, there is growing public disquiet over food safety problems. Some interviewees said that they grew edible plants particularly for producing organic food which are natural and pollution-free for their own consumption. Furthermore, some interviewees mentioned

that these self-produced “natural” products are more fresh and tasty than those bought from the supermarket.

## **5.2.2 The emergence of edible landscapes for public or collective benefits**

Through the semi-structured interviews of the “professional urban gardeners” and the none-for-profit “initiators of formally organized ELWUA project”, as well as literature review, the impetus for the emergence of the edible landscapes for public or collective benefits can be summarized as below.

### **Social demands**

Social demands are the objective impetus for the emergence of the edible landscapes for public or collective benefits, which mainly include social demands of fast greening, food provision, education and research.

#### **- Fast greening**

Beijing was always a picturesque place with a fairly good ecological environment; in history, it had clear streams and green hills in the mountain areas, and had productive plains with floral fragrances. However, because of the unrestrained use of natural resources, the environment was consequentially damaged: before the foundation of the People's Republic of China in 1949, forest covered only 1.5% of the land (Commission of the Beijing Local Chronicles 2000). In the 1950s, the landscaping and greening development in Beijing were promoted and fast greening became the urgent task at that time. Some edible plants, especially some fruit trees, have the characteristics of being cheap and growing fast, which could meet the demand of fast greening, and thereby were massively used for urban greening. Some edible trees which currently exist within the urban area were planted at that time. Although since 1979, when the new guidelines were proposed by the Chinese Central Committee, decorative woody shrubs and trees became the first choice in urban greening, there were still a lot of Danwei using fruit trees as the greening trees in the 1980s (e.g. Case B2).

#### **- Food provision during the Three Years of the Great Chinese Famine**

The Three Years of the Great Chinese Famine, called the Three Years of National Disasters or the Difficult Three Year Period by the Communist Party of China, was the period in the People's Republic of China from 1958 through 1961 characterized by widespread famine. It gave enormous impetus to the emergence of the edible landscapes in the urban spaces in the 1960s. In order to alleviate the national food shortage, grain crops, vegetables and fruit trees were largely planted in parks and in nurseries. Some fruit trees which currently exist in urban parks and Danwei are the preserved edible trees planted during that time (e.g. Case D2).

## - Education and research

The need for education and research gives impetus to the emergence of the educational/demonstration garden and experimental farm. For example, some schools in Beijing grew edible plants as teaching or experimental materials. In addition, as the popularity of the concept of ELWUA in China, the research and demonstration programs which aim to demonstrate and popularize growing vegetables in urban areas were gradually launched in the urban area of Beijing (e.g. Case B3). Besides, the need of agricultural scientific research gave impetus to the emergence and existence of the agricultural experimental farm (Case B4).

## The national guideline (policy)

The national guideline (policy) was ever one of the most important driving forces of developing edible landscapes in the urban space from 1950s to 1970s. In 1950s, in order to achieve the universal urban greening as quickly as possible, the government adopted the guideline of planting fast growing trees in urban space for achieving greening. The Article 4 in the *Beijing Urban Planning on Greening* that was worked out in March 1957 noted that, the urban greening should combine with the production and research. It required “growing more fruit trees, especially in the neighborhood green space, in the urban shelterbelt, in the forests of suburbs and in the forest belt on both sides of railways and highways” (Commission of the Beijing Local Chronicles 2000). In 1958, the Central Committee of the Communist Party of China (CPC) called on the whole party and nation to “turning the land into parks and gardens”, and the Beijing Municipal Party Committee of the CPC proposed the policy of “greening combined with production”. Then the whole nation responded these state policies and started to plant edible trees massively in parks and green space not only for achieving greening but for producing fruits and woods as well.

After the three years of Great Chinese Famine difficulty from 1959 through 1961, the government proposed new guidelines, which put an emphasis on large-scale production in gardens and parks, thereby in the next consecutive years large numbers of gardens and nurseries were used for grain and vegetable production, and animal husbandry. In 1963, based on the guidelines of the adjustment period of national economy, a revision was made to the *Beijing Urban Planning on Greening* in 1957. In this new version, Article 5 stated that, the planning of urban gardens and afforestation should combine with the agricultural farmland, which should extend in ribbons from the suburbs to urban areas (i.e. surrounding the decentralized urban groups with large areas of agriculture, forestry and urban green space). The reason of proposing this layout is that it would not only narrow the gap between urban and rural areas but also solve the problems of fresh food production and food supply as well (ebd). Although in 1967 National Construction Commission suspended the “revision of 1963” because of the “Cultural Revolution” from 1966 to 1976, with the influence of the guidelines of the



“revision of 1963”, fruit trees were widely planted in urban gardens and forest. Some fruit trees which currently exist in the urban space of Beijing were planted following the guidelines in 1950s and 1960s, such as the fruit trees in the Temple of Heaven (Case D2). However, in 1979, the Central Committee pointed out that the lawns should be considerably used in urban greening, and a slogan of “No exposed earth” was proposed to improve greenery. Since then fruit trees were gradually replaced by decorative plants, and the decorative woody shrubs and trees started to be massively used in the urban greening.

### **The planning by Danwei or other organizations**

Most of the ELWUA for public or collective benefits, especially those relatively newly-built ones, were built through planning by Danwei or other organizations. Therefore, Danwei or other organizations gave an impetus to the emergence of the ELWUA for public or collective benefits in Beijing, although then might organized the ELWUA with different objectives. For example, the edible landscapes which were built for achieving greening in urban squares, along the streets, in the Danwei precinct and in urban parks were all built based on the planning by Danwei (e.g. Case B2). The educational and demonstration garden in Haidian Park in Beijing (Case D2) was built under the plan of governments. The community garden and demonstration garden in an old residential area of Minkang No. 30 (Case A14) was built by transforming the public space into edible gardens under the planning of the community neighborhood committee and the property management with the aim of achieving greening and improving the degenerated living environment of the residential area.

### **The introduction by professional designers**

Some edible landscapes emerged in the urban area because the professional designers and planners designed them as one component of the urban landscape. If designers or planners take the edible plants into consideration during the planning and design stage of urban construction, then edible landscapes would be much more likely to emerge in urban spaces. Therefore, the professional designers play an important role in introducing edible landscapes into urban spaces. The introduction by professional designers is one of the driving forces of the emergence of the ELWUA for public or collective benefits. For example, the landscape of sunflowers in Chaoyang Park was designed by a landscape architect; the organic farm (educational garden, kitchen garden) on the roof-top of the upper building in Fangshan Campus of Beijing No.4 High School, which was one nominee to the Designs of the Year 2015, was designed by OPEN Architecture, an architecture office. In addition to the examples in Beijing, there are some famous projects which have involved edible landscapes as one component by professional designers in other Chinese cities. For example, the rice field in the project of Shenyang Architectural University Campus, which won the ASLA 2005 Professional Awards, and the sunflowers, crops and vegetables in Shanghai Houtan Park, which won the ASLA 2010 Professional Awards, were planned and designed by Turenscape, a landscape office.

### **5.2.3 The emergence of edible landscapes for commercial benefits**

Through the semi-structured interviews of the “initiators of the commercial ELWUA project”, the impetus for the emergence of the edible landscapes for commercial benefits can be summarized as below.

#### **The commercial opportunities promoted by urban inhabitants’ demand of growing edible plants**

The urban inhabitants have demand of growing food themselves, which have been introduced previously, and this demand gave impetus to the emergence of the commercial ELWUA. It promoted the emergence of leisure farms, such as the “Happy Farm” and the Agrotourists’ Picking and Sightseeing Garden, and also brought commercial opportunities for the estate developers. Because of urban residents’ demands, ELWUA has become a symbol of the dreamy pastoral life, which is a good commercial publicity to attract people to buy houses. Therefore, in some wealthy residential areas such as the villa areas, the estate developers usually select fruit trees as the landscaping trees (e.g. Case A21, A23) and sometimes plant fruit trees in the private courtyards to attract potential buyers (e.g. Case A23).

#### **The influence of the new concept on urban agriculture**

Along with the popularity of the concept of the urban agriculture all over the world, new varieties of urban agriculture forms, such as allotment gardens, community gardens, roof gardens and community supported agriculture (CSA), were gradually introduced in China. These new concepts in urban agriculture brought new commercial possibilities for developers, companies and other organizations, and gave an enormous impetus to the emergence of the commercial ELWUA such as the “Happy Farms”. In addition, the concept of the online game named “Happy Farm” also gave an enormous impetus to the emergence of the real “Happy Farm”.

## **5.3 Summary**

Based on the analysis to the emergence process of edible landscapes in different urban spaces of Beijing, the emergence time of the edible landscapes which exist within the urban area of Beijing could be summarized in Table 5.3. The research into the process of the emergence of ELWUA in Beijing shows that the edible landscapes which exist within the urban area of Beijing is mainly a phenomenon that emerged along with the modern urbanization process of China, especially during the rapid urbanization after the Chinese economic reform in 1978. The contemporary edible landscapes which exist within the urban area of Beijing have evolved in three types according to the order they emerged in the urbanized area, which are 1) the edible

landscapes already in the city before the urbanization in the modern sense (such as the family's garden in traditional courtyards), 2) the edible landscape swallowed by the expanding city (such as the experimental farm, the agrotourists' picking farm and the "Happy Farm" at the edge of city) and 3) the edible landscape which emerged in the urbanizing or urbanized area (such as the family garden in the modern residential area, the guerrilla garden, the community garden, the "Happy Farm" attached to the residential area, the educational/demonstration garden, the Danwei kitchen garden, the edible greening plants) (Figure 5.5). Of these, most of the ELWUA belong to the third type, and in which, except for the urban (semi-) public greening with edible plants, the edible landscapes cultivated by the public such as guerrilla gardens mainly emerged during the fast urbanization process since the reform and open up policy was carried out in 1978. Moreover, there has been an upsurge of growing food in cities especially since the 2000s, and some new types of ELWUA such as "Happy Farm", educational/demonstration gardens and Danwei kitchen gardens emerged.

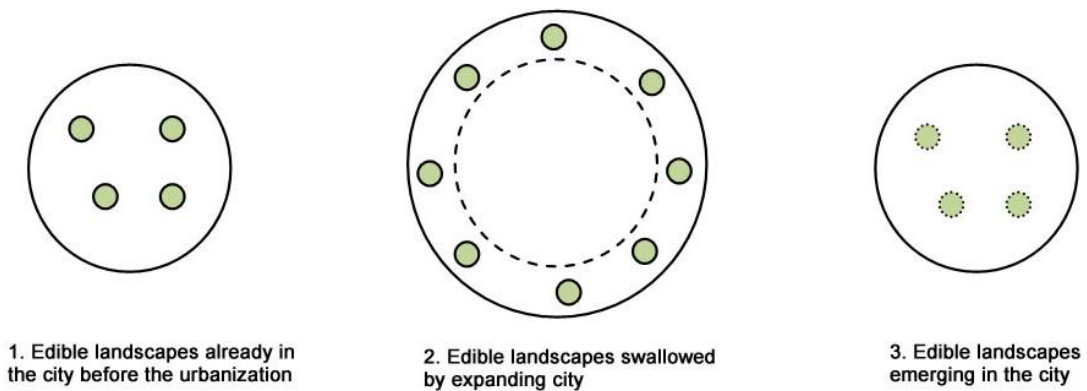


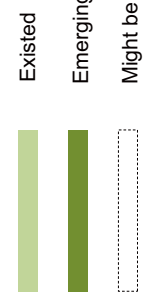
Figure 5. 5 The evolutionary models of the contemporary edible landscapes within the urban area of Beijing

Table 5. 3 The emergence time of the edible landscape within the urban area of Beijing

			1950s	1960s	1970s	1980s	1990s	2000s	2010s
ELWUA in or around residential area	Traditional	Family garden							
		Guerrilla garden							
		Public greening with fruit trees							
	Modern	Family garden							
		Guerrilla garden							
		"Happy Farm"							
ELWUA in the Danwei precinct	Community garden								
	Public greening with fruit trees								
	Educational/demonstration garden								
	Kitchen garden								
	Public greening with fruit trees								
	Experimental farm								
	Guerrilla garden								
	Public greening with fruit trees								
	Educational/demonstration garden								
	Public greening with fruit trees								
ELWUA in urban parks	Public greening with crops								
	"Happy Farm"								
	Agrotourists' picking farm								

China's reform and opening up policy was carried out in 1978

China entered the stage of rapid urbanization since 1992



The impetus for the emergence of the edible landscapes which currently exist within the urban area of Beijing could be summarized as following (Table 5.4).

**Table 5. 4 The impetus for the emergence of the edible landscapes which currently exist within the urban area of Beijing**

<b>Types</b>	<b>Impetus for the emergence of the edible landscape</b>	
Edible landscapes for self-use	<ul style="list-style-type: none"> <li>• Recreation and enriching life</li> <li>• Health: physical exercises and mental relaxation</li> <li>• For connecting with nature</li> <li>• Food supplement</li> <li>• The influence of a cultivating tradition</li> <li>• Organic and fresh food</li> </ul>	
Edible landscapes for public or collective benefits	<ul style="list-style-type: none"> <li>• Social demands</li> </ul>	<ul style="list-style-type: none"> <li>Fast greening</li> <li>Food provision during the Great Chinese Famine</li> <li>Education and research</li> </ul>
Edible landscapes for commercial benefits	<ul style="list-style-type: none"> <li>• The national guideline (policy)</li> <li>• The planning by Danwei or other organizations</li> <li>• The introduction by professional designers</li> </ul>	
Edible landscapes for commercial benefits	<ul style="list-style-type: none"> <li>• The commercial opportunities promoted by urban inhabitants' demand of growing edible plants</li> <li>• The influence of the new concept on urban agriculture</li> </ul>	

# Chapter 6 Services of edible landscapes within the urban area of Beijing

The edible landscape within the urban area of Beijing provides multiple services for the urban residents, who live under the pressure of rapid urbanization. Building on the theoretical framework of ELWUA services based on the literature review in chapter 2, the ELWUA services in Beijing can be classified into the following eight types: provision services, environmental services, social services, health services, economic services, recreational services, educational services and cultural services (Figure 6.1). Each of these services can be subdivided into several sub-services, which will be detailed in this chapter. The ELWUA categories in Beijing which offer these services have been marked out respectively (Table 6.1, 6.2., 6.3, 6.4, 6.5, 6.6, 6.7, and 6.8) and summarized together in the end (Figure 6.10). These services were identified mainly from the empirical field survey in Beijing, including semi-structured interviews and field observations, and also partly from the literature research as supplement.



Figure 6. 1 The services of ELWUA in Beijing

## 6.1 Provision services

The field survey in Beijing indicated that the ELWUA in Beijing can supply provision services to the urban residents, which mainly include the provision of food, medicinal materials and materials for ornaments, handicrafts or daily use.

### Food provision

The most particular characteristic of the ELWUA is that it can provide food such as herbs, vegetables, fruits and crops for the urban residents, when comparing with the ornamental landscape. The field investigation in Beijing indicated that except for the landscape garden in urban parks and the experimental farm in Danwei precinct, all the other edible landscapes in Beijing can supply food provision service for urban residents (Table 6.1). Take some responses of the interviewees who participated in different types of edible landscape as examples, when the question of “*What’s the use of the products?*” was asked during the semi-structured interviews, the responses are as following:

- Almost all of the 72 “urban hobby farmers” (71 people, 99%), who grew food respectively in family gardens, guerrilla gardens, community gardens, renting farming gardens replied, “*Eat them ourselves*”, of which, some of them added that “*If the production is too much for their family, we share with neighbors, relatives and friends*”.
- The organizers of the educational and demonstration landscapes replied that the edible plants are harvested and distributed as food gifts.

*‘We distribute the products to the volunteers as rewards.’ ---- Ms. Lv, a woman aged 20, one organizer of the educational and demonstration roof garden, Case B3”*

*‘We distribute the rice as a gift to the leaders who supported our event.’ ---- A woman aged 28, staff of management office in Haidian Park, Case D1*

- One organizer of the Danwei kitchen garden replied that,

*‘The harvested food is used in the kitchen of the canteen as cooking materials for our staff’. ---- Mr. Wei, a man aged 46, the manager of a factory, Case B1*

- One grower of the fruit trees in the public space of Danwei precinct replied that:

*‘Several years ago, we (staff in the greening department) picked up the persimmons together and distributed them to the residents who live in the residential area. But in recent years, we didn’t do that, so the fruits might be picked up by the staff who maintain the plants or the people who work here and have interest in the fruits (such as the stuff and students), or just cleaned away by the greening department.’ ---- Mr. Wang, a man*



*aged 55, the director of the greening department of ISCAS, Case B2*

This result indicated that food provision is one basis service for urban residents especially for the “urban farmers”, although producing food is usually not the gardener’s primary motivation to cultivate edible plants as mentioned in chapter 4. Regarding the yield of the edible plants, the owner (also the designer) of the Balcony Garden in Brown Stone Apartment (Case A19) has estimated that his terrace garden of 20 m<sup>2</sup> could produce about 40kg vegetables every year<sup>29</sup>. However, most of the interviewees have not calculated it. Although it’s difficult to precisely calculate the production of each edible garden, the field observations and interviews indicated that usually a garden of around 2-5 m<sup>2</sup> only can only produce a few vegetable which can just serve as a taste for members of one family, and a garden of around 100 m<sup>2</sup> can produce enough, even too much, for a family of five, except for the species they didn’t grow. And many “urban hobby farmers” expressed their pleasure with their yield.

*‘I harvested 17 pumpkins last year.’ ---- A woman aged 69, one guerrilla gardener, Case A2*

*‘The cucumber grows very well; I harvested more than 100 cucumbers last year.’ ---- A woman aged 70, one “urban hobby farmer” of family garden, Case A21*

*‘The edible plants that I planted can produce so much vegetables, they not only provide enough green vegetables for my five family members, but also some extra for my neighbors.’ ---- A man aged 50, one guerrilla gardener, Case C2*

The food provision service could bring convenience to people’s daily life especially in certain extreme situations, e.g. the aged people who have difficulty accessing a vegetable market, or in bad weather, etc.

*‘Self planting vegetables, especially those plant spices and condiments such as chilli peppers can bring convenience to daily cooking.’ ---- A woman aged 81, one “urban hobby farmer” of family garden and guerrilla garden, Case A3*

*‘When I come home late from work and have no time for buying vegetables, I can just pick up two luffas for cooking dishes, which is so convenient.’ ---- A woman aged 52, one guerrilla gardener, Case A4*

*‘The edible plants can be used as a food supplement in wet weather, which brought conveniences of life, because I don’t need to go out to buy vegetables.’ ---- A man aged 70, one “urban hobby farmer” in family garden, Case A15*

## **Medicinal material provision**

In addition to providing food, some edible plants can provide medicinal materials for

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<sup>29</sup> Source: <http://www.turenscape.com/paper/paper.php?id=411>.

the urban residents. For example, some “urban hobby farmers” planted special medicinal plants to treat or prevent diseases, or heal wounds. In the 72 “urban hobby farmers”, four of them (6%) mentioned that they plant the edible plants because of their medicinal functions.

*‘This plant which I planted is called gualou (Snakegourd fruit); it is a very good medicine to treat coughs and tracheitis endemic to the aged.’ ---- A woman aged 81, one “urban hobby farmer” of family garden and guerrilla garden, Case A3*

*‘I planted some DAUN NGOKILO, which could be used to treat hypertension.’ ---- A woman aged 72, one “urban hobby farmer” of family garden and guerrilla garden, Case A10*

*‘This plant can be used to treat diabetes.’ ---- A woman aged 88, one “urban hobby farmer” of family garden and guerrilla garden, Case A2*

Except for some herbs which are planted in urban food gardens, some edible trees which are planted for achieving urban public greening also can be used for medicinal purposes. For example, the nut-like part inside the seeds of the ginkgo trees, which are commonly planted in the public space in traffic areas, urban parks, residential areas and Danwei precinct, are not only a traditional Chinese food, which are usually used in congee, but also is a possible treatment for dementia and Alzheimer’s disease (Xie et al. 2014). And some people also believe that the ginkgo seeds can be used as a dietary adjunct for treating pulmonary disease, cough and asthma<sup>30</sup>. During the field investigation we found that many urban residents were picking the seeds of the ginkgo from ground when they were mature (Figure 6.2).



**Figure 6. 2 One urban resident is picking seeds of Ginkgo from the ground**

<sup>30</sup> Source: [http://www.3phk.com/v5article2.asp?id=2422&folder=hot\\_topics&section=healthinfo&issue=](http://www.3phk.com/v5article2.asp?id=2422&folder=hot_topics&section=healthinfo&issue=)

### **Materials for ornaments, handicrafts or daily use**

The edible plants can produce materials for making decorations, handicrafts or daily-use items. For example, the fruits of bottle gourds can be used for making handicrafts; the dried fruits of chili pepper, maize or garlic, etc. can be threaded together as ornaments, and bottle gourd fruits also can be hung as ornaments; the dried, fibrous part of the luffa fruits can be used as a washing sponge (Figure 6.3).



**Figure 6. 3 The four photos respectively are a birthday present made by a son to his father-a handicraft made of bottle gourd fruit, some ornaments made of dried chili peppers and garlic fruits, ornaments made of bottle gourd fruits and a washing sponge made of fibers of luffa fruits**

Table 6. 1 The provision services of different ELWUA categories in Beijing

Typologies of ELWUA in Beijing	Provision services	Food			Medicinal plants	Other materials
		Herb	Vegetable	Fruit		
Residential area	Gardening	×	×	×	×	×
	Family garden	×	×	×	×	×
	Guerrilla garden	×	×	×	×	×
	Community garden	×	×	×	×	×
	Renting farming garden	×	×	×	×	×
Greening	Public greening with fruit trees			×	×	
	Public greening with crops, vegetables, etc.	×	×	×	×	×
	Educational/demonstration landscapes	×	×	×	×	
Danwei precinct	Kitchen garden	×	×	×		
	Guerrilla garden	×	×	×	×	×
	Public greening landscape (e.g. fruit trees)			×	×	
Farming	Experimental field					
	Guerrilla garden	×	×	×	×	×
Traffic space	Public greening with fruit trees			×	×	
	Educational/demonstration landscapes					×
Urban parks	Public greening with fruit trees			×	×	
	Public greening with crops					×
	Renting farming garden	×	×	×	×	×
Leisure farms at the edge of the urban area	Agrotourists' picking farm	×	×	×	×	

## 6.2 Environmental services (dwelling/community/street level)

The same as the ornamental street trees, urban forests, urban lawns/parks, wetlands and bodies of water, the urban edible landscape is one form of urban ecosystem. Therefore, in theory, the edible landscape can supply ecosystem services in the environmental aspect, such as micro climate regulation, biodiversity increase, reduction of city's ecological footprint, local resilience of fossil energies, carbon sequestration, flooding regulation, closing of the ecological loops, city noise attenuation, reduction of urban glare and windbreak, etc. However, compared with other forms of urban ecosystems, most of the ELWUA in Beijing is in a micro scale (gardening level) and the quantity of ELWUA is much less than other forms of urban ecosystem, therefore, except for the very few cases in the meso scale, such as agrotourists' picking farms and the experimental farms, the environmental services of ELWUA in Beijing are usually limited to the dwelling and community level. The field investigation shows that the environmental services of the ELWUA in Beijing mainly include producing environmental amenities, local waste recycling, energy saving on food-related transportation, and increasing plant diversity (Table 6.2). For the other ecosystem services which have been mentioned before, because the effect of these services is trifling and difficult to test, these services were not included into the current ELWUA services in Beijing.

### Environmental amenities

The ELWUA in Beijing can create environmental amenities for the urban residents mainly through filtering local air, providing shade and cooling, regulating inside temperature, and transforming urban forms into ecosystems (green space).

Like other ornamental urban vegetations, the edible plants can filter air by absorbing and keeping down particulate matter in the air that would otherwise pollute the atmosphere, absorbing CO<sub>2</sub> and releasing O<sub>2</sub>, thereby improve the local air quality.

Moreover, ELWUA such as edible trees, vines or tall crops can provide shade and cooling for urban residents.

*'In summer, I can obviously feel cooling when I go to my roof garden'. ---- Mr. Zhang, a man aged 55, one "urban hobby farmer" of a family roof garden, Case A1*

In addition, ELWUA such as roof gardens and balcony gardens can regulate the room temperature. One experiment, which was carried out in July 2008 in Wuhan city in China, shows that in summer the average inside air temperature of the dwelling building with a roof vegetable garden and balcony greening is 1.89 °C lower than the one without any greening, and during the period from 3:30 to 5:30 in the afternoon, the mean temperature difference was 3 °C and the difference reached its peak of 4 °C

(Liu 2011).

In addition, the cultivation of edible landscapes, especially in the vacant lots, such as rooftops, spots of lawn degradation, or other urban wastelands with a lack of management contributes to transforming urban spaces into natural ecosystems. For many “urban farmers”, the edible landscape is equal to “nature”, and going to the edible garden means accessing “nature”, just like the proximity to a forest, a river, a park, or a lake. The roof garden of Mr. Zhang (Case 1) is such an example (Figure 6.4). The roof garden is located in the densely Chinese traditional Hutong area. The house was originally a two-floor building. In 2008 the part of the second floor was demolished, leaving a messy and bleak roof space. Facing with the decayed scene Mr. Zhang transformed the urban hard space into green space by growing vegetables, herbs and fruits on the roof, which not only provide a beautiful “natural” environment but also other multiple services for people.



Figure 6. 4 The roof edible garden of Guichun Zhang (Case 1)

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### **Local waste and water recycling**

Waste and water recycling is not only a result of ELWUA but a service that ELWUA could supply to the urban residents as well. “Urban farmers” can transform organic waste into soil-enhancing fertilizer which would contribute to a more closed cycle in the city. Also the use of grey water and rain water for irrigating edible plants and the percolating of the recycling water through unsealed soil could relieve the pressure on the sewer system. In the 72 “urban hobby farmers”, many people recycled organic waste as fertilizers and used grey water and collected rainwater for irrigating.

### **Energy saving on food-related transportation**

Locally grown food can reduce the energy needs and cost associated with long distance travel, refrigeration, storing as well as packaging, although there is no quantitative evidence to show how much energy could be saved through the ELWUA

in Beijing. Food grown in backyards close to the consumer or within walking/cycling distance could also partly lessen the energy need for car-based shopping trips.

### **Increasing plant diversity**

The ELWUA increases the plant diversity in urban areas. The field investigation shows that there were more than 100 species of edible plants which were planted within the urban area of Beijing, which has been introduced in Chapter 4.

**Table 6. 2 The environmental services of different ELWUA categories in Beijing**

Typologies of ELWUA in Beijing	Environmental services			Environmental amenities			Waste recycling on food-related transportation	Energy saving	Increasing plant diversity
	Air filtering	Providing shade, cooling	Regulating inside temperature	Transforming urban form into ecosystems					
Residential area	Gardening	Family garden	×	×	×	×	×	×	×
		Guerrilla garden	×	×	part	×	×	×	×
		Community garden	×	×	×	×	×	×	×
		Renting farming garden	×	×	×	×	×	×	×
	Greening	Public greening with fruit trees	×	×	×	×	×	part	×
		Public greening with crops, vegetables, etc.	×	×	×	×	×	×	×
Danwei precinct	Gardening	Educational/demonstration landscapes	×	×	×	×	×	×	×
		Kitchen garden	×	×	×	×	×	×	×
		Guerrilla garden	×	×	×	×	×	×	×
		Educational/demonstration garden	×	×	×	×	part	×	×
	Greening	Public greening with fruit trees	×	×	×	×	×	×	×
	Farming	Experimental field	×	×	×	×	×	×	×
Traffic space	Gardening	Guerrilla garden	×	×	part	×	×	×	×
	Greening	Public greening with fruit trees	×	×	×	×	×	×	×
Urban parks	Gardening	Educational/demonstration landscapes	×	×	×	×	×	×	×
	Greening	Public greening with fruit trees	×	×	×	×	×	×	×
		Public greening with crops	×	×	×	×	×	×	×
Leisure farms at the edge of urban area	Gardening	Renting farming garden	×	×	×	×	×	×	×
	Farming	Agrotourists' picking farm	×	×	×	×	×	part	×



## 6.3 Social services

The ELWUA in Beijing could offer some social services to the urban residents, such as promoting social interaction, relieving the loneliness of old age and promoting social integration (Table 6.3).

### Promoting social interaction

The field investigation shows that the ELWUA in Beijing could obviously promote the interaction of people, which might promote neighborhoods' coherence and social communication. These interactions include face-to-face interaction and virtual interaction, which might be occasional or regular.

#### - Face-to-face interaction

An edible landscape looks very different from other urban ornamental landscapes because of its own agricultural characteristics such as bearing fruits; therefore, its appearance in urban area can more easily capture people's attention and make a stronger sense of place. In addition, edible landscaping is a time consuming activity and usually takes place outside, thereby it creates opportunities for face-to-face interaction between the gardeners and passersby.

An edible landscape which was cultivated for self-use by certain fixed people in a set place can not only create opportunities for people's occasional interaction but also tend to create people's regular interactions, such as the family garden, guerrilla garden and community garden in the residential areas. When the 72 "urban hobby farmers" were asked the question of "*Does the edible landscape facilitate encounters and communication of the neighbors/people?*" most of them (89%, 64 people) gave a *positive answer* although the encounters' circumstances and depth of communication might differ. Some people just simply greet the gardeners; some people were attracted by the edible landscape and stayed by the garden, at which time a conversation usually happened with the gardener; some people who are interested in food gardening might ask the gardener some questions about agricultural knowledge or gardening skills, such as what type of vegetables were planted and how to grow them, which might bring more interactions with the gardener and might become a regular interaction in future; some neighbors who are also "urban hobby gardeners" might come and exchange seeds, fruits or cultivating skills with them, which is usually a regular interaction. When the question of "*Have you ever known new friends (means a regular interaction) in the productive space? If yes, how many new friends have you made?*" went on to be asked, many of them (81%, 58 people) replied yes, and they usually can account some (at least two) "new friends" they have known through gardening. This result indicated that edible landscaping for self-use could promote

regular integrations. Take Mr. Zhang, who is the owner of the roof garden in Case A1, as an example:

*'I have known many new friends through gardening. They just came to talk with me when they saw my roof garden. They admired my vegetable roof garden and asked me how to build it, and I was willing to tell them my experience. Through this way, we became friends naturally. I feel that this type of friendship is very nice, it's a pure relationship without touching upon any profits such as fame and wealth. After my roof garden was shown on the TV program, there have been many people coming to see my garden every day, which even makes me have to go downstairs to ease out of the endless conversation.'*  
---- Mr. Zhang, a man aged 55, one "urban hobby farmer" of family roof garden, Case A1

In addition to the ELWUA for self-use, the edible landscape which was built for public or collective benefit could promote people's occasional communication. For example, the fruit trees which are used as greening trees in residential areas or in Danwei precinct might attract people's attention when they bear fruits, which creates opportunities for people's occasional communication. Another example is a farming event, such as the sowing or harvesting events of the rice garden in Haidian Park (Case D1), which can create communication opportunities for those "experiential urban farmers" during hours of the farming event.

#### - Virtual interaction

In addition to the face-to-face interaction, the ELWUA also promoted people's virtual interaction through different channels, such as the media and internet. As the popularity of the ELWUA concept grew, more and more urban residents become interested in growing vegetables themselves at home. Under this context, many programs about edible landscapes were produced through TV media, radio media and internet media. They usually invite those famous "urban gardeners" to introduce their gardening experience and gardening skills and also interact with the viewers by answering their questions such as how to prepare soils, or how to deal with the pests. In addition to these media programs, these famous "urban gardeners" who have appeared on the media programs usually have their own networking platforms which could be used for communicating with the new friends. Mr. Zhang, whose roof garden was shown in the TV programs, was such a typical example.

*'After my garden was shown on CCTV program, I met a huge number of friends from internet, and at present, I have more than 2000 WeChat<sup>31</sup> friends and more than 200,000 fans in Weibo<sup>32</sup>.'* ---- Mr. Zhang, a man aged 55, one "urban hobby farmer" of family roof

<sup>31</sup> "WeChat" is a mobile text and voice messaging communication service developed by Tencent in China, first released in January 2011. It is the largest standalone messaging app by monthly active users. In: Wikipedia, the free encyclopedia Wikimedia Foundation. Retrieved 2 May, 2015 from <http://en.wikipedia.org/wiki/WeChat>.

<sup>32</sup> "Sina Weibo" is a Chinese microblogging (weibo) website. Akin to a hybrid of Twitter and Facebook, it is one of the most popular sites in China, in use by well over 30% of Internet users. It was launched by SINA Corporation on 14 August 2009, and has 503 million registered users as of December 2012. About 100 million messages are posted each day on Sina Weibo. In: Wikipedia, the free encyclopedia

In addition to taking part in different varieties of programs introducing his vegetable growing skills, he set up several informal WeChat groups in 2004, which specially serve these “urban hobby farmers”, who have the common hobby of growing food for themselves, to communicate online. The members of the WeChat groups can show their harvested fruits, tell their gardening stories, exchange their gardening experiences online, and ask for advice from the experts in the chat group.

### **Relieving the loneliness and nothingness of the aged**

China has experienced the rapid aging of its society since 1999. The aged people not only require material comfort but spiritual satisfaction as well. However, in reality the elderly are often encumbered with a variety of physical and mental problems, of which, loneliness and nothingness are the most common psychological problems, which might be primarily retired syndrome or empty nest syndrome. In the interviews, many aged interviewees expressed that they experienced a depressed mood after their retirement. For example, this kind of response is very common, “There was nothing to do after my retiring. I felt at loose ends, and I had a sense of great sadness and loss.” This feeling is called *Retired Syndrome*, which refers to negative emotions of anxiety, depression, sadness and fear, or even a psychological barrier which appears a deviation from the normal behaviors which the elderly may feel and suffer after their retirement when they cannot adapt to their new social roles, living environment and lifestyle changes in a timely manner. The psychological barrier caused by *Retired Syndrome* might subsequently trigger other physiological diseases, to the detriment of health. According to statistics available, 1/4 of the retirees in China suffer from Retired Syndrome in varying degrees of severity<sup>33</sup>. In addition to the *Retired Syndrome*, the feeling of loneliness and nothingness of the elderly might be *Empty Nest Syndrome*, which refers to a feeling of grief and loneliness parents or guardians may feel when their children leave home, such as when they are living on their own, attending a college or university, or working in another city. Most of their grown children were busy with various careers and had less time to go home and be company to their parents. The field survey in Beijing shows that although some parents settled in Beijing, following their children, sometimes they felt even more loneliness and nothingness because of leaving their familiar environment for a strange new place. Under this context, farming activities could enrich the lives of the aged people and help them obtain a sense of accomplishment, thereby help them relieve the loneliness.

*‘I had nothing to do after retirement, so when I saw the land was empty I started cultivating in search of fun and pleasure.’---- A woman aged 66, a guerrilla gardener, Case A18*

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Wikimedia Foundation. Retrieved 2 May, 2015 from [http://en.wikipedia.org/wiki/Sina\\_Weibo](http://en.wikipedia.org/wiki/Sina_Weibo).

<sup>33</sup> Statistics from <http://baike.baidu.com/view/443517.htm>.

*'After my retirement I felt bored with nothing to do. I noticed that the land was left deserted, so I started planting vegetables as a pleasure of life. It gives me a sense of fulfillment and a sense of achievement especially when I see the vegetable cultivated by myself.'* ---- A woman aged 52, a guerrilla gardener, Case C2

*'I had nothing to do, and I was bored with wandering every day, so I started planting vegetables.'* ---- A woman aged 72, a guerrilla gardener, Case C3

### **Promoting social integration**

The ELWUA can promote social integration of people from different backgrounds, such as people who move from the countryside or from other cities through the regular interactions provided by ELWUA. Take the family garden in one high-grade residential area in Beijing as an example (Case A21); since the urban households are usually lack the knowledge and skill of growing vegetables, they sometimes employ time-workers who come from countryside and have farming experience to help them grow vegetables in their family gardens. In this way, the family gardens built a close and sustained interaction between rural and urban people, which promotes social inclusion and contributes to social justice by building unprejudiced attitudes towards rural people by urban people. Another example is the guerrilla garden along Sha River (Case C3), where there were many "urban hobby farmers" who just moved from other cities. Some interviewees mentioned that through growing food there they got to know some native "urban hobby gardeners", which helped them orient themselves in their new environment.

**Table 6.3 The social services of different ELWUA categories in Beijing**

Typologies of ELWUA in Beijing	Social services	Promoted social interaction				Relieving the loneliness of old age through cultivation	Promoting social integration
		Face-to-face interaction		Internet interaction			
		Occasional interaction	Regular interaction				
Residential area	Gardening			×	×	×	×
	Family garden	×	×				
	Guerrilla garden	×	×				
	Community garden	×	×				
	Renting farming garden	×	×				
	Public greening with fruit trees	×	×				
Danwei precinct	Greening						
	Public greening with crops, vegetables, etc.	×	×				
	Gardening			×	×		
	Educational/demonstration landscape	×	×				
	Kitchen garden	×					
	Guerrilla garden	×					
Traffic space	Greening			×	×		
	Farming						
	Experimental field						
Urban parks	Gardening			×	×		
	Greening			×	×		
	Gardening			×	×		
	Educational/demonstration landscape	×	×				
	Greening			×	×		
	Public greening with fruit trees	×	×				
Leisure farms at the edge of the urban area	Greening			×	×		
	Farming						
	Agrotourists' picking farm	×					

## 6.4 Health services

The field survey indicated that health service is a significant service which ELWUA can supply to the urban residents in Beijing. When the question of “*What benefits could the edible landscape bring to you and to other people?*” was asked, almost all of the 72 “urban hobby farmers” (93 %, 67 people) mentioned the health benefits which ELWUA can bring. The health services of the ELWUA in Beijing can be generally divided into four aspects, including better quality (organic, fresh, and tasty) food intake, improving dietary diversity and dietary habit, improving physical health and improving mental health. Table 6.4 shows the health services of different ELWUA categories in Beijing.

### **Better quality (organic, fresh, tasty) food intake**

In the interviews, many “urban hobby farmers” expressed their pleasure at having fresh, organic and tasty vegetables and fruits from the edible gardens, as these foods alleviated their anxiety for their food safety concerns, which might be caused by the pesticide overuse or genetically modified foods. They believed that the vegetables and fruits they planted by themselves are of better quality, and can offer superior health benefits to them. In the 72 “urban hobby farmers”, 28% of them (20 people) regarded producing better quality food as their main motivation for starting edible gardening.

*‘I cultivated for green food. The vegetables I planted myself are quality-assured because we almost don’t use pesticides.’ ---- A woman aged 61, a guerrilla gardener, Case C3*

*‘The vegetables I planted by myself are pure “green” food produced without using any pesticide even when the plants are wormy. The organic vegetables and fruits taste very delicious, and they are much more delicious than those bought from supermarkets.’ ---- Mr. Zhang, a man aged 55, one “urban hobby farmer” of family roof garden, Case A1*

*‘I have trust in the safety of the vegetables I planted by myself. I eat them with trust and don’t need to worry about the issues of chemical pesticides, fertilizers and genetically modified foods.’ ---- Mr. Song, a man aged 78, one guerrilla gardener, Case A22*

### **Improving dietary diversity and dietary habit**

Several “urban hobby farmers” mentioned that the edible landscaping increased their intake of fresh vegetables and fruits in terms of volume, frequency and variety. Easy access to healthy food choices where people live, work and play is important to help maintain their health and prevent chronic disease. Nutritionally appropriate food offers protection from illness and chronic disease, increases life expectancy and provides

people with greater vitality (Donovan, Larsen and McWhinnie 2011).

*'My roof garden can produce more vegetables than we need, a family of five. The yield of the edible plants such as tomatoes, cucumbers and varieties of gourd vegetables are very high - we can pick the vegetables whenever we want to eat in the harvest season.'* ---- Mr. Zhang, a man aged 55, one "urban hobby farmer" of family roof garden, Case A1

*'I usually plant some edible plants which can produce highly nutritional food, such as Chinese yam and yam bean.'* ---- A woman aged 81, one "urban hobby farmer" of family garden and guerrilla garden, Case A3

### **Improving physical health**

The physical benefits of gardening have been well documented in previous research. For example, studies show that gardening is an activity the benefits of which can be compared to walking or water aerobics (Relf 1996). Residents of neighbourhoods with beautiful parks are more likely to be healthy since their increase in exercise makes them less susceptible to physical ailments and more resilient against minor illnesses (Hall and Dickson 2011). The field survey to ELWUA in Beijing proved the physical health benefits brought by gardening. 32 % (23 people) of the interviewed 72 "urban hobby farmers" said that doing physical exercise through gardening is one of their motivations for growing food, and they strongly recommended that growing food is good physical exercise which could enhance and promote human health.

*'I grow vegetables only for physical exercise, for sweating.'* ---- A man aged 40, one "urban hobby farmer" of renting farming garden, Case A16

*'Vegetable planting is a good physical activity, which can change my daily life; It's much more healthy than just staying home and playing computer games.'* ---- Mr. Han, a man aged 30, one guerrilla garden, Case C3

Moreover, in the 72 interviewed "urban hobby farmers", 52.5% (21 people) of the elderly people, 37.5% (9 people) of the middle-aged people, 14.3% (1 person) of the young people regarded doing physical exercise as their motivation for growing food, which revealed a high demand for the physical health service of ELWUA in the group of elderly gardeners.

*'The people over 60 are old people, I'm an old person almost aged 70, I need to do some physical exercise to keep strong and healthy.'* ---- A man aged 62, one guerrilla gardener, Case A9

Furthermore, studies have found that gardening can help patients with heart disease improve their health and lower their risk of heart attack (Lee et al. 2001). This finding was strongly supported by one interviewee who was gardening in a community garden:

*'Ever since owning this garden I could not only eat pure organic food, but also have my own activity space. I could experience the fun of farming, could exchange my experience with neighbors, and the most pleasing thing is that I become more and more healthy; I had heart disease before, but my heart condition is much better now.'*---- A woman aged 71, one "urban hobby farmer" of community garden, Case A14

## **Improving mental health**

For more than 30 years now, the therapeutic benefits of contact with nature have been studied and they are known to restore psychological balance and good mood and to foster emotional resilience (Nail 2015). Large numbers of studies have shown that gardening can promote human mental wellbeing which has been reviewed in Chapter 2. The field survey in Beijing confirmed that edible landscaping can promote human mental well-being in the following two ways, including generating happiness, and relaxing and reducing stress.

### **- Generating happiness**

There is a popular saying in the edible landscaping group, "What we planted is not mere vegetables but more happiness", which well expresses the real minds of most "urban hobby farmers". The ELWUA service of generating happiness beyond food production is particularly important for them. In the 72 "urban hobby farmers", almost all the people mentioned their pleasure and happiness through edible landscaping, although gardening might be hard work. Happiness and health go hand-in-hand (Scott 2015). A 2012 review of more than 200 studies found a connection between positive psychological attributes, such as happiness, optimism and life satisfaction, and a lower risk of cardiovascular diseases (Boehm and Kubzansky 2012). Besides, the happiness from edible landscaping can help the people who have undergone either mental or physical trauma to reach a better psychological state during recovery and to more easily work past the mental barriers that could impede their healing.

The urban gardener's pleasure and good emotion might just come from seeing the natural aesthetic beauty of the edible plants, seeing the plants laden with fruits, observing the growth of the edible plants, including everyday changes, the whole growth process from small seedlings to matured plants with flowers and fruits, etc., obtaining a sense of achievement through gardening and harvesting, having the interactions with friends created by the edible landscaping, or also be from just staying in the natural or agricultural atmosphere which is created by the edible plants.

*'Every time when I come to my garden, I have a feeling of returning to the arms of nature, which bring me happiness and good humor.'* ---- Mr. Song, a man aged 78, one guerrilla gardener, Case A22

*'My roof garden brings me good spirits and pleasure; because these plants were growing*



*day by day under my own care, there is a special emotion to my edible plants, I feel happy as soon as I see them. Besides, I like the feeling of many friends being around me, which brings happiness to me.’ ---- Mr. Zhang, a man aged 55, one “urban hobby farmer” in a family roof garden, Case A1*

**- Relaxing and reducing stress**

Several “urban hobby farmers” mentioned that gardening can help them turn their stressful feelings or negative emotions into something positive which brings them pleasure and relaxation. Some also mentioned that gardening can give them relief from the anxiety, stress and tiredness in the modern concrete jungles.

*‘I just resigned from my original working unit, and I’m considering starting my own business. Gardening can help me relax and get away from the stress.’ ---- Mr. Xia, a man aged 30, one guerilla gardener, Case C3*

*‘I have a lot of obligations on weekdays. I need to take care of my granddaughter, cook for her, ferry her to and from school. Every time when I come to my garden, I feel relaxed and can forget all other issues, just concentrating on gardening.’ ---- Mr. Song, a man aged 78, one guerilla gardener, Case A22*

**Table 6. 4 The health services of different ELWUA categories in Beijing**

Typologies of ELWUA in Beijing		Health services				Improving health		
		Better quality (organic, fresh, tasty) food intake	Improving dietary diversity and dietary habit	physical health	Generating happiness	Improving mental health	Relax and reducing stress	
Residential area	Gardening	Family garden	×	×	×	×	×	×
		Guerrilla garden	×	×	×	×	×	×
		Community garden	×	×	×	×	×	×
		Renting farming garden	×	×	×	×	×	×
Greening		Public greening with fruit trees					×	
		Public greening with crops, vegetables, etc.					×	
		Educational/demonstration landscape	×	×	×	×	×	×
Danwei precinct		Kitchen garden	×	×	×	×	×	×
		Guerrilla garden	×	×	×	×	×	×
		Public greening with fruit trees					×	
Traffic space	Farming	Experimental field					×	
		Guerrilla garden	×	×	×	×	×	×
Urban parks		Public greening with fruit trees					×	
		Educational/demonstration landscape					×	×
		Public greening with fruit trees					×	
		Public greening with crops					×	
Leisure farms at the edge of the urban area	Gardening	Renting farming garden	×	×	×	×	×	×
	Farming	Agrotourists' picking farm	×				×	×

## 6.5 Economic services

The field investigation in Beijing shows that the ELWUA in Beijing can offer economic services to the urban residents in the following aspects: it can help a family in economizing in food consumption and energy consumption (heating and cooling, and “food miles”), increase real-estate value, give cost savings in urban landscape construction, promote new business related to agriculture in city, and provide job/employment opportunities. Table 6.5 shows the ELWUA categories that offered these economic services in Beijing.

### Family economizing

#### - Cost saving in food consumption or income patching in food production

ELWUA can help urban residents by helping them in partly economizing in food consumption, although this is usually not the main motivation of “urban hobby farmers” when starting edible landscaping. In the 72 interviewees of “urban hobby farmer”, only a few people (14%, or 10 people) could harvest enough or even too many seasonal vegetables for the whole family (two to five members) except for the vegetable species they didn’t grow; a few people (34%, or 25 people) could harvest some vegetables which were not enough for daily consumption but could supplement part of their food consumption; most of the people (46%, or 33 people) could only harvest limited vegetables, which can only be used as a sample; others (6%, or 4 people) didn’t harvest any vegetables. For those that fit to the first situation mentioned above, supposing a family of three people consume 1200g<sup>34</sup> vegetables every day (usually more than 1200g in reality), and the average price of vegetable in Beijing is 4.71 Yuan per kilogram<sup>35</sup>, then the family could save approximately 5.7 Yuan per day (i.e. at least 170 Yuan per month) on their vegetable consumption. However, too often, the initial cost is high when compared with the food they can harvest. But anyway, it could save part of money on their food consumption.

Few “urban hobby farmers” ever sold their products to other urban citizens to get a bit of extra income, however, they don’t sell them any more now.

*I came to Beijing in 1990s and started growing vegetables here then, at that time this place was still a vast wasteland with nothing except for tall and thick weeds. I reclaimed it and grew lots of vegetables that had a very high output. Some harvested vegetables were*

<sup>34</sup> A WHO/FOA report recommends a minimum of 400g of fruit and vegetables per day (excluding potatoes and other starchy tubers) for the prevention of chronic diseases such as heart disease, cancer, diabetes and obesity, as well as for the prevention and alleviation of several micronutrient deficiencies. Retrieved May 28, 2015 from <http://www.who.int/dietphysicalactivity/fruit/en/>.

<sup>35</sup> The average price of vegetable in Beijing is 4.71 Yuan per kilogram in September 2015. Source: Ministry of Agriculture of the People’s Republic of China. Retrieved October 15, 2015 from <http://jjage.shucaiyuan.com>

*used for my own consumption, and anything more than I could eat was distributed to relatives and friends, or was sold in the market. Many people bought my vegetables then. But I don't sell them anymore now, because first, I grew less than before since many tall buildings have occupied much space, second, my children asked me stop selling vegetables since they can give me enough money.' --- A man aged 80, one guerilla gardener, Case C4*

Moreover, one staff member who works in the “Happy Farm” in Case E1 said that one of the gardeners has calculated the yield of his vegetables and found that the value of the produced vegetables, calculated at the prices of the standard organic food, is higher than the rent per year (900 Yuan/ 15m<sup>2</sup>).

#### **- Family economizing in energy consuming**

As mentioned above, ELWUA can create environmental amenities for the urban residents through providing shade and cooling, and regulating inside temperature. For example, the fruit trees in the residential areas, the vine plants in the private courtyards, the balcony gardens and roof gardens, etc. can offset the urban heat and absorb heat and sunlight. Therefore, they also can help in economizing by reducing the energy consumption used on cooling.

Moreover, the ELWUA can help in economizing by reducing the energy consumption on food purchasing trips to a supermarket. From the aspect of the holistic food system, the local food production can reduce the “Food Miles”, defined as the distance that food travels from the point of production to the point of consumption, the price of which has usually already been included in the food which is sold in the supermarket.

#### **Cost saving in urban landscape construction**

Existing urban greening needs large quantities of money and manpower on maintenance and the purchase of trees and turf, and the landscape deterioration often occur because of improper or untimely maintenance. For example, the interviews show that the public lawn in the residential area usually needs to be replaced every two years, otherwise the lawn would become bald. At present, there are large numbers of public green space lacking maintenance such as the public green space in certain old residential areas, and there are also numerous urban spaces where the management still lags behind due to the excessively rapid urbanization. Introducing ELWUA into cities and at the same time inviting urban residents' participation for maintenance could more or less save the urban landscaping maintenance costs. For example, faced with the landscape deterioration of the residential area, the community neighborhood committee in Minkang residential area No.30 (Case A14) divided the public green space of the residential area into small plots and distributed them to the residents for planting vegetables to achieve greening from 2006 to 2012. And in the Yanbeiyuan residential area (Case A10), one 76-year-old woman changed

the site adjacent to her house, which had already become a wasteland due to lack of maintenance, by planting vegetables and fruit trees. And as another example in Case A22, a vast vacant wasteland was landscaped through the guerrilla gardening of hundreds of residents who lived around in the Yuan Ming Yuan Villa District. All these actions of ELWUA reduced the maintenance investment in urban landscape constructions to some extent.

### **Increase in real-estate value**

ELWUA not only have the added advantage of beautifying urban communities but have also become a symbol of the dreamy pastoral life. The interviews show that the urban residents respond positively to homes with fruit trees (Case A21, Case A23), which indicated that ELWUA could potentially increase the real-estate value to the potential buyers. Therefore, some real-estate developers in Beijing have started to use the edible landscape (usually fruit trees) as landscape trees to attract the potential buyers, especially in those wealthy residential areas. For example, in the Xiang Shan Qing Qin Villa District (Case A23), persimmon trees are not only planted in the public green space as greening trees but also planted in the private courtyards for household's self cultivation, which is a big attraction for the potential buyers.

Except for the edible landscape inside the residential areas, those adjacent to residential areas can also help to increase the real-estate value (potentially). For example, a number of people who want to sell their residential houses adjacent to the experimental farmland (Case F1) usually make use of the edible landscape to advertise for their houses: "Give yourself a satisfied mood by overlooking the green with wheat shoots and enjoying the pastoral life in city".

### **Promoting new business related to ELWUA in city**

The popularity of ELWUA is also promoted in the development of new business related to agriculture in city, such as the sale of soils, vegetable seeds, devices for balcony growing and books on vegetable growing. One small Taobao<sup>36</sup> online store that is located in Beijing has sold 16644 plastic planters online for balcony vegetable growing since 2013, and there were a total of more than two hundred such online stores which were set up in Beijing. Meanwhile, some new leisure agriculture models such as "Happy Farm" and "Agrotourists' picking and sightseeing farm" also came into vogue.

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<sup>36</sup> "Taobao" (literally: "searching for treasure website") is a Chinese website for online shopping similar to eBay and Amazon that is operated in China by Alibaba Group. In: Wikipedia, the free encyclopedia Wikimedia Foundation. Retrieved May 29, 2015 from <http://en.wikipedia.org/wiki/Taobao>.

## **Job/Employment opportunities**

The appearance of the new types of business related to ELWUA, which was mentioned above, naturally created employment opportunities in the city for people, including farmers, underemployed people, etc. For example, the Sijiqing Agrotourists' Picking and Sightseeing Farm (Case E2) had employed 20 farmers in 2011 doing farming work, maintaining farms and providing support of farming skills, etc.

**Table 6. 5 The economic services of different ELWUA categories in Beijing**

Typologies of ELWUA in Beijing	Economic services	Family economizing		Cost saving in urban landscape construction	Increase in real-estate value	Promoting new business related to ELWUA in city	Job/Employment opportunities
		Food consuming	Energy consuming "Food miles"				
Residential area	Gardening	Family garden	×	×	×	×	
		Guerrilla garden	×	×	×	×	
		Community garden	×	×	×	×	×
		Renting farming garden	× part	×	×	×	×
	Greening	Public greening with fruit trees	× part	× part	×	×	
		Public greening with crops, vegetables, etc.			×	×	×
Danwei precinct	Gardening	Educational/demonstration landscape				×	
		Kitchen garden	×	×	×		×
		Guerrilla garden	×	×			
	Greening	Public greening with fruit trees		× part	×		
Traffic space	Farming	Experimental field					
	Gardening	Guerrilla garden	×			×	
	Greening	Fruit trees		×			
Urban parks	Gardening	Educational/demonstration landscape					
	Greening	Public greening with fruit trees		×			
		Public greening with crops			×		
Leisure farms at the edge of the urban area	Gardening	Renting farming garden	× part	× part		×	×
	Farming	Agrotourists' picking farm				×	×

## 6.6 Leisure and recreational services

Rapid urbanization in China has led to unbalanced urban entertainment development, which could be reflected in the lack of urban leisure space and entertainment activities, especially for elderly people. In this context, edible landscaping became a way of enriching entertainment options for the urban citizens. The interviews show that leisure and recreation services are the most frequently mentioned service which ELWUA can supply to the urban residents by the interviewees. In the 72 “urban hobby farmers”, 47 people (65 %) ever mentioned the leisure and recreation benefits which ELWUA can bring. The leisure and recreation services of ELWUA in Beijing mainly include two categories, which are individual leisure and organized recreation activities respectively. Table 6.6 shows the leisure and recreational services of different ELWUA categories in Beijing.

### Leisure

The definition of leisure can be considered in three ways: leisure as time, leisure as activity, and leisure as state of mind. Leisure is time spent away from obligations, work (paid and unpaid), and tasks required for existing (sleeping, eating); leisure can be viewed as activities that people engage in during their free time; leisure can also be viewed as a state of mind, such as the perceived freedom, intrinsic motivation, perceived competence or enjoyment on the experience or activity (Hurd and Anderson 2010).

Urban residents no matter the youth or the age can enjoy the leisure services of ELWUA through three ways, viewing the ELWUA scenes such as appreciating and watching the seasonal variation of ELWUA, being inside the environment of ELWUA such as walking in the environment of ELWUA or just staying with edible plants, and interacting with ELWUA in ways such as gardening. Many people especially the aged people considered these leisure activities as their preferred even favourite pastime.

*‘I planted vegetables for fun. I feel delighted each time when I watch my self-grown vegetables, which look very nice. I merely take vegetable cultivation as a pleasure of life. I really don’t care whether or not my vegetables will produce. I’ll be delighted as long as I watch them. I come almost every day when I have time. During the working day, I usually stay in my vegetable fields around 4 hours; after getting up at 5:00 a.m., I come here, at 7:30 a.m. I go back home for breakfast, at 8:00 a.m. I go to work, at 5:00 p.m. in the afternoon I come back from work to my vegetable field again until 7:00 p.m. back home. During the nonworking days, I almost stay here the whole day.’ ---- A man aged 62, one guerrilla gardener, Case C3*

*‘My husband and I, we both are aged people, and we have much time. Planting fruit trees and vegetables are a pleasure of our life.’ ---- A woman aged 77, one “urban hobby farmer”*



*in family garden, Case A 23*

*'I do not plant vegetables for eating. I earn enough money, five or six thousands Yuan every month. I come just for leisure activities, for fun and relaxation. I prefer to do farming work in my vegetable field rather than go to park where there are usually a lot of people to spend my leisure time' ---- A man aged 76, one guerrilla gardener, Case A22*

*'I come to my vegetable field whenever I have time.' ---- One man aged 50, one guerrilla gardener, Case C3*

*'I like the fruit trees in the park especially when they bear fruits. I usually come here to pick mulberry and apricot when I have time; most of the time I pick them from the ground, but sometimes I also climbed up to the trees to pick them although it's forbidden. I have a lot of fun picking.' ---- A woman aged 30, one passerby, Case D2*

*'The community ecological garden has brought a lot of fun to the residents who live in the community. Some elderly people with no family seldom went out because they couldn't walk far. However, attracted by the piece of agricultural plants, these elderly people stepped outside the door and out of the building. They stand or sit in groups, enjoying the sunshine, chatting with each other. Some elderly people often teach their cultivation experience to the young people.' ---- A woman aged 44, the secretary of the community neighbourhood committee, Case A14*

In addition, ELWUA can create space for urban residents' leisure activities. For example, the space shadowed by grape vines is often an essential venue for individual leisure activities.

*'I often meet with my friends on my roof garden. We enjoy organizing parties and spending time together. We often dance, sing Peking Opera and chat with each other here.' ---- Mr. Zhang aged 57, one "urban hobby farmer" of family roof garden, Case A1*

*'I planted grapes in my vegetable field, which can afford shade in summer. I usually play cards with my friends here.' ---- A man aged 50, a guerrilla gardener, Case C3*

*'We five tenants of the apartment are all designers with different professional backgrounds and coming from different places. The garden created a communication space for five people who originally wouldn't have crossed paths. In our leisure time we talk about the plan of gardening, we do farming activities and harvest food together, which become a great pleasure of our lives.' ---- A man aged 28, one "urban hobby farmer" in family garden, one designer of the edible garden, Case A5*

## **Organized recreational programs**

The definition of recreation is an activity that people engage in during their free time. Similar to leisure activities, participants also hope that their recreation pursuits can

help them to balance their lives and refresh themselves from their work as well as other mandated activities such as housecleaning, child rearing, and so on. But unlike leisure, recreation has a connotation of being morally acceptable not just to the individual but also to society as a whole. Very often people see recreation as a social instrument because of its contribution to society (Hurd and Anderson 2010). Therefore, professionals can use organized recreational programs and services to produce socially desirable outcomes. In support of these recreational activities the organizers such as government, companies, research institutes and non-profits organizations usually take an important role in their creation, maintenance, and organization.

ELWUA is one good resource for organizing the recreation programs for urban residents. The field investigation shows that some meaningful recreation activities in Beijing were organized around the topic of farming, and the recreation providers might range from municipalities to nonprofits organizations. One example is the recreation program of sowing and harvesting events, which are held in the An Acre Paddy Field in Haidian Park (Case D1) every year and organized by the government. This program not only creates recreational opportunities for urban residents but also has a further social meaning such as memorizing the plant species of Jing Xi Rice which has a long history, and creating an opportunity for children to experience farming processes and learn agricultural knowledge. Take another instance, the Roof Farm in the High School Affiliated to Tsinghua University not only offer urban citizens a recreational opportunity but also popularizes the concept of family cultivation and low-carbon life.

**Table 6. 6 The recreational services of different ELWUA categories in Beijing**

Typologies of ELWUA in Beijing		Leisure and recreational services			
		Individual leisure	Organized recreational activities		
Residential area	Gardening	Family garden	×	×	
		Guerrilla garden	×	×	
		Community garden	×	×	
		Renting farming garden	×	×	
	Greening	Public greening with fruit trees	×	×	part
		Public greening with crops, vegetables, etc.	×	×	
Danwei precinct	Gardening	Educational/demonstration landscape	×	×	
		Kitchen garden	×		
		Guerrilla garden	×		
	Greening	Public greening with fruit trees	×		
	Farming	Experimental field	×		
Traffic space	Gardening	Guerrilla garden	×	×	
	Greening	Public greening with fruit trees	×		
Urban parks	Gardening	Educational/demonstration landscape	×	×	
	Greening	Public greening with fruit trees	×		
		Public greening with crops	×	×	

Leisure farms at the	Gardening	Renting farming garden	×	×
edge of the urban area	Farming	Agrotourists' picking farm	×	×

## 6.7 Educational services

ELWUA in Beijing can offer educational services to the urban residents, which were reflected in the following aspects: popularization of agricultural knowledge and farming skill, promoting awareness about food, health and environment, supporting teaching, research and experiment, and enlightenment. Table 6.7 shows the educational services of different ELWUA categories in Beijing.

### Popularizing agricultural knowledge or farming skills

In the rapid urbanization in China, people who grew up in the modern tall buildings are so disconnected from where their food comes from the traditional agricultural knowledge and farming skills are missing in the young Chinese generation. ELWUA can help to popularize this agricultural knowledge and farming skills which are fast disappearing with urban residents through inviting food back into our cities. The urban food gardening by the urban residents themselves can teach people agricultural knowledge such as edible plants species, fertilizer, irrigation, and farming skills, which might be learnt through accumulating practical cultivation experiences, consulting experienced people or learning from the internet. Besides, the farming programs organized by certain organizations can teach participants recognizing edible plants and cultivation skills, etc. through the trainings and practical experiences (e.g. Case D1). Furthermore, even though they are not engaging in farming activities, the urban residents also have opportunities to recognize edible plants and experience the growth of the edible plants through visiting and observation. For example, children can learn about the agricultural plants and understand the origin of food through family gardens, guerrilla gardens, community gardens and renting farming gardens, etc., which are cultivated by their parents or neighbors. And people also can learn to recognize edible plants and their characteristic features from the edible greening plants with introduction labels. For example, many schools, universities and research institutions usually plant fruit trees in their campus, and hang a small label for each tree marking its species, family, characteristics and functions, which can not only achieve greening but also extend students' knowledge on edible plants (e.g. Case B2) (Figure 6.5).



Figure 6. 5 The persimmon trees with information labels in the Institute of Semiconductor, Chinese Academy of Sciences (Case B2)

### Promoting awareness about food, health and environment

ELWUA can reconnect people, their living environments and food and promote public awareness of food. Today the Chinese people who grew up in cities have very limited knowledge of edible plants. Because of their separation from agriculture and the lack of farming experience, many children cannot distinguish rice from wheat, and even worse, they don't have the awareness of thrift in food and even don't feel any shame in wasting food. The following thought is very common, 'Food is not expensive; cabbages which come from the free market are very cheap, and even the best rice produced in northeast China costs a little for an ordinary family, so it's not a pity but normal to throw leftover food away.' Moreover, many parents believe contact with nature or understanding the food production process is far less important than some other issues, such as the scores in schools, entering a well-known university and getting a good job, etc., which makes urban residents' lack of awareness of food more serious. At present, some curriculums are used in primary and middle schools to educate the students to cherish food, for example, the well-known Chinese poetry named *Toiling Farmers*<sup>37</sup> in Tang Dynasty is one obligatory course of the Chinese class in primary school, however, because the students do not have the direct farming experience, the effect of this type of education is in fact limited to a theoretical level. Within this context, ELWUA can help urban residents regarding food as an integral system within the city instead of considering it as a matter of course offered or something only related to rural areas. And by personally cultivating food, urban residents can profoundly understand the meaning of "Who knows food on a tray, /Thanks to their toiling day?", which was described in the poetry of *Toiling Farmers*, thereby raise the awareness of food thrift.

<sup>37</sup> The poetry named *Toiling Farmers* was written by the writer Shen Li in Tang Dynasty. The whole poem is that "Farmers weeding at noon. /Sweat down the field soon./ Who knows food on a tray,/Thanks to their toiling day?"

Moreover, through the process of food cultivation people usually can learn more about health diet and health lifestyle, and furthermore, locally produced food serves as an easily accessible possibility to increase resident involvement with environmental issues (Newman 2008), which can more widely promote urban residents' environmental awareness.

### Supporting teaching, research and experiment

ELWUA can be used as instructional tools to teach students environmentally, agriculturally and ecologically related curriculums. Many agricultural universities usually have their own plantations for carrying out agricultural teaching and research. And many fruit trees planted in schools and comprehensive universities are also usually used for teaching a variety of curriculums. For example, the edible educational garden located on the roof terrace of the teaching buildings in Beijing Shijia Primary School, with a size of 2000 m<sup>2</sup>, has become an important experimental education base for multiple curriculums (Figure 6.6). It was used as teaching and studying materials by teachers and students: in the Labor course, teachers teach students how to cultivate plants and prune leaves and branches; in the art course, teachers guide students painting on the roof; in the science course, teachers guide students doing the observation recordings of plants, and conducting a variety of research on ecology and plant breeding, grafting and planting, etc.; even maths teachers also make use of the edible garden for statistics teaching.<sup>38</sup>



Figure 6. 6 Edible educational garden of Beijing Shijia Primary School

© Liang and Zhou, source: <http://www.ccppg.com.cn/zizhan/btwl/reporter/xwbd/2012-09-24/130755.html>

Moreover, the experimental farm in an urban area is important resource for carrying out national agricultural scientific research projects and experiments. For example, many well-known experts of Chinese crop cultivation have worked in the experimental farmland of CAAC in the past several years (Case F1) and produced a number of new crop varieties, which has won the National Technology Invention Prize and National

<sup>38</sup> Source: <http://news.sina.com.cn/o/2012-09-27/145925266727.shtml>.

Prize for Progress in Science and Technology. Many new crop varieties which were bred in this experimental field, such as better type of maize, winter wheat, soybean with both high quality and yield, have spread across China and the total area planted the new crop varieties reached over 100 million mu<sup>39</sup>, which brought a large revenue to the agricultural economy<sup>40</sup>.

## Enlightenment

Urban residents, especially the children, can obtain various types of enlightenment from ELWUA. During the process of interviews, some “urban hobby gardeners” mentioned that the vegetables and fruit trees which they planted in their family garden by themselves can bring enlightenment to their grandchildren’s study, for example, the plants usually become their grandchildren’s materials for writing compositions and diaries.

*‘The fruit trees planted by myself have educational functions; they bring writing inspiration to my granddaughter.’ ---- A woman aged 77, one “urban hobby farmer” in family garden, Case A23*

*‘My grandchildren often draw their writing inspiration from the vegetables planted by me, for example, my granddaughter ever wrote a composition with the topic of The Luffa Planted by My Grandma’. ---- A woman aged 57, one guerrilla gardener, Case A2*

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<sup>39</sup> Mu is a traditional East Asian unit of area, which equals to about 667 m<sup>2</sup>.

<sup>40</sup> Source from: <http://baike.baidu.com/view/8867227.htm>.

**Table 6. 7 The educational services of different ELWUA categories in Beijing**

Typologies of ELWUA in Beijing		Educational services				
		Popularizing agricultural knowledge or farming skills	Promoting awareness about food, health and environment	Supporting teaching, research and experiment	Enlightenment	
Residential area	Family garden	×	×		×	
	Guerrilla garden	×	×		×	
	Community garden	×	×		×	
	Renting farming garden	×	×		×	
	Public greening with fruit trees	×			×	
	Public greening with crops, vegetables, etc.	×			×	
Danwei precinct	Educational/demonstration landscape	×	×	×	×	
	Kitchen garden					
	Guerrilla garden	×	×			
	Public greening with fruit trees	×		×	×	
Traffic space	Experimental field			×	×	
	Guerrilla garden	×	×		×	
	Public greening with fruit trees				×	
Urban parks	Educational/demonstration landscape	×	×	×	×	
	Public greening with fruit trees	×			×	
	Public greening with crops	×			×	
Leisure farms at the edge of the urban area	Renting farming garden	×	×		×	
	Agrotourists' picking farm	×	×	×	×	

## 6.8 Cultural services

ELWUA in Beijing can offer cultural services to the urban residents, which were reflected in the following aspects: exhibition of farming culture, developing a sense of place, inspiration, and aesthetic enjoyment. Table 6.8 shows the cultural services of different ELWUA categories in Beijing.

### Exhibition of farming culture

China is a large and ancient agricultural country. Archaeological findings have proved that China has an agricultural history of ten thousand years, and rice cultivation agriculture in China originated 14000 years ago in the Upper Paleolithic (Li n.d.). Farming culture is the material and cultural basis of the 5000-year-old Chinese civilization; agricultural production provided not only a rich variety of food and clothing products for Chinese people's multiplication and extended inhabitation but has also provided varieties of spiritual resources for the development of Chinese culture. However, nowadays in the process of industrialization and urbanization which is energetically promoted, affected by the inaccurate view of achievement and the indiscriminate pursuit of GDP (gross domestic product), farming culture is considered to be backward, decadent and discardable by many municipalities when compared with industrial culture and urban culture. Affected by this thought, urban residents' attitudes towards agriculture are seriously skewed, and many people look down on agriculture. Within this context, the preserved historical agriculture landscape within urban area can serve as an exhibition of farming culture, which could remind urban residents about the significance of agriculture to Chinese society. The An Acre Paddy Field in Haidian Park (Case D1) is one such example (Figure 6.7). Haidian Park was built in the site of Chang Chun Garden, which was ever one of the royal gardens in Qing Dynasty called *Three Hills and Five Gardens*<sup>41</sup>, where large areas of Jingxi rice were cultivated for royal consumption. Nowadays, one acre of rice field is preserved in Haidian park as the epitome of the spectacular imperial rice field of former times, which can on the one hand pass on the culture of Jingxi rice and on the other offer visitors a place to experience the joy of farming. Since 2004 the park held the sowing and harvesting festivals annually with different themes of rice culture which include different programs such as farming experience and the exhibition of the traditional agricultural tools, which offered the visitors especially the teenagers an opportunity to experience the charm of the traditional Chinese farming culture from childhood.

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<sup>41</sup> Three Hills and Five Gardens is a general term of the royal gardens in Qing Dynasty, which consists of Longevity hill, Yuquan hill, Fragrant hill, Ji Yi garden, Jing Ming garden, Qing Yi garden (the Summer Palace), Chang Chun garden and the Yuan Ming garden (the Winter Palace). The gardens were built during the reign of Emperor Kangxi, flourished in the reign of Emperor Qianlong, and most of them were burned down during the Second Opium War in 1860.





Figure 6. 7 The 10<sup>th</sup> rice harvesting festival in Haidian Park

© Haidian Park, source: [http://hdgy.bjhd.gov.cn/gzhd/whhd/201310/t20131017\\_539546.htm](http://hdgy.bjhd.gov.cn/gzhd/whhd/201310/t20131017_539546.htm)

### Developing a sense of place

The term of “sense of place” has been defined in many different ways by different people. To some, it is a characteristic that some geographic places have and some do not, while to others it is a feeling or perception held by people to a place (Washington State Department of Commerce 2012). Places said to have a strong “sense of place” have identities and characteristics that make a place special or unique, which can be deeply felt by local inhabitants and by many visitors. The Chinese modern city consists of large quantities of places that lack a “sense of place”, such as gas/petrol stations, fast food chains and part of monotonous new housing estates, which have no special relationship to the places in which they are located and could be anywhere. ELWUA in Beijing can help developing a sense of place through its distinctive agricultural characteristics or the interaction with urban residents.

For example, many students at the Beijing Institute of Technology mentioned that the grove of persimmon trees in the campus is the place where they have the most impressive memories.

*‘In the huge campus, there are two landscapes which are my favourite, one is the grove of persimmon trees in the central garden and the other one is the two rows of ginkgo trees in the front of the entrance of the building No.4. ... When I was in the first year in university, the persimmon trees was a great temptation attracting me to go to central garden to read in the morning. I even have analyzed whether the persimmons are edible or not from varieties of aspects, including species, sunlight time, humidity and soil fertility, etc. ’---  
Blog of Xiaoman Zhou*

Another student also mentioned several times in her writing that the grove of persimmon trees was a special place she anchored her wishes and built up confidence.

*'The first time when I saw the legendary persimmon trees was in my freshman year. A senior told us that it is just the flowering and fruiting time of the persimmon trees when our exam results of the first term come out. At that time I was thinking that I would come to pick up one persimmon to eat if I were to win a scholarship. ... I often go for a walk in the grove and enjoy its varieties of landscapes in different seasons. ... After making the decision to taking part in the entrance exam for postgraduate schools, I came to the grove again and told myself that I would pick up one persimmon to eat if I were to pass the exam. My friend ever encouraged me that she would buy a lot of persimmons for me if I were to pass the exam, but she didn't know that what I want is only one persimmon of this grove in our campus. ... During the stressful times I usually walked in the persimmon trees, and sometimes a breeze blew over the garden, which brought me some confidence.'* ---- Juanyao Liu, one student in the School of Humanities and Social Sciences, Beijing Institute of Technology<sup>42</sup>

As another example, the experimental farm, which survived in the concrete jungles during the urbanization process in Beijing, has become a unique pastoral landscape for the urban residents and passersby, although not everyone has positive attitudes towards it.

*'The experimental farm is not only a special pastoral landscape in Beijing city but a meaningful space which offers an opportunity for urban residents to understand the significance of agricultural activities to the urban development again.'* ---- One ecological profession<sup>43</sup>

*'Whenever I pass by the experimental field I feel it doesn't match with the buildings around and the urban planning. Furthermore, I think it's a waste to built such kind of project in such highly prized real estate zone of city centre and it should be moved the suburbs'* ---- A student aged 22, passerby

In addition, ELWUA could help developing a sense of place through interactions (e.g. farming activities, gardening, etc.) with urban residents.

*'I usually come to my vegetable field to do some farming work such as sowing, watering, harvesting and fixing. I consider here as my own back yard. Every time when I come and see the growth of my vegetable, I feel very delighted and am full of expectations.'* ---- Mr. Han, a man aged 30, one guerrilla gardener, Case C3

## **Inspiration**

ELWUA could provide inspiration for people's creativity. Many literary compositions such as prose, novel and networks usually use the prolific fruit trees as the creation material. For example, somebody has recalled the persimmon trees in the campus of Beijing Institute of Technology in his prose *Back Home*.

<sup>42</sup> Source: <http://www.bit.edu.cn/dqgz5/dxwhzt/whsy/66478.htm>.

<sup>43</sup> Source: <http://baike.baidu.com/view/8867227.htm>.

*'The persimmon grove in the front of the teaching building of Beijing Institute of Technology is a place I frequented. Along with the seasonal alternation from spring to winter, the persimmon trees were also always changing their looks. Originally, I felt the scene of the persimmon grove is unspectacular, which was neither as fine as the moonlight over lotus pool in Tsinghua University, nor as beautiful as the Weiminghu Lake of Peking University. Until the coming of the first snow since my registration, I was pleased and surprised to find that the branches of the persimmon trees were weighed heavily with red fruits, which brought joy, strength and hope for people in such a snow-white and clean day. Perhaps this is the inherent charm and particular characteristic of it. I fell in love with the persimmon grove, the ordinary persimmon trees.'* ---- Extracted from the prose entitled *Back Home*<sup>44</sup> written by Xialong Li

Moreover, the edible plants in urban areas often become the raw materials for photographers. For example, every year when the wheat is ripe after Mangzhong<sup>45</sup>, large stretches of golden wheat field which were planted in the experimental field (Case F1) becomes a special scene which is tucked among the high-rise buildings of Beijing, which always attracts a lot of photographers to take photographs here (Figure 6.8). Another example is the persimmon trees in the campus of Beijing Institute of Technology, which always attracts numerous photographers especially when it snows (Figure 6.9).



**Figure 6. 8 A researcher is working in the experimental farmland of CAAC on 19 June 2012**

Source: <http://img.bjnews.com.cn/epaper/20120620/A40/03BA212016AE.jpg>

<sup>44</sup> Source: <http://zj.gtzyb.com/html/ddyc/sw/78553.html>.

<sup>45</sup> The traditional East Asian calendars divide a year into 24 solar terms. Mangzhong is the 9th solar term. In the Gregorian calendar, it usually begins around June 5 (June 6 East Asia time) and ends around June 21.



Figure 6. 9 One selected photograph of the persimmons after snow in Beijing Institute of Technology

Source: <http://www.bit.edu.cn/xww/jjxy/49685.htm>

### Aesthetic enjoyment

Just as the ornamental landscape, a properly set edible landscape could provide aesthetic beauty to urban residents, and moreover, it can offer different beauty through its special agricultural characteristics. The edible plants not only provide beautiful scenery at blossom time but also produce fruits or vegetables which provide pleasure to the eye as well. In the 72 “urban hobby farmers”, 75% (54 people) of them think ELWUA is beautiful.

*‘My cabbages are much more beautiful than the ornamental flowers.’ ---- A man aged 50, one guerrilla gardener, Case C3*

*‘The edible plants can not only blossom but bear fruits as well, both of which are beautiful, and even more beautiful than the flowers. The planted pumpkins and other plants can be appreciated by not only my family but also all the passersby.’ ---- A woman aged 57, one “urban hobby farmer” of family garden and guerrilla garden, Case A2*

**Table 6.8 The cultural services of different ELWUA categories in Beijing**

Typologies of ELWUA in Beijing		Cultural services			Inspiration	Aesthetic enjoyment
		Exhibition of farming culture	Developing a sense of place			
Residential area	Gardening	Family garden		×	×	×
		Guerrilla garden			×	× part
		Community garden	×		×	×
		Renting farming garden	×		×	×
	Greening	Public greening with fruit trees	×		×	×
		Public greening with crops, vegetables, etc.	×		×	×
Danwei precinct	Gardening	Educational garden		×	×	×
		Kitchen garden			×	×
		Guerrilla garden			×	
Traffic space	Greening	Public greening with fruit trees	×		×	×
	Farming	Experimental field	×		×	×
	Gardening	Guerrilla garden	×	part	×	×
	Greening	Public greening with fruit trees			×	×
Urban parks	Gardening	Educational/demonstration garden	×	part	×	×
	Greening	Public greening with fruit trees			×	×
		Public greening with crops	×		×	×
Leisure farms at the edge of the urban area	Gardening	Renting farming garden	×		×	×
	Farming	Agrotourists' picking farm			×	×

## **6.9 Summary and discussion**

Incorporating edible landscapes into the urban environment will improve the sustainability of cities through providing urban residents multiple services as mentioned above. The services of ELWUA in Beijing could be summarized in Figure 6.10.

However, it should be noticed that the services introduced above are only the positive side of ELWUA when it is properly conducted in an ideal situation. Besides these positive services, the field survey in Beijing indicated that ELWUA often brings negative impacts on urban residents and environment when it is improperly conducted. For example, as many interviewees worried, polluted urban air, water, soil, and waste recycling systems may affect the quality of food products and can be a threat to human health; the biological fertilizer might produce unpleasant odors and cause unsanitary urban environment; the usage of agricultural chemicals and pesticides in an edible landscape might pollute the urban environment; the guerilla gardens out of control will encroach on the public green space, intrude the public benefits and cause conflicts between urban gardeners, other urban residents and governmental authorities; people usually plant edible plants in chaos, which could affect the visual effect of the urban landscape, etc. These negative impacts of ELWUA should be also recognized, and a proper education, organization and management are necessary to avoid these problems.



		RESIDENTIAL AREA					DANWEI PRECINCT			TRAFFIC SPACE		URBAN PARK		LEISURE FARM			
		FAMILY GARDEN	GUERRILLA GARDEN	COMMUNITY GARDEN	RENTING FARMING GARDEN	PUBLIC GREENING GARDEN	PUBLIC GREENING WITH FRUIT TREES	EDUCATIONAL/DEMONSTRATIONAL ELWUA	KITCHEN GARDEN	PUBLIC GREENING WITH FRUIT TREES	GUERRILLA GARDEN	EXPERIMENTAL FARM	PUBLIC GREENING GARDEN	EDUCATIONAL/DEMONSTRATIONAL ELWUA	PUBLIC GREENING WITH FRUIT TREES	RENTING FARMING WITH CROPS, ETC	AGROTOURISTS' PICKING FARM
PROVISION SERVICE	Food provision	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Medicinal material provision	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Materials for ornaments, handicrafts or daily use	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
ENVIRONMENTAL SERVICE	Environmental amenities	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Local waste recycling	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Energy saving on food-related transportation	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
SOCIAL SERVICE	Promoting social interaction	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Relieving the loneliness and nothingness of the aged	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Promoting social integration	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
HEALTH SERVICE	Better quality (organic, fresh, tasty) food intake	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Improving dietary diversity and dietary habit	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Improving physical health	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
ECONOMIC SERVICE	Family economizing	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Cost saving in urban landscape construction	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Increase in real-estate value	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
LEISURE & RECREATIONAL SERVICE	Promoting new business related to ELWUA in city	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Job/Employment opportunities	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Leisure	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
EDUCATIONAL SERVICE	Organized recreation programs	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Popularizing agricultural knowledge or farming skills	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Promoting awareness about food, health and environment	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
CULTURAL SERVICE	Supporting teaching, research and experiment	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Enlightenment	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Exhibition of farming culture	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Developing a sense of place	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Inspiration	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Aesthetic enjoyment	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

Figure 6. 10 Summary of the ELWUA services in Beijing

# Chapter 7 People's attitudes towards edible landscapes within the urban area of Beijing

"Attitude is a scientific concept that represents an individual's degree of like or dislike for something"(Haller et al. 2013, cited from Eagly and Chaiken 1993). It can be "interpreted as an overall evaluation that is shaped by beliefs and goals or values people hold with respect to the object of their attitude"(Haller et al. 2013, cited from Kruglanski and Stroebe 2005). Attitudes towards ELWUA might be influenced by the benefits people expect from it and the problems it might cause.

## 7.1 The perception and attitude towards edible landscapes

Through an internet questionnaire (see Appendix A, question 14-26), a group of people's perception and attitudes towards the ELWUA in Beijing was investigated. A sample of the population was selected with snowball sampling through the following ways: 1) the author's group of friends who are living in Beijing, 2) author's friends' group of friends who are living in Beijing, 3) randomly selected QQ group<sup>46</sup> (usually large QQ group with more than 500 people), containing people who are living in Beijing, 4) Paid sampling database of SOJUMP.COM<sup>47</sup> (for collecting responses from people who are older than 40). Data collection started in September 2013. The automatically generated link of the questionnaire with an introduction inviting people to fill it was randomly sent online to the sampled population, and 211 respondents replied until January 2014. The respondents include 2 people below the age of 18, 113 people aged between 18 and 30, 38 people aged between 31 to 40, 47 people aged between 41 and 50, 8 people aged between 51 and 60, and 3 people aged between 61 and 70. More men participated than women (113 men, 54% vs. 98 women, 46%). And the respondents' education was far above the average level in the city, including 18 people (9%) with a vocational school degree, 81 people (38%) with a bachelor's degree, and 112 people (53%) with a master's degree and above. Out of the 211 respondents, 151 people (72%) have been living in Beijing more than 5 years (Figure 7.1), 33 (16%) people are professional planners and designers. Although the respondents include a high proportion of highly-educated people and professional designers, which could not objectively represent the opinions from the public, their responses could still be used as a reference for taking a glimpse of people's general attitudes towards ELWUA.

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<sup>46</sup> QQ, is an instant messaging software service developed by Chinese company Tencent Holdings Limited. As of January 2015, there are 829 million active QQ accounts, with a peak of 176.4 million simultaneous online QQ users. Source: <http://tencent.com/en-us/ir/news/2015.shtml>.

<sup>47</sup> SOJUMP.COM is a professional online platform for survey, evaluation and voting, which focuses on providing a powerful, user-friendly services including online questionnaire, data collection, self-defined report and data analysis, etc. Source: <http://baike.baidu.com/view/1885054.htm>.



The internet questionair survey (n=211) shows that a lot of respondents have no awareness of the edible landscape within the urban area. To the question of “Have you ever noticed any edible plants such as vegetables, fruit trees, crops, and sunflowers, etc. planted in the central urban area (1) by the residents in residential areas; 2) under an unified planning or construction by the developers, government departments, or other institutions in residential area, 3) in other places except for residential area)”, 65% (137 people) of the respondents have noticed the edible landscapes built by the residents in residential areas; only 14% (30 people) have noticed the edible landscapes built under an unified planning or construction by the developers, government departments, or other institutions in residential area, and only 30% (63 people) have noticed the edible landscapes in other places except for residential area. This result indicated that there is a lack of awareness to the existence of the ELWUA from the public.

In addition, the internet questionnaire survey (n=211) shows that the public’s attitudes towards the ELWUA in Beijing were generally positive. To the question of “Do you like the ELWUA in Beijing”, 64% (135 people) of the respondents replied “like”, 10% (21 people) “don’t like”, 18% (38 people) “don’t care” and 8% (17 people) had “other” opinions. When asked whether they will grow food by themselves if they have a chance, 61% (129 people) of the respondents replied “they will” (97 people, 45%) or “already grow” (32 people, 15%), 17% “will not” and 22% are “not sure” (Figure 7.2).

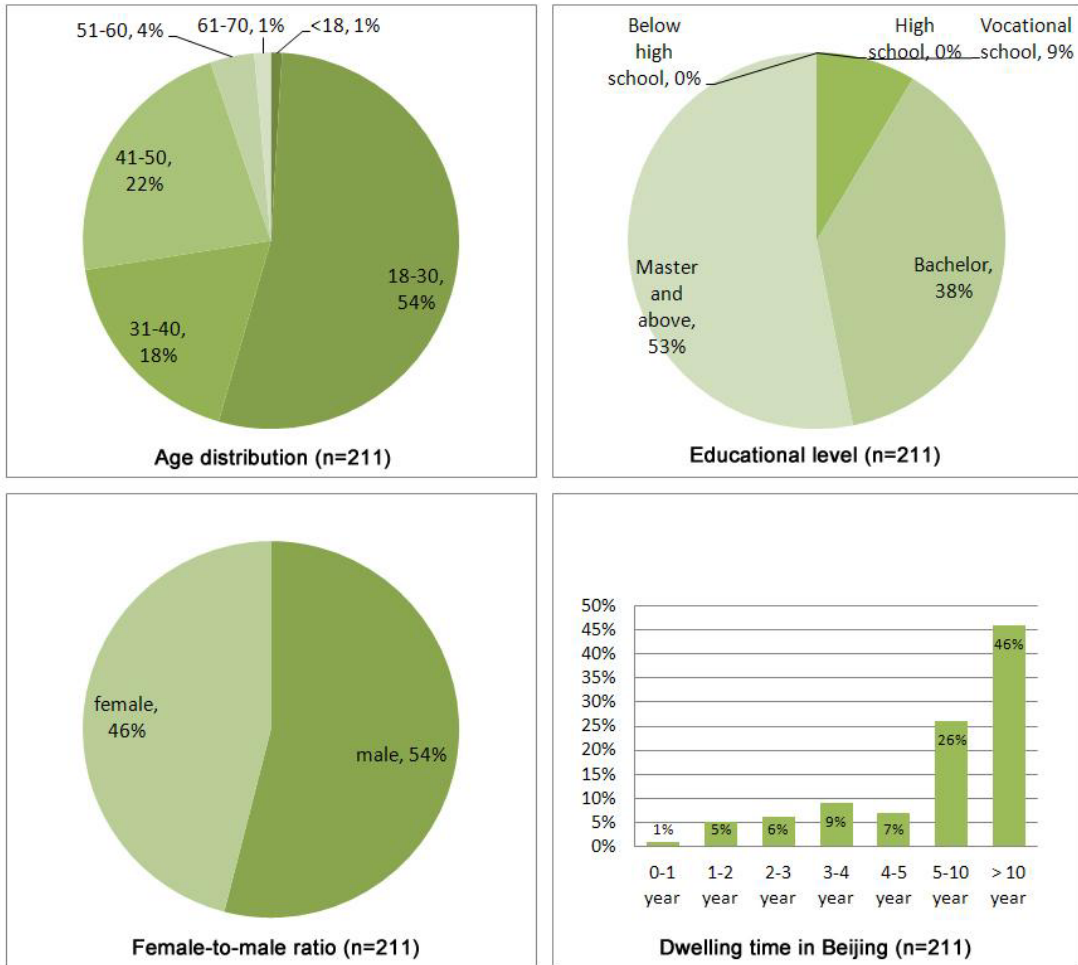


Figure 7. 1 Age distribution, educational level, female-to male ratio and dwelling time in Beijing of the internet respondents (n=211)

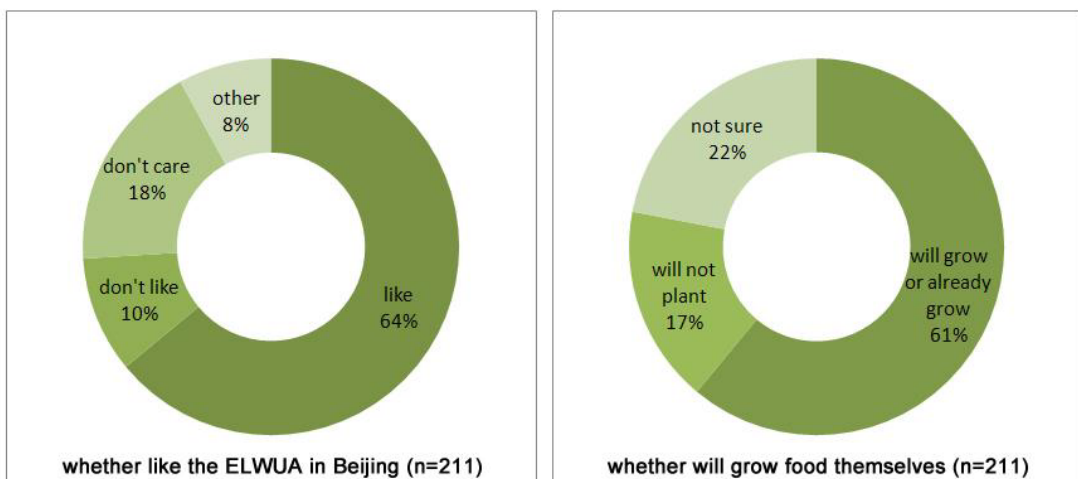


Figure 7. 2 People's attitudes towards ELWUA in Beijing achieved from internet questionnaire survey-the first figure shows the respondents' reply to the question of whether like the ELWUA in Beijing, and the second figure shows the reply to the question of whether they will grow food themselves if they have a chance (n=211)

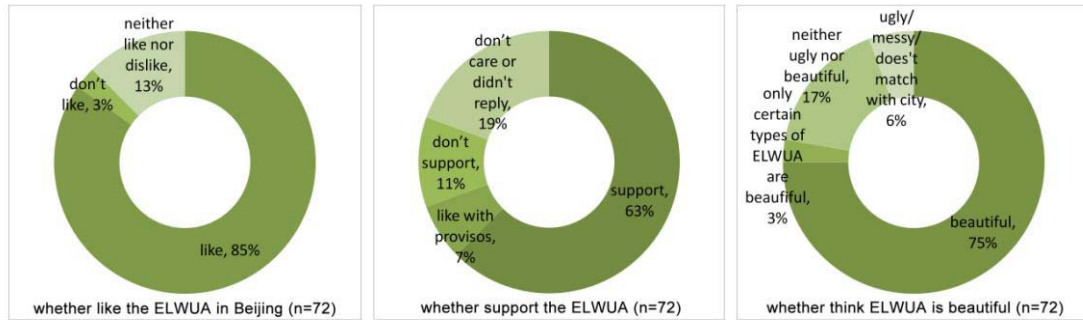
## **7.2 Perception of different groups of people**

In addition to the internet questionnaire, people's attitudes towards the ELWUA in Beijing were also investigated through semi-structured interviews with six different groups of people. The six groups of people include "urban farmers" (84 people), "neighbours (104 people), staff in property management companies or neighbourhood committees in the residential area (20 people in 13 residential areas), developers or project directors (10 people), professional designers or planners (3 people) as well as governmental officials (1 people). The number of the interviewees and their distributions could be found in Appendix C. The semi-structured interview shows that people's attitudes towards the ELWUA in Beijing vary with different people groups. The following sections will detail their attitudes respectively.

### **7.2.1 Perspectives of "urban farmers"**

The 84 interviewed "urban farmers" are composed of 72 "urban hobby farmers" and 12 "professional urban gardeners".

The "urban hobby farmers" generally hold a positive attitude towards the ELWUA in Beijing. To the question of whether people like the ELWUA, 85% (61 people) of the interviewees replied "like", 3% (2 people) "don't like" and 12% (9 people) hold neutral opinion of "neither like nor dislike". To the question of whether people support the idea of planting vegetables/fruit trees/other edible plants in urban space, 63 % (45 people) of the "urban hobby farmers" support, 7 % (5 people) support it with provisos (e.g. the ELWUA need to be developed under uniform planning, the ELWUA only can be built in certain space such as balcony and private space, etc.), 11 % (8 people) don't support, and 20% (14 people) replied "don't care" or didn't give any reply. Moreover, from the aesthetic aspect, 75% (54 people) of the interviewed "urban hobby farmers" think ELWUA is "beautiful", 3% (2 people) think "only certain types of ELWUA are beautiful", 17% (12 people) think it is "neither ugly nor beautiful", and 5% (4 people) think it is "ugly/ messy/ doesn't match with city" (Figure 7.3). To assess the preference between edible landscape and ornamental landscape, the question of whether people agree the idea of changing part of the ornamental trees or grass in the urban space into vegetables or fruit trees was asked. It revealed that although most of the "urban hobby farmers" think ELWUA is beautiful, many "urban hobby farmers" still preferred to see ornamental flowers, grass and trees or only few edible plants in public space and did not like too many vegetables being planted in the urban area.



**Figure 7.3 Attitudes towards ELWUA in Beijing from “urban hobby farmers” achieved from interviews -the first figure shows the respondents’ reply to the question of whether like the ELWUA in Beijing, the second figure shows the reply to the question of whether they support the ELWUA, and the third figure shows the reply to the question of whether they think ELWUA is beautiful (n=72)**

The main reasons why the “urban hobby farmers” don’t like or don’t support ELWUA and the problems of the ELWUA reflected by them mainly include the following aspects:

### **(1) Spatial and visual**

- There is a lack of space for cultivation in the densely-built urban area.
- The edible plants cannot keep evergreen.
- There is a lack of aesthetic value, e.g. the opinion of “the ELWUA doesn’t match with the metropolis’ urban environment” is common.
- There is a lack of uniform planning, which usually causes people’s chaotic cultivation and affects the visual effect of the urban landscape.

### **(2) Environmental**

- More fertilizers are needed than for ornamental plants, which might pollute the urban environment.
- ELWUA might damage the urban environment. For example, the reclamation of the river revetment might cause soil erosion.

### **(3) Management**

- The spontaneous ELWUA in public space often cause conflicts between property management companies and spontaneous growers. The edible plants grown in public space are usually cut down and cleared away by the staff of the property management companies or community neighborhood committees.
- There are many management difficulties. For example, theft, children’s vandalism and dog’s harassment often occur to the EUWLA, which can affect the visual effect of the urban landscape and also might dishearten the growers.

### **(4) Technological**

- The edible plants are often attacked by insect pests and plant diseases.
- The bio-fertilizer might produce unpleasant odor and cause unsanitary urban environment.
- The soil in urban area is too exhausted to grow edible plants well.
- Urban pollution such as vehicle emissions, polluted river water might cause food safety problems.
- There are more insects such as mosquitoes around the edible landscapes.
- “Urban hobby farmers” are often stymied by the lack of agricultural knowledge and skills.
- There is a shortage of water for irrigation.

#### **(5) Social equity**

- When people occupy a piece of public land without permission for growing food, there arises the issue of an unequal distribution of the space and the harvest food, which might cause conflicts between growers and neighbors.

Moreover, the “professional urban gardeners” also generally hold positive attitudes towards the ELWUA in Beijing, but meanwhile, they also mentioned some problems and challenges of the current ELWUA in Beijing, mainly including:

#### **(1) Spatial and visual**

- The space for organized edible landscape is limited. For example, the One Acre Paddy Field in Haidian Park (Case D1) is overcrowded every year when the sowing and harvesting festivals is held. The demand for the “Happy Farm” in Xi Shan (Case D1) has exceeded the supply.

#### **(2) Organization and management**

- In some cases of urban greening with edible plants, there is a lack of organization of food harvest and food distribution. A few mature fruits might be picked by the staff who maintain the plants, or by people (such as the staff and students) who work in the Danwei and are interested in the fruits, or left to the animals (such as birds) for food, but very often they are annually cleaned away by the greening department as rubbish, which is a heavy burden for the “professional urban farmers”.
- For urban greening with edible plants, the fallen fruit, nuts, and husks could create a messy and hazardous ground surface, therefore harvesting and cleaning has become a big burden for the “professional urban gardeners”.
- The edible plants such as the fruit trees might be damaged by strangers’ barbarous picking behavior thereby affect the visual effect of the landscape. In addition, there is a potential safety hazard for the people who climb up a tree for picking fruits without permissions. Take the grove of Chinese pearleaf crabapple trees in Fengshang International Apartment area as an example. The grove were planned by professional designers and planted by the property management company of the residential area. Before 2012 the

property management company annually held a picking event to celebrate the autumn harvest of the crabapples and also give the residents a chance to experience the harvesting process themselves. However, as more and more people knew it, some people who didn't live in the residential area slipped in and picked up the crabapples rudely without permission, which damaged the fruit trees heavily and also disorganized the residential area. Therefore, since 2013, the property management company pruned the crabapple trees heavily to prevent the trees from fruiting.

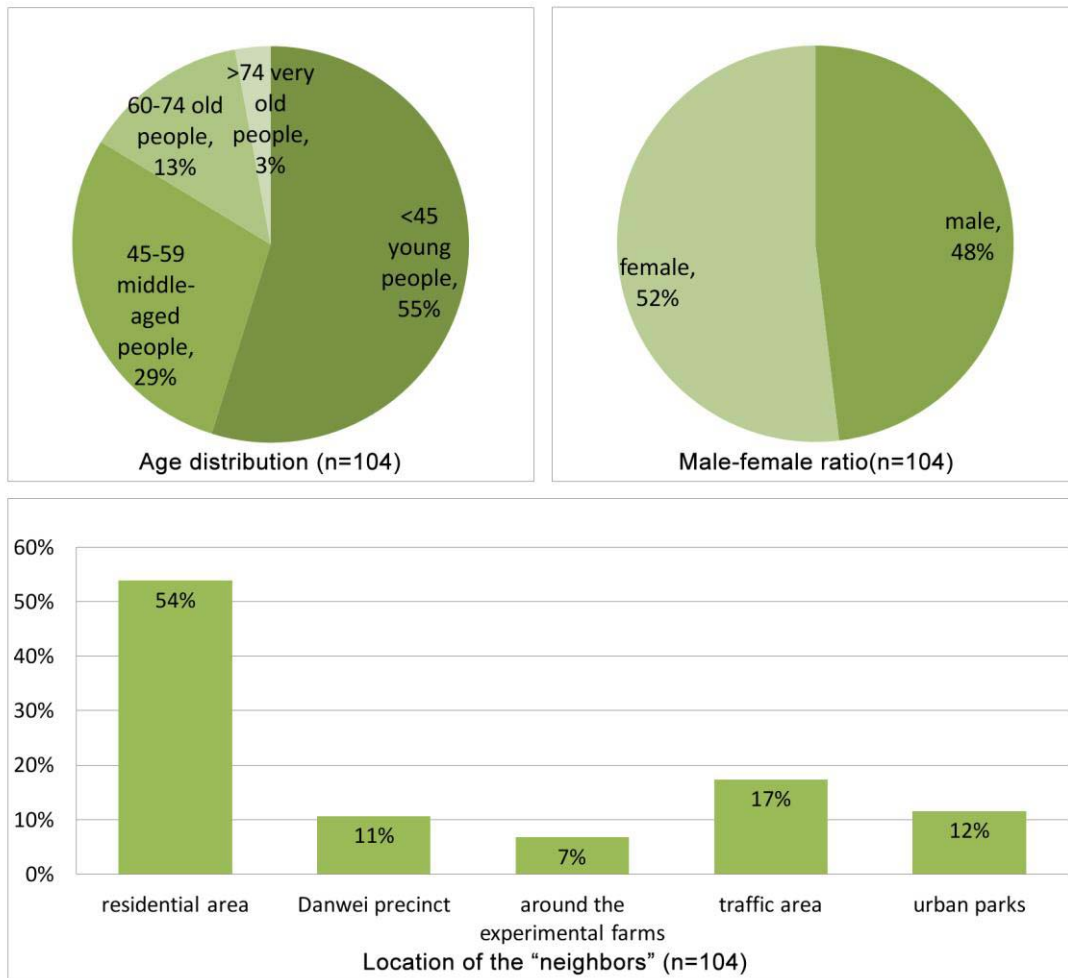
### **(3) Technological**

- Urban pollution such as industrial waste gas emission, laboratory gas emission and vehicle emission might cause food safety problems.

In addition to the perspectives of the “urban hobby farmers” and “professional urban gardeners”, the attitudes of “experimental urban farmers” toward ELWUA were obtained from the “professional urban gardeners”, who are usually responsible for organizing the farming activities. They said that the farming events which are organized within the urban area for urban citizen's short time farming experience are very popular. For example, the sowing and harvesting events in the paddy field in Haidian Park is a very popular activity, and the entrance tickets to the event are very difficult to get. These information shows that the “experimental urban gardeners” hold a general positive attitude towards the organized ELWUA for people's farming experience.

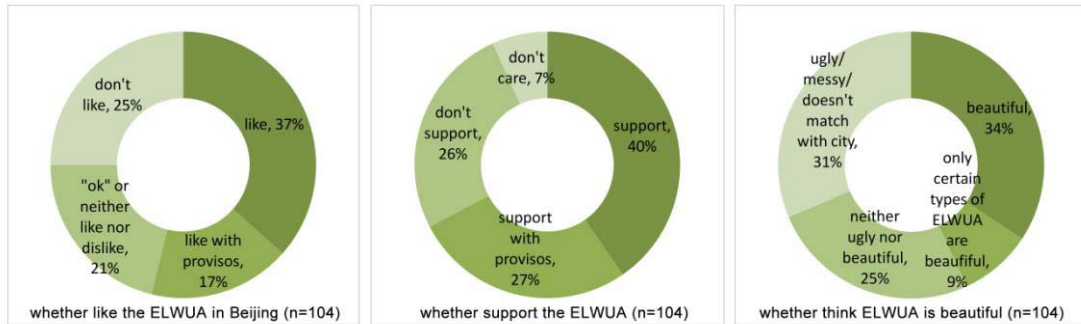
#### **7.2.2 Perspectives of “neighbors”**

The 104 interviewed “neighbors” include 57 (55%) young people (below 44 years old), 30 (29%) middle-aged people (between 45 and 59 years old), 14 (13%) old people (between 60 to 74 years old) and 3 (3%) very old people (above 75 years old), and of these there were 41 men and 49 women. These interviewees were randomly selected from the passersby respectively in the six different types of urban space, including 56 people in the residential area, 11 people in the Danwei precinct, 7 people around the experimental farms, 18 people in the traffic area and 12 people in urban parks (Figure 7.4).



**Figure 7.4 Age distribution and male-female ratio of the interviewed "neighbors" (n=104)**

The attitudes to the ELWUA in Beijing from the "neighbors" are not as positive as the "urban farmers", and there were more people who hold a negative attitude towards the ELWUA. To the question of whether people like the ELWUA, 37% (38 people) of the interviewees replied "like", 17% (18 people) "like" with provisos, 25% (26 people) "don't like", and 21% (22 people) hold neutral opinion of "it's ok" or "neither like nor dislike". To the question of whether people support the idea of planting vegetables/fruit trees/other edible plants in urban space, 40% (42 people) of the interviewees replied "support", 27% (28 people) "support it with provisos", 26% (27 people) "don't support", and 7% (7 people) "don't care". Of these, the provisos mainly include: ELWUA need to be developed under uniform planning; ELWUA only can be built in certain types of space such as balcony and private space; the edible plants used in ELWUA only can be fruit trees but not vegetables or crops; there should be support from government; ELWUA could not bring visual intrusion for the city outlook, etc. To the question of whether people think ELWUA is beautiful, 34% (35 people) of the interviewees think it is "beautiful", 9% (9 people) think "only certain types of ELWUA are beautiful", 25% (27 people) think it is "neither ugly nor beautiful", and 32% (33 people) think it is "ugly/ messy/ doesn't match with city" (Figure 7.5).



**Figure 7. 5 Attitudes towards ELWUA in Beijing from “neighbors” achieved from interviews -the first figure shows the respondents’ reply to the question of whether like the ELWUA in Beijing, the second figure shows the reply to the question of whether they support the ELWUA, the third figure shows the reply to the question of whether they think ELWUA is beautiful (n=104)**

Moreover, the interviews to the “neighbors” indicated that people’s attitudes towards ELWUA are correlative with the ELWUA types, locations and organization forms. The negative attitudes were mainly against the informal ELWUA in the public space, especially those crops and vegetables which were planted without uniform planning in the residential areas. The main reasons why the “neighbors” don’t like or don’t support ELWUA and the main problems reflected by them mainly include the following aspects:

**(1) Spatial and visual**

- There is no space for cultivation in the densely-built urban area.
- The edible landscape might encroach on the public green space.
- The edible plants cannot keep evergreen.
- From the visual aspect, ELWUA seems irregular and doesn’t match with the environment of the modern city and even tarnishes the image of the metropolis.
- Many people consider the public green space with ornamental plants as a fixed support facility of a residential area, therefore, it is impossible to replace it with cultivated land.
- There is a lack of uniform planning and necessary guidance for the farming activities; therefore, people usually plant edible plants in chaos, which could affect the visual effect of the urban landscape.
- The ground surface will become bare when the edible plants are harvested or wither in autumn and winter, which likely cause dusty haze.
- The precinct of Danwei is not suitable for farming activities, because the staff is expected to work hard in the working space but not to expend energy on growing vegetables (a leader of a Bank said that).
- Difficult to access. The vegetables are often enclosed with fences, and the fruit trees are usually shorter than the ornamental trees, which make it difficult to make use of the space under the trees for entertainment.
- The experimental farm should not be located in the densely-built urban area because, firstly, it is unworthy building an experimental farm on such



expensive land in the central urban area; secondly, the greenhouse effect of the urban area might affect the experimental results.

## **(2) Environmental**

- The reclamation of the river revetment for ELWUA might cause soil erosion and damage the urban environment.
- The usage of chemical or biological fertilizers for growing food might pollute the urban environment.

## **(3) Management**

- Occupying the public land for self cultivation without permission is forbidden.
- There is a lack of management to ELWUA.
- Theft, children's vandalism and dog's harassment often occur to the EUWLA, which often damages the visual effect of the urban landscape.
- Poor time management of EUWLA could create a messy and unsanitary urban environment. For example, without timely harvest and clean, the withered plants and fallen fruit, nuts, and husks could create a messy and even hazardous ground surface.
- Even there is a uniform organization of the ELWUA, there arises the issues of the distribution difficulties and the high management costs.
- People might be too busy to do the farming activities.
- Without a proper management, the pesticides sprayed on the edible plants in public spaces might cause food safety problems.

## **(4) Technological**

- The biological fertilizer might produce unpleasant odors and cause unsanitary urban environment.
- The soil in the urban area is exhausted and not suitable for growing edible plants.
- Urban pollution such as the industrial waste gas emission and the vehicle emission might cause food safety problems.
- There is a shortage of water for irrigation.
- There is a lack of agricultural knowledge and skills.

## **(5) Social equity**

- When people occupy and cultivate the public land without permission for private use, they have encroached upon the public interests, which is unequal for the other people who didn't use the public land.

### **7.2.3 Perspectives of the property management companies or community neighborhood committees in residential areas**

Twenty staff members who work in the property management companies and/or

neighbourhood committees in 13 different residential areas respectively (Case A3, A6, A10, A12, A13, A14, A15, A17, A 18, A20, A21, A22, and A23) were interviewed. The property management company is mainly responsible for the smoothly running of the hardware facilities in the residential area, while the community neighborhood committee mainly takes charge of the affairs at the social level. The property management company in the residential area is a hired property service enterprise which is responsible for the maintenance and management of the real estate and the attached supporting facilities, the environmental sanitation, and the security and order of the residential area, according to the contract of real estate management signed by the residents and enterprise together. The property management activities in the Chinese residential area have been specially regulated in the *Property Management Regulations* issued by the State Council of People's Republic of China. Of these, their main task in the field of environmental sanitation and landscape greening is maintaining and keeping the residential area quiet, comfortable, tidy and beautiful, and the detailed work activities mainly include: 1) prohibiting littering, arbitrary posting, scrabbling and raising livestock and poultry, controlling noise pollution, air pollution and water pollution, and eliminating the pollution sources in the residential area, 2) timely sweeping and cleaning the public space including road, sidewalk, green space and other space for public activities, collecting and clearing garbage, cleaning and sterilizing the sanitary wares and putting them back in place, organizing deratization and de-insectization, carrying out health management and inspection of the business merchants in the residential area, 3) landscape maintenance, keeping the beauty and greening landscape in the residential area through assigning special personnel to take care of the green belt, garden, trees, grass, flowers and garden furniture along the roads in the residential area.<sup>48</sup> The community neighborhood committee is a grass-roots autonomous organization of self-management, self-education and self-service, which is not a government organization. It is established in accordance with the residents' living conditions and with the principles of facilitating the community inhabitant autonomy. Generally one community neighborhood committee is set up for every 100 to 700 households. Based on China's *Community Neighborhood Committee Law*, the primary functions and tasks of the community neighborhood committee include: 1) publicizing the national constitution, laws, regulation and policies, safeguarding the legitimate rights and interests of the residents, and educating residents to fulfill their statutory obligations, 2) dealing with public affairs and public welfare undertakings of the residents living in its precinct, 3) mediating private disputes, 4) assisting in maintaining social order, 5) assisting the government or other administrative agencies in working on the issues which are related to residents' interests, such as public health, family planning, special care and relief and adolescent education, 6) reflecting the residents' opinions, requests and suggestions to the government or other administrative agencies.<sup>49</sup>

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<sup>48</sup> Source:

<http://wiki.mbalib.com/wiki/%E4%BD%8F%E5%AE%85%E5%B0%8F%E5%8C%BA%E7%89%A9%E4%B8%9A%E7%AE%A1%E7%90%86>.

<sup>49</sup> Source: <http://baike.baidu.com/view/635932.htm>.

The interviews show that except for a few particular cases, most of the property management companies or community neighborhood committees in residential areas hold a negative attitude towards the ELWUA in the residential areas of Beijing. To the question of whether they support the residents planting vegetables/fruit trees/other edible plants in the public space of the residential area, the staff from 11 residential areas out of the 13 replied definitely “no”. The reasons are generally the same, that is according to the *Property Management Regulations*, any of the following acts without permission are forbidden, including changing the land use of the residential area, occupying the public land, damaging the public greening and landscape, etc. To the question of whether they would like to support a uniform planning of growing food in a residential area, almost all the staff members in the 11 residential areas (10 out of 11), who didn't support edible plants growing in residential areas, also expressed their negative attitude - the current existing greening space in residential area is already limited and there is no space for cultivation except for in suburbs or in rural areas. Only a director of the property management company in a residential area of farmers' moving back house (Case A18) expressed his will to support the implementation of ELWUA in residential areas. However, meanwhile, he also mentioned the current limitations, such as the opposition from the “neighbors” who live around that area, and the difficulties of management and land/food distribution, which make it impossible to apply it at once in the residential area where he works. He also said that he would like to contribute his effort to the application of ELWUA in his residential area if there is any opportunity in future.

Except for the 11 residential areas where food growing in the public space is forbidden, the left two residential areas where the staff supports ELWUA are the Courtyard House in South Luogu Lane (Case A3) and Min Kang Residential Area No.30 (Case A14). The Courtyard House in South Luogu Lane is a traditional courtyard residential area, where the community neighborhood committee regularly distributes seeds of edible plants to the residents and encourages them to grow food for achieving greening. The Min Kang Residential Area No.30 is a relatively old modern residential area with a deteriorated environment; in order to improve the landscape of the residential area, the property management company and community neighborhood committee have already created one edible demonstration garden for achieving greening and beauty by transforming the public space into edible land.

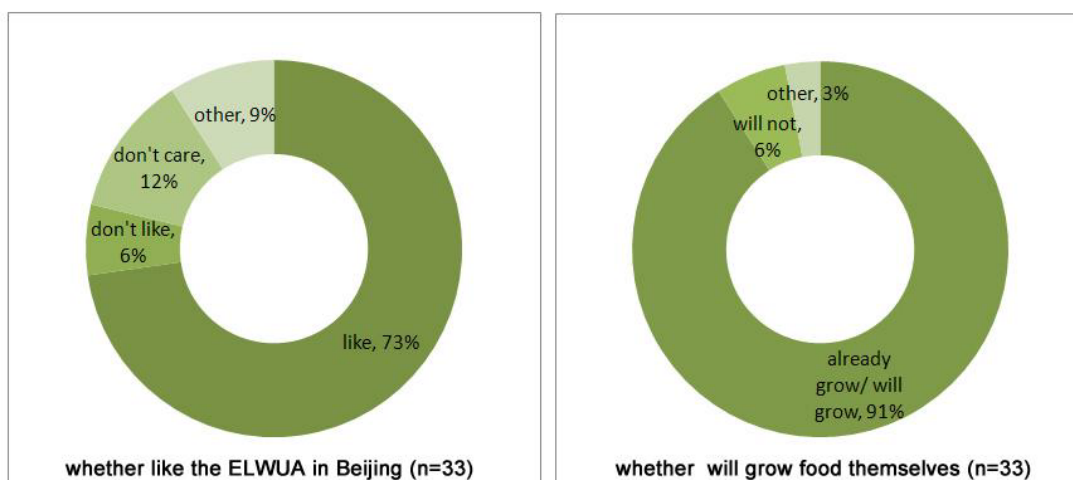
#### **7.2.4 Perspectives of the initiators of the formally organized edible landscape**

The initiators of the formally organized ELWUA might include commercial developers and project directors of the ELWUA project. The interviewed initiators are composed of 4 commercial developers (Case A16, A20, E1 and E2) and 6 project directors (Case A6, A14, B1, B2, B3 and D1) of the formally organized edible landscapes. In the 10 interviewees, 6 of them also act as “professional urban gardeners”. All the 10 interviewees confirmed the positive effect of their ELWUA projects and expressed their willingness to continue the ELWUA projects, although some “professional urban

gardeners” reflected some of the problems and challenges especially with the urban greening with edible plants, which have been mentioned above. Except for the problems of the urban greening with edible plants, the main challenge for developing an organized ELWUA project with people’s participation is how to find more land for developing edible landscapes. For example, one developer of the Xi Shan “Happy Picking Garden” (Case E1) expressed the worry about the future development possibility of their “Happy Farm” located at the edge of the city; at present, the urban residents’ demand of renting a piece of “Happy Farm” exceeds supply, but they are also facing the danger of being swallowed by urbanization.

### 7.2.5 Perspectives of the professional planners and designers

In the 211 respondents of the internet questionnaire, there are 33 professional planners and designers, including 11 urban planners, 2 landscape planners, 2 urban designers, 6 architects, 7 landscape architects and 5 designers. Most of them have a positive attitude toward the ELWUA in Beijing. To the question of “Do you like the ELWUA in Beijing”, 73% of them (24 people) replied “like”, 6% (2 people) “don’t like”, 12% (4 people) “don’t care” and 9% (3 people) had “other” opinions (e.g. didn’t ever see any ELWUA). When asked whether they will grow food by themselves if they have a chance, 91% (30 people) of them replied they “will” or “already grow”, 6% (2 people) “will not”, and 3% (1 people) had “other” opinions (Figure 7.6).



**Figure 7. 6 Professional planners and designers’ attitudes towards ELWUA in Beijing achieved from internet questionnaire survey-the first figure shows the respondents’ reply to the question of whether like the ELWUA in Beijing, and the second figure shows the reply to the question of whether they will grow food by themselves if they have a chance (n=33)**

Then from the 33 respondents, three professionals, including two landscape architects and one urban planner, were selected for an expert interview. The three experts all supported the concept of ELWUA; meanwhile, they also raised some challenges and problems of the contemporary ELWUA development, which mainly include the following aspects:

### **(1) Dilemma of accepting the concept of edible landscape**

- Whether the edible landscape can be implemented in a project usually depends on the clients, whereas it is usually difficult to persuade the clients to accept the concept of edible landscape. Reasons for rejecting edible landscapes mainly include: 1) there are more organization and management difficulties for using edible landscape than ornamental landscape, 2) many people, especially those with rural origins, prefer ornamental landscape rather than the agricultural landscape, which they can easily connect with the backwardness of the rural life they have experienced before.

- The current aesthetical standard of urban landscape is confined to ornamental formal beauty and the practical edible landscape is excluded from the urban landscape. A diversified aesthetic standards for urban landscape must be built, thereby an official popularization (e.g. from government) of the concept of edible landscape is needed.

### **(2) Organization, management and maintenance**

- The organization, management and maintenance of edible landscape will be much more complex than the ornamental landscape, especially for the ELWUA in public spaces. Many problems which have been mentioned above by other interviewees, such as the visual problem of the chaotic or untidy look of edible landscape, the environmental problem of unpleasant odors caused by improper usage of bio-fertilizers, the frequent attacks of the plant diseases and insect pests, and the security problem of theft, vandalism and pet dog's harassment, etc., might be caused by the lack of proper organization, management and maintenance.

- The edible landscape without proper organization, management and maintenance would not bring beauty and contribute to the urban sustainability but cause a chaos of the urban landscape and even lead to urban pollution. Therefore, the establishment of a set up organization, management and maintenance system is necessary before the implementation of the edible landscape.

### **7.2.6 Perspectives of the governmental officials**

Through a semi-structured interview with one governmental official in the Beijing Municipal Bureau of Landscape and Forestry, the government's attitude towards the ELWUA was generally understood.

The interviewee's understanding of the concept of "urban agriculture" and "edible landscape" is mainly around the "agrotourists' picking and sight-seeing farms" in suburbs or rural areas, and it was difficult for her to connect the edible landscape with the central urban space. She said that "with the aim of building an Eco-city, which was raised by the Chinese government since 2012, at the moment, their main task in urban landscape greening is increasing the size of urban green space". According to the Landscape and Forestry Planning of Beijing which was proposed in 2012, the urban green space should increase by 4500 hectares and the urban green coverage

rate should reach 48%<sup>50</sup>. However, until the interview was carried out, there was not any policy supporting the development of the edible landscape within the urban area. She mentioned that the urban greening with fruit trees was common, but because the fruit trees might easily cause many problems, for example, the fallen fruit might create a messy and hazardous ground surface, people might eat the pesticide sprayed fruits by mistake, etc., therefore, fruit trees are usually avoided being used for urban greening at present. Furthermore, for the edible landscape built by the residents themselves, because the it might lead to many problems, such as encroaching on the urban green space which is already scarce, management difficulties, problem of landscape efficiency (e.g. could not keep evergreen), it was considered unlikely at present to get a top-down policy or financial support from the government unless there is a strong demand of growing edible plants from the mass.

### 7.3 Summary

This chapter mainly investigated people's attitudes towards the edible landscape within the urban area of Beijing through an internet questionnaire and semi-structured interviews of six different groups of people related to ELWUA. The internet questionnaire survey (n=211) indicates generally positive attitudes towards the ELWUA in Beijing from the public. Furthermore, the semi-structured interview (n=214) during the field survey shows that people's attitudes towards the ELWUA in Beijing varies with each of different groups which are related to the ELWUA ("urban farmers", "neighbors", initiators of the formally organized ELWUA, professional planners and designers, the staff in property management companies and community neighborhood committees, and the government officials). Of these, the "urban farmers", the initiators and the professional planners and designers show general positive attitudes towards ELWUA; the "neighbors" has more critical opinions thereby shows a lower positive rate but still have generally positive attitudes towards ELWUA; meanwhile there are some obvious negative attitudes towards ELWUA coming from the property management companies, the community neighborhood committees and the government; and on the side of the government there is a lack of awareness to the concept of edible landscape within the urban area (ELWUA) (Table 7.1).

No matter whether they hold positive or negative attitudes, each of the six groups of people reflected the challenges and problems of the ELWUA. The interviews provided an overview of the major challenges for the introduction and implementation of ELWUA in Beijing from the perspective of the six groups of people interviewed. In which, the challenges and problems reflected by the "urban farmers" and "neighbors" are mainly of the aspects of 1) spatial and visual, 2) environmental, 3) organizational and management, 4) technological and 5) social equity. The challenges and problems reflected by the property management companies and community neighborhood committee in residential areas, and the governmental official are mainly on the

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<sup>50</sup> Source from: <http://www.xglfy.com/1243560.html>.

aspects of 1) regulations, 2) spatial and visual, 3) environmental and 4) organization and management. The challenges and problems reflected by the initiators of the formally organized ELWUA are mainly on the aspects of 1) spatial and visual and 2) management. The challenges and problems reflected by the professional planners and designers are mainly on the aspect of 1) the dilemma of accepting the concept of ELWUA and 2) organization, management and maintenance.

The general public perception and the attitudes of the people involved in urban gardening (“urban farmers”) towards ELWUA are generally positive, which shows a social demand for the edible plants growing and a great development potential of edible landscapes within the urban area. The “neighbors”, who are the direct audience of the ELWUA, have raised a lot of criticism although they held a generally positive attitude towards it. This indicated that while providing benefits to the “urban farmers”, the edible landscape also brought a negative impact even damaged the interests of “neighbors”, which need to be solved before the implementation of ELWUA. The negative attitudes from the property management companies, community neighborhood committee and the government officials indicated that during the performance of their duties, in order to make the landscape maintenance and management easier and also for in accordance with the rules and regulations, they has not considered urban residents’ demands of food growing, but simply adopted the approach of “one size fits all” and excluded edible landscape from the urban landscape. On the side of the government there is a lack of awareness of ELWUA concept, which indicated that edible landscape is currently negelected from the urban planning and urban landscaping agenda. The community neighborhood committee, as an organization which is responsible for “reflecting the residents’ opinions, requests and suggestions to the government or other administrative agencies<sup>51</sup>”, actually not only neither reflect urban residents’ demands of food growing to government, but also nor actively contribute positive efforts to serve people’s needs. On the edible landscape issue, each of the four groups just stands on their own point of view for their own interests and there is a lack of comprehensive concept of a general and communitcations between each other. Furthermore, because of the lack of communication on the food growing issue bwtween each other of the four groups, a conflicting situation on the food growing issue was formed (Figure 7.7). Under this context, the positive attitudes from the professional designers and initiators of the formally organized ELWUA projects indicated that they have great potential to act as the bridge between people’s demand of food growing and decision making on ELWUA.

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<sup>51</sup> Source: <http://baike.baidu.com/view/635932.htm>.

**Table 7. 1 Summary of people's attitudes towards ELWUA**

<b>People</b>	<b>Attitudes towards ELWUA</b>
Attitudes from internet survey respondents (n=211)	<ul style="list-style-type: none"> <li>• There is a lack of awareness of the existence of the ELWUA.</li> <li>• 64% "like", 10% "don't like", 18% "don't care" and 8% had "other" opinions.</li> </ul>
Attitudes of the six different groups	<ul style="list-style-type: none"> <li>• "Urban hobby farmers" (n=72) <ul style="list-style-type: none"> <li>• 85% "like", 3% "don't like" and 12% "neither like nor dislike".</li> <li>• 64 % "support", 7 % "conditional support", 10 % "don't support", 19% "don't care" or didn't reply.</li> <li>• 75% think ELWUA is "beautiful", 3% think "only certain types of ELWUA are beautiful", 17% think it is "neither ugly nor beautiful", and 5% think it is "ugly or messy or doesn't match with city".</li> </ul> </li> <li>• "Professional urban gardeners" (n=12) Hold a general positive attitude towards ELWUA.</li> <li>• "Experimental farmers" Hold a general positive attitude towards ELWUA.</li> <li>• "Neighbors"(n=104) <ul style="list-style-type: none"> <li>• 37% "like", 17% "conditional like", 21% "neither like nor dislike", and 25 % "don't like".</li> <li>• 40 % "support", 27 % "conditional support", 26 % "don't support", and 7% "don't care".</li> <li>• 34% think it is "beautiful", 9% think "only certain types of ELWUA are beautiful", 25% think it is "neither ugly nor beautiful", and 32% think it is "ugly or messy or doesn't match with city".</li> </ul> </li> </ul>
Property management companies or community neighborhood committee in residential area (n=13)	<p>Most of them (11 out of 13) forbid residents' food growing in the public space of the residential area. Furthermore, 10 of them don't support the formally organized food growing activities in the public space of the residential area.</p>
Initiators (developers and project directors) (n=10)	<p>Almost all of them confirm the positive effect of their ELWUA project, although some of them reflected some challenges and problems.</p>
Professional planners and designers	<p>Internet questionnaire (n=33) 73% "like", 6% "don't like", 12% "don't care" and 9% had "other" opinions</p> <p>Expert interview (n=3) All of them hold a positive attitude towards ELWUA, although many challenges and problems were reflected by them.</p>
Governmental official (n=1)	<p>There is a lack of awareness of ELWUA, and the government hold a general negative attitude towards ELWUA: "It is forbidden to damage the public landscape, changing the land use of the public space occupying public land for private use without permission"; "There was not any policy to support the construction of edible landscape"; "It is unlikely at present to get a top-down policy or financial support to ELWUA from the government unless there is a strong demand of growing edible plants from the mass."</p>



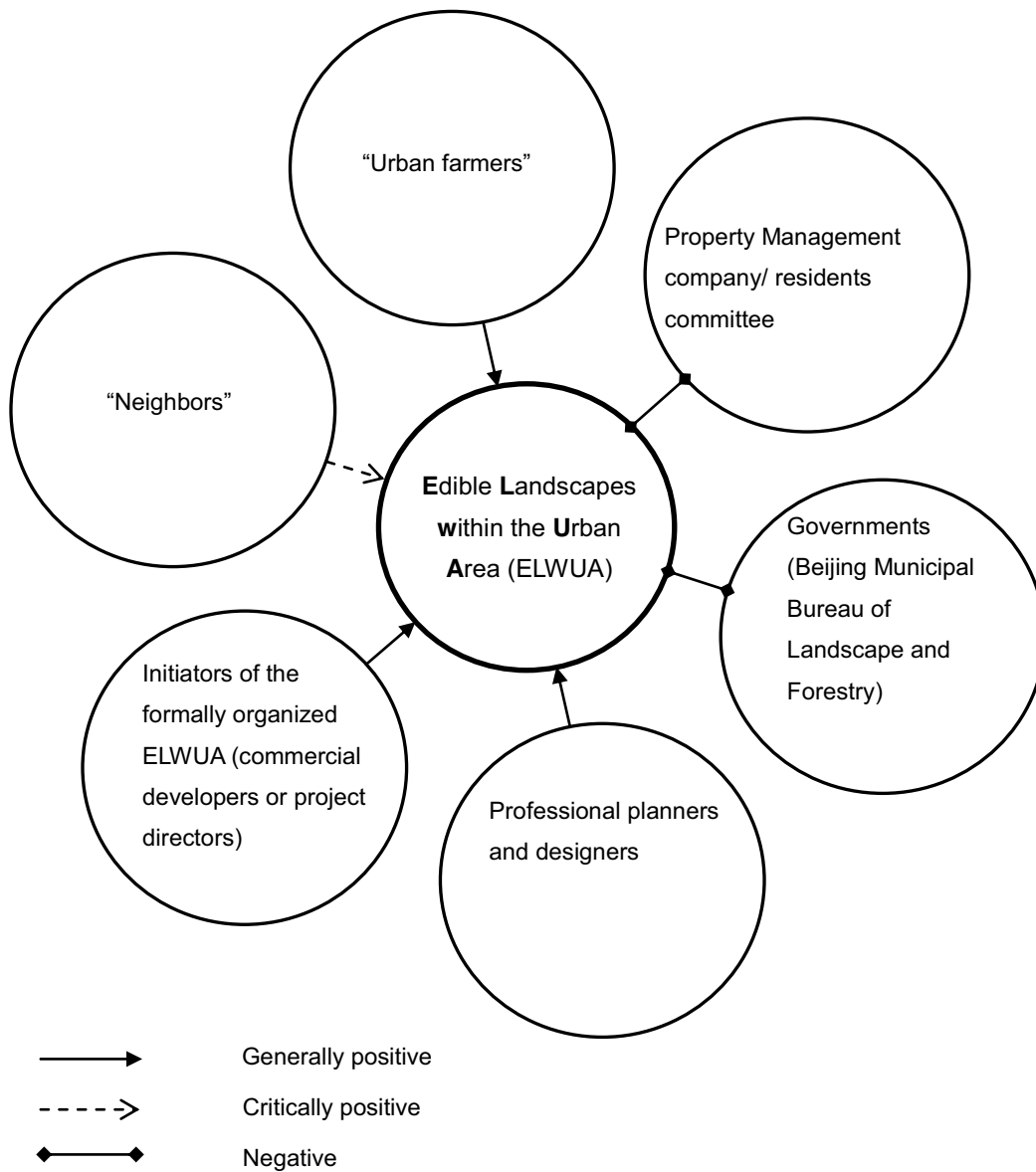


Figure 7. 7 Digram of the attitudes towards ELWUA from six groups of people



















# Chapter 8 Comparative analysis with European cases of the edible landscape within urban area

## 8.1 Comparison of the ELWUA Types

Through comparing the types of the ELWUA between Beijing and European cities, it is obvious that the ELWUA existing in European cities are more diverse than in Beijing (Table 8.1). All the ELWUA types existing in Beijing could be found in Europe, while not all the ELWUA types existing in European cities could be found in Beijing. In the level of urban food gardening, the family garden, educational garden, community garden and guerrilla garden, which are prevalent in Europe, also exist in Beijing, but the allotment garden, which has a history of over one hundred years in Europe, doesn't exist in Beijing. In the level of urban public greening, the ELWUA types of urban greening with fruit trees and urban greening with vegetables and crops can be found in both Beijing and European cities. In the urban farming level, the leisure farms and experimental farms, which exist in Europe, also were found in Beijing, while the local food farms, educational farms, social farms, therapeutic farms, cultural heritage farms, agri-environmental farms, which are widespread ELWUA types in Europe, were not found in Beijing. In addition, the non urban oriented farming, which exists in Europe, was not found in Beijing.

Moreover, even though some ELWUA types commonly exist in both Beijing and European cities, their prevalence in the two different backgrounds are different. In Beijing, only the family garden and guerrilla garden are widespread ELWUA types, which are similar with the European situation, while the prevalence of other ELWUA types are much lower than in Europe.

Table 8. 1 The ELWUA types existing in Europe and Beijing

Level	Types	Prevalence *	
		European cities	Beijing
Urban food gardening	Family gardens		
	Allotment gardens		
	Educational gardens		
	Therapeutic gardens		
	Community gardens		
	Squatter gardens/Guerrilla garden		
Urban public greening	Edible trees		
	Crops, vegetables, etc.		
Urban farming	Local food farms		

Leisure farms	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Educational farms	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/>
Experimental farms	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Social farms	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/>
Therapeutic farms	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/>
Cultural heritage farms	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/>
Agri-environmental farms	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/>
Non urban oriented farming	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/>

\* The column "Prevalence" expresses the prevalence rate of "high" (  ), "medium" ( ), "low" () , "very low" () and "does not exist" () of certain type of ELWUA.

Furthermore, the physical characteristics such as the spatial forms, participants, organizational forms and the motivations of the common ELWUA types might be very different under the two different contexts. Take the participants of the ELWUA as another example, based on the result of the survey in Lausanne: younger and better educated persons were more positive towards urban agriculture than others (Haller et al. 2013). This conclusion also can be proved from the current numerous numbers of the young "urban hobby gardeners" in Europe, while in Beijing, the demographic characteristics of the identified and interviewed "urban hobby farmers" shows that 55% of the "urban hobby farmers" are old and very old people, and only 10 % of them are young people, of which, the retired people are 67%. Take the guerrilla garden as another example. In Beijing, the guerrilla gardens are usually built by individual urban residents spontaneously, and the gardeners cultivate mainly for individual needs, such as for leisure, health, healthier food and food supplement, while the guerrilla gardens in European cities are usually built by a group of people, and the motivations are more diversified, such as seeking to provoke change of land use, for making the area more attractive, or for publicity of something as a form of activism; for example, the guerrilla garden "Keimzelle" which was started at the "Öhlmühlenplatz" in Hamburg St. Pauli in 2011 was built with the aim of building a self-organized, non-commercial and colorful social garden for all (Figure 8.1). The urban citizens want to express their desire to shape their own living and working environment, creating more green space, transcending communication barriers through gardening in public space. In the guerrilla garden, different meaningful protests about food might be proposed, for example, they tried to draw people's attention to protest the diversity of plants seeds through an exhibition of varieties of heritage plant seeds which are not so commonly seen today (Figure 8.2).



**Figure 8. 1 The guerrilla garden “Keimzelle”**

Source: <http://keimzelle.rindermarkthalle.de/eine-bilder-galerie/>



**Figure 8. 2 The exhibition of heritage plant seeds in the guerrilla garden “Keimzelle”**

Source: <http://keimzelle.rindermarkthalle.de/eine-bilder-galerie/>

## 8.2 Comparison of the spatial distributions

The urban space could be divided into private space, semi-public space and public space based on the extent of spatial privacy. The ELWUA might exist in any urban space type of the three, no matter whether in Beijing or in European cities, however, the percentage of the ELWUA located in the same spatial type are different in the two different contexts (Table 8.2). The field survey in Beijing indicated that most of the ELWUA in Beijing are located in private space and semi-public space, such as the family garden, guerrilla garden, which are usually located in the private courtyard attached to the residential house, or the space adjacent to the residential buildings, just like a “backyard space”. And only very few ELWUA cases are located in the public space, for example, the fruit trees along the street used for achieving urban greening, the educational/demonstration garden in urban parks, etc. Furthermore, these accountable ELWUA case in public space are mainly used for public benefits, but are not allowed to be used or cultivated in the long-term. Through comparing the spatial

distribution of the ELWUA in Beijing with that in European cities, we can find that there are more ELWUA existing in the public space or being transformed from the public space in Europe, such as the community garden, educational garden and fruit trees, and furthermore, most of them allow a long-term use by the urban citizens. Take the Prinzessinnengarten, a non-profit community garden in Berlin, Germany as an example (Figure 8.3); it was built at Moritzplatz in Berlin's Kreuzberg district, on a public site that had been a wasteland for more than 50 years. Prinzessinnengarten not only provides fresh food and flowers for the local community, it is also a social hub in a central location. The public is free to access and visit Prinzessinnengarten, and any cultivators who work here can freely pick and take the food. In addition, the Stadtteilgarten Schillerkiez community garden, which was built on the site of Berlin's abandoned Tempelhof Airport, is another good example (Figure 8.4). The garden is free, open to the public and provides a friendly space to meet people, read, participate in any number of events, and grow vegetables. This community garden was created for people to experience "the countryside enjoyment" and enjoy the "luxury of an open space" without ever having to leave the city.



**Figure 8. 3 Prinzessinnengarten in Berlin's Kreuzberg district, Germany**

© Marco Clausen, NomadischGrün gGmbH



**Figure 8. 4 The Stadtteilgarten Schillerkiez in Berlin's abandoned Tempelhof Airport**

The "backyard space" model of the distribution of ELWUA in Beijing has severely limited people's understanding of the edible landscape.

Table 8. 2 The spatial zoning of the ELWUA in Europe and Beijing

Level	Types	Prevalence*								
		Private space			Semi-public space			Public space		
		European cities	Beijing	European cities	Beijing	European cities	Beijing	European cities	Beijing	
Urban food gardening	Family gardens	■ ■ ■ ■	■ ■ ■ ■	□	□	□	□	□	□	□
	Allotment gardens	■ ■ ■ ■	□	□	□	□	□	□	□	□
	Educational/demonstration gardens	□	□	■ ■ ■ ■	■ ■ ■ ■	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
Urban public greening	Community gardens	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
	Squatter gardens/Guerrilla garden	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
Urban farming	Edible trees	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
	Crops, vegetables, etc.	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
	Local food farms	■ ■ ■ ■	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
	Leisure farms	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
	Educational farms	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
	Experimental farms	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
	Social farms	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
	Therapeutic farms	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
	Cultural heritage farms	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
	Agri-environmental farms	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□
Non urban oriented farming	□	□	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	□	

\* The column "Prevalence" expresses the prevalence rate of "high" (■ ■ ■ ■), "medium" (■ ■ ■ ■), "low" (■ ■ ■ ■), "very low" (■ ■ ■ ■) and "does not exist" (□) of the ELWUA which is located in certain type of urban space.



### 8.3 Comparison of the organizational forms

The organizational forms of the ELWUA are different but also similar in European cities and in Beijing. Based on their commonalities, the organizational forms of the ELWUA could be classified into the five types, which are the individual mode, self-managed mode of groups, professional organization by Danwei or social organizations, scientific organization and commercial organization. Furthermore, each organizational form might include different organizers of the ELWUA. Table 8.3 shows the organizational forms and the organizers' sector of different types of ELWUA existing in European cities and Beijing. According to the prevalence of the ELWUA types in European cities and in Beijing (Table 8.1), the prevalence of the organizational forms of the ELWUA under these two different contexts could be deduced (Table 8.4).

Through the comparison of the organizational forms between European cities and Beijing, we can find that:

- (1) Most of the ELWUA in Beijing are bottom-up activities, while in Europe, the ELWUA initiated bottom-up and top-down are both prevalent.**
- (2) Most of the ELWUA in Beijing are individual activities under no organization (in individual mode), while the organized ELWUA cases (self-managed mode of groups, professional organization, scientific organization, commercial organization) are very few, which is quite different from the European status, where there is a large number of organized ELWUA in addition to the unorganized ones.** For example, the community gardens in Europe are usually initiated and well organized by the community members collectively with common rules although it is normally a bottom-up initiative. And the allotment gardens usually stem from municipal initiatives on public land and their regulation are highly formalized and precise, sometimes even following specific regional or national laws.
- (3) The informal ELWUA is widespread both in European cities and in Beijing, but in Beijing most of the informal ELWUA are in individual mode, while in Europe, the informal ELWUA built under self-managed mode of group organization are also very common and popular nowadays.** Take the informal community garden in Europe, which are bottom-up initiated and managed by a group of people, as an example. The urban gardeners usually don't have land use permission when they started the gardening activities, but many such kind of informal community garden are organized very well. The Prinzessinnengarten in Berlin's Kreuzberg district, Germany (Figure 8.3) is such an example.
- (4) Many of the professional organized ELWUA by government, departments or**

**social organizations in Europe are provided for the urban residents' long-term participation or cultivation, such as the allotment garden, community garden, social farms and fruit trees, whereas in Beijing there is a lack of interaction between urban residents and ELWUA; most of them are only built for greening or just for urban residents' short term farming experience.** Take the fruit trees along the avenue as an example, the edible avenue trees in Beijing are only planted for urban greening, while numerous cities in Europe allow people's interaction with the edible avenue trees. For example, the city of Nantes and Strasbourg in France have promoted healthy diets by planting fruit trees in the city centre, inviting urban dwellers to help themselves to the fruits, thus encouraging them to look at food production in a different way and to change their eating habits (Nail 2015).

**(5) There are more government involved ELWUA in Europe than in Beijing.**

Although it is not universal in all European cities, and the institutional framework in many European cases is still a limitation to the development of ELWUA (for example, the struggles often occurred between the authorities and the "urban gardeners"), government in many European cities have started to support the ELWUA initiatives. For example, Lausanne's authorities have provided cultivation plots of 6 to 48 m<sup>2</sup> in densely-built areas for approximately 260 inhabitants since 1996. In addition, many cities have started consultation services to support urban gardeners and are promoting urban gardening initiatives by awarding prizes. For example, the community garden "Stadtacker Wagenhellen" in Stuttgart, Germany, which is a bottom-up urban gardening project initiated by a group of people, has won two prizes: "1. Prize of the Environment Prize of Stuttgart in 2012 (Umweltpreis Stuttgart 2012)" and "The Prize of the City Beautification Competition of Stuttgart in 2015 (Wettbewerb Stadtverschönerung Stuttgart 2015)", which were awarded by the mayor of Stuttgart (Figure 8.5). Furthermore, in some European cities policies have been put forward to support the development of ELWUA. For example, since 2012, "productive landscape" has been included as a development aim in Berlin's open space planning strategy (SenStadt 2012). In London, the report *Cultivating the Capital* was proposed by the London Assembly to call on the mayor to integrate urban agriculture into waste, water and energy policies and empower boroughs to encourage growing spaces on housing developments, rooftops and vacant land in the Green Belt (London Assembly 2010). The information above indicated that they have moved food up the political and planning agenda (Morgan 2014). In Beijing, there is not any policy or regulations which could support ELWUA in Beijing, although the Beijing Green Roof Association, which was an social association established in 2006 and then incorporated into the Beijing Municipal Bureau of Landscape and Forestry, has started thinking about using edible landscapes for roof greening.





Figure 8. 5 Two prizes awarded to the community garden project “Stadtacker Wagenhallen”

© Stadtacker WAGENHALLEN

**(6) The internet food-growing network has been widely set up in European cities.** For example, some British cities, such as Brighton (Brighton and Hove Food Partnership [BHFP] 2012), Bristol (Bristol Food Network 2010), Leeds (Leeds Permaculture Network n.d.) and London (Sustain n.d.) have developed dedicated food-growing networks and programmes since 1999 (Bohn and Viljoen 2014). And in Austria, a virtual community garden network was also developed (Gartenpolylog 2007)<sup>52</sup>, **while it does not exist in China at present.**

From the comparison of the organization forms between European cities and Beijing above, we can find that the organization of the ELWUA in Beijing is still in its infant stages.

<sup>52</sup> <https://gartenpolylog.org/en/home>

Table 8. 3 The organization forms and the organizers' sector of different types of ELWUA existing in European cities and Beijing

Level	Types	European cities			Beijing		
		Organization form	Sector of the organizers	Organization form	Organization form	Sector of the organizers	
Urban food gardening	Family gardens	Individual mode	-	Individual mode	-	-	
	Allotment gardens	Professional organization	(Government) **	-	-	-	
	Educational gardens	Scientific and academic organization	Allotment garden associations	Scientific and academic organization	Government		
			Research institutions	Research institution			
Therapeutic gardens	Professional organization	Social institutions	Professional organization	Social institutions			
		Group of urban residents	-	-			
Community gardens	Self-managed mode of groups	Community members	Professional organization	Community neighborhood committees			
		(Government)**	Community-based organizations	Property management, (Volunteer association) **			
Squatter gardens/Guerrilla garden	Individual mode	-	Individual mode	-			
	Self-managed mode of groups	Group of urban residents	Self-managed mode of groups	Group of urban residents			
	Government	Developers	Government, Developers				
Urban public greening	Professional organization	Government	Professional organization	Government			
	Professional organization	Government	Professional organization	Government			
Urban farming	Commercial organization	Companies	-	-			
	Farmer-based associations	Farmer-based associations	-	-			

Leisure farms	Commercial organization	Companies Farmer-based associations	Commercial organization	Companies Group of farmers
Educational farms	Scientific and academic organization	Research institutions Educational institutions	-	-
Experimental farms	Scientific and academic organization	Research institutions	Scientific and academic organization	Research institutions
Social farms	Professional organization	Government Social associations	-	-
Therapeutic farms	Professional organization	Social institutions	-	-
Cultural heritage farms	Professional organization	Government	-	-
Agri-environmental farms	Professional organization	Government	-	-
Non urban oriented farming	Commercial organization	Companies Farmer-based associations	-	-

\*\* The stakeholders with “( )” means they exist in some cases not all the cases.

**Table 8. 4 The organization form of the ELWUA and their prevalence in European mega-cities and Beijing**

Organization form	Europe		Beijing	
	Examples	prevalence	Examples	prevalence
Bottom-up organized	Individual mode		Family garden	Family garden
	Formal	████	Guerrilla garden, squatter garden	Guerrilla garden, squatter garden
Group organized	Formal	████	Community garden	-
	Informal	████	Community garden, squatter	Guerrilla garden, squatter

Top-down	Officially organized	Professional organization	Community/residence based organizations	Formal	garden, guerrilla garden	garden,
			Community/residence based organizations	Formal	Community gardens, fruit trees	Community garden, fruit trees
			Social associations	Formal	Allotment garden, squatter garden, social farms	Squatter garden, community garden
			Government	Formal	Allotment garden, community garden, fruit trees, landscape gardens, social farms, therapeutic farms, cultural heritage farms, agri-environmental farms	Fruit trees, landscape gardens
			Social institutions	Formal	Therapeutic garden, fruit trees	Fruit trees
		Scientific and academic organization	(Government), Educational institutions	Formal	Educational garden, educational farm	Educational garden
		Commercial organization	Research institutions	Formal	Experimental farm	Educational garden
			Companies, (farmer-based associations)	Formal	Local food farm, leisure farm, none urban oriented farming	Leisure farm
			developers	Formal	Fruit trees	Fruit trees

\* The column "Prevalence" expresses the prevalence rate of "high" (■■■■), "medium" (■■■■), "low" (■■), "very low" (■) and "does not exist" (□) of certain organization of ELWUA. \*\* The stakeholders with "( )" means they exist in some cases not all the cases.

## **8.4 Comparison of the impetus and services**

There are some prevailing conclusions on the motivation and service of the ELWUA in the current literature, such as: “The urban agriculture, practiced in both developed and developing economies, often serves different purposes, for example, recreational or social in a developed, cash-based economy, but subsistence food production in a developing country (Pearson et al. 2010).” And: “In developing countries, urban agriculture is largely driven by economic demands, while in developed countries it is more likely to have arisen in response to social or recreational needs and desires (Howe, Bohn and Viljoen 2005).” However, the field survey in Beijing shows a difference with these conclusions above, and it indicates that subsistence food production does not seem to be a driving force for ELWUA in Beijing, and people cultivated mainly for leisure, health, food supplement and healthier food, which is similar to the developed countries. Actually, the “urban agriculture” mentioned in these conclusions mentioned above actually refers to the “suburban agriculture” or the “agriculture located in large and middle-sized cities” in the context of China. Except for the motivations mentioned above, the difference is, the resurgence of growing food in urban centers in western countries is also in response to concerns about the environment, food miles, rising food prices (Philips 2013), and unsustainable food trade regimes and trade policies. It is also because people want to enjoy cultivating beautiful green spaces and meeting local people (ebd). While in Beijing, people’s motivations for growing food are relative weak in these aspects.

Because there are fewer ELWUA types in Beijing and the prevalence of most ELWUA types are lower than Europe (Table 8.1), many potential ELWUA services could not be reflected in Beijing. For example, the short food supply chains could not be reflected because of the lack of local food farms; the service of supplying opportunities for special population groups could not be reflected because of the lack of the social farms. Moreover, even for those ELWUA types existing in both Beijing and European cities, because the amount of these ELWUA cases in Beijing, especially the organized ones, are much less than in Europe, the degree of the current existing ELWUA service is very limited in Beijing. However, these service gaps between Beijing and European cities also show a strong potential for a better future ELWUA development in Beijing.

## **8.5 Comparison of people’s attitudes towards ELWUA**

The interest in growing food in urban areas is increasing in both Europe and in China. However, there is still a big difference of people’s attitudes towards ELWUA under the two different contexts. The similarities and differences can be previously reflected from the attitudes of the public and the government. The result of a internet survey on the public’s attitudes towards growing food in cities, which was carried on in Lausanne,

Switzerland (Haller et al. 2013), could to some extent reflect the European situation.

Through comparing the attitudes towards ELWUA of the public and the government between European cities and Beijing (Table 8.5), we can find that:

**(1) The public in European cities has a higher awareness of the existence of the ELWUA than the public in Beijing.**

At present, “the emergence of food production as a commonly recognized activity within the urban context has started to transform urban agriculture from a theoretical concept with occasional, exceptional, experimental manifestations to a common phenomenon” (Nasr, Komisar and Gorgolewski 2015) in the European society. “All age groups and walks of life are getting involved in urban gardening” (Caggiano 2015), therefore, people are already familiar with the existence of the edible landscape within the urban area. A survey (n=269) which was carried out in 2010 showed that 2/3 citizens in Beijing haven't seen or have paid no attention to productive landscape in the intra-urban area of Beijing (Editorial Office of Landscape Architecture China 2010). And the internet survey (n=211) of this research which was carried out in 2013 also showed that there is a lack of awareness to the concept of ELWUA from the public. Furthermore, based on the result of the interviews, many Beijing citizens do not regard agriculture as a usual phenomenon within the urban area, and many people even still have the impression of “agriculture is a sign of social backwardness” and can't imagine the existence of the farming activities within the urban area.

**(2) Respondents hold general positive attitudes towards ELWUA both in Lausanne (representing European cities) and in Beijing.**

The survey (n=889) in Lausanne shows that the attitudes towards growing food in cities were generally positive: attitude towards micro-scale urban agriculture was favorable for 50.6 % of the respondents, towards meso-scale urban agriculture was favorable for 72.6%, and towards macro-scale urban agriculture was 27.0% favorable (Haller et al. 2013). Meanwhile, the internet questionnaire survey (n=211) in Beijing shows that the respondents' attitudes towards the ELWUA in Beijing were also generally positive: 64% of the respondents “like” the edible landscapes in Beijing. This phenomenon shows a social demand for the edible plants growing within the urban area both in European cities and in China as well.

**(3) More and more governments and municipalities in Europe have started giving support from policy and financial aspects to the ELWUA initiatives and moving urban agriculture up to the political and planning agenda, while in Beijing, there was a lack of awareness of ELWUA concept from the government, and the current regulations and planning policies work against growing food in urban areas.**

The support from government, whatever from national, state, city or local municipal level, is very important to the development of ELWUA. The region with the support of the governmental policy will greatly promote the development of its local ELWUA. For example, in Genoa (Italy), the local authorities have identified informal community gardens and have legalized their occupation of the land and granted the gardeners contracts. Likewise in densely-populated Paris (France), a program was set up in 2003 to assist with the creation of shared kitchen gardens, mostly on vacant municipal ground (Nail 2015). Reflecting the great popular demand, more than 70 shared kitchen gardens (jardins partages, JPs) have been created in Paris. They are set up on small public plots granted by the local authorities, and local associations manage the gardens (Caggiano 2015).

**Table 8. 5 The comparison of people’s attitudes towards ELWUA between European cities and Beijing**

<b>Group</b>	<b>European cities</b>	<b>Beijing (data from internet survey + interviews)</b>
General attitude of public	The public are already familiar with the existence of the ELWUA.	There is a lack of awareness of the existence of the ELWUA from the respondents
	The internet survey which was carried on in Lausanne, Switzerland (n=889) shows that the attitudes towards growing food in cities were generally positive (Haller et al. 2013).	The internet questionnaire survey (n=211) in Beijing indicates general positive attitudes towards the ELWUA in Beijing from the respondents.
Attitude of government	The bottom-up urban gardening initiatives are increasingly taken up by the local authorities since the early 2000s. For example, in Genoa (Italy), the local authorities have identified informal community gardens and have legalised their occupation of the land and granted the gardeners contracts. Likewise in Paris (France), a programme was set up in 2003 to assist with the creation of shared kitchen gardens, mostly on vacant municipal ground (Nail 2015). Lausanne’s authorities have provided cultivation plots of 6 to 48 m2 in densely-built areas for approximately 260 inhabitants since 1996 (Haller et al. 2013).	“It is forbidden to damage the public landscape, changing the land use of the public space occupying public land for private use without permission.” “There is not any policy to support the construction of edible landscape.” “It is unlikely to get a top-down policy or financial support to ELWUA from the government. “ (Source from: Semi-structured interview with governmental official in Beijing)

## **8.6 Comparison of the historical evolution of the ELWUA since the industrialization and urbanization**

The review of the history of growing food in cities in Chapter 2 shows that the edible landscape within the urban area has a long history, which could go back as far as the

traditional cities both in Europe and in China. However, the real large-scale farming activities of the public within the modern city started in parallel with the industrialization process and urbanization, and many of the edible landscapes which exist in the current urban space emerged from that time. Therefore, the study to the historical evolution of the ELWUA which emerged since the industrialization and urbanization could contribute to the understanding of the contemporary ELWUA. Furthermore, through comparing the historical evolution of the ELWUA between European cities and Beijing, we can understand the contemporary ELWUA in Beijing more comprehensively under a broader background (Figure 8.6).

The development of the ELWUA in Europe experienced several important and fluctuating periods. In the pre-industrial cities, food production and the built environment co-existed and farming activities were an integrated part of the urban life. In parallel with the industrialization processes and the associated migration from rural areas to the fast growing urban areas **in the 19<sup>th</sup> century**, urban gardens in Europe emerged in great numbers. Urban workers with rural identities and lifestyles “naturally” cultivated non-built areas, and large numbers of migrant gardens for underprivileged people emerged (Caggiano 2015). These urban gardens were built by people to produce part of their food themselves and to supplement meager incomes, and later the urban gardens were also built with the aim of pursuing entertainment and accessing nature for the underprivileged people. During World War I and II **between 1900 and 1945**, war was the biggest driving force to urban food production in Europe. In both World Wars, because of the threat of starvation, so called “war gardens” or “victory gardens” proliferated with the aim of increasing food output and reducing the pressure of food shortage. However, **since the postwar period in the 1950s**, along with the economic boom, the increased power of supermarkets and the global transportation of food, gardening in cities gradually lost its importance (Caggiano 2015). **In the early 1970s** the revival of urban food growing and some new forms of urban food growing activity emerged. The main reason for the revival seems to be a growing environmental ethic developed during the 1960s, for example, alternative lifestyles, and notions of self-sufficiency led to a renewed appreciation of urban food production (Howe, Bohn and Viljoen 2005). **In 1990s**, the concept of sustainability made the environmental benefits of urban agriculture gradually be identified and acknowledged by people, and large quantities of urban agriculture emerged or were preserved in developed countries in response to social or recreational needs and desires. The recent attention to urban agriculture **in the 21<sup>st</sup> century** covers more multifaceted needs and tendencies, and involves a great diversity of political, environmental, economic, social and educational issues (Caggiano 2015). Especially after the global financial crisis that broke out **in 2007 and 2008**, urban agriculture flourished and became an alternative strategy to face the economic crisis and urban shrinkage.

Comparing with the long history (more than 200 years) of the ELWUA in European modern cities, most of the ELWUA in Chinese modern cities is a new thing. Since the



Chinese industrialization and urbanization happened much later than Europe, most of the ELWUA which currently exist in Beijing emerged in the past 60 years. When China was founded in 1949, 89.4% of the Chinese people were farmers, who worked on the rural farmland surrounding the city, and at that time there wasn't much edible landscapes within the urban area except for some fruit trees or edible gardens in traditional courtyards (Siheyuan) especially in the royal families. **Since 1950s**, in order to achieve a fast urban greening, fruit trees with the characteristics of being cheap and fast-growing were widely planted in the urban area. **In 1960s**, in order to alleviate the national food shortage (Great Chinese Famine from 1958 to 1961), edible plants such as grain crops, vegetables and fruit trees were widely planted in parks and in nurseries. However, **in 1980s**, because of the guidelines of the government, the decorative woody shrubs and trees started to be mass planted and gradually replaced the edible plants. Except for a few cases, the ornamental plants became the protagonist of urban green space. The Chinese economic reform **in 1978** greatly promoted the economic development and urbanization in China. Especially after entering the phase of rapid urbanization **since 1992**, large quantities of people left the farm and moved to the modern residential areas with multi-storied buildings, which were usually dictated with a uniform landscaping tone with ornamental plants for the whole residential area. Most of them did not have outside open space any more to continue their cultivation, although many of them still want to. Therefore, some of them tried to make use of the space in or close to their houses to grow vegetable or fruit trees, which is the main reason why the informal edible landscape emerged within the urban area. **In 21st century**, along with the urban problems such as the food safety risks, environmental pollution and social problems during the rapid urbanization in China, and also with the influence of international urban agriculture concepts, more and more Chinese urban residents started realizing the multiple benefits of ELWUA, and started their farming activities within the urban area, but most of the practices are still exist in an informal way so far.



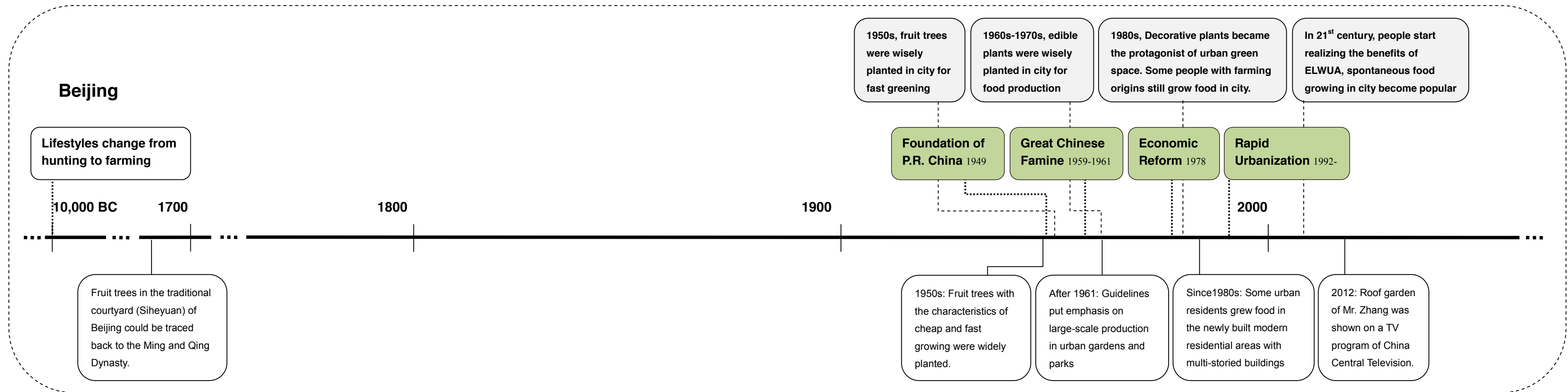
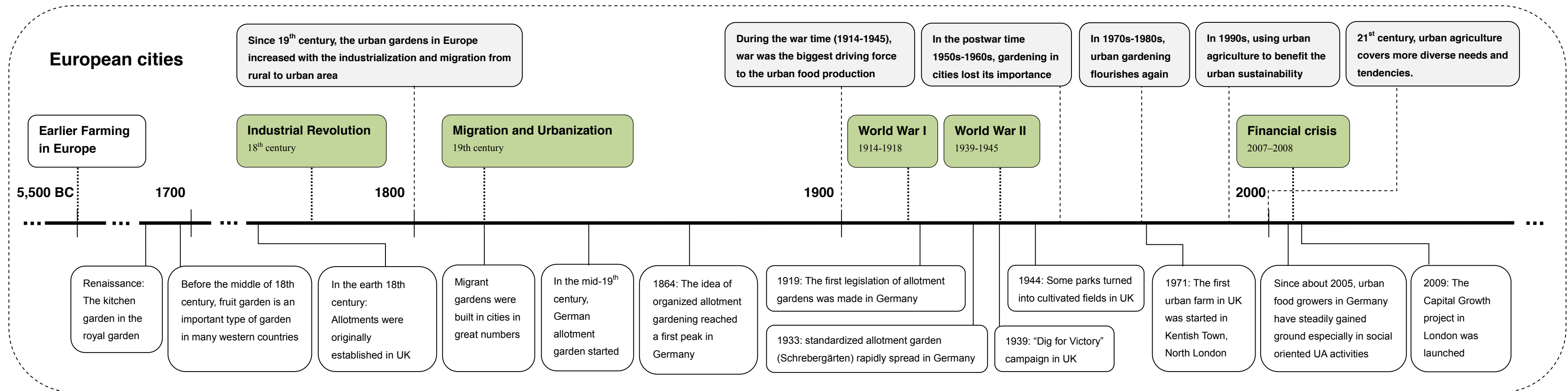


Figure 8. 6 The comparison of the historical evolution of the ELWUA between European cities and Beijing

The historical evolution of the ELWUA in Beijing indicates some similarities with the European cities: 1) many farming activities within the urban area were initiated by the people with rural origins, 2) the national food shortage was ever an impetus for growing food in cities, and 3) the motivations of growing food within cities have transferred from producing food for subsistence to getting the benefits beyond food production (e.g. for recreation, healthier food, etc.). Meanwhile, there are many differences of the ELWUA evolution between the two contexts: 1) the ELWUA in European modern cities have experienced a longer and more complicated evolution process than in modern Beijing, since the industrialization and urbanization happened earlier in Europe than in China, 2) during the past two hundred years since the industrialization in Europe, the ELWUA has shifted from being a sign of social backwardness to an instrument of improving urban environmental quality and human well-being (Ingersoll 2004), while in Beijing, since most of the ELWUA emerged in the last decades, which was not long ago, the ELWUA in China is still being perceived as informal, even a sign of social backwardness, although along with the fast-flowing new concepts on ELWUA with the background of the international age, more and more Chinese people have started realizing the benefits of ELWUA and accepting them. As a new phenomenon under the particular background, the ELWUA in Beijing has its uniqueness; at the moment diverse attitudes towards ELWUA exist, and ELWUA is still a controversial topic in China; 3) The motivations for growing food in European cities have evolved from the stage of “for food producing”, then, through the stage of “for recreation, food healthier food and social benefits”, and at present to “the concerns about the environment, food miles, rising food prices, unsustainable food trade regimes and trade policies, and social justice, etc”., while in Beijing, people’s motivations for growing food are still in the second stage, such as for health, recreation and healthier food, etc. Maslow’s theory of hierarchy of needs (Maslow 1943) could help to explain this phenomenon (Figure 8.7).

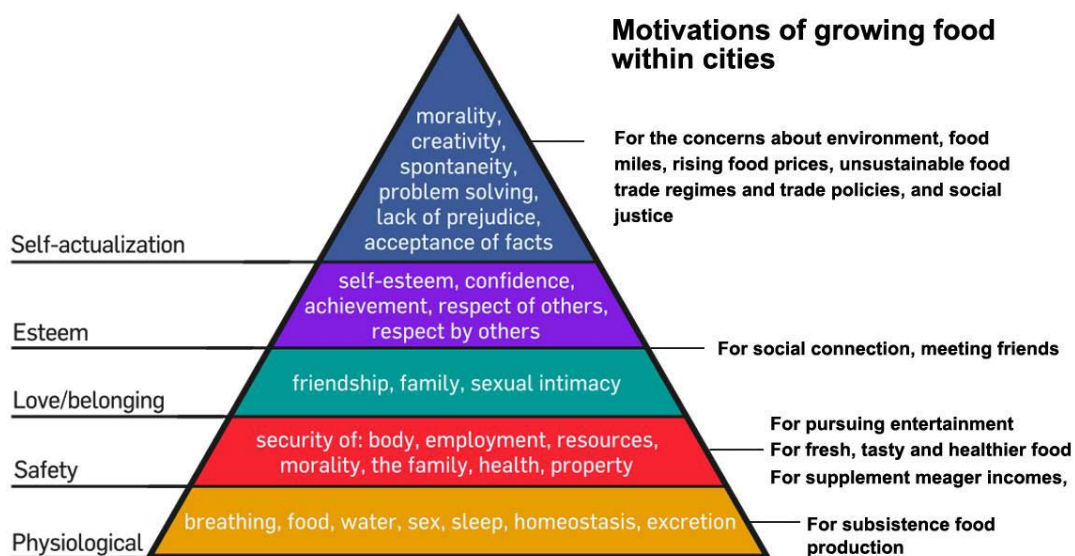


Figure 8. 7 The motivations of growing food within cities explained by Maslow’s hierarchy of needs

Adapt from Maslow, A., 1943

The comparison of the historical evolution of the ELWUA in modern cities of Europe and in modern Beijing city also can partly explain the reasons for the other differences of the contemporary ELWUA under the two contexts (types, spatial distribution, organization form, impetus and service, and people's attitude), which have been analyzed above.

## **8.7 The particular characteristics and challenges of the contemporary ELWUA in Beijing**

### **8.7.1 The particular characteristics**

China's contemporary ELWUA mainly emerged along with the urbanization process after industrialization especially after the Chinese economic reform in 1978. It embedded in the particular Chinese context and has its own characteristics. The field survey shows that ELWUA in Beijing is an approach of the urban dwellers that are away from the rural landscape to pursuit leisure and healthy lifestyle, to access healthy and affordable food, and to enjoy cultivating experience and connect with nature in the 21<sup>st</sup> century. However, comparing with the contemporary ELWUA in European cities, the development of ELWUA in Beijing is still in the early stage.

- 1) There are large quantities of ELWUA which were spontaneously cultivated by the urban dwellers existing in Beijing, in which, except for some family garden which are located the private space, most of them are the informal guerrilla gardens, which are usually a temporary activity without security guarantee.
- 2) Most of the existing ELWUA in Beijing is located in private space and semi-public space, only a few are located in urban public space. Moreover, most of them are located in the residential areas.
- 3) Most of the ELWUA is bottom-up, spontaneous activities of the urban dwellers, and there is a large proportion of aged retirees in the "spontaneous urban farmers". Only a few were built under formal organization, in which, except for the commercial ELWUA, most of them were built only for public greening or exhibition but not for cultivation.
- 4) There is a high demand of growing food within the urban area from the urban residents. However, there is a disparity of the perception and attitudes towards ELWUA between the public and the government or other administrations of urban landscape.
- 5) There are still a lot of potential ELWUA services which could contribute to the urban healthy development and the well-being of people in Beijing.

### **8.7.2 The challenges**

The survey to people's attitudes towards edible landscapes within the urban area of

Beijing and the comparison with the ELWUA cases in European cities allow us to identify the challenges of the development of ELWUA in China.

### **ELWUA is neglected even excluded from the urban landscape planning by urban authorities**

Along with the economic development and social progress during the Chinese rapid urbanization, the quality of the environment and landscape has been greatly improved. However, the current landscape planning and design in China is mainly biased in pursuit of a high urban greening rate and visual effects, but ignores the urban residents' real demands, in which growing food is one of the demands. The internet questionnaire survey (n=211) indicated that 61% of the respondents would grow food by themselves if they have a chance. But in reality, the edible landscape was neglected even excluded from the urban landscape by the urban authorities, and there is a lack of urban space and opportunities for the public to grow food. Although the urban residents usually spontaneously build informal guerrilla gardens, the government didn't take people's demand of growing food into the account during the urban construction process. On the contrary, most of the governmental departments, urban administrations, property management companies, and community neighborhood committees usually hold negative attitudes towards ELWUA and forbid the appearance of ELWUA especially those informal ones. Because the lack of a holistic understanding of the edible landscape, the government ignored and undervalued the value of edible landscape, and didn't consider it as a strategy for the sustainable urban development and improving people's quality of life. Therefore, there is a lack of supportive planning and municipal policy context to assist the development of ELWUA in China, and there are even some policies that make it harder and even impossible to build edible landscape within the urban area.

### **Perception of agriculture being inappropriate in a city and lack of vision**

Since the 1980s, along with the Chinese urbanization process, people's lives has undergone profound changes; large quantities of Chinese people moved from farmland in rural area to urban area, and they witnessed the big difference between rural activities and urban activities. In which, agriculture, the typical component of rural life, has been considered exclusively one attribute of rural area outside of the city limits. Therefore, in their eyes the idea of agriculture within the urban area seems inappropriate because agriculture is associated with dirt, poverty, odors and backwardness in rural areas, which does not match with the modern urban environment. This association brings many people's negative attitudes towards ELWUA. With the perception of agriculture being inappropriate in a city in mind, people lack the vision of using ELWUA to achieve multiple services from environmental, social and economic aspects. That's also the reason why there are many fewer ELWUA types than in European cities and why many ELWUA services

have not been reflected in Beijing.

### **Lack of space and land tenure uncertainties for ELWUA**

The main constraint to start edible landscaping is lack of space. The interview results show that a large part of the population would like to grow food or grow more food, but they lack space. Nowadays the land resource is exiguous in Beijing. The land within the densely urban area of Beijing represents very high value in terms of real estate. Both the city and estate developers expect to see a reasonable return on their land assets. However, if the land is used for food growing there will be a much lower economic return than the real estate investment; therefore, normally it will not happen that there will be a piece of special urban land for food growing without the intervention of the urban authorities. Most of the people who live in the multi-storey dwelling buildings have no space for food growing, therefore, those who want to grow food can only start their informal guerilla gardens in the semi-public space or public space. However, because the lack of secure tenure on land, the “urban hobby farmers” of guerilla gardens usually have conflicts with the urban administrative organizations, property management companies and community neighborhood committees, and the edible plants were often destroyed, cut and uprooted. Figure 8.8 shows the destruction process of two guerrilla gardens (Case A12 and Case C3).



CASE A12 No.6 Hai Dian South Road Dwelling (Before and after in October 2012 and October 2013)



CASE C3 River Revetment and Public Green Space along Sha River (Before and after in September and November 2013)

**Figure 8. 8 The demolishing process of the edible landscape**

### **Lack of organization, management and maintenance**

Many problems of the existing ELWUA in Beijing, which have been mentioned by the interviewees, were related to the lack of systematic organization, management and maintenance. For example, the problems in the spatial and visual aspect such as the

disordered cultivation of edible plants, the chaotic look of ELWUA, the withered ELWUA attacked by plant diseases and insect pests, the perception of untidiness; the environmental problems such as the unpleasant odor and unsanitary urban environment caused by improper usage of bio-fertilizers; the security problems which frequently occur to the ELWUA such as theft, vandalism and pet dog's harassment; and the social justice problems such as encroaching upon the public land without permission. All these problems might be caused by the lack of proper organization, management and maintenance. The edible landscape with improper organization, management and maintenance within the urban area would not contribute to the urban sustainability and the well-being of people, but would have harmful influence to it.

### **Lack of knowledge and technical guide**

Because of the particular and diverse growth feature of edible plants an edible landscape might easily fail for the lack of knowledge and technical support. The lack of basic agricultural knowledge, such as the soil type, temperature, irrigation volume and solar exposure which the edible plants require, would affect the healthy growth of the edible plants, which usually bring no or low food production and a bad visual effect. At the moment, the lack of knowledge and technical guide on how to garden is a challenge in the urban area of Beijing where most people have had no experience of agriculture or horticulture. The edible landscape which is built under the knowledge and technical guide on organic and sustainable agriculture, such as the collection of storm water for irrigation, could contribute to the urban sustainability; on the contrary, the farming activities without knowledge and technical guide might cause damage to the urban environment. For example, the improper use of chemical fertilizers or organic compost might pose threats to human health through water contamination and air pollution, which has been mentioned by many interviewees. Moreover, the lack of agricultural knowledge might lead to improper food growing activities, such as growing food in polluted area, thereby bring hazard on human health.

### **Challenge of combing the aesthetic value of ELWUA into urban landscape**

There is no doubt that a properly set edible landscape could offer beauty to urban residents, not only through beautiful scenery at blossom time which the ornamental landscape also can provide, but also through its special agricultural characteristics such as bearing fruits or producing vegetables. However, due to the different characteristics of edible plants with the ornamental plants, such as the short life cycle of some edible plants and the special care demands based on the crop growth feature, it is more complicated to build a beautiful edible landscape and avoid the possible negative visual effects. Therefore, how to achieve the aesthetic expectations of the ELWUA and gain the acceptance of the public through a set of scientific and professional design and maintenance approach becomes a challenge.



# Chapter 9 Conclusions and recommendations

## 9.1 Summary of the research

### Types of the ELWUA existing in Beijing

The ELWUA existing in Beijing could be classified into three main levels and nine types based on their comprehensive physical and social characteristics, which are: 1) the urban food gardening level, which includes family gardens, guerrilla gardens, community gardens, renting farming garden (called “Happy Farm”), educational/demonstration gardens and Danwei kitchen gardens; 2) the urban greening and landscaping level, which includes edible greening and landscaping with fruit trees and edible greening and landscaping with crops or vegetables; 3) the urban farming level, which includes agrotourists’ picking farms and experimental farms. Family gardens and guerrilla gardens, which are usually spontaneously built by individuals, account for the majority of the total ELWUA in Beijing, while the other types of ELWUA, which are usually built under organizations, are still very few.

### People’s perceptions

The internet questionnaire survey shows a lack of awareness of the existence of the ELWUA and generally positive attitudes towards the ELWUA in Beijing. Furthermore, the semi-structured interview during the field survey shows that people’s attitudes towards the ELWUA in Beijing varies with each of different groups which are related to the ELWUA (“urban farmers”, “neighbors”, initiators of the formally organized ELWUA, professional planners and designers, the staff in property management companies and community neighborhood committees, and the government officials). Of these, the “urban farmers”, the initiators and the professional planners and designers show general positive attitudes towards ELWUA; the “neighbors” has more critical opinions thereby shows a lower positive rate but still have generally positive attitudes towards ELWUA; meanwhile there are some obvious negative attitudes towards ELWUA coming from the property management companies, the community neighborhood committees; and on the side of the government there is a lack of awareness to the concept of ELWUA. No matter whether they hold positive or negative attitudes, each of the six groups of people reflected challenges and problems of the ELWUA. The interviews provided an overview of the major challenges for the introduction and implementation of ELWUA in Beijing from the perspective of the six groups of people interviewed, which are mainly on the following aspects: 1) spatial and visual, 2) environmental, 3) organizational, management and maintenance, 4) technological, 5) social equity, 6) regulations and 7) the dilemma of accepting the concept of ELWUA.

The different attitudes from the six groups indicated that 1) there is a social demand for the edible plants growing within the urban area; 2) while providing benefits to the “urban farmers”, the edible landscape also brought a negative impact even damaged the interests of “neighbors”, which need to be solved before the implementation of ELWUA; 3) the property management companies, community neighborhood committee and the government has not considered urban residents’ demands of food growing, but simply adopted the approach of “one size fits all” and excluded edible landscape from the urban landscape; 4) edible landscape is currently neglected from the urban planning and urban landscaping agenda in China; and 5) there is a lack of communication on the food growing issue between each other of the first four groups (“urban farmers”, “neighbors”, property management companies and community neighborhood committee, and government), a conflicting situation on the urban food growing issue was formed; and 6) professional designers and initiators of the formally organized ELWUA projects have great potential to act as the bridge between people’s demand of food growing and decision making on ELWUA.

## **Physical characteristics**

### *Spatial aspect*

The ELWUA in Beijing is mainly located in five types of urban spaces, which are: 1) the space in or around the residential area, 2) the Danwei precinct, 3) traffic space (street space, space along rivers, space along the rail network, space around the car park, etc.), 4) urban parks, and 5) multifunctional leisure farms at the edge of the urban area.

The ELWUA in or around the residential area might include the family garden, guerrilla garden, community garden, renting farming garden (named “Happy Farm”) and public greening with edible plants, which are usually in micro or meso scale; the ELWUA in the Danwei precinct might include the Danwei kitchen garden, educational/demonstration gardens, public greening with edible plants, which are usually in meso scale, and the experimental farm, which might be in macro scale; the ELWUA in traffic space might include the guerrilla garden and public greening with edible trees, which are usually in meso scale; the ELWUA in urban parks might include the educational/demonstration gardens, public greening with edible plants, which are usually in meso scale; the ELWUA in the multifunctional leisure farms at the edge of the urban area might include the renting farming garden and the tourists’ picking farm, which might be in meso or macro scale.

Of these, the ELWUA cases in or around the residential area account for the majority of the total ELWUA in Beijing, since there are numerous family gardens and guerrilla gardens widely distributed in those areas. Urban dwellers usually make use of the roof, balcony, facade, and the private courtyard of the residential buildings, the public

(green) space adjacent to the residential buildings, and the space outside but adjacent to the residential area for growing food. This phenomenon reveals that there is greater demand for growing food in residential areas.

As regards the spatial accessibility, except for a few organized ELWUA which are accessible by the public, such as the educational/demonstration plants/garden in urban parks, most of the EUWLA, including the family gardens, some guerrilla gardens, and the renting farming gardens, are usually enclosed and inaccessible to the public or are only accessible by some people.

### *Type of edible plants*

The edible plants within the urban area of Beijing are quite diverse. The field survey shows that more than 100 edible plant species were found planted within the urban area of Beijing. These edible plants could be generally categorized into six species based on different functions, which are the grain crops, the oil crops, the herbs/spices/condiments, the vegetables, the fruits, and the medicinal plants; and also could be categorized into four types based on their different forms' outward appearance, which are herbaceous plants, climbing plants, shrubs and trees.

Usually the edible plant species are selected flexibly based on the functional requirement of the urban area. For the edible landscape used for daily food consumption, such as the family garden, guerrilla garden, renting farming garden, Danwei kitchen garden and the agrotourists' picking farm, the common herbs, spices, vegetables and fruits are the commonly used edible plants, and the forms of these edible plants which might be made up of low herbaceous plants, climbing plants and trees. For the edible landscape built for urban (semi-)public space greening, fruit trees are the most selected edible plants, but in a few cases common herbs, vegetables or oil crops also might be used as decorative plants. For the edible landscape for demonstration or education, such as the educational/demonstration plants/garden, the selected edible plants might be grain crops, common herbs, spices, vegetables and fruits, which include the forms of low herbaceous plants, climbing plants and trees. For the edible landscape for scientific research, such as the experimental farm, the selected edible plants are mainly grain crops and oil crops.

### *Physical evolution*

The contemporary edible landscapes existing within the urban area of Beijing have evolved in three types according to the order they emerged in the urbanized area, which are the edible landscape already in the city before the urbanization in the modern sense (such as the family garden in traditional courtyards), the edible landscape swallowed by the expanding city (such as the experimental farm, the agrotourists' picking farm and the renting farming garden at the edge of city) and the edible landscape which emerged in the urbanizing or urbanized area (such as the

family garden in the modern residential area, the guerrilla garden, the community garden, the renting farming garden attached to the residential area, the educational/demonstration garden, the Danwei kitchen garden, the urban greening with edible plants). Of these, most of the ELWUA belong to the third type. In which, the guerrilla gardens mainly emerged during the fast urbanization progress since the reform and open up policy was carried out in 1978. Since the appearance of issues such as environmental pollution and food safety problems in the course of China's rapid urbanization, there has been an upsurge of growing food in cities especially since the 2000s.

### *Materials and technology*

For the ELWUA created for food consumption, especially those spontaneous ELWUA, simplified farming tools and materials (e.g. the recycled materials) and self-learnt or -created technologies (for irrigation, fertilization, and disease and pest control, etc.) were commonly used. For example, urban citizens usually stored the rainwater and grey water in containers for irrigation; some of them used self-made compost as fertilizer. In the organized ELWUA, such as the renting farming garden, uniform farming tools and materials are usually equipped for the “urban gardeners” by the organizers, and a professional technological guide is also supplied as an attached service. For the ELWUA type which is built for purposes of education, scientific research or achieving public greening, the farming activities were usually completed by professional urban gardeners or farmers equipped with professional gardening and farming tools.

### **Social characteristics**

#### *“Urban farmers”*

The survey in Beijing shows that there are three types of “urban farmers” who carry out farming activities within the urban area: the “urban hobby farmers”, which refers to the urban dwellers who grow food in the urban area as an avocation for individual use; the “professional urban gardeners”, whose job is cultivating and maintaining the edible plants; and the “experiential urban farmers”, which refers to the people who do not engage with urban farming activity regularly but only participate in selected activities as an experience. The interviews show that the “urban hobby farmers” come from a wide range of professions and show no significant gender preference. They are composed of urban dwellers of different ages, including young people (<44, 10%), middle-aged people (45-59, 33%), old people (60-74, 35%) and very old people (>75, 21%), and retirement aged people hold a majority percentage.

#### *Organizational forms*

The organization forms of the ELWUA in Beijing can be divided into five types, which

are the 1) individual mode, 2) self-managed mode of group organization, 3) professional organization by Danwei or social organizations, 4) scientific and academic organization, and 5) commercial organization. Of these, the first two are bottom-up spontaneous mode, and the last three are top-down official organized modes. The field survey shows that most of the ELWUA in Beijing are built in the individual mode, while the ELWUA cases in organized mode (including the bottom-up group organization and the top-down official organization) are very rare. Moreover, in the bottom-up spontaneous activities, the informal ELWUA is widespread. This phenomenon could be interpreted to mean the ELWUA in Beijing is still in the early stages.

### *Motivations*

The impetus for the emergence of the bottom-up ELWUA in Beijing mainly comes from the urban residents' individual motivations, such as for leisure, health, food supplement and healthier food. In particular, the purpose of pure food production is often perceived as a secondary benefit. This perception can be explained by the fact that along with the economic development, Chinese people have generally established regional food chains and solved the food access issue. For the top-down organized ELWUA, the governmental, commercial and other organizations and designers gave an impetus for its emergence during the rapid urbanization of China, which is mainly for public (or collective) interests or commercial benefits and driven by the social demands.

### **ELWUA Services**

The contemporary ELWUA in Beijing provides multiple services for the urban residents. The services of the ELWUA in Beijing can be classified into the following eight types, including 1) provision services, 2) environmental services, 3) social services, 4) health services, 5) economic services, 6) recreational services, 7) educational services and 8) cultural services. The provision services mainly include provision of 1) food, 2) medicinal materials and 3) materials for ornaments, handicrafts or daily use; the environmental services mainly include 1) producing environmental amenities, 2) local waste recycling, 3) energy saving on food-related transportation, and 4) increasing plant diversity; the social services mainly include 1) promoting social interaction, 2) relieving the loneliness of the aged, and 3) promoting social integration; the health services can be generally divided into four aspects, including 1) better quality (organic, fresh, and tasty) food intake, 2) improving dietary diversity and dietary habit, 3) improving physical health and 4) improving mental health; the economic services mainly include 1) family economizing in food consuming and energy consuming (heating and cooling, and "food miles"), 2) increase in real-estate value, 3) cost saving in urban landscape construction, 4) promoting new business related to agriculture in city, and 5) job/employment opportunities; the leisure and recreation services mainly include two categories, which

are 1) individual leisure and 2) organized recreation activities respectively; the educational services might be reflected from the following aspects: 1) popularization of agricultural knowledge and farming skill, 2) promoting awareness about food, health and environment, 3) supporting teaching, research and experiment, and 4) enlightenment; and the cultural services might be reflected from the following aspects: 1) exhibition of farming culture, 2) developing a sense of place, inspiration, and 3) aesthetic enjoyment.

### **The similarities and differences with European cases**

The comparison of the ELWUA between Beijing and European cities allows us to find out the similarities and differences of ELWUA under the two different contexts. The similarities mainly include: 1) there is an upsurge of growing food in cities in both context in recent decades; 2) many people cultivate for leisure, health, food supplement and healthier food rather than for subsistence. Meanwhile, many differences of the ELWUA between the two contexts were found out, which mainly include the following aspects: 1) the ELWUA types which exist in European cities is more diverse than in Beijing; 2) there is more ELWUA which is located in the public space in European cities than in Beijing; 3) there is more organized, more top-down, more government involvement and more informal organized ELWUA initiatives in European cities than in Beijing, and meanwhile, there is more organized ELWUA for urban residents' long-term cultivation in European cities than in Beijing; 4) many ELWUA services which benefit to the European cities have not been reflected in Beijing; 5) from the European's perception, urban agriculture has already become a common social phenomenon, while in Beijing, ELWUA is still a marginal concept, therefore, there are more positive attitudes from the public in European cities than Beijing; 6) more and more governments and municipalities in Europe have started moving urban agriculture up to the political and planning agenda and giving support from policy and financial aspects, while in Beijing, "There was not any policy to support the construction of edible landscape"; 7) the contemporary ELWUA in European cities, which mainly emerged since industrialization, have experienced a longer and more complicated evolution process than in Beijing.

## **9.2 The essence and significance of the ELWUA in Beijing**

The findings above show that the contemporary edible landscape existing within the urban area of Beijing is mainly a phenomenon that emerged along with the modern urbanization process of China, especially during the rapid urbanization after the Chinese economic reform in 1978. It is a response of the urban dwellers that are living away from the rural landscape and nature for pursuing a pastoral and healthy life, rather than only simply an initiative for food production. Growing food within the urban area in Beijing is mainly urban residents' spontaneous activities and it is inseparable from the daily life demands of the Chinese urban dwellers. It is a natural phenomenon

embedded in the Chinese cultivation culture and rooted in the Chinese rapid urbanization process. The ELWUA in Beijing can supply multiple services for urban citizens from environmental, social, economic and aesthetic aspects, including provision service, environmental service, social service, health service, economic service, leisure and recreation service, educational service and cultural service. However, comparing with the tremendous increasing upsurge of new concept, research, initiatives and practical projects on the ELWUA in European countries, to date the development of ELWUA in China is still in its infancy and has its own characteristics, which could be reflected in: 1) family gardens and informal guerrilla gardens, which are usually built by individuals, account for the majority of the total ELWUA in Beijing, 2) most of the ELWUA in Beijing is located in private space or semi-public space, 3) most of the ELWUA is bottom-up spontaneous activities of the urban dwellers, only a few were built under formal organization, in which, most of them were built only for public greening but not for people's cultivation, 4) there is a large proportion of aged retirees in the spontaneous "urban hobby farmers", 5) there is a high demand for growing food within the urban area from the urban residents, but ELWUA still belongs to a marginalized concept, and there is a disparity of the perception and attitudes towards ELWUA between the public and the government or other administrations of urban landscape, 6) a lot of potential ELWUA services which could contribute to the urban healthy development and the well-being of people are still waiting to be recognized, explored and applied. Although the development of ELWUA in China is still at an early stage, as urban residents' spontaneous, instinctive and creative approach for pursuing healthy and better life, ELWUA has its strong vitality.

## **9.3 Recommendations**

The recommendations are proposed based on the understanding of the status, particular characteristics and challenges of the existing ELWUA in Beijing. They aim to develop a sustainable urban development and a healthy relationship between urban living and nature using edible landscapes in Beijing and other metropolitan cities in China.

### **9.3.1 Integrating ELWUA as ordinary urban practice and component of the urban landscape**

#### **9.3.1.1 Transition of conception on ELWUA**

The survey reveals the urban dwellers' willingness of to grow food within the urban area, and also indicates that ELWUA is just the everyday urban practices of the urban dwellers. They may grow food or simply enjoy the presence of production sites within the urban area. Moreover, many pioneer ELWUA cases in Beijing and European cities

proved that edible landscape is indeed an alternative sustainable approach for creating healthy cities and human well-being. However, the long-term benefits of ELWUA were often neglected, and the current ordinances and policies in Beijing make it harder and even impossible to build them within the city limits. Faced with the challenge of the current perceptions to ELWUA in Beijing, a conception transition from decorative to productive is needed from both the urban authorities and the public. The urban authorities, including governmental department, urban planning department, and municipal management department, etc., should recognize the directly and potential benefits of ELWUA to the urban residents, and consider ELWUA as an ordinary urban practice and integrate it as an ordinary part of the urban landscape. Moreover, urban authorities have obligation to supply popular science to the public for a better understanding of the ELWUA benefits.

### **9.3.1.2 Support and promotion by urban authorities**

Urban dwellers could obtain multiple benefits which could improve their quality of life from the ELWUA: urban population can harvest fresh and healthier food, get the chance for recreation, communication and connecting with nature, and the aged people can get rid of the depressed mood and loneliness after retiring, etc. Moreover, ELWUA is estimated to play a crucial role in the urban food system in future. Therefore, the urban authorities should allow the existing of the ELWUA, give urban citizens permission of growing food within the urban area and use ELWUA as a strategy for promoting the human well-being. Moreover, for the abundantly existing informal ELWUA, urban authorities should try to improve them and lead them to a proper way, which not only meet people's demands but also avoid the adverse effect on the surrounding community and environment through uniform guide, organization and assistant, rather than just demolish them in a crude and oversimplified way.

### **9.3.1.3 Policies to recognize and support ELWUA in future**

Many of the services of ELWUA are important for urban policy making and planning. After completing the conception transition on ELWUA, the government should consider formulating policies to recognize and support ELWUA, and even integrating ELWUA into the urban planning system in future. In this way, a secure tenure on land could be obtained by the urban residents, which will be a warranty to the labour of the "urban farmers". With the support of the policy, more social actors such as NGOs, developers, municipal associations would be willing to supply support to the ELWUA. For example, 10 American cities, including Chicago, Portland, Austin, Boston, Cleveland, Chicago, Seattle, Baltimore, Milwaukee and Minneapolis, have led the way with urban agriculture ordinances which made great strides in allowing and inviting edible landscaping to occur within the city limits (Seedstock 2014).



### **9.3.2 Making use of the potential urban space for ELWUA**

The survey shows that the shortage of space is one of the main constraints for starting ELWUA in Beijing. Therefore, recommendations are particularly proposed from the spatial aspect.

#### **9.3.2.1 Recommendations on the aspect of overall urban spatial planning**

The research into the spatial revolution of the ELWUA in Beijing shows that the contemporary edible landscapes existing within the urban area of Beijing can be divided into three types by their emerging order along with the Chinese modern urbanization, which are the edible landscape already in the city before the modern urbanization (the foundation of the P.R. China in 1949), the edible landscape swallowed by expanding city and the edible landscape emerging in the city. The evolution process inspires three possible space utilization modes of the future ELWUA development from the overall urban spatial planning aspect, which are 1) preserving or transforming the existing productive space in the urbanized area, 2) preserving the productive space under urbanizing process, and 3) creating new ELWUA in the urbanized space.

#### **Preserving or transforming the existing productive space in the urbanized area**

The survey shows that there are already numerous edible landscapes existing within the urban area of Beijing, including both a small number of well-organized ones and large quantities of disorganized ones. For the former type, such as some demonstration/educational gardens and some renting farming gardens, we should try to preserve them; while the later type could be improved and better used to supply better multiple services to the urban dwellers through implementing proper organization and management. For example, at the moment, there are large quantities of informal guerrilla gardens existing in Beijing, which are usually a temporary activity without land tenure guarantee. Because of a lack of necessary guides, planning and management, these informal ELWUA usually easily cause some environmental and social problems such as environmental pollution, social inequity and conflicts with municipal managers. Facing with this situation, if the informal ELWUA could be improved by a proper organization, it could not only meet the urban residents' demand for growing food, but also supply the urban residents with fresh food, beautiful green environment, harmonious community and educational chances, etc. Take the fruit trees existing within the urban area of Beijing as another example. Currently, the fruit trees within the urban area are mainly used for urban greening. Every year when the fruits become mature, they might create a messy ground surface, and cleaning will become a big burden for the urban gardeners. In this situation, a proper organization of food harvest and food distribution could not only solve the problems above but also supply the urban residents with fresh fruits, opportunities for

farming experience and educational opportunities.

### **Preserving the productive space under urbanizing process**

The farmland being swallowed by urbanization could be preserved as the ELWUA. For example, the original farmland, vegetable garden or orchard could be reserved and transformed into the commercial leisure farms. Even though the original productive land could not escape the fate of being swallowed by the urbanized area, it also could be preserved in the gap between buildings in fragment pattern. The preserved farmland, vegetable garden or orchard could not only keep the relationship between farmland and the original farmers, but also save the urban greening cost for the municipals and supply multiple services to the urban dwellers. The economic and technological development zones in Qingdao, China is such an example (Figure 9.1).



Figure 9. 1 The preserved edible landscape in the new development zone in Qingdao, China

### **Creating new ELWUA in the urbanized space**

In the already urbanized space, new ELWUA projects could be constructed in the suitable space and supply multiple services for urban residents. Take the degraded urban green area as an example. The field survey in Beijing indicated that at the moment there is a lot of urban green space which has been severely degraded due to lack of maintenance and management especially in residential area. In this situation, a transition from decorative to productive ELWUA, could not only rebuild the degraded green space but also supply the urban residents with fresh fruits, opportunities for farming experience and educational opportunities. The Min Kang Residential Area No.30 (Case A14) is such an example (Figure 9.2).



Figure 9. 2 The demonstration food garden in Min Kang Residential Area No.30 (Case A14)

### 9.3.2.2 Recommendations of the potential urban space for creating new ELWUA and possible types

Edible landscape is an adaptive and flexible component of urban landscapes. The edible plants can be grown in a broad spectrum of spaces both in the private and public space. Based on the result of the field survey in Beijing, the potential urban space for ELWUA can be divided into the following types: 1) residential areas, 2) Danwei precinct, 3) traffic space, 4) urban parks and urban public green space, 5) urban plaza and Pedestrian Street, and 6) temporary urban vacant space. And the possible ELWUA types are presented as following. Moreover, the suitability of the optional ELWUA types for different potential urban space has been assessed (Table 9.1). The assessment is highly subjective based on the opinions of the author and interviewees, therefore, further detailed assessments will be required to check whether any recommended ELWUA type is feasible in the given situation or not.

#### Residential areas

The field survey in Beijing shows that the residential areas are where the ELWUA is most widely distributed, which reveals that there are more demands for growing food here. A survey on the preference to the productive landscape which was carried out in 2010 also shows that more of the public expect the productive landscape to appear close to the residential area which is more related with their everyday life (Editorial Office of Landscape Architecture China 2010). Therefore, the residential area has great potential in developing ELWUA. In the new residential area planning, ELWUA could be integrated as one component of the attached support facilities and infrastructures. For the existing residential areas, the space including roof, balcony and facades of the buildings, the private courtyards, the space around the buildings, the public (green) space of the residential area could be used for integrating edible plants. Many interviewees reflected that they would like to grow food, but they lack

space. However, Mel Bartholomew from the United States estimated that a 1.2m×1.2m square is enough for a mini intensively planted vegetable gardens. His “Square Food Gardening” program which is a revolutionary way to grow more in less space which might help the urban dwellers to realize their pastoral dreams (Figure 9.3). The possible ELWUA types in residential areas might include: family garden, community garden, renting farming garden (“Happy Farm”), educational garden, demonstration garden, urban greening with edible plants (fruit trees, vegetables, crops, etc.).



**Figure 9. 3 Square foot gardening**

Source: Bartholomew, M., 2013

### **Danwei precinct**

Danwei such as schools, hospitals, government and factories, could consider integrating ELWUA in the precinct to supply multiple ELWUA services for people. The possible ELWUA types in Danwei precinct might include: community garden, renting farming garden (“Happy Farm”), educational garden, demonstration garden, Danwei kitchen garden and urban greening with edible plants (fruit trees, crops, vegetables etc.). Taking the Fangshan Campus of Beijing No.4 High School as an example, which was designed by the OPEN Architecture and located in the centre of a new town just outside the southwest fifth ring road in Beijing, the roof-top of the upper building was designed to be an organic farm (educational garden, kitchen garden), with 36 plots for the 36-classes of students in the school, providing students the chance to learn the agricultural knowledge and farming techniques, and also paying tribute to the site’s pastoral past (OPEN Architecture 2014) (Figure 9.4).





Figure 9. 4 Beijing No.4 High School Fangshan Campus

© OPEN Architecture

### **Traffic space**

The traffic space such as the space along rivers and rail networks, and parking lots could consider integrating ELWUA for supplying urban residents multiple ELWUA services. The possible ELWUA types in traffic space might include: educational gardens, demonstration gardens and urban greening with fruit trees, vegetables and crops.

### **Urban parks and urban public green space**

Urban parks and public green space have great potential for edible landscape. The possible ELWUA types might include: community garden, renting farming garden (“Happy Farm”), educational garden, demonstration garden, kitchen garden and urban greening with edible plants (fruit trees, crops, etc.). The edible landscape in the public space in Andernach, a city with a history of more than 2000 years and is known as the Edible City in Germany since 2010, was taken as an example (Figure 9.5). The edible plants such as herbs, vegetables and fruits, and also the cut flowers are widely cultivated in the public green spaces in the historic urban central area for residents. Urban dwellers can pick the fruits and vegetables freely. In addition to producing fresh produce, varieties of edible plants especially those old forgotten varieties are planted in this area, which can popularize the biodiversity of food crops to urban residents.



Figure 9. 5 The edible landscape in traditional urban space of Andernach, Germany

### Urban plaza and Pedestrian street

The possible ELWUA types in urban plazas and pedestrian streets might include: community garden, educational garden, demonstration garden and urban greening with edible plants (fruit trees, bushes, vegetable and crops, etc.). Since the urban plazas and pedestrian streets are normally hard spaces with very little bare soil, containers could be used for growing the plants. The edible demonstration container in Karlsruhe, Germany is such an example (Figure 9.6).



Figure 9. 6 The edible demonstration container in Karlsruhe, Germany

### Temporary urban vacant space

There are two types of vacant space within the urban area; one is the vacant space waiting for transformation and planning or in dispute, and the other one is the vacant space with a lack of management. For the urban vacant space it's better to make use of them with the temporary ELWUA servicing the public than to waste them as empty. The possible ELWUA types in temporary urban vacant space might include: temporary community gardens and demonstration gardens. The community garden in

Stuttgart, Germany is such an example (Figure 9.7).



Figure 9. 7 The community garden “Stadtacker Wagenhallen” in Stuttgart, Germany

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In addition to the proposed ELWUA types above, there are also other possibilities for the development of ELWUA in future. For example, the architects in the Agriculture Urbanism Lab in Paris, France and the research team of Dickson Despommier, who an American environmentalist who first proposed the concept of “vertical farming” in 1999, have proposed 11 schemes on future urban agriculture, which are: vertical tower, mini farm, agro-urban park, terrace farm, super farm, tridi farm, musical farm, rooftop farm, vertical landscape, urbannana and educational farm<sup>53</sup>. As the economy and society develops in China, it is believed that more varieties of ELWUA might appear in future.

### 9.3.2.3 Establishing regulations and guidance of edible landscape

Edible landscapes within the urban area can bring multiple services to urban residents; however, it is not the more the better. The informal edible gardens out of control will encroach on the public green space, intrude the public benefits and bring conflicts between the urban gardeners and other people or governmental authorities. Therefore, restrictions and guidance of land usage for ELWUA initiatives need to be established to regulate urban residents’ informal farming activities in public urban space.

<sup>53</sup> Source: <http://www.lens-china.org/index.php?m=content&c=index&a=show&catid=19&id=121>.

Table 9. 1 Suitability of ELWUA type options for different types of potential urban space for creating new ELWUA

Categories of ELWUA in Beijing	Residential area	Danwei precinct	Traffic space	Urban parks/public green space	Urban plazas/		Temporary urban vacant space
					Street	Pedestrian	
Urban food gardening	★★★★	☆	☆	☆	☆	☆	☆
Family garden	★★★★	☆	☆	☆	☆	☆	☆
Community garden	★★★★	★★★★	★★	★★	★★	★	★★
Renting farming garden (entitled "Happy Farm")	★★★★	☆	★	★	★	☆	☆
Educational garden	★★★★	★★★★	★★	★★	★★	★	☆
Demonstration garden	★★★★	★★★★	★★	★★	★★	★★	★★
Kitchen garden	★	★★★★	★	★	★	★	☆
Urban food greening with fruit trees, bushes	★★★★	★★★★	★★★★	★★★★	★★★★	★★	☆
Urban greening with crops, vegetables, etc.	★★★★	★	★★	★★★	★★★	★	☆

Note: The suitability of the ELWUA options for different types of potential urban space for creating new ELWUA is "high" (★★★★), "medium" (★★★), "low" (★★) and "not applicable" (☆).



### 9.3.3 Formulate systematic guide to the ELWUA implementation

ELWUA can supply multiple services to urban residents, but in order to realize these services, some critical and challenging realities need to be addressed through formulating and following a systematic guide to the implementation of the ELWUA. The survey indicated that during the implementation of ELWUA, the absence of any of the following procedures including planning, organization, management and maintenance might easily lead to environmental, social or visual problems; therefore, these aspects should be involved in the ELWUA planning. Moreover, the edible landscape is a complex and dynamic system, which evolves quickly and never appears the same through the years. The lack of response to the changes will easily lead to the failure of ELWUA. For example, an edible garden might easily become deserted for neglect of weeding and nursing even just within a few days; the ground surface will become bare if there is no timely alternation of plants; the participants might abandon cultivation for different reasons such as having no time, lack of guide for gardening skill; if not reorganized in time, the edible land will be wasted. Therefore, the procedure of monitoring, evaluating and giving feedback should be set in the planning and implementation process of ELWUA, creating a circular process rather than a linear process with an end. Based on the analysis above, a systematic looped implementation model of ELWUA is formed, which includes the following procedures: 1) planning, 2) building, 3) maintenance and management, 4) monitoring, evaluation and giving feedback (Figure 9.8). The process should not be a linear one with an end but an adaptable circular network.

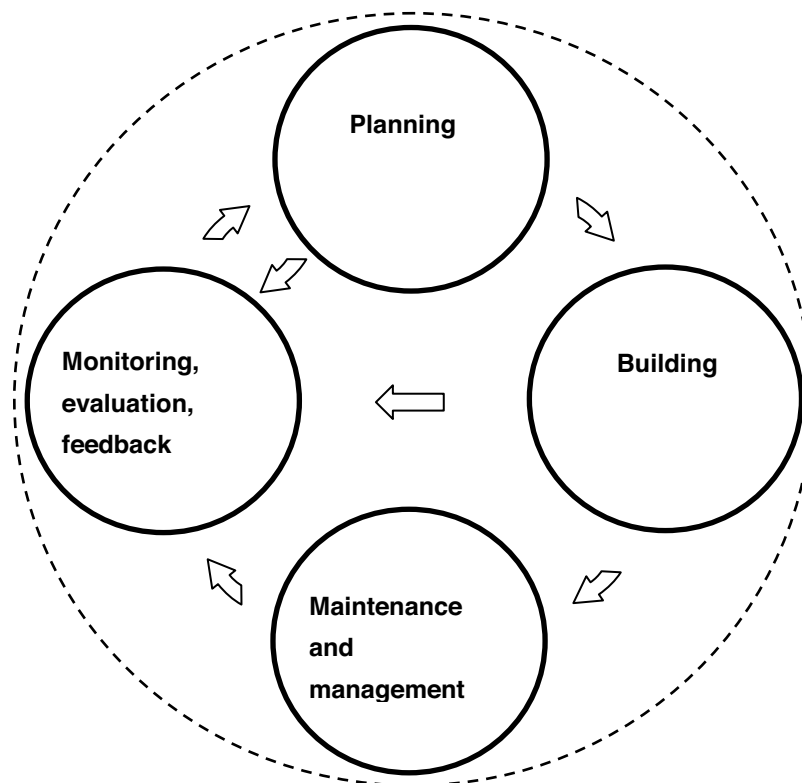


Figure 9. 8 The looped implementation model of ELWUA

Procedure 1) planning is a process of identifying goals, proposing ELWUA types and physical forms, and formulating solutions to realize the goals and the implementation of ELWUA based on the understanding of the sites.

Some principles of the ELWUA planning are proposed as follows:

- ELWUA is expected to contribute to urban sustainability and supply multiple services from environmental, social, economic and aesthetic aspects. Therefore, all the four aspects mentioned above should be covered during the planning stage of ELWUA.
- ELWUA should be considered as a component of the food system, urban ecosystem, urban infrastructure system and social system rather than an isolated issue.
- In addition to achieving the main goal of an ELWUA project, try to expand ELWUA services to broad field to input more vitality or explore more possibility of ELWUA for human well-being. For example, making use of the ELWUA for creating educational opportunities, creating job opportunities, developing case study data for research, initiating ELWUA program advocacy, producing food for market, etc.

Moreover, the planning to the organizational form of ELWUA is an important component of the solutions which are supposed to be formulated in the planning stage. The organizational form is composed of two parts, which are the stakeholders (actors) and their way of participation in different procedures of ELWUA implementation. The planning of the organizational form might center around the issues of the identifying stakeholders, the financial source, the way of land distribution and food distribution, the way of construction, maintenance, management, monitoring, evaluating, giving feedback and providing necessary technical guide (who and how), etc. Some suggestions on organization form are proposed as follows:

- A specific organization is suggested to be established for particular ELWUA issues, such as building an ELWUA project network, organizing ELWUA projects or programs, supplying financial support, management and maintenance, etc.
- Both top-down and bottom-up organization forms of ELWUA should be developed.
- Designers are encouraged to be involved in the design process of ELWUA, because with their professional skills and knowledge they can play an important role in coordinating the aesthetic service with other ELWUA services.
- More social actors, such as developers, governmental departments, social associations (e.g. NGOs) and students, should be advocated to support the organization of ELWUA through financial support, policy support or voluntary activities.
- Arouse a sustainable initiative of the participants through effective communication. Edible landscape is a more complex system than some decorative landscape, and the cost for building and maintaining ELWUA is huge. If the participants of the

ELWUA could be well organized in the building, maintenance and management stage and would like to contribute to the development of the ELWUA project, it will greatly benefit the implementation of ELWUA. For example, the reason that Andernach in Germany makes its food growing in public space less expensive to manage and hugely more attractive lies in that many people are willing to get involved and make it work. In order to achieve this purpose, regular workshops or meetings involving the participants for discussing the common issues of ELWUA is necessary (Figure 9.10).

- Guidance on agricultural knowledge, ecological knowledge and gardening skill is indispensable for avoiding the negative effect to the environment and contribute to the urban sustainability. As many failed edible landscapes in Beijing have proven, technical knowledge of plants, soil, and growing conditions was a fundamental necessity.



**Figure 9. 9 The regular group member meeting of the community garden “Stadtacker Wagenhallen” in Stuttgart, Germany**

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Procedure 2) building includes both the physical construction of ELWUA and the realization of the organization solutions. In this stage the use of environmentally friendly materials and methods are encouraged in the construction of ELWUA.

Procedure 3) maintenance and management is a process of keeping the ELWUA work well and protect the ELWUA from damage through applying regulations and regular attendance.

Procedure 4) monitoring, evaluating and giving feedback should be conducted to each of the other three procedures from environmental, social, economical and aesthetic aspects. Based on the feedback of the procedure, the implementation process of ELWUA will restart to justify and improve the development of ELWUA.

### **9.3.4 Establish publicly available environmental monitoring and information system on health security**

Facing the problems of environmental pollutions and the missing of pollution monitoring and management system in current Chinese cities, the toxins in polluted urban air, water, soil and waste recycling systems might affect the quality of food products and could bring hazard on human health. Moreover, the improperly conducted edible landscapes excessive use of agricultural chemicals and pesticides in an edible landscape might pollute urban environment. Therefore, a publicly available environmental monitoring as well as information system on health security should be set up for edible landscape. Through the publicly available environmental monitoring, people can be warned to avoid growing food in polluted area. And the public information system could provide urban gardeners educations on scientific and organic food growing, thereby avoid the risks of health security and the threat to the environment caused by improperly self-grown food, and meanwhile, contribute to the urban sustainability.

## **9.4 Limitations and prospects**

This exploratory empirical study filled in the research gap in the field of the edible landscapes within the urban area (ELWUA) in China and contributed to the understanding of the essence and significance of the contemporary ELWUA in China. Taking Beijing as research area, the study mainly discussed the types, the physical characteristics and the social characteristics of the ELWUA and people's perceptions towards it, and then found out its own characteristics through the comparison with European ELWUA cases. Some issues still need to be discussed:

- 1) Limitation: When the research was completed, it was just the time when the concept of ELWUA was gradually introduced into China from abroad and was increasingly recognized by the Chinese people. At the moment, many professional designers have noticed the value of ELWUA and have been trying to integrate it into design. It is sure that there will be more ELWUA cases emerging in the near future. Therefore, the study of the ELWUA types needs to be continued and updated.
- 2) This study explored the ELWUA services through qualitative research. In the next step, the quantitative research on the ELWUA services in the environmental, social, economic and aesthetic aspects could be an important research project, because it could contribute to a more solid and objective understanding of ELWUA.
- 3) At present the research on the evaluation of the ELWUA is a weak area not only in

China but also all over the world. How to form an objective criterion that can be universally accepted to evaluate the sustainability of ELWUA and also assess the suitability of land use transitions of non-productive landscape to edible landscape is a hot spot of research in the future.

- 4) How to build a set of systematic design tools and strategies (design manual for urban planners and designers) integrating ELWUA in different type of urban space in China for resilience and sustainability is a meaningful research project.

## References

- Adachi, M., Rohde, C.L.E. and Kendle, A.D. (2000). Effects of floral and foliage displays on human emotions. *HortTechnology*, 10, 59–63.
- Adeyemi, A. (2000). *Urban Agriculture: An Abbreviated List of References & Resource Guide 2000*. Retrieved May 7, 2015 from [http://www.nal.usda.gov/afsic/AFSIC\\_pubs/urbanag.htm](http://www.nal.usda.gov/afsic/AFSIC_pubs/urbanag.htm).
- AESOP Association of European Schools of Planning. (n.d.). *Sustainable Food Planning Group*. Retrieved 10 November, 2015 from [http://www.aesop-planning.eu/blogs/en\\_GB/sustainable-food-planning](http://www.aesop-planning.eu/blogs/en_GB/sustainable-food-planning).
- Agriculture in an Urbanizing Society (AUS). (n.d.). Agriculture in an Urbanizing Society. Retrieved November 10, 2015 from <http://www.agricultureinurbanizingsociety.com/>.
- Alaimo, K. (eds) (2008). Fruit and vegetable intake among urban community gardeners. *Journal of Nutrition Education and Behavior*, 40 (2), 94-101.
- Aldous, D.E. (2000). Perspectives on horticultural therapy in Australia. *HortTechnology*, 10, 18–23.
- Allen, L.H. (2003). Interventions for micronutrient deficiency control in developing countries: past, present and future. *Journal of Nutrition*, 133, 3875S-3878S.
- Armstrong, D. (2000). A survey of community gardens in upstate New York: implications for health promotion and community development. *Health and Place*, 6.4, 319-327.
- Baker, L.E. (2004). Tending cultural landscapes and food citizenship in Toronto's community gardens. *Geographical Review*, 94(3), 305-325.
- Balter, M. (2013). Farming Was So Nice, It Was Invented at Least Twice. *Science*. 4 July 2013. Retrieved October 15, 2015 from <http://news.sciencemag.org/archaeology/2013/07/farming-was-so-nice-it-was-invented-least-twice>.
- Barker-Reid, F. and Faggian, R. (2008) Health benefits of community gardens and their potential to create links between urban and rural communities. In *Margins to Mainstream: 5th World Conference on the Promotion of Mental Health and the Prevention of Mental and Behavioural Disorders*. Melbourne: World Federation for Mental Health, 10-12 September, 2008.
- Bakker, N., Dubbeling, M., Gündel, S. Sabel-Koschella, U. and Zeeuw, H. de (eds)

(2000). *Growing Cities, Growing Food: Urban Agriculture on the policy agenda: a Reader on Urban Agriculture on the policy agenda: A Reader on Urban Agriculture*. Feldafing, Germany: Deutsche Stiftung für internationale Entwicklung (DSE), Zentralstelle für Ernährung und Landwirtschaft.

Baron, J.S., Poff, N.L., Angermeier, P.L., Dahm, C.N., Gleick, P.H., Hairston, N.G. Jackson, R.B., Johnston, C.A., Richter, B.D. and Steinman, A.D. (2002). Meeting ecological and societal needs for freshwater. *Ecological Applications*, 12, 1247–1260.

Barradas, V.L. (2000). Energy balance and transpiration in an urban tree hedgerow in Mexico City. *Urban Ecosystems*, 4, 55–67.

Barrs, R. (2002). Sustainable Urban Food Production in the City of Vancouver: An Analytical and Strategy Framework for Planners and Decision-Makers Agriculture. *City Farmer*, 1-27.

Bartholomew, M. (2013). *All new square foot gardening: The revolutionary way to grow more in less space*. Minneapolis: COOL SPRINGS PRESS.

Beck, T. and Quigley, M.F. (2001). Edible Landscaping. *Horticulture and Crop Science*, 02, 1-3.

Bell, D. (1974). *The Coming of Post-Industrial Society*. New York: Harper Colophon Books.

Bell, J. and Standish, M. (2009). Building healthy communities through equitable food access. In *Community Development Investment Review*, volume 5, issue 3. San Francisco: Federal Reserve Bank of San Francisco. Retrieved 22 June, 2015 from <http://community-wealth.org/content/building-healthy-communities-through-equitable-food-access>.

Bellows, A.C., Brown, K. and Smit, J. (n.d.). *Health Benefits of Urban Agriculture*. Retrieved 24 June, 2015 from <http://www.co.fresno.ca.us/Search85.aspx?key=Health%20Benefits%20of%20Urban%20Agriculture>.

Benevolo, L. (1971). *The Origins of Modern Town Planning*. London: The MIT Press.

Bertram, C. and Gröning, G. (1996). *Leipziger Schrebervereine und ihre gesellschaftspolitische Orientierung zwischen 1864 und 1919*. Frankfurt/Main: Waldemar Kramer.

Blacksmith Institute. (2007). *Ten Most Polluted Places in the World*. Retrieved 13 May 2013 from <http://www.Factmons>

ter.com/science/environment/top-ten-most-polluted-2007.html.

Blair, D., Giesecke, C. and Sherman, S. (1991). A Dietary, Social and Economic Evaluation of the Philadelphia Urban Gardening Project. *The Journal of Nutrition Education*, (23), 161-167.

Boehm, J.K. and Kubzansky, L.D. (2012). The heart's content: the association between positive psychological well-being and cardiovascular health. *Psychological Bulletin*, 138(4), 655-691.

Bohn, K. and Viljoen, A. (2005). Part One: Carrot and City: The Concept of CPULs. In A. Viljoen (ed) *CPULs: Continuous Productive Urban Landscapes*, pp.1-15. Oxford: Architectural Press.

Bohn, K. and Viljoen, A. (2014). Urban Agriculture on the map: Growth and challenges since 2005. In A. Viljoen and K. Bohn, *Second Nature Urban Agriculture: Designing Productive Cities*, pp. 6-11. London: Routledge.

Bohn, K. and Viljoen, A. (2014). Urban Agriculture on the map: The CPUL CITY concept. In A. Viljoen and K. Bohn, *Second Nature Urban Agriculture: Designing Productive Cities*, pp. 12-17. London: Routledge.

Bolund, P. and Hunhammar, S. (1999). Ecosystem services in urban areas. *Ecological Economics*, 29, 293–301.

Bouvier-Daclon, N. and Sénécal, G. (2001). Les jardins communautaires de Montréal: un espace social ambigu (The Montreal community gardens: a socially ambiguous territory). *Loisir et Société/Society and Leisure*, 24 (2), 507-531.

Bowler, D.E., Buyung-Ali, L., Knight, T.M. and Pullin, A.S. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landscape and Urban Planning*, 97, 147–155.

Bradshaw, J. and Tozer, L. (1993). Enviroscaping to conserve energy: A guide to microclimate modification. *University of Florida, IFAS Extension*, EES43.

Brady, E. (2006). The aesthetics of agricultural landscapes and the relationship between humans and nature. *Ethics, Place & Environment: A Journal of Philosophy & Geography*, 9(1), 1-19.

Bringslimark, T., Hartig, T. and Patil, G.G. (2007). Psychological benefits of indoor plants in workplaces: Putting experimental results into context. *HortScience*, 42, 581–587.



Bringslimark, T., Hartig, T. and Patil, G.G. (2009). The psychological benefits of indoor plants: A critical review of the experimental literature. *Journal of Environmental Psychology*, 29, 422–433.

Broadway, M.J. and Broadway, J.M. (2011). Green dreams: promoting urban agriculture and the availability of locally produces food in the Vancouver metropolitan area. *Focus on Geography*, 54 (1), 33-41.

Brown, K.H. and Jameton, A.L. (2000). Public health implications of urban agriculture. *Journal of Public Health Policy*, 21 (1), 20-39.

Bryman, A. (2012). *Social research methods*. New York: Oxford University Press Inc.

Butler, L. and Moronek, D.M. (eds) (2002). *Urban and Agriculture Communities: Opportunities for Common Ground*. Ames: Council for Agricultural Science and Technology.

Caggiano, M. (2015). 15 Les jardins partages in Paris. Cultivating space, community and sustainable way of life. In J. Dessen (ed) *Cultural Sustainability and Regional Development*, pp.219-234. London and New York: Routledge.

Carpenter, P. L., Walker, T. D. and Lanphear, F. O. (1975). *Plants in the Landscape*. San Francisco: W. H. FREEMAN AND COMPANY.

Castles, H. (2005). Food and the City. *Architectural Design*, 75 (3). Retrieved October 15, 2015 from <http://onlinelibrary.wiley.com/doi/10.1002/ad.69/abstract>.

CBS (Centraal Bureau voor de Statistiek) [Dutch Statistics]. (2007). Heerlen.

Chen, F. and Feng, G. (2008). The historical evolution of German Schrebergarten and its contemporary significance. *Urban planning international* 23 (2), 78-82 (in Chinese).

Cheng, Y.N. (1991). A brief analysis on the planting system of middle maize and late wheat. *Bulletin of Agricultural Science and Technology*, 02, 7 (in Chinese).

Chon, J.H. and Shafer, C.S. (2009). Aesthetic responses to urban greenway trail environments. *Landscape Research*, 34, 83–104.

City Farmer. (n.d.). *Urban Agriculture Notes*. Retrieved November 10, 2015 from <http://www.cityfarmer.org/>.

Collins, C.C. and O’Callaghan, A.M. (2008). The impact of horticultural responsibility on health indicators and quality of life in assisted living. *HortTechnology*, 18, 611–618.

Commission of the Beijing Local Chronicles (2000). *Beijing Annals-Municipal*

*Administration Volume-Gardens and Afforestation Annals*. Beijing: Beijing Press (in Chinese).

Cook, H.F., Lee, H.C. and Perez-Vazquez, A. (2005). Allotments, plots and crops in Britain. In: A. Viljoe (ed) *CPULs: Continuous Productive Urban Landscapes*, pp 206-216. Oxford: Architectural Press.

COST UAE. (2012). *COST Action Urban Agriculture Europe*. Retrieved from <http://www.urbanagricultureeurope.la.rwth-aachen.de/>.

Creasy, R. (1982). *The Complete Book of Edible Landscaping*. San Francisco: Sierra Club.

Creasy, R. (2009). *Edible Landscaping*. Retrieved 21 June 2013 from <http://www.rosalindcreasy.com/edible-landscaping-basics/>.

Criley, R.A. (2008). Ornamentals — more than just beautiful. *Proceedings of the International Workshop on Ornamental Plants, 788*, 23–28.

Crouch, D. and Ward, C. (1988). *The Allotment*. Faber and Faber, London.

Cruz, M. C. (2001). Agricultura y Ciudad una clave para la sustentabilidad, Fundación de la Naturaleza y el Hombre, Havana.

Cummins, S. and Macintyre, S. (1999). The location of food stores in urban areas: a case study in Glasgow. *British Food Journal, 101* (7), 545–53.

Daily, G.C. (eds) (1997). *Nature's services: societal dependence on natural ecosystems*. Washington: Island Press.

Dallas, P., Barnes, G., and Williamson, T. (2015). Orchards in the Landscape: A Norfolk Case Study. *Landscapes, 16*(1), 26-43.

De Groot R.S., Wilson, M.A. and Boumans, R.M.J. (2002). A typology for the description, classification and valuation of ecosystem functions, goods and services. *Ecological Economics, 41*, 393-408.

De Groot, R. (2006). Function-analysis and valuation as a tool to assess land use conflicts in planning for sustainable, multi-functional landscape. *Landscape Urban Plan, 75*, 175-186.

Deelstra, T. and Girardet, H. (2000). Urban agriculture and sustainable cities. In N. Bakker (ed.) *Growing Cities, Growing Food, Urban Agriculture on the Policy Agenda*, pp. 43-65. Feldafing: DSE.

Delind, L. B. (2006). Of Bodies, Place, and Culture: Re-Situating Local Food. *Journal of Agricultural and Environmental Ethics*, 19(2), 121-146.

Deng, F. and Huang, Y. (2004). Uneven land reform and urban sprawl in China: the case of Beijing. *Progress in Planning*, 61, 211-236.

Díaz, J. P. and Harris, P. P. (2005). Urban Agriculture in Havana: Opportunities for the Future. In A. Viljoe (ed) *CPULs: Continuous Productive Urban Landscapes*, pp.135-145. Oxford: Architectural Press.

Donovan, G.H. and Butry, D.T. (2009). The value of shade: Estimating the effect of urban trees on summertime electricity use. *Energy and Buildings*, 41, 662–668.

Donovan, G.H. and Prestemon, J.P. (2010). The effect of trees on crime in Portland, Oregon. *Environment and Behavior*. doi:10.1177/0013916510383238.

Donovan, J., Larsen, K. and McWhinnie, J-A. (2011). *Food-sensitive planning and urban design: A conceptual framework for achieving a sustainable and healthy food system*, Heart Foundation. Retrieved June 13, 2013 from <http://www.heartfoundation.org.au/driving-change/current-campaigns/local-campaigns/Pages/food-sensitive-planning.aspx>.

Dravigne, A., Waliczek, T.M., Lineberger, R.D. and Zajicek, J.M. (2008). The effect of live plants and window views of green spaces on employee perceptions of job satisfaction. *HortScience*, 43,183–187.

Drescher, A. (2001). The integration of Urban Agriculture into urban planning – An analysis of the current status and constraints. In Annotated Bibliography on Urban Agriculture. Wageningen: CTA.

Duan, L. L. (2013). *The Research on Landscape Design of Farm Landscape Applied in Residential Areas*. Master dissertation. Beijing: Chinese Academy of Forestry (in Chinese).

Duchemin, É, Wegmuller, F. and Legault, A.-L. (2008). *Urban agriculture: multidimensional tools for social development in poor neighbourhoods*. Field Actions Science Report. Retrieved July 27, 2015 from <http://factsreports.revues.org/113>.

Dunnett, N. and Qasim, M. (2000). Perceived benefits to human well-being of urban gardens. *HortTechnology*, 10, 40–45.

Eagly, A.H. and Chaiken, S. (1993). *Psychology of Attitudes*. Belmont CA: Wadsworth Group /Thomson Learning.

Editorial Office of Landscape Architecture China. (2010). A survey on productive landscape. *Landscape Architecture China*, 9 (1), 78-79.

Elmqvist, T., Colding, J., Barthel, S., Borgstrom, S., Duit, A., Lundberg, J., Andersson, E., Ahrne, K., Ernstson, H., Folke, C. and Bengtsson, J. (2004). The dynamics of social-ecological systems in urban landscapes — Stockholm and the national urban park, Sweden. In C. Alfsen-Norodom (ed) *Urban Biosphere and Society: Partnership of Cities*, pp. 308–322. New York: New York Academy of Sciences.

Endreny, T.A. (2004). Storm water management for society and nature via service learning, ecological engineering and ecohydrology. *International Journal of Water Resources Development*, 20, 445–462.

Evers, A.-M., Linden, L. and Rappe, E. (2000). A review of human issues in horticulture in finland: Urbanization motivates a renewed appreciation for plants and nature. *HortTechnology*, 10, 24–26.

Fang, M. Q. (2013). *Study of the Farm Landscape Design Ideas*. Master dissertation. Zhuzhou: Hunan University of Technology, College of Packaging Design and Art (in Chinese).

Fang, Z. Y. and Zhang, W, N. (2011). *Pictorial Handbook of Vegetable Crops in China*. Nanjing: Jiangsu Science and Technology Press (in Chinese).

FAO (Food and Agriculture Organization of the United Nations). (1998). *Feeding the cities*. Sofa report.

FAO (Food and Agriculture Organization of the United Nations). (n.d.). *FAO's Role in Urban Agriculture*. Retrieved 20 March, 2015 from <http://www.fao.org/urban-agriculture/en/>.

Feng, Y.Q. (2011). On protection of quadrangle dwellings in Beijing. *Journal of Shanxi Architecture*, 37 (23), 25-26 (in Chinese).

Flagler, J.S. (1992). Master gardeners and horticultural therapy. *HortTechnology* 2, 249–250.

Fleury, A. (2002). Agriculture as an urban infrastructure: a new social contract. In C.A. Brebbier (ed) *The Sustainable City II: Urban Regeneration and Sustainability*. Proceedings of the International Conference on the Sustainable City, Spain, pp. 935-944. Southampton: WIT Press.

Foodurbanism.org. (2011). *What is Food Urbanism?* Retrieved 14 November, 2014 from <http://www.foodurbanism.org/what-is-food-urbanism/>.

Forkes, J. (2007). Nitrogen balance for the urban food metabolism of Toronto, Canada. Resources, *Conservation & Recycling*, 52, 74-94.

Fried, G.G. and Wichrowski, M.J. (2008). Horticultural therapy: A psychosocial treatment option at the Stephen D. Hassenfeld Children's Center for Cancer and Blood Disorders. *Primary Psychiatry*, 15(7), 73–77.

Fu, Y. B., Gao, J., Tang, H.P., Jiang, W. R. and Dong, B. (2012). Medium - An Experiment of a 20m<sup>2</sup> Garden. In *Ideamasg.com*, 01 (in Chinese).

Gallo, K.P., McNab, A.L., Karl, T.R., Brown, J.F., Hood, J.J. and Tarpley, J.D. (1993). The use of a vegetation index for assessment of the urban heat-island effect. *Internat. J. Remote Sensing*, 14, 2223–2230.

Gan, G.H. (1990). Perspective of Urban Land Use in Beijing. *GeoJournal*, 20(4), 359-364.

Garnett, T. (1996). Harvesting the cities. *Town and Country Planning*, 65(9), 264-265.

Gaytan, M. (2003). Globalizing the Local: Slow Food and the Collective Imaginary. Paper presented at the annual meeting of the American Sociological Association, August 16, Atlanta, GA.

Gibney, M.J. and Strain, S. (1999). Food and nutrition for all. *Lancet*, 354, SIV 38.

Giseke, U. (2011). Preface. In U. Giseke. *Urban agriculture Casablanca: Design as an integrative factor of research*, pp.3. Berlin: Technische Universität Berlin (TUB).

Gorgolewski, M., Komisar, J. and Nasr, J. (2011). *Carrot city: Creating places for urban agriculture*. New York: The Monacelli Press.

Gorham, M.R., Waliczek, T.M., Snelgrove, A. and Zajicek, J.M. (2009). The impact of community gardens on numbers of property crimes in urban Houston. *HortTechnology* 19, 291–296.

Gröning, G. and Wolschke-Bulmahn, J. (1995). *Von Ackermann bis Ziegelhütte, Studien zur Frankfurter Geschichte, Band 36*. Frankfurt am Main, Germany.

Guitart, D., Pickering, C. and Byrne, J. (2012). Past results and future directions in urban community gardens research. *Urban Forestry and Urban Greening*, 11,

364-373.

Guo, H.C., Lv, M.W. and Ren, G.Z. (2007). *Planning and Design of the Leisure Agricultural Park*. Beijing: China Architecture & Building Press (in Chinese).

Guo, S.F. (2012). *Study of Urban Farming Space*. Master dissertation. Beijing: Tsinghua University, School of Architecture (in Chinese).

Hall, C.R. and Dickson, M.W. (2011). Economic, Environmental, and Health/Well-Being Benefits Associated with Green Industry Products and Services: A Review. *Journal of Environmental Horticulture*, 29(2), 96-103.

Haller, T. et al. (2013). Attitudes towards growing food in cities: the case of Lausanne, Switzerland: *YSA 2013*, 201-223.

Han, F. (2010). *Development Pattern and Spatial Reconstruction of Villages Based on Urban Agriculture---A Case Study of Beijing*. PhD dissertation. Beijing: Graduate University of Chinese Academy of Sciences, Institute of Geographic Sciences and Natural Resources Research, CAS (in Chinese).

Haney, D.H. (2010). *When Modern was Green: Life and work of landscape architect Leberecht Migge*. London and New York: Routledge.

Hartig, T., Mang, M. and Evans, G.W. (1991). Restorative effects of natural environment experiences. *Environment and Behavior*, 23, 3–26.

Haviland-Jones, J., Rosario, H.H., Wilson, P. and McGuire, T.R. (2005). An environmental approach to positive emotion: Flowers. *Evolutionary Psychology*, 3, 104–132.

Heimlich, R.E. (eds) (1989). *Land Use Transition in Urbanizing Areas: Research and Information Needs*. Washington, D.C.: Farm Foundation in cooperation with Economic Research Service, U.S. Department of Agriculture.

Hilscher, M. (2012). *Urban Agriculture for a Sustainable City Development– Analysis on Land Potential, Stakeholders, and Promotion Strategies of Urban Agriculture in Stuttgart, Germany*. Master dissertation. Hohenheim: University of Copenhagen, Department of Agriculture & Ecology, Plant and Soil Science, and University of Hohenheim, Department of Gender & Nutrition.

Holland Barrs Planning Group, Less+Associates, Sustainable Ventures Group. (2002). *Southeast False Creek Urban Agriculture Strategy, City Farmer*. Retrieved June 2013 from <http://www.cityfarmer.org/SEFalseCreekFinal.html>.

- Hough, M. (1995). *Cities and natural process*. London: Routledge.
- Howe, J., Bohn, K. and Viljoen, A. (2005). Food in Time: The History of English Open Urban Space as a European Example. In A. Viljoen (ed) *CPULs: Continuous Productive Urban Landscapes*, pp. 95-106. Oxford: Architectural Press.
- Huang, A.H. and Xu, Y. (2010). *The urban renewal of Beijing: Can the poor still affordable for the accommodations?* (in Chinese) Tencent News Review on 10 August. Retrieved March 19, 2015 from <http://view.news.qq.com/a/20100810/000001.htm>.
- Hurd, A.R. and Anderson, D.M. (2010). *The Park and Recreation Professional's Handbook With Online Resource*. United States: Human Kinetics.
- Hynes, P. (1996). *A pinch of eden*. White River Junction: Chelsea Green Publishing.
- Iles, J.K. (2003). The science and practice of stress reduction in managed landscapes. *International Horticultural Congress: Environmental Stress and Horticulture Crops*, 117–124.
- IFAD (International Fund for Agricultural Development). (2008). *Methods for monitoring and Evaluation: A guide for Project Monitoring and Evaluation*. Retrived 20 April 2014 from <http://ifad.org/evaluation/guide/annexd/index.htm>.
- Ingersoll, R. (2004). *Sprawl town*. Rome: Meltemi.
- ISHS International Society for Horticultural Science. (n.d.). *The world's leading independent organization of horticultural scientists*. Retrieved 1 October, 2015 from <http://www.ishs.org>.
- Islam, K.M.S. (2004). Rooftop gardening as a strategy of urban agriculture for food security: the case of Dhaka city, Bangladesh. *Acta Horticultureae*, 643.
- Jackson, B. (2014). Together We Sow The Seeds: Social Interaction, Ethics, and Justice in Urban Agriculture. *The Graduate Research Journal*, 1, 20-27.
- Jackson, R.B., Carpenter, S.R., Dahm, C.N., McKnight, D.M., Naiman, R.J., Postel, S.L. and Running, S.W. (2001). Water in a changing world. *Ecological Applications*, 11, 1027–1045.
- Jansma, J. E. and Visser, A. J. (2011). Agromere: Integrating urban agriculture in the development of the city of Almere. *Urban Agriculture Magazine*, 25, 28-31.
- Jarrott, S.E., Kwack, H.R. and Relf, D. (2002). An observational assessment of a dementia-specific horticultural therapy program. *HortTechnology*, 12, 403–410.

Jones, A. (2002). An environmental assessment of food supply chains: a case study on dessert apples. *Environmental Management*, 30, 560-576.

Khai, N.M., Ha, P.Q. and Oborn, I. (2007). Nutrient flows in small-scale peri-urban vegetable farming systems in Southeast Asia – a case study in Hanoi. *Agriculture, Ecosystem & Environment*, 122, 192-202.

Krasny, E. (2012). *Hands-on Urbanism 1850-2012. The Right to Green*. Hong Kong: MCCM Creations.

Kruglanski, A.W. and Stroebe, W. (2005). The influences of beliefs and goals on attitudes: Issues of structure, function and dynamics. In D. Albarracín (ed) *The handbook of attitudes*. Mahwah, NJ: Lawrence Erlbaum Associates.

Kumar, G.V.P., Deqangan, K.N., Sarkar, A., Kumari, A. and Kar, B. (2008). Occupation noise in rice mills. *Noise and Health*, 10 (39), 55-67.

Kuo, F.E. (2003). The role of arboriculture in a healthy social ecology. *Journal of Arboriculture*, 29(3), 148–155.

Kuo, F.E. (2004). Horticulture, well-being, and mental health: From intuitions to evidence. *Expanding Roles for Horticulture in Improving Human Well-Being and Life Quality*, 27–34.

Kuo, F.E., Bacaicoa, M. and Sullivan, W.C. (1998). Transforming inner-city landscapes — trees, sense of safety, and preference. *Environment and Behavior*, 30, 28–59.

Kuo, F.E. and Sullivan, W.C. (2001). Environment and crime in the inner city — does vegetation reduce crime? *Environment and Behavior*, 33(3), 343–367.

Kuo, F.E., Sullivan, W.C., Coley, R.L. and Brunson, L. (1998). Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology*, 26(6), 823–851.

Kwack, H.R. and Relf, P.D. (2002). Current status of human issues in horticulture in Korea. *HortTechnology*, 12, 415–419.

Kweon, B.S., Ulrich, R.S., Walker, V.D. and Tassinary, L.G. (2008). Anger and stress — the role of landscape posters in an office setting. *Environment and Behavior*, 40, 355–381.

Laaken, L.L. (1992). *Community gardening as a tool for empowerment*. Unpublished



honors thesis, Pennsylvania State University.

Landscape and Human Health Laboratory. (2003). *How cities use parks to create safer neighborhoods*, American Planning Association. Retrieved May 14, 2015 from <http://www.planning.org/cityparks/briefingpapers/saferneighborhoods.htm>.

Larsen, K., Ryan, C. and Abraham, A. (2008). *Sustainable and Secure Food Systems for Victoria: What Do We Know? What Do We Need to Know?* Melbourne: Victorian Eco-Innovation Laboratory, University of Melbourne.

Lee, I.M., Rexrode, K.M., Cook, N.R., Manson, J.E. and Buring, J.E. (2001). Physical Activity and Coronary Heart Disease in Women: Is "No Pain, No Gain" Passé? *Journal of the American Medical Association*, 285 (11), 1447-1454.

Lee, S-H., Choi, K-I., Osako, M. and Dong, J.-I. (2007). Evaluation of environmental burdens caused by changes of food waste management systems in Seoul, Korea. *Science of the Total Environment*, 387, 42-53.

Lee, Y-C., Ahern, J. and Yeh, C-T. (2015). Ecosystem services in peri-urban landscapes: The effects of agricultural landscape change on ecosystem services in Taiwan's western coastal plain. *Landscape and Urban Planning*, 139, 137-148.

Lehvävirta, S. (2007). Non-anthropogenic dynamic factors and regeneration of (hemi) boreal urban woodlands — synthesising urban and rural ecological knowledge. *Urban Forestry & Urban Greening*, 6, 119–134.

Levenston, M. (n.d.). *City Farmer News: New stories from 'Urban Agriculture Notes'*. Retrieved November 10, from <http://www.cityfarmer.info/about/>.

Lewis, C.A. (1996). *Green nature/human nature: The meaning of plants in our lives*. Urbana and Chicago: University of Illinois Press.

Li, J.H. (n.d.). *China, the Birthplace of the Ancient Agricultural Civilization of the World: An Interview to the Cultural Anthropologist and Folklorist, He Lin* (in Chinese). Retrieved 7 June 2015 from <http://agri-history.ihns.ac.cn/reading/050701.htm>.

Li, Q. and Yang, K.Z. (2007). *Urban Sprawl*. Beijing: Machinery Industry Press (in Chinese).

Li, W.F., Ouyang, Z.Y. and Wang, R.S. (2005). *Land Potential Evaluation for large-scale greenbelt development at urban-rural transition zone- a case study of Beijing, China*. Retrieved 15 October, 2015 from [www.isprs.org/proceedings/XXXVI/8-W27/li.pdf](http://www.isprs.org/proceedings/XXXVI/8-W27/li.pdf).

- Lin, G.X. (2009). *The Productive Landscape: Applications in Urban Open Space Design*. Master thesis. Beijing: Peking University, College of Urban and Environmental Sciences (in Chinese).
- Lin, Q. and Wang, X.R. (2005). Regional Feature and Landscape Forms. *Chinese Landscape Architecture*, 21 (6), 6-24 (in Chinese).
- Litt, J.S., Soobader, M-J., Turbin, M.S., Hale, J.W., Buchenau, M. and Marshall, J.A. (2011). The Influence of Social Involvement, Neighborhood Aesthetics, and Community Garden Participation on Fruit and Vegetable Consumption. *American Journal of Public Health*, 101(8), 1466–1473.
- Liu, J.J. (2011). *Rsearch on the feasibility and strategies of urban agriculture in urban built-up area in China*. PhD dissertation. Wuhan: Huazhong University of Science and Technology, School of Architecture and Urban Planning (in Chinese).
- Liu, M. (2011). *Problems and Solutions for Food Security of Large and Medium Cities in China – A Case Study of Jinan City*, pp, 20 (in Chinese).
- London Assembly. (2010). *Cultivating the Capital: Food growing and the planning system in London*. London: The London Assembly.
- Long, A.J. and Ramachandran Nair, P.K. (1999). Trees outside forests: Agro-, community, and urban forestry. *New Forests*, 17, 145–174.
- Lyson, T. A. (2004). *Civic Agriculture: Reconnecting Farm, Food, and Community*. Medford, Massachusetts: Tufts University Press, Hanover and London: University Press of New England.
- MacDonald, J.A. (2007). *How cities use parks for climate change management*. American Planning Association.
- Maslow, A. H. (1943). A Theory of Human Motivation. *Psychological Review*, 50 (4), 370-396.
- Mbiba, B. (2005). Urban and Peri-Urban Agriculture in East and Southern Africa: Economic, Planning and Social Dimensions. In A. Viljoe (ed) *CPULs: Continuous Productive Urban Landscapes*, pp. 192-199. Oxford: Architectural Press.
- Mbiba, B. (1994). Institutional responses to uncontrolled urban cultivation in Harare: prohibitive or accommodative? *Environment and Urbanization*, 6, 188-202.
- McBey, M.A. (1985). The therapeutic aspects of gardens. *Journal of Advanced*

*Nursing*, 10, 591-595.

McClintock, N. (2010). Why farm the city? Theorizing urban agriculture through a lens of metabolic rift. *Cambridge Journal of Regions, Economy and Society*, 3(2), 191-207.

McCormack, L.A., Laska, M.N., Larson, N.I., and Story, M. (2010). Review of the nutritional implications of farmers' markets and community gardens: a call for evaluation and research efforts. *Journal of the American Dietetic Association*, 110(3), 399-408.

McCullough, L. M. (n.d.). *The Community Food Security Movement*. Retrieved November 10, 2015 from [http://www.emmitsburg.net/archive\\_list/articles/thoughtful/jcfs/cfsmovement.htm](http://www.emmitsburg.net/archive_list/articles/thoughtful/jcfs/cfsmovement.htm).

Miazzo, F. and Minkjan, M. (2013). *Farming the City: Food as a Tool for Today's Urbanisation*. Amsterdam: Trancity, Valiz.

Millennium Ecosystem Assessment (2005). *Ecosystems and human well-being*. Washington: Island Press.

Ministry of Construction of the People's Republic of China (1998). *Basic terminology standards of urban planning GB/T50280-98*. Beijing: China architecture & building press.

Morgan, K. (2014). *Sustainable Food Cities-Glasgow*. Keynote speak of the workshops and discussion on moving Glasgow towards a sustainable food future, April 30, 2014, St Andrews in the Square, Glasgow.

Mougeot, L. J. A. (2006). *Growing better cities: urban agriculture for sustainable development*. Ottawa: International Development Research Centre.

Mudimu, G.D. (1996). Urban agricultural activities and women's strategies in sustaining family livelihoods in Harare, Zimbabwe. *Singapore Journal of Tropical Geography*, 17 (2), 179-194.

Müller, C. (eds) (2011). *Urban Gardening: Über die Rückkehr der Gärten in die Stadt*. München: Oekom Verlag.

NAi Publishers and Haag, S. D. (2012). *Food for the City: A Future for the Metropolis*. Rotterdam: NAI Publishers, pp.26.

Nail, S. (2015). Urban Agriculture to the Rescue of Urban Health in Europe and the America. *Chinese Landscape Architecture*, 2015, 31(5), 80-84.

Nasr, J., Komisar, J. and Gorgolewski, M. (2014). Urban Agriculture as ordinary urban practice: Trends and lessons. In A. Viljoen and K. Bohn, *Second Nature Urban Agriculture: Designing Productive Cities*, pp. 24-31. London and New York: Routledge Taylor & Francis Group.

Newman, L. (2008). Extreme Local Food: Two Case Studies in Assisted Urban Small Plot Intensive Agriculture. *Environments*, 36(1), 33-43.

Nowak, D.J., Rowntree, R.A., McPherson, E.G., Sisinni, S.M., Kerkmann, E.R. and Stevens, J.C. (1996). Measuring and analyzing urban tree cover. *Landscape and Urban Planning*, 36, 49-57.

Nugent, R. (2003). Economic impacts. In SIDA (ed) *Annotated Bibliography on Urban and Peri Urban Agriculture*, pp. 130-169.

OPEN Architecture. (2014). *Beijing No.4 High School Fangshan Campus, Beijing, China*, In Official website of OPEN Architecture. Retrieved 10 October 2015 from <http://www.openarch.com/task/2293>.

Panno, S.V., Nuzzo, V.A., Cartwright, K., Hensel, B.R. and Krapac, I.G. (1999). Impact of urban development on the chemical composition of ground water in a fen-wetland complex. *Wetlands*, 19, 236-245.

Park, S. and Mattson, R.H. (2009). Ornamental indoor plants in hospital rooms enhanced health outcomes of patients recovering from surgery. *Journal of alternative and complementary medicine*, 15, 975-980.

Parmer, S.M., Salisbury-Glennon, J., Shannon, D. and Struempfer, B. (2009). School Gardens: An Experiential Learning Approach for a Nutrition Education Program to Increase Fruit and Vegetable Knowledge, Preference, and Consumption among Second-Grade Students. *Journal of Nutrition Education and Behavior*, 41(3), 212-217.

Pearson, L.J., Pearson, L., and Pearson, C.J. (2010). Sustainable urban agriculture: stocktake and opportunities. *International journal of agricultural sustainability*, 8 (1&2), 7-19.

People's Daily. (2001). *Beijing*. Retrived 21 April 2014 from <http://english.people.com.cn/data/province/beijing.html>.

Perez-Vazquez, A., Anderson, S. and Rogers, A.W. (2005). Assessing benefits from allotments as a component of urban agriculture in England. In L. Mougeut (ed) *Agropolis: The Social Political and Environmental Dimensions of Urban Agriculture*. London: IRDC.

Petricks, H. (2014). *Social farming (also called care farming): an innovative approach for promoting women's economic empowerment, decent rural employment and social inclusion. What works in developing countries?* Retrieved November 2, 2015 from <http://www.fao.org/fsnforum/forum/discussions/care-farming>.

Philips, A. (2013). *Designing Urban Agriculture: A Complete Guide to the Planning, Design, Construction, Maintenance, and Management of Edible Landscapes*. Canada: Wiley.

Predny, M.L. and Relf, D. (2000). Interactions between elderly adults and preschool children in a horticultural therapy research program. *HortTechnology*, 10, 64–70.

Premat, A. (2005). Moving between the plan and the ground: shifting perspectives on urban agriculture in Havana Bay, Cuba. In L. Mougeut (ed) *Agropolis: The Social Political and Environmental Dimensions of Urban Agriculture*, pp. 153-186. London: IRDC.

Quon, S. (1999). Planning for Urban Agriculture: A Review of Tools and Strategies for Urban Planners. In IDRC, *Cities Feeding People Program Initiative Cities. Feeding people series*, rept. 28.

Raanaas, R.K., Patil, G.G. and Hartig, T. (2010). Effects of an indoor foliage plant intervention on patient well-being during a residential rehabilitation program. *HortScience*, 45, 387–392.

Reising, V. and Hobbiss, A. (2000). Food deserts and how to tackle them: a study of one city's approach. *Health Education Journal*, 59 (2), 137–49.

Relf, D. (1992). Horticulture, Human Issues in Horticulture. *HortTechnology, Department of Horticulture*, 2(2). Retrieved October 15, 2015 from <http://www.hort.vt.edu/HUMAN/hihart.htm>.

Rindels, S. (1993). Gardening for Exercise. *1993 issue*, 161-162.

Roley Jr., W.H. (1993). Edible Landscaping. *The Futurist*, 27 (2), 18-20.

Rosa, D.L., Barbarossa, L., Privitera, R. and Martinico, F. (2014). Agriculture and the city: A method for sustainable planning of new forms of agriculture in urban contexts. *Land Use Policy*, 41, 290-303.

Rosal, M. (2006). *Gemeinschaftsgärten in Berlin: Eine qualitative Untersuchung zu Potenzialen und Risiken bürgerschaftlichen Engagements im Grünflächenbereich vor dem Hintergrund des Wandels von Staat und Planung*, Berlin: Mensch & Buch

Verlag.

De la Salle, J. and Holland, M. (eds) (2010). *Agriculture Urbanism: Handbook for Building Sustainable Food & Agriculture Systems in 21st Century Cities*. Winnipeg, Manitoba: Green Frigate Books.

Saarikoski, H. (eds) (2015). Exploring operational ecosystem service definitions: The case of boreal forests. *Ecosystem Services*, 14, 144-157.

Sawio, C. (1998). *Managing Urban Agriculture in Dar Es Salaam. Cities Feeding People*. Report 20, IDRC, Ottawa, Canada. [www.idrc.ca/in\\_focus\\_cities/ev-2486-201-1-DO\\_TOPIC.html](http://www.idrc.ca/in_focus_cities/ev-2486-201-1-DO_TOPIC.html).

Scott, E. (2015). *The Link Between Happiness and Health: Happiness and Health Go Together*. Retrieved May 26, 2015 from [http://stress.about.com/od/happinessandpositivity/a/happiness\\_and\\_health.htm](http://stress.about.com/od/happinessandpositivity/a/happiness_and_health.htm).

Seedstock. (2014). *10 American Cities Lead the Way With Urban Agriculture Ordinances*. Retrieved October 27, 2015 from <http://seedstock.com/2014/05/27/10-american-cities-lead-the-way-with-urban-agriculture-ordinances/>.

Seinfeld, H. (2003). Economic constraints on production and consumption of animal products. *Journal of Nutrition*, 133, 4054S-4061S.

Senate Department for Urban Development and the Environment. (n.d.). *The History of Berlin's Urban Green Space: Allotment Gardens*. Retrieved October 21, 2015 from <http://www.stadtentwicklung.berlin.de/umwelt/stadtgruen/geschichte/en/kleingaerten/index.shtml>.

SenStadt Senatsverwaltung für Stadtentwicklung und Umwelt Berlin. (2012). *Strategies Stadtlandschaft Berlin: natürlich-urban-produktiv*. Retrieved October 15, 2015 from [www.stadtentwicklung.berlin.de/umwelt/landschaftsplanung/strategie\\_stadtlandschaft/download/Strategie-Stadtlandschaft-Berlin.pdf](http://www.stadtentwicklung.berlin.de/umwelt/landschaftsplanung/strategie_stadtlandschaft/download/Strategie-Stadtlandschaft-Berlin.pdf).

Shasta Master Gardeners. (2012). *Edible Landscaping: Combining Form & Function*. Lecture notes.

Sherman, S.A., Varni, J.W., Ulrich, R.S. and Malcarne, V.L. (2005). Post-occupancy evaluation of healing gardens in a pediatric cancer center. *Landscape and Urban Planning*, 73,167–183.

Shi, Y. (2012). How to Rebuild the Safe Food Chain. *South Review*, 5, 51-3 (in

Chinese).

Shuster, W.D., Gehring, R. and Gerken, J. (2007). Prospects for enhanced groundwater recharge via infiltration of urban storm water runoff: A case study. *Journal of Soil and Water Conservation*, 62, 129–137.

Smardon, R.C. (1988). Perception and aesthetics of the urban environment: Review of the role of vegetation. *Landscape and Urban Planning*, 15, 85–106.

Smit, J. (2000). Urban Agriculture and Biodiversity. *Urban Agriculture Magazine*, 1.

Smit, J. Nasr, J. and Ratta, A. (2001). *Urban Agriculture: Food, Jobs and Sustainable Cities*. New York: United Nations Development Programme.

Smit, J., Nasr, J. and Ratta, A. (eds) (2001). *Urban Agriculture Yesterday and Today*. In UNDP (United Nations Development Programme)-sponsored manual Urban Agriculture: Food, Jobs and Sustainable Cities.

Smit, J., Ratta, A. and Nasr, J. (1996). *Urban Agriculture: Food, Jobs and Sustainable Cities*, pp. 302. New York: UNDP.

Spronken-Smith, R.A., Oke, T.R. and Lowry, W.P. (2000). Advection and the surface energy balance across an irrigated urban park. *International Journal of Climatology*, 20, 1033–1047.

Stagl, S. (2002). Local Organic Food Markets: Potentials and Limitations for Contributing to Sustainable Development. *Empirica*, 145-162.

Stokman, A., Rabe, S. and Ruff, S. (2008). Beijing's New Urban Countryside – designing with Complexity and Strategic landscape planning. *Journal of Landscape Architecture, Autumn*, 18-33.

Stoneham, J.A., Kendle, A.D. and Thoday, P.R. (1995). Horticultural therapy: Horticulture's contribution to the quality of life of disabled people. *Horticulture in Human Life, Culture, and Environment*, 65–75.

Strathopoulou, M. and Cartalio, C. (2007). Daytime urban heat islands from Landsat ETM and Corine land cover data: an application to major cities in Greece. *Solar Energy*, 81, 358-368.

Sullivan, W.C., Kuo, F.E. and DePooter, S.F. (2004). The fruit of urban nature — vital neighborhood spaces. *Environment and Behavior*, 36(5), 678–700.

Sun, Y.B. (2013). *Urban Agriculture and Its Potential in Urban Development*. PhD

dissertation. Tianjian: Tianjin University, School of Architecture (in Chinese).

Svendsen, E.S., Campbell, L.K., Falxa-Raymond, N., Northridge, J. and Stone, E. (2012). Introducing a longitudinal study of community gardeners and gardens in New York City. *Cities and the Environment (CATE)*, 5(1), Article 11.

Taha, H. (1997). Urban climates and heat islands: albedo, evapotranspiration, and anthropogenic heat. *Energy & Buildings*, 25, 99-103.

Tang, C. (2005). The Evolution of the Chinese Urban and Rural Family Structure and Function. *Zhejiang Academic Journal*, 2, 201-8 (in Chinese).

Taylor, A.F. and Kuo, F.E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders OnlineFirst*, 12, 402-409.

Taylor, A.F., Kuo, F.E. and Sullivan, W.C. (2001). Coping with ADD — the surprising connection to green play settings. *Environment and Behavior*, 33, 54-77.

Taylor, A.F., Kuo, F.E. and Sullivan, W.C. (2002). Views of nature and self-discipline: Evidence from inner city children. *Journal of Environmental Psychology*, 22, 49-63.

Taylor, A.F., Wiley, A., Kuo, F.E. and Sullivan, W.C. (1998). Growing up in the inner city — green spaces as places to grow. *Environment and Behavior*, 30, 3-27.

Tcpa (Town and Country Planning Association). (n.d.). *Garden Cities*. Retrieved 1 May, 2014 from <http://www.tcpa.org.uk/pages/garden-cities.html>.

Termorshuizen, J.W. and Opdam, P. (2009). Landscape services as a bridge between landscape ecology and sustainable development. *Landscape Ecology*, 24, 1037-1052.

Tsai, W.-T. (2008). Management considerations and environmental benefit analysis for turning food garbage into agricultural resources. *Bioresource Technology*, 99, 5309-5316.

Tsubota, K. (n.d.) *Urban Agriculture In Asia: Lessons From Japanese Experience*. Retrieved October 27, 2015 from [https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwjjuZD01KfMAhVLAZoKHdxIDUcQFggrMAE&url=http%3A%2F%2Fwww.agnet.org%2Fhtmlarea\\_file%2Factivities%2F20110719103448%2Fpaper-997674935.pdf&usg=AFQjCNF82-LPGOpLggH-DvOOr\\_6jN-5sAw](https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwjjuZD01KfMAhVLAZoKHdxIDUcQFggrMAE&url=http%3A%2F%2Fwww.agnet.org%2Fhtmlarea_file%2Factivities%2F20110719103448%2Fpaper-997674935.pdf&usg=AFQjCNF82-LPGOpLggH-DvOOr_6jN-5sAw).

TUB Technische Universität Berlin Architekturmuseum. (2011). *Die Produktive Stadt/Carrot City*. Retrieved October 27, 2015 from



<http://architekturmuseum.ub.tu-berlin.de/index.php?set=1&p=524>.

Turkey, HB Jr. (1983). Urban Horticulture: horticulture for populated areas. *HortScience*, 11-13.

Tyrvaäinen, L. (1997). The amenity value of the urban forest: An application of the hedonic pricing method. *Landscape and Urban Planning*, 37, 211–222.

Tyrväinen, L., Ojala, A., Korpela, K., Lanki, T., Tsunetsugu, Y. and Kagawa, T. (2014). The influence of urban green environments on stress relief measures: a field experiment. *Journal of Environmental Psychology*, 38, 1–9.

Tzoulas, K. (eds) (2007). Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review. *Landscape and Urban Planning*, 81, 167-178.

Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A. and Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11, 201–230.

UNDP China and Institute for Urban and Environmental Studies, Chinese Academy of Social Sciences. (2013). *China National Human Development Report 2013. Sustainable and livable Cities: Toward Ecological Civilization*. [Electronic version]. Beijing: China Publishing Group Corporation, China Translation & Publishing Corporation, p. 32.

Van Bonsdorff, H. (2005). Agriculture, aesthetic appreciation and the worlds of nature. *Contemporary Aesthetics*, 3, 1-14.

Van Leeuwen, E., Nijkamp, P. and de Noronha Vaz, T. (2010). The multifunctional use of urban green space. In C. J. Pearson et al. (ed) *International Journal of Agricultural Sustainability*, 8 (1&2), pp.20-25. New York: Earthscan.

Van Veenhuizen, R. and Danso, G. (2007). *Profitability and Sustainability of Urban and Periurban Agriculture*. Rome: FAO.

Viljoen, A. (2011). Ouled Ahmed Research Competition - Designing and Defining a New Essential Infrastructure. In U. Giseke. *Urban Agriculture Casablanca: Design as an Integrative Factor of Research*, pp. 12-13. Berlin: Technische Universität Berlin (TUB).

Viljoen, A., Bohn, K. and Howe, J. (2005). *CPULs: Continuous Productive Urban Landscapes*. Oxford: Architectural Press.

Viljoen, A. and Bohn, K (2014). *Second Nature Urban Agriculture: Designing Productive Cities*. London: Routledge.

Voicu, L. and Been, V. (2008). The Effect of Community Gardens on Neighboring Property Values. *Real Estate Economics*, 36 (2), 241-283.

Wageningen University and Research Center. (2011). *Agromere*. Retrieved November 10, 2012 from <http://www.wageningenur.nl/en/Research-Results/Projects-and-programmes/Agromere.htm>.

Wakefield, S., Yeudall, F., Taron, C., Reynolds, J. and Skinner, A. (2007). Growing urban health: community gardening in South-East Toronto. *Health promotion international*, 22(2), 92-101.

Waliczek, T.M., Mattson, R.H. and Zajicek, J.M. (1996). Benefits of community gardening to quality of life issues. *Journal of Environmental Horticulture*, 14, 204–209.

Wang, Y. R. (2013). *Feasibility Analysis and Strategies Research on Urban Agriculture Integrating in the Residential Community*. Master dissertation. Tianjin: Tianjin University, School of Architecture (in Chinese).

Warber, S.L., Fetters, M.D. and Kaufmann, P.B. (2003). Environmental ethics: finding a moral compass for human-plant interaction. *Alternative Therapies In Health And Medicine*, 9(2), 100–105.

Ward, C. (1993). *New Town, New Home, The lessons of experience*. Calouste Gulbenkian Foundation.

Washington State Department of Commerce. (2012). *Sense of Place. A Discussion Paper of Energy Aware Communities*. Retrieved October 15, 2015 from <http://www.commerce.wa.gov/Pages/default.aspx>.

Wise, P. (2014). *Grow Your Own: The potential value and impacts of residential and community food gardening*. Retrieved April 2, 2015 from <http://www.tai.org.au/content/grow-your-own>.

Wong, N.H. and Yu, C. (2005). Study of green areas and urban heat island in a tropical city. *Habitat International*, 29, 547-558.

Xian, G. and Crane, M. (2006). An analysis of urban thermal characteristics and associated land cover in Tampa Bay and Las Vegas using Landsat satellite data. *Remote Sensing of Environment*, 104, 147–156.

- Xiao, Q. and McPherson, E.G. (2002). Rainfall interception by Santa Monica's municipal urban forest. *Urban Ecosystems*, 6, 291–302.
- Xiao, Q., McPherson, E.G., Simpson, J.R. and Ustin, S.L. (2007). Hydrologic processes at the urban residential scale. *Hydrological Process*, 21, 2174–2188.
- Xie, H.Y., Wang, J.R. and Yau L.F. (eds) (2014). Quantitative Analysis of the Flavonoid Glycosides and Terpene Trilactones in the Extract of Ginkgo biloba and Evaluation of Their Inhibitory Activity towards Fibril Formation of  $\beta$ -Amyloid Peptide. *Molecules*, 19(4), 4466-4478.
- Xie, Z. (2009). *Public Space Study of Beijing Residential Community in the Context of Contemporary Neighborhoods*. Master dissertation. Beijing: China Central Academy of Fine Arts, Department of Architecture (in Chinese).
- Xu, X.Q., Zhou, Y.X. and Ning, Y.M. (2009). *Urban Geography (Second version)*. Beijing: Higher Education Press (in Chinese).
- Xu, Y. Q. (2011). *The Model Research of Agriculture Integrating Urban Space*. Master dissertation. Jinan: Shandong Jianzhu University, CAU (in Chinese).
- Yan, C.Y. (2000). The protection and the rational development and utilization of water resources in Beijing. *Beijing City Planning & Construction Review*, 6, 26-29 (in Chinese).
- Yin, S. S (2010). *Research on the Fruits and Vegetables Cultivation in the Urban Residential Landscape Design*. Master dissertation. Yunnan: Yunnan Arts University (in Chinese).
- Yokohari, M., Takeuchi, K., Watanabe, T. and Yokota, S. (2000). Beyond greenbelts and zoning: Future directions of the environment of Asian mega-cities. *Landscape and Urban Planning*, 47, 159-171.
- Younis, A., Qasim, M. and Riaz, A. (2008). Case study: Impact of a well-planned landscape in delivering quality of life to city dwellers. *ISHS Acta Horticulturae*, 775, 147–154.
- Yu, J. S. (1999). Theory and New – trails Blazing System Construction of City Agriculture. *Research of Agricultural Modernization*, 20 (4), 207-210 (in Chinese).
- Yu, K.J. and Ji, Q.P. (2000). China to Learn from the international “City Beautiful Movement” (A). *Journal of Chinese Landscape Architecture*, 1, 27-33 (in Chinese).
- Yu, K.J. (2006). *The Art of Survival: Position Landscape Architecture*. Beijing: China

Architecture & Building Press.

Yu, K.J. (2010). Back to Productiveness. *Landscape Architecture China*, 9 (1), 22-3.

Yu, Y.H. (2002). The Greening and Plants Design in Urban Residential Area. *Journal of Qijing Teaching College*, 3, 74-6 (in Chinese).

Zeza, A. and Tascotiu, L. (2008). Does Urban Agriculture Enhance Dietary Diversity? Empirical Evidence from a Sample of Developing Countries, FAO RIGA. Retrieved May 8, 2015 from <http://www.fao.org/economic/riga/riga-publications/pubs-detail/en/c/43791/>.

Zhang, C. L. (2005). Lecture on Urban Agriculture. Symposium on Three Rural Issues, October 17, 2005, Shun Yi District in Beijing (in Chinese).

Zhang, F. and Zhang, S.L. (eds) (2005). *Urban Agriculture and sustainable development*. Beijing: Chemical Industry Press (in Chinese).

Zhang, F.R., Zhao, H.F., Chen, F. and Liu J.J. (eds) (2007). *The Layout of the Modern Urban Agriculture*. Dongying: China university of petroleum press & Beijing: China agricultural university press (in Chinese).

Zhang, Q. (1999). The Sociological Development of the Development of Urban Agriculture. *Chinese Rural Economy*, 11, 64-66 (in Chinese).

Zhang, S.Q. (2000). The Water Problem in Beijing in the 21st Century and Its Solutions. *China Soft Science*, 8, 14-18 (in Chinese).

Zhang, T.T. (2013). Evaluation and Application of Urban Residents' Self-planting Activities in Beijing. Master dissertation. Beijing: Peking University, Department of Architecture. College of Architecture and Landscape Architecture of Peking University (in Chinese).

Zhou, Y. X. (1995). *Urban Geography*. Beijing: The Commercial Press (in Chinese).



# Appendix

## Appendix A Internet questionnaire

### Questionnaire of people's acknowledgement towards the edible landscapes within the urban area of Beijing

Dear friends living in Beijing,

Thank you very much for taking your valuable time to fill out this questionnaire.

I graduated from the Graduate School of Landscape Architecture in Peking University, and at present I'm a PhD student in the institute of Landscape Planning and Ecology in the University of Stuttgart in Germany, where I'm carrying out the research entitled "Edible landscapes within the Urban Area of Beijing". In recent years in order to meet the diverse demands such as entertainment, returning to the country life, physical exercise, education, food safety, greening environment, etc, more and more urban residents start to plant edible plants such as vegetables and fruits in the urban space. This survey aims to find out more cases of productive landscape in Beijing for the research, and also appeals to understand people's acknowledgment and attitudes towards the intra-urban edible landscapes in Beijing. The scope of "intra-urban" here refers to the central urban area of Beijing, not including the suburbs and rural areas. The "Edible landscapes" here refers to the landscape which is composed of the plants that have productive functions such as edible function and medical function, etc.. The questionnaire will be filled out with secret name, and we promise that the answers you give will be kept confidential and used seriously for research purposes only, not for any commercial purposes. Please fill out the questionnaire combining your daily experiences and observations. Your answer will be very helpful for the research and the environment improvement. If you have other friends who are interested, we will really appreciate for forwarding the questionnaire to them.

Thank you very much for your cooperation and support!

Institute of Landscape Planning and Ecology  
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With \* are mandatory.

1. Did you ever notice any edible plants such as vegetables, fruit trees, crops, and sunflowers, etc., including the corresponding pot planting, planted by the residents in residential areas (the traditional residential area such as Hutong and traditional Chinese courtyard are also included) in the central urban area (not including the suburbs and rural areas) of Beijing? \*

- A. Yes
- B. No (If choose this option, it turns to question 5 automatically)
- C. Do not remember (If choose this option, it turns to question 5 automatically)

2. If yes, what kind of edible landscapes is it? \* [Multiple]

- A. Vegetable (or vegetable garden). What kind of vegetable? \_\_\_\_\_
- B. Melon and fruit. What kind of melon and fruit? \_\_\_\_\_
- C. Fruit trees (or fruit tree garden). What kind of fruit? \_\_\_\_\_
- D. Grain crop (e.g. corn). What kind of grain crop? \_\_\_\_\_
- E. Cash crop (e.g. sunflower). What kind of cash crop? \_\_\_\_\_
- F. Other (If neither of the options above match, please describe) \_\_\_\_\_

3. Where are they located in the residential area? \* [Multiple]

- A. On the balcony
- B. On the windowsill
- C. On the roof
- D. Adjacent to the wall of the residential buildings
- E. Private courtyard
- F. Occupied public green space (or public space) in residential area
- G. Outside the residential area but adjacent to residential areas
- H. Other \_\_\_\_\_
- I. Do not remember

4. What are the name and the address of the residential area? \*

Tip: please fill out the name and address you remember as many as possible. For example, Haidian District Peony Garden Residential area, or \* Square \*Street No.\*, etc.

5. Did you ever notice any edible plants such as vegetables, fruit trees, crops, and sunflowers, etc., including the corresponding pot planting, the scale of which could draw people's attention, under an unified planning or construction by the developers, government departments, or other institutions in residential area (the traditional residential area such as Hutong and traditional Chinese courtyard are also included) in the central urban area (not including the suburbs and rural areas) in the central urban area of Beijing? For example, the fruits trees such as persimmon trees, hawthorn trees, etc. which were unified planted in the residential area, \*

- A. Yes
- B. No (If choose this option, it turns to question 9 automatically)
- C. Do not remember (If choose this option, it turns to question 9 automatically)

6. If, yes, what kind of edible landscapes is it? \* [Multiple]

- A. Vegetable (or vegetable garden). What kind of vegetable? \_\_\_\_\_
- B. Melon and fruit. What kind of melon and fruit? \_\_\_\_\_
- C. Fruit trees (or fruit tree garden). What kind of fruit? \_\_\_\_\_
- D. Grain crop (e.g. corn). What kind of grain crop? \_\_\_\_\_
- E. Cash crop (e.g. sunflower). What kind of cash crop? \_\_\_\_\_
- F. Other (If neither of the options above match, please describe) \_\_\_\_\_

7. Where are they located in the residential area? \* [Multiple]

- A. On the balcony
- B. On the windowsill
- C. On the roof
- D. Private courtyard
- E. Occupied public green space ( or public space) in residential area
- F. Outside the residential area but adjacent to residential areas
- G. Other \_\_\_\_\_
- H. Do not remember

8. What are the name and the address of the residential area? \*

Tip: Please fill out the name and address you remember as many as possible. For example, Haidian District Wanquan Xinxin Residential area, or \* Street No.\*, etc..

9. Did you ever notice any edible plants (e.g. vegetable gardens, fruit trees, crops and sunflowers, including the corresponding pot planting) in other places such as campus, urban parks, medical rehabilitation zones, green area and small garden along the streets, urban squares, commercial zones, the compound of company, government or research institutions, traffic space (e.g. space along the street, space beneath the overpass), the space around the public buildings, the roof and the interior of the public buildings, etc. in the urban central area of Beijing? \*

- A. Yes
- B. No (If choose this option, it turns to question 12 automatically)
- C. Do not remember (If choose this option, it turns to question 12 automatically)

10. If yes, what kind of edible landscapes is it? \* [Multiple]

- A. Vegetable (or vegetable garden). What kind of vegetable? \_\_\_\_\_
- B. Melon and fruit. What kind of melon and fruit? \_\_\_\_\_
- C. Fruit trees (or fruit tree garden). What kind of fruit? \_\_\_\_\_
- D. Grain crop (e.g. corn). What kind of grain crop? \_\_\_\_\_
- E. Cash crop (e.g. sunflower). What kind of cash crop? \_\_\_\_\_



- F. Other (If neither of the options above match, please describe) \_\_\_\_\_
- G. Do not remember

11. What's the address of them? \*

Tip: Please fill out the address you know as many as possible. For example, Haidian park rice field of one acre in Haidian District, or \* district \* Street \* position, or \* district \* Square, or \* district (on the roof of the) \*Building, or \* district \* Street \* number.

12. Have you ever been to or heard of the “Happy Farm” in the urban central area of Beijing within the 5th ring? (“Happy Farm” refers to the piece of land where people can rent and claim one plot for the cultivation and harvest of vegetables) \*

- A. Yes
- B. No (If choose this option, it turns to question 14 automatically)

13. What's the name and address of the “Happy Farm” you have been to or ever heard of? \*

Tip: Please fill out the name and address you know as many as possible.

14. Do you plant any edible plants (e.g. vegetables, fruit trees, crops, sunflowers) in the central urban area of Beijing? \*

- A. Yes (If choose this option, the question 18 skips)
- B. No (If choose this option, it turns to question 18 automatically)

15. If yes, what kind of edible plants have you planted? \* [Multiple]

- A. Vegetable (or vegetable garden). What kind of vegetable? \_\_\_\_\_
- B. Melon and fruit. What kind of melon and fruit? \_\_\_\_\_
- C. Fruit trees (or fruit tree garden). What kind of fruit? \_\_\_\_\_
- D. Grain crop (e.g. corn). What kind of grain crop? \_\_\_\_\_
- E. Cash crop (e.g. sunflower). What kind of cash crop? \_\_\_\_\_
- F. Other (If neither of the options above match, please describe) \_\_\_\_\_

16. Where do you plant the edible plants? \* [Multiple]

- A. On the balcony in residential area
- B. On the windowsill in residential area
- C. On the roof of residential buildings

- D. Interior of residential buildings
- E. Adjacent to the wall of the residential buildings
- F. Private courtyard
- G. Occupied public green space( or public space) in residential area
- H. Outside the residential area but adjacent to residential area
- I. In Office
- J."Happy farmland"
- K. Campus
- L. Urban parks
- M. Green area and small garden along the street
- N. Urban squares
- O. The compound of company, government or research institutions
- P. Traffic space (e.g. space along the street, space beneath the overpass)
- Q. Space around the public buildings
- R. The roof and the interior of the public buildings
- S. Other \_\_\_\_\_

17. Why do you plant them? \*

18. If you have a chance to plant the edible plants, will you plant any? \*

- A. Yes, because \_\_\_\_\_
- B. No, because \_\_\_\_\_
- C. Do not know \_\_\_\_\_

19. Do you like the edible landscapes which are located in the central urban area of Beijing (not including the suburban and rural area)? \*

- A. Like
- B. Not like
- C. Do not care
- D. Other \_\_\_\_\_

20. For planting edible plants (edible, medicinal or other plants which have special-functions) in the central urban space in Beijing (not including suburban and rural area), do you think there are problems? If yes, what problems? \*

21. Your gender \*

- A. Male
- B. Female

22. Your age \*

- A. Younger than 18
- B. 18-30
- C. 31-40
- D. 41-50
- E. 51-60
- F. 61-70
- G. 71-80
- H. Older than 80

23. Your education level \*

- A. Below high school
- B. High school
- C. Vocational school
- D. Bachelor
- E. Master and above

24. Your career \*

25. Your email

26. How many years have you lived in Beijing?

- A. 0-1 year
- B. 1-2 years
- C. 2-3 years
- D. 3-4 years
- E. 4-5 years
- F. 5-10 years
- G. Longer than 10 years

## Appendix B List of the selected cases in or around residential areas and the selecting reasons

Type of residential areas	Selecting reason	Name	Description of the residential area (construction time, plot ratio, rate of green coverage, type of the buildings)
Chinese traditional courtyard	On the roof	A1 Roof Garden of Guichun Zhang	1970s, -, -, a small two-floor house in traditional Hutong area
	In the courtyard, cultivation with flower pot	A2 The Tenement Courtyard House in Shi Cha Hai Hutong	Qing dynasty, -, -, tenement yard modified from the traditional Chinese courtyard
	In the courtyard, fruit trees, cultivation with flower pot	A3 The Courtyard House in South Luogu Lane	Qing dynasty, -, -, tenement yard modified from the Traditional Chinese courtyard
Common unit-dwelling building or apartment	1970s Dwellings waiting for demolition, using containers	A4 Dormitory of the Recorder Factory	1970s, -, -, multi-storey unit-dwelling buildings
	Courtyard of the first floor, with designer's participation	A5 20 m <sup>2</sup> Courtyard Garden Experiment	1970s, -, -, five-stories unit-dwelling buildings
	Staff's dormitory of research institutes, with uniform planning	A6 Dormitory District of the Institute of Semiconductor, Chinese Academy of Sciences	1970s, -, -, multi-storey unit-dwelling buildings
1980s	Special population: dwellings for military's families	A7 Military Residential Area	1980s, -, -, multi-storey unit-dwelling buildings
	In the public space of residential area	A8 San Li He 3 Qu Residential Area	1985, 0.35, 40%, multi-storey unit-dwelling buildings
	In the public space of residential area	A9 Mu Dan Yuan Residential Area	1992, 1.3, 35%, multi-storey unit-dwelling buildings
1990s	Special population: dwellings for the staff's families in universities	A10 Yan Bei Yuan Residential Area	1998, 2.7, 30%, six-stories unit-dwelling buildings
	In the public space of residential area	A11 Shuangyushu Residential Area	1992, 1.5, 30%, multi-storey unit-dwelling buildings
	Single high-rise Slab-type building,	A12 No.6 Hai Dian South Road Dwelling	1995, -, -, high-rise slab-type unit-dwelling buildings

	using containers			
	In the public space of residential area	A13 Dongwangzhuang Residential Area	1998,0.9,30.7%, six-stories unit-dwelling buildings	
	Staff's dormitory, uniform organization	A14 Minkang Residential Area No.30	1999, -, 25%, high-rise tower building	
2000s	In the public space of residential area	A15 Morden City Homeland Residential Area	2004,0.85,40%, six-stories unit-dwelling buildings	
	Residential area with "Happy Farm"	A16 Jia Zhou Shui Jun Residential Area	2008,0.65,40%, high-rise slab-type unit-dwelling buildings	
Economical house	Special dwelling style	A17 Long Yue Yuan 3 <sup>rd</sup> Residential Area	2000,1.6,30%, six-stories unit-dwelling buildings	
Move back house	Special population: dwellings for farmers who move back	A18 Hui Xin Homeland Residential Area	2004, 5.4, 50%, high-rise tower buildings	
Modern high-grade apartment	On the balcony, with designer's participation	A19 Balcony Garden in Brown Stone Apartment	2009, 1.2, 38%, multi-storey unit-dwelling buildings	
	High-grade apartment, uniform planning, with designer's participation	A20 Fengshang International Apartment	2002,3.0,63%, high-rise tower buildings	
	Morden luxury building, with private courtyard	A21 Wan Quan Xin Xin Residential Area	2003, 1.8, 40%, western-style multi-storey unit-dwelling buildings and high-rise tower buildings	
	Outside but adjacent to the residential area	A22 Yuan Ming Yuan Villa District	2003, 1.5, 45%, multi-storey unit-dwelling buildings	
Luxury modern villa	Villa, with private courtyard, uniform planning	A23 Xiang Shan Qing Qin Villa District	2006, 0.84, 40%, Individual villa with private courtyard	

## Appendix C The number of the interviewees and the sampling distribution

Type of the edible landscape	Site	“Urban farmers”	“Neighbors”	Property management companies /Community neighborhood committees	Initiators (developers, project directors)	Total number
A. In or around residential areas	A1 Roof Garden of Guichun Zhang	1	2			3
	A2 The Tenement Courtyard House in Shi Cha Hai Hutong	5	2			7
	A3 The Courtyard House in South Luogu Lane	3	2	1		6
	A4 Dormitory of the Recorder Factory	3	4			7
	A5 20 m <sup>2</sup> Courtyard Garden Experiment	1	2			3
	A6 Dormitory of the ISCAS	1	3	1	1 (also staff member and “urban farmer”)	6 (1 is repeated)
	A7 Military Residential Area	3	1			4
	A8 San Li He 3 Qu Residential Area	1	1			2
	A9 Mu Dan Yuan Residential Area	3	2			5
	A10 Yan Bei Yuan Residential Area	5	3	1		9
	A11 Shuang Yu Shu Residential Area	3	9			12
	A12 No.6 Hai Dian South Road Dwelling	1	2	1		4
	A13 Dong Wang Zhuang Residential Area	2	5	1		8
	A14 Minkang Residential Area No.30	2	2			4
	4	1	5 (4 of them are also “professional urban gardeners”)	2 (also staff members)	12 (6 are repeated)	

A15 Morden City Homeland Residential Area	2	1	1	1	4
A16 Jia Zhou Shui Jun Residential Area	2	1	1	1 (also staff member, "urban farmer")	5 (1 is repeated)
A17 Long Yue Yuan 3 <sup>rd</sup> Residential Area	3	1	2		6
A18 Hui Xin Homeland Residential Area	2	5	1		8
A19 Balcony Garden in Brown Stone Apartment					-
A20 Feng Shang International Apartment	1	3	1	1	6
A21 Wan Quan Xin Residential Area	1	3	2 (1 is also "professional urban gardener")		6 (1 is repeated)
A22 Yuan Ming Yuan Villa District	1	1	1		3
A23 Xiang Shan Qing Villa District	1		1		2
Total	51	56	20 (5 are repeated)	5 (4 are repeated)	132 (9 are repeated)
B. In the Danwei precinct					
B1 Si Bo Lian Hua Neng Electromechanical Factory	1			1	2
B2 ISCAS	2	2		The same person in A6 (also "urban farmer")	4
B3 Roof Farm in Tsinghua University	1	9		1(also "urban farmer")	11 (1 is repeated)
B4 The Experimental Farmland of CAAC	2	7			9
Total	6	18		2 (1 are repeated)	26 (1 are repeated)
C. In traffic space					
C1 Vegetable Field along the Street adjacent to Shang Di Flower Market	2	4			6

	C2 The Vegetable Field along Shanghe Road	5	3		8
	C3 River Revetment and Public Green Space along Sha River	11	7		18
	C4 The Public Space along Subway 13	1	1		2
	C5. The Public Space around a Parking Lot	1 (1 is repeated)	3		4 (1 is repeated)
	C6. The Avenue Trees in the Embassy Districts				-
	<b>Total</b>	20 (1 is repeated)	18		38 (1 is repeated)
D. In urban parks	D1. One Acre Paddy Field in Haidian Park		7	1	8
	D2 Fruit Trees in the Temple of Heaven Park		2		2
	D3 The Landscape of Sun Flower in Chao Yang Park		3		3
	<b>Total</b>		12	1	13
E. Leisure farms	E1 Xi Shang "Happy Farm"	3		1 (also one "urban farmer")	4 (1 is repeated)
	E2 Si Ji Qing Agrotourists' Picking and Sightseeing Farm	1		1 (also one "urban farmer")	2 (1 is repeated)
	<b>Total</b>	4		2 (2 are repeated)	6 (2 are repeated)
<b>Total</b>		81 (2 are repeated)	104	20 (5 are repeated)	215 (14 are repeated)



## **Appendix D Semi-structured interview guideline**

### **D1 Semi-structured interview guideline \_for “urban farmers”**

#### **1. Status quo**

##### **Origin and Evolution**

- How was the vegetable garden/fruit trees garden/project originated? When did you start to plant them? Who paid for the first cost, including the seeds, soil, tools, irrigation water, fertilizer etc.? Where were the seeds from?
- What's the main reason did you start the planting?
- Could you tell me the history of the garden/project since you have taken over? Do you know how did the land look like before and what was the use of it?

##### **Spatial Vision**

- What size is your vegetable garden / fruit trees garden?
- What kind of plants have you planted?
- Are people allowed to visit your vegetable garden/ fruit trees garden? (Public, private or semi-public)
- Why are you planting vegetables/ fruit trees here? Are there any special reasons for the site?

##### **Organization**

- Is this planting action organized or spontaneous?
- If it's under a unified organization, how is it organized? Who are the actors? What are their responsibilities?
- What's your job? Do you have any farming experience before? How old are you? (Selected)
- How many people work here? (Number, gender, age, origin, occupation, hours of work and responsibility)
- What do you usually do here?
- Who is the owner of the land that you are cultivating? Do you have right to use it?
- What do you need to maintain the garden? Normally how much do you invest for it every year?
- Do you sell the harvested vegetables/fruits to the market? If yes, where do you sell the products? How do you sell them? Who are the consumers? Where do they live?

##### **Attitudes**

- Do you think the vegetable garden/fruit tree garden is beautiful?
- Do you like your vegetable garden/fruit tree garden?
- Do you support to plant vegetables/fruit trees here?
- If the property management/government plan to develop a piece of land with 5 m<sup>2</sup> per plot for the cultivating by the residents, would you like to join in? Why?
- If no, then in your opinion, how much should the amount for changing the original green area

into the cultivating one made good be?

- If you would like to join, and you can get a plot of 5 m<sup>2</sup>, how much would you like to pay for renting the plot?

### **Policy**

- Is there any support from legislative, financial, planning or other aspects?

## **2. Relationship between people and edible landscape**

### **Relationship between people and plants**

- Do you like plants? What kind of plants do you prefer?
- Do you have time to stay with plants or appreciate plants outside every week? How much time do you usually use for that every day?
- Does your child like plants outside? How old is your child? (selected)
- What's the purpose of staying with plants outside?
- Do you think plants are important in your life? What benefits could they bring to you? And what benefits could they bring to other people?

### **Relationship between people and the normal green space**

- How much time do you usually stay in the normal green space outside?
- What's your main activities in the normal green space outside?
- Have you ever known friends when you in the green space outside? If yes, how many new friends have you made?
- How do you perceive the space here? What's the impressed feeling whenever you come here?
- Is there any interesting or impressive story when you behave in the green space?

### **Relationship between people and edible plants**

- What kinds of vegetable/fruits do you plant every season?
- When do you start to plant vegetable/fruit, and when do you end the planting?
- How often do you work in your garden? How much time do you usually work in your garden every time?
- What's your main purpose for planting vegetable/fruit trees?
- What's the use of the products?
- If the products are used for eating, what's the yield? Are they enough for supporting the whole families? How much cost could be saved through consuming the products every year?
- Do you give the harvested vegetable/fruit to your neighbors?
- Do you share the harvested vegetable/fruit with other residents who are also cultivating here?
- Have you ever known new friends because of planting vegetable here? If yes, how many new friends have you made?
- Do you family support you to plant vegetable/fruit? Who usually take care of the vegetable garden in your family? How old are they?
- Does your child like these edible plants? Does your child like coming here? How old is your

child? (selected)

- Do you think the edible plants are important in your life? What benefits can the vegetable/fruit tree bring to you and to other people?
- If the vegetable/fruit tree will take part of the place of the ornamental trees or grass close to your home, do you agree with it?

### **Relationship between people and productive space**

- Besides farming, do you usually come here? If yes, how long do you usually stay here?
- Besides farming, what do you usually do here? e.g. talking with friends, sitting under trees for cool.
- Since having the garden with edible plants, what's the biggest change compared to the life before?
- Have you ever known new friends in the productive space? If yes, how many new friends have you made?
- In your opinions, does the vegetable garden facilitate encounters of the neighbors?
- How do you perceive the space here? What's the impressed feeling whenever you come here?
- Is there any interesting or impressive story when you behave in the green space?

## **3. Technology**

### **Seeds**

- Where do the seeds/seedlings come from?
- Do you exchange seeds with your neighbors/friends?
- How much do the seeds cost?

### **Soil**

- Where does the soil come from?
- Is the soil fertile?
- How much does the soil cost?

### **Irrigation water**

- What kind of water do you use as the irrigation water?
- How often do you irrigate? And how much water do you use every time?
- How much is the average cost every month?

### **Fertilizer**

- What kind of fertilizer do you use? Where does the fertilizer come from?
- Does the fertilizer smell or attract bugs such as mosquitoes?
- How much fertilizer is needed?
- How much does the fertilizer cost?

### **Tools**

- Which working tools do you use? Where do they come from?

- How much do they cost?

#### **Cultivating knowledge and skills**

- Where do you learn the cultivating knowledge and skills?
- Is there any pest and disease problems? If yes, how do you deal with or control them?

#### **4. Existing problems and suggestions**

##### **Existing Problems**

- Are there any conflicts with the city or citizens/neighbors?
- Are there any neighbors opposing you to plant edible plants here?
- Is there any unpleasant things happened related to the cultivating of the edible plants?
- Have your vegetables/fruits ever being stolen? What strategies have you done to deal with it?
- In your opinion, what disadvantages does it still have?

##### **Suggestions**

- Do you have any design plan for improving your vegetable garden/project?
- From the organization aspect, do you have any suggestions to make it better?
- Do you think the government should give some support to the development of urban farms?  
If yes, what kinds of support are needed?
- What technical considerations and technical support are needed?
- Can you imagine how will it look like after 10 or 20 years?
- Do you think the model of growing edible plants (e.g. vegetable, fruit tree) will be developed?  
If yes, which forms will be developed?
- In your opinion, where is suitable for planting the edible plants in the urban space in Beijing?

## **D2 Semi-structured interview guideline \_for “neighbors”**

### **Attitudes**

- Do you support the residents planting vegetable/fruit tree/other edible plants in residential area? (The question will change according to the real situation: Do you support a unified planning of vegetable garden/fruit garden/other edible plants in residential area? Do you support planting vegetable/fruit tree/other edible plants in the courtyard of institutions? Do you support building picking garden/“Happy Farm” in central urban space? Do you support planting vegetable/fruit tree/other edible plants along the street? Do you support planting vegetable/fruit tree/other edible plants in urban parks? Do you support keeping experimental agricultural field in central urban space?)
- Do you think the vegetable garden/fruit tree garden is beautiful?
- If the property management/government plan to develop a piece of land with 5 m<sup>2</sup> per plot for the cultivating by the residents, would you like to join in? Why?
- If no, then in your opinion, how much should the amount for changing the original green area into the cultivating one made good be?
- If you would like to join, and you can get a plot of 5 m<sup>2</sup>, how much would you like to pay for renting the plot?

### **Relationship between people and plants**

- Do you like plants? What kind of plants do you prefer?
- Do you have time to stay with plants or appreciate plants outside every week? How much time do you usually use for that every day?
- Does your child like plants outside? How old is your child? (selected)
- What’s the purpose of staying with plants outside?
- Do you think plants are important in your life? What benefits could they bring to you? And what benefits could they bring to other people?

### **Relationship between people and the normal green space**

- How much time do you usually stay in the normal green space outside?
- What’s your main activities in the normal green space outside?
- Have you ever known friends when you in the green space outside? If yes, how many new friends have you made?

### **Relationship between people and edible plants**

- Do you have any friends or neighbors who are cultivating their own vegetable or fruit tree? If yes, are there any people sharing their harvested vegetable or fruit with you?
- Do you visit the vegetable/fruit trees some times? If yes, then how often do you visit the plants?
- Does your child like these edible plants? Does your child like coming here? How old is your child? (selected)
- Do you think the vegetable/fruit tree which were planted by the residents are beautiful?
- If there is a chance, will you plant some vegetables or fruit trees?

- In your opinion, what advantages does the vegetable /fruit tree has?
- If the vegetables/fruit trees will take part of the place of the ornamental trees or grass close to your home, do you agree with it?
- Do you think the edible plants such as vegetables and fruit trees are important in your life? What benefits have they brought to you?

#### **Relationship between people and productive space**

- Do you come to the place where grow vegetable/fruit trees for some activities? e.g. talking with friends in the vegetable garden, sitting under fruit trees for cool. If yes, what's the average time for your activities in the garden?
- How do you perceive the space here? What's the impressed feeling whenever you come here?
- Since having the garden with edible plants, what's the biggest change compared to the life before?
- In your opinions, does the vegetable garden facilitate encounters of the neighbors?

#### **Existing Problems**

- Are there any conflicts with the city or citizens/neighbors?
- Is there any unpleasant things happened related to the cultivating of the edible plants?
- In your opinion, what disadvantages does the vegetable garden/fruit garden have?

#### **Suggestions**

- Do you have any suggestions for improving the development growing edible plants such as vegetables and fruit trees) in central urban space?
- In your opinion, where is suitable for planting the edible plants in the central urban space in Beijing?

#### **Personal information**

- What's your occupation? How old are you?

### **D3 Semi-structured interview guideline \_for property management companies and community neighborhood committee**

#### **Attitudes**

- Do you support the residents planting vegetable/fruit tree/other edible plants in residential area?
- Do you support a unified planning of vegetable garden/fruit garden/other edible plants in residential area?
- Do you think the vegetable gardens/fruit tree gardens developed by the residents are beautiful?
- If the property management/government plan to develop a piece of land with small plot for the cultivating by the residents, would you like to support it or even join in the organization? Why?
- If no, then if the residents could pay as the compensation for changing the original green area into the cultivating one, would you like to support it or even join in the organization? Why?
- If the residents would like to rent a plot, e.g. a plot of 5 m<sup>2</sup> for planting the edible plants, would you like to support it or even join in the organization? Why?

#### **Services that edible landscape could supply**

- In your opinions, what advantages does the edible landscape within the urban space have? What services could it supply to the citizens?

#### **Policy**

- Is there any regulation for the public green space and the vegetation planting? Is there any forbiddance for the residents to plant the edible plants in the public residential area? Who made it?

#### **Existing Problems**

- Does the edible landscape have any conflicts with the city or citizens/neighbors?
- Is there any unpleasant things happened related to the cultivating of the edible plants?
- In your opinion, what disadvantages does the vegetable garden/fruit garden within residential area have?

#### **Suggestions**

- Do you have any suggestions for improving the development of edible landscapes within the urban space?
- In your opinion, where is suitable for planting the edible plants within the urban space in Beijing?
- Do you think the government should give some support to the development of urban farms?
- Currently in many countries in the United States and Europe, there are many forms of urban agriculture in central urban space, such as the agriculture preserved as cultural heritage, the family gardening, the agriculture preserved as cultural heritage, the community gardening, the vertical gardening/roof top, agro-park, proximity agriculture (Community supported agriculture, residential agriculture, social farming), the agriculture oriented to local market (public procurement), etc. Do you think in future the model of edible landscape within the urban space of Beijing could be developed? If yes, which forms will be developed?

## **D4 Semi-structured interview guideline \_for initiators of the formally organized ELWUA project (commercial developers, project directors)**

### **Spatial Vision**

- What size is your project?
- What kind of plants have you planted?
- Are people allowed to visit your project? (Public, private or semi-public)
- Why did you develop your project on this site? Are there any special reasons for the site?

### **Organization**

- How is this project organized? Who are the actors? What are their responsibilities?
- What's your responsibility? Do you have any farming experience before? How old are you? (Selected)
- How many people work here? (Number, gender, age, origin, occupation, hours of work and responsibility)
- How many people cultivate here? (Number, gender, age, origin, occupation, hours of work and responsibility)
- Who is the owner of the land for the project? Do you have right to use it?
- What do you need to maintain this project? How much do you invest for it?
- Do you sell the harvested vegetables/fruits to the market? If yes, where do you sell the products? How do you sell them? Who are the consumers? Where do they live?

### **Origin and Evolution**

- How was the project originated? When did you start it? Who paid for the first cost, including the soil, tools, irrigation water, etc.? Where did the seeds/young plants come from?
- What's the main reason did you start project?
- What's the aim of the project?
- Could you tell me the history of the project since you have taken over? Do you know how did the land look like before and what was the use of it?

### **Attitudes**

- Do you think the vegetable garden/fruit tree garden is beautiful?
- Do you like your vegetable garden/fruit tree garden?
- In your opinion the people who do farming like the vegetable garden/fruit tree garden

### **Policy**

- Is there any support from legislative, financial, planning or other aspects?

### **Services that edible landscape could supply**

- In your opinions, what benefits could the project bring for people?
- In your opinions, what are the biggest changes since the project started?
- In your opinions, does the project facilitate encounters of the neighbors/people?



**Technology**

- What does the irrigation water come from? How much does it cost?
- What kind of fertilizer do you use? How much does it cost?
- Is there any advising about the cultivating knowledge and skills? If yes, where do the cultivating knowledge and skills come from?

**Existing Problems**

- Are there any conflicts with the city or citizens/neighbors?
- In your opinion, what disadvantages does it have?

**Suggestions**

- Do you have any design plan for improving your vegetable garden/project?
- From the organization aspect, do you have any suggestions?
- Do you think the government should give some support to the development of urban farms?  
If yes, what kinds of support are needed?
- What technical considerations and technical support are needed?
- Can you imagine how will it look like after 10 or 20 years?
- Do you think the model of growing edible plants (e.g. vegetable, fruit tree) will be developed?  
If yes, which forms will be developed?

## **D5 Semi-structured interview guideline \_for professional planners and designers**

### **Attitudes**

- Have you ever noticed the phenomenon that some residents planting vegetable/fruit tree/other edible plants in residential area, or ever noticed a unified planning of vegetable garden/fruit garden/other edible plants in residential area, or people planting vegetable/fruit tree/other edible plants in the courtyard of institutions, along the street, in urban parks, and also the experimental agricultural field in central urban space?
- Do you support planting edible plants (e.g. vegetable, fruit trees, and crops) in the central urban space of Beijing?
- Do you think the landscape composed of edible plants is beautiful?
- Do you like this kind of edible landscape?
- If the vegetable/fruit tree will take part of the place of the ornamental trees or grass in the central urban space in Beijing, do you agree with it?
- As you know, is there any relative policy support/financial support/planning support/other support for introducing edible landscape into the central urban space of Beijing?
- In your opinion, do you think the government should give some support to the development of edible landscape in the central urban space in Beijing? If yes, what kinds of support are needed?

### **Services that edible landscape could supply**

- In your opinions, what advantages does the edible landscape within the urban space have? What services could it supply to the citizens?

### **Existing Problems**

- Are there any conflicts with the city or citizens/neighbors?
- In your opinion, what disadvantages does it have?

### **Suggestions**

- Currently in many countries in the United States and Europe, there are many forms of urban agriculture in central urban space, such as the agriculture preserved as cultural heritage, the family gardening, the agriculture preserved as cultural heritage, the community gardening, the vertical gardening/roof top, agro-park, proximity agriculture (Community supported agriculture, residential agriculture, social farming), the agriculture oriented to local market (public procurement), etc. Do you think in future the model of edible landscape in central urban space of Beijing could be developed? If yes, which forms will be developed?
- Do you have any suggestions for improving the development of it?

## **D6 Semi-structured interview guideline \_for governmental official in the Beijing Municipal Bureau of Landscape and Forestry**

### **Attitudes**

- How do you understand the concept “urban agriculture”and “edible landscape within the urban area”?
- Is there any support to the development of urban agriculture in Beijing? E.g. the relevant law, policy, agriculture planning as well as some major projects which are financially supported.
- Have you ever noticed the phenomenon that some residents planting vegetable/fruit tree/other edible plants in residential area, or ever noticed a unified planning of vegetable garden/fruit garden/other edible plants in residential area, or people planting vegetable/fruit tree/other edible plants in the courtyard of institutions, along the street, in urban parks, and also the experimental agricultural field in central urban space?
- Do you support planting edible plants (e.g. vegetable, fruit trees, and crops) in the central urban space of Beijing?
- Do you think the landscape composed of edible plants is beautiful?
- Do you like this kind of edible landscape?
- If the vegetable/fruit tree will take part of the place of the ornamental trees or grass in the central urban space in Beijing, do you agree with it?
- As you know, is there any relative policy support/financial support/planning support/other support for introducing edible landscape into the central urban space of Beijing?
- In your opinion, do you think the government should give some support to the development of edible landscape in the central urban space in Beijing? If yes, what kinds of support are needed?

### **Services that edible landscape could supply**

- In your opinions, what advantages does the edible landscape in central urban space have? What services could it supply to the citizens?

### **Existing Problems**

- Are there any conflicts with the city or citizens/neighbors?
- In your opinion, what disadvantages does it have?

### **Suggestions**

- Currently in many countries in the United States and Europe, there are many forms of urban agriculture in central urban space, such as the agriculture preserved as cultural heritage, the family gardening, the agriculture preserved as cultural heritage, the community gardening, the vertical gardening/roof top, agro-park, proximity agriculture (Community supported agriculture, residential agriculture, social farming), the agriculture oriented to local market (public procurement), etc. Do you think in future the model of edible landscape in central urban space of Beijing could be developed? If yes, which forms will be developed?
- Do you have any suggestions for improving the development of it?

**Appendix E Cases of the edible landscape within the urban area  
(ELWUA) in Beijing**

## CASE A1 Roof Garden of Guichun Zhang

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<b>Type</b>	Family garden (roof)
<b>Location</b>	Traditional residential area (1970s), 2 <sup>nd</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2008
<b>Size</b>	About 100 m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	1 "urban hobby farmer", 2 "neighbors"
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.....

The roof garden is located in the densely Chinese traditional Hutong area. It was built by a Beijing resident Mr. Guichun Zhang, a man aged 55, on the roof of his house. This house was originally a two-floor building, where Mr. Zhang and his neighbor live. In 2008 his neighbor moved out and the part of the second floor which his neighbor lived in was demolished, leaving a messy and bleak roof space. Facing with the decayed scene Mr. Zhang started growing vegetables, herbs and fruits on the roof with the aim of not only beautifying the environment but also supplying a leisure space for him and his neighbors. The edible plants which Mr. Zhang planted include tomato, cucumber, eggplant, green pepper, bottle gourd, hot pepper, coriander, watermelon, etc. Except for the edible plants, he built a fishpond for breeding carps. The interview to Mr. Zhang shows that besides beautifying environment and supplying leisure and recreation space, the roof garden offered a wide variety of fresh food to the family, supplied green and cool shade, let Mr. Zhang know many new friends, and the most important benefit is the happiness he achieved form the farming activities. After Mr. Zhang's roof garden was shown on a TV program, he became a famous "urban farmer" all over China and is frequently invited by many Medias to introduce his gardening experience and gardening skills, which educated urban citizens about self grown food and sustainable living.



Source: a) Googleearth; 1) bbstaobao.com; 2) and 3) YNET.com

## CASE A2 The Tenement Courtyard House in Shi Cha Hai Hutong

<b>Type</b>	Family garden (courtyard), guerrilla garden
<b>Location</b>	Traditional residential area (Qing dynasty), 2 <sup>nd</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	Several decades ago, 1984, and 2008
<b>Size</b>	About 2-6 m <sup>2</sup> / family
<b>Status</b>	In progress
<b>Interviewee</b>	5 “urban hobby farmers”, 2 “neighbors”



The Shi Cha Hai Hutong is one densely Chinese traditional Hutong area, and most of the traditional courtyard houses have transformed into tenement courtyard houses. Residents in Beijing have the tradition of greening their courtyards with fruit trees and vegetables. Some fruit trees such as persimmon trees and jujube trees which now exist there were planted several decades ago (1950s-1980s), and a few of them even had a history of over hundreds of years. The tradition of growing edible plants in the courtyard was inherited. At present, many residents still make use of the limited space of the shared courtyard, in the verges around the houses, or in the public space adjacent to their courtyards to grow herbs, spices, vegetables, fruits and medicinal herbs. Many of them use the containers such as the flower pot for the cultivation. The “urban hobby farmers” might be house owners or tenants of the houses. The interview to the 4 interviewees indicated that their motivations for growing food are mainly for greening and beautifying environment, for entertainment, or the influence of a cultivating tradition. Besides, the edible landscape offered fresh food to their families and friends. It also has educational functions: one interview said that her grandchildren often draw their writing inspiration from the vegetables.



Source: a) Googlearth



## CASE A3 The Courtyard House in South

### Luogu Lane

.....

<b>Type</b>	Family garden (courtyard), guerrilla garden
<b>Location</b>	Traditional residential area (Qing dynasty), 2 <sup>nd</sup> ring
<b>Organization</b>	Individual mode, professional organization by community neighborhood committee
<b>Start date</b>	1980s, 1990s,
<b>Size</b>	About 2-6 m <sup>2</sup> / family
<b>Status</b>	In progress
<b>Interviewee</b>	3 "urban hobby farmers", 2 "neighbors", 1 staff member in community neighborhood committee

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The South Luogu Lane is one densely Chinese traditional Hutong area which was built in Qing dynasty. Some fruit trees such as persimmon trees and jujube trees which now exist there were planted several decades ago (1950s-1980s), and a few of them even had a history of over hundreds of years. The tradition of growing edible plants in the courtyard was inherited. At present, many residents still make use of the limited space of the shared courtyard, in the verges around the houses, or in the public space adjacent to their courtyards to grow herbs, spices, vegetables, fruits and medicinal herbs. Many of them use the containers such as the flower pot for cultivation. The "urban hobby farmers" might be house owners or tenants of the houses. In addition to individual mode of residents' food growing, the community neighborhood committee regularly distributes seeds to residents to encourage them to grow edible plants for achieving greening. The interviews of the 3 "urban hobby farmers" indicated that their motivations for growing food are mainly for producing organic foods which are natural and pollution-free for their own consumption, for greening and beautifying environment, for entertainment, or the influence of a cultivating tradition. Besides, one interview said that the edible landscapes could provide medicinal materials.



Source: a) Googlearth

## CASE A4 Dormitory of the Recorder

### Factory

.....

<b>Type</b>	Guerrilla garden
<b>Location</b>	Modern residential area (1970s), 4 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2007, 2009 and 2010
<b>Size</b>	About 2-10 m <sup>2</sup> / family
<b>Status</b>	Terminated in 2015 because of demolition
<b>Interviewee</b>	3 "urban hobby farmers", 4 "neighbors"

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This residential area with multi-storey buildings was built in the 1970s, which was originally the dormitory of the staff of a recorder factory. Because of the demolition of part of the buildings, the environment of the residential area became messy and bleak in the 2000s. In order to improve and beautify the living environment, some residents started growing herbs, spices and vegetables in the public space of the residential area. Some of them use containers such as the flower pot, recycled ceramic basins and packing boxes for the cultivation. In addition, other motivations for growing food include for entertainment and enriching life and for physical exercise. In addition to the services mentioned above, the interviewees mentioned that the edible landscapes could provide food supplementation which is associated with bring pleasure or convenience to their daily life rather than subsistence. Through farming activities, they also "learn a lot of agricultural and gardening knowledge from each other".



Source: a) Googlearth



## CASE A5 20 m<sup>2</sup> Courtyard Garden

### Experiment

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<b>Type</b>	Family garden
<b>Location</b>	Modern residential area (1970s), 5 <sup>th</sup> ring
<b>Organization</b>	Self-managed mode of group organization + Designers
<b>Start date</b>	2010
<b>Size</b>	About 20 m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	1 “urban hobby farmers” (also designer), 2 “neighbors”

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The garden is a private courtyard attached to an apartment which is located in one relatively old modern residential area with multi-storied buildings in Haidian District which was built in the 1970s. When the apartment was rented out, the garden was abandoned and occupied with weeds. In 2010, the garden was reconstructed by the 5 tenants of the apartment, who are 5 designers (3 landscape architects, 1 architect and 1 costume designer), with the aim of creating a shared space with good environment. The garden was planted with both ornamental and edible plants in the form of checkerboard, including wheat, rape pumpkin, bottle gourd, white clover and safflower clover. The crops planted in the garden created a communication space for the 5 designers to discuss the dressing of the garden, cultivate and harvest together, which became a great pleasure for them. The garden often attracts the retired elderly in the community to have chat with them about the agriculture scenery. The passersby also stop and chat frequently when they are working in the garden, which provide the possibility of communication with neighbors and harmonious neighborhood. The garden is located at the intersection of two roads, as pedestrians pass by frequently, the low vegetation forms a good visual and communication interface (Fu et al. 2012).



Source: a) Googleearth; 1) and 2) Fu et al. 2012

## CASE A6 Dormitory of the ISCAS

.....

<b>Type</b>	Family garden, guerrilla garden, urban greening with fruit trees
<b>Location</b>	Modern residential area (1970s), 5 <sup>th</sup> ring
<b>Organization</b>	Individual mode, professional organization by the community neighborhood committee
<b>Start date</b>	1980s
<b>Size</b>	20 m <sup>2</sup> /family garden 2-6 m <sup>2</sup> /guerrilla garden fruit trees (meso scale)
<b>Status</b>	In progress
<b>Interviewee</b>	1 “urban hobby farmer”, 1 “professional gardener” (he is also one initiator and one staff member of the community neighborhood committee), 3 “neighbors”

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This residential area with multi-storey buildings was built in the 1970s, which was originally the dormitory of the staff of the Institute of Semiconductor, Chinese Academy of Sciences (ISCAS). In 1980, in order to achieve greening quickly, persimmon trees, which were cheap and grow fast, were selected by the community neighborhood committee for public greening of the residential area. In addition to the the fruit trees planted in professional organization, some residents started making use of the private courtyard on the first floor (family garden) and the public space of the residential area (guerrilla garden) for growing edible plants such as herbs, spices, vegetables, fruits and medicinal herbs since their moving in. The interviewed “urban hobby farmer” said that she grew food mainly for fun and entertainment.



Source: a) Googlearth



## CASE A7 Military Residential Area

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<b>Type</b>	Family garden, guerrilla garden
<b>Location</b>	Modern residential area (1980s), 4 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	1980s, 1990s, and 2000s
<b>Size</b>	20 m <sup>2</sup> / garden
<b>Status</b>	In progress
<b>Interviewee</b>	3 “urban hobby farmers”, 1 “neighbor”

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This residential area with multi-storey buildings was a military compound which was built for the families of military in the 1980s. Since the residents' moving in, some of them started growing edible plants such as herbs, spices, vegetables, fruits and medicinal herbs in the private courtyard on the first floor (family garden), or in the public space of the residential area (guerrilla garden). One interviewed “urban hobby farmer” mentioned that some fruit trees were transplanted from his old house. The interview to the 3 “urban hobby farmers” indicated that their motivations for growing food are mainly for improving and beatifying the environment, for entertainment, for cultivating the mind and for physical exercises. In addition, the edible landscapes could provide food supplement for the residents.



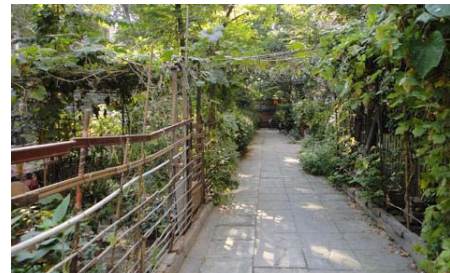
Source: a) Googlearth

## CASE A8 San Li He 3 Qu Residential Area

.....  
**Type** Guerrilla garden  
**Location** Modern residential area (1985), 3<sup>rd</sup> ring  
**Organization** Individual mode  
**Start date** -  
**Size** About 2-20 m<sup>2</sup>/ guerrilla garden  
**Status** In progress  
**Interviewee** 1 "urban hobby farmer", 1 "neighbor"  
.....



.....  
This residential area with multi-storey buildings was built in the 1980s. Since the residents' moving in, some of them started growing edible plants such as herbs, spices, vegetables, fruits and medicinal herbs in the public space of the residential area. The interviewed "urban hobby farmer" said that growing food was his hobby and he cultivated mainly for entertainment. In addition, the edible landscapes provided food supplement, created environmental amenities and provided chances for physical exercises for the urban residents, and also promoted neighbors' encounters and communications



Source: a) Googlearth



## CASE A9 Mu Dan Yuan Residential Area

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<b>Type</b>	Guerrilla garden, family garden (balcony, windowsill)
<b>Location</b>	Modern residential area (1992), 3 <sup>rd</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	
<b>Size</b>	About 2-20 m <sup>2</sup> / guerrilla garden
<b>Status</b>	In progress
<b>Interviewee</b>	3 “urban hobby farmer”, 2 “neighbors”

.....



.....

This residential area with multi-storey buildings was built in the 1990s. Since the residents' moving in, some of them started growing edible plants such as herbs, spices, vegetables, fruits and medicinal herbs in the public space of the residential area (guerrilla garden) and on the balcony windowsill using containers (family garden). The interview to the 3 “urban hobby farmers” indicated that their motivations for growing food are mainly for entertainment, for physical exercises and for producing organic food. “The people over 60 are old people, I’m an old person almost aged 70, I need to do some physical exercise to keep strong and healthy.” In addition, the edible landscapes provided food supplement, created environmental amenities for the urban residents and promoted neighbors’ encounters and communications.



Source: a) Googlearth

## CASE A10 Yan Bei Yuan Residential Area

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<b>Type</b>	Guerrilla garden, family garden
<b>Location</b>	Modern residential area (1998), 3 <sup>rd</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	1990s, 2000s
<b>Size</b>	About 20 m <sup>2</sup> / family garden, About 8-100 m <sup>2</sup> / guerrilla garden About 1000 m <sup>2</sup> (one illegal garden)
<b>Status</b>	Family/guerrilla garden - in progress Illegal garden – terminated in 2013
<b>Interviewee</b>	5 "urban hobby farmers", 3 "neighbors", 1 staff member of the community neighborhood committee

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This residential area with multi-storey buildings was built in the 1990s for the families of the staff in Peking University. Since the residents' moving in, some of them started growing edible plants such as herbs, spices, vegetables, fruits and medicinal herbs in the private courtyard on the first floor (family garden), or in the public space of the residential area (guerrilla garden). In addition, there was a big illegal guerrilla garden with a size of about 1000 m<sup>2</sup> which was built by the construction workers, but it was demolished in 2013. The interviews to the 5 "urban hobby farmers" indicated that their motivations for growing food are mainly for enriching life and cultivating the mind, for fun and entertainment, for hobby and habit, for physical exercises and for improving and beautifying the wild environment. In addition, the edible landscapes provided food supplement for the urban residents and also promoted neighbors' encounters and communications.



Source: a) Googleearth



## CASE A11 Shuang Yu Shu Residential

### Area

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<b>Type</b>	Guerrilla garden
<b>Location</b>	Modern residential area (1992), 4 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	1990s, 2010s
<b>Size</b>	About 2-20 m <sup>2</sup> / guerrilla garden
<b>Status</b>	In progress
<b>Interviewee</b>	3 "urban hobby farmers", 9 "neighbors"

.....



.....

This residential area with multi-storey buildings was built in the 1990s. Since the residents' moving in, some of them started enclosing public space adjacent to their houses for growing edible plants such as herbs, spices, vegetables, fruits and medicinal herbs. The interview to the 3 "urban hobby farmers" indicated that their motivations for growing food are mainly for fun and entertainment, for the hobby and habit of farming, for enriching life and cultivating the mind, for physical exercises and for improving and beatifying the disorderly and annoying environment. In addition, the edible landscapes provided food supplement for the urban residents.



Source: a) Googlearth

## CASE A12 No.6 Haidian South Road

### Dwelling

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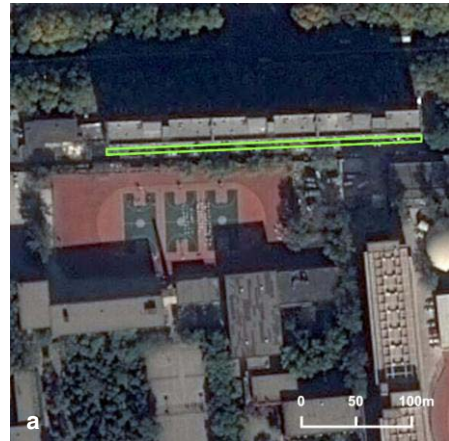
<b>Type</b>	Guerrilla garden, family garden (windowsill)
<b>Location</b>	Modern Residential area (1995), 4 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	-
<b>Size</b>	About 2-20 m <sup>2</sup> / guerrilla garden
<b>Status</b>	Terminated because of building renovation
<b>Interviewee</b>	1 “urban hobby farmer”, 2 “neighbors”, 1 staff member of the community neighborhood committee

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This dwelling building is a single high-rise Slab-type building which was built in the 1990s. Some residents started growing herbs, spices and vegetables in containers such as bubble chambers and flower pots and put them in the public space such as the public flower bed (guerrilla garden), or on their windowsills (family garden). The interviewed “urban hobby farmer” said that he grew food in his balcony mainly for producing natural, pollution-free and tasty food. According to the interviews to one “neighbor”, who is a store operator nearby the building, the vegetables in the containers around the building were mainly grown by some old people. In addition, the edible landscapes provided food supplement and provided chances for physical exercises for the urban residents, and also promoted neighbors’ encounters and communications



Source: a) Googleearth



## CASE A13 Dong Wang Zhuang

### Residential Area

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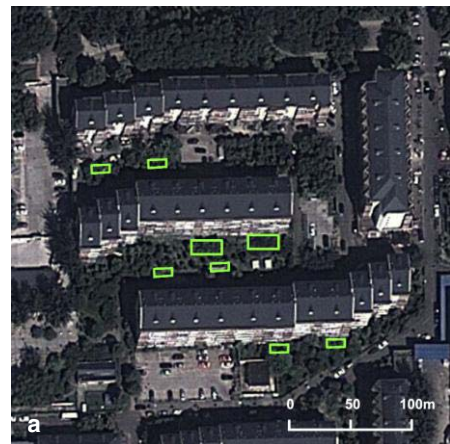
<b>Type</b>	Guerrilla garden
<b>Location</b>	Modern residential area (1998), 5 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2000s
<b>Size</b>	About 2-20 m <sup>2</sup> / guerrilla garden
<b>Status</b>	In progress
<b>Interviewee</b>	2 "urban hobby farmer", 5 "neighbors", 1 staff member of the community neighborhood committee

.....



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This residential area with multi-storey buildings was built in the 1990s. There is uniform residential landscaping maintained by the the proptery management company. Since the residents' moving in, some of them started growing edible plants such as herbs, spices, vegetables and fruits in the public space of the residential area. The interview to the 2 "urban hobby farmers" indicated that their motivations for growing food are mainly for fun and entertainment and for building shade. In addition, the edible landscapes provided food supplement, created environmental amenities and provided chances for physical exercises for the urban residents, and also promoted neighbors' encounters and communications



Source: a) Googleearth

## CASE A14 Min Kang Residential Area

### No.30

.....

**Type** Community garden, urban greening with fruit trees and crops

**Location** Modern residential area (1999), 2<sup>nd</sup> ring

**Organization** Professional organization by the volunteer association, by the property management company and the community neighborhood committee

**Start date** 2009 and 2013

**Size** meso scale

**Status** In progress

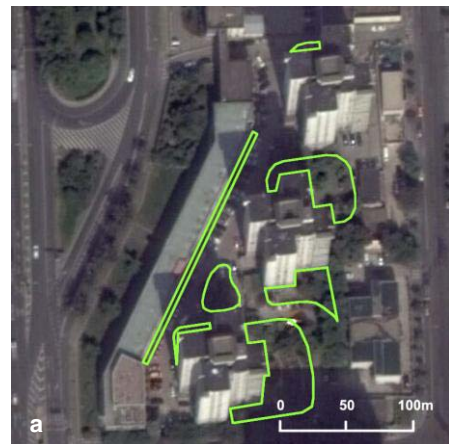
**Interviewee** 3 “urban hobby farmers”, 3 “neighbors”, 5 staff members in property management company and community neighborhood committee (4 of them are also “professional urban gardeners”, 2 of them are also initiators)

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This residential area with three high-rise tower buildings was built in the 1980s, in which, two buildings were built for the families of the staff in Bank of China, and one is built for relocating the original residents. The food growing activities started in 2009. In order to deal with the problem of landscape deterioration and lack of management of the public green space, from 2009 to 2012, the community neighborhood committee and the property management department of the residential area divided the public green space into 75 small plots and distributed them to the residents for growing herbs, spices, vegetables and fruits to achieve greening. Environmental experts in the Environmental Protection Agency of Xi Chen District were invited to explain and teach gardening and farming skills to the residents. Since 2013, the plots were taken back and uniformly cultivated by the staff of the property management department with edible plants. Collaborating with the community neighborhood committee and the academy of agricultural science, a community ecological demonstration garden was established.



Source: a) Googlearth; 1) Minkang community neighborhood committee



## CASE A15 Modern City Homeland

### Residential Area

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<b>Type</b>	Guerrilla garden, family garden
<b>Location</b>	Modern residential area (2004), 6 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2000s
<b>Size</b>	About 20 m <sup>2</sup> / family garden, About 2-20 m <sup>2</sup> / guerrilla garden
<b>Status</b>	In progress
<b>Interviewee</b>	2 “urban hobby farmers”, 1 “neighbor”, 1 staff member in property management company

.....



.....

This residential area with multi-storey buildings was built in the 2000s for the families of the university staff. There is uniform residential landscaping maintained by the the propterty management company. Some residents started making use of the private courtyard on the first floor (family garden) and the public space of the residential area (guerrilla garden) for growing edible plants such as herbs, spices, vegetables, fruits and medicinal herbs since their moving in. The interview to the 2 “urban hobby farmers” indicated that their motivations for growing food are mainly for physical exercises, for producing organic food and for food supplement associated with bringing convenience and pleasure to daily life. In addition, the edible landscapes created environmental amenities for the urban residents, and also promoted neighbors’ encounters and communications.



Source: a) Googleearth; 1) Shuying Han;  
2)Qinqin Liu

## CASE A16 Jia Zhou Shui Jun Residential

### Area

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<b>Type</b>	Renting farming garden ("Happy Farm")
<b>Location</b>	Modern residential area (2008), 6 <sup>th</sup> ring
<b>Organization</b>	Commercial organization by companies
<b>Start date</b>	2013
<b>Size</b>	30 m <sup>2</sup> / plot, total about 14,467 m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	2 "urban hobby farmers", 1 "neighbor", 1 initiator (also one staff member in property management company)

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This residential area with high-rise buildings was built in the 2000s in the satellite town, which is located in the 6<sup>th</sup> ring zone of Beijing. In 2013, an area of around 14,467m<sup>2</sup> greening reserved land of the residential area was developed into a "Happy Farm" enterprise by the property management company. In the "Happy Farm", the land is divided into small plots and rented to the resident in the residential area for growing vegetables. Renting a plot of 30 m<sup>2</sup> annually costs 900 yuan, which contains two carts of cow dung, usage of the tools, bamboo partridge for building fences and irrigation water. The interview to the staff member indicated that most of the "urban hobby farmers" here are old people. The interviews to the 2 "urban hobby farmers" indicated that their motivations for growing food are mainly for physical exercises and for fun and entertainment. The project created new employment opportunities and improved the staff members' income of the property management company. In addition, the edible landscapes provided organic and fresh food supplement for the urban residents, educated them agricultural knowledge and farming skill, offered cultural services to the urban residents and also promoted neighbors' encounters and communications.



Source: a) Googlearth



## CASE A17 Long Yue Yuan 3<sup>rd</sup> Residential

### Area

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<b>Type</b>	Guerrilla garden
<b>Location</b>	Modern residential area (2000), 6 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2000s
<b>Size</b>	About 2-30 m <sup>2</sup> / guerrilla garden
<b>Status</b>	In progress
<b>Interviewee</b>	3 “urban hobby farmers”, 1 “neighbor”, 2 staff members in property management company and community neighborhood committee

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This residential area is an economically affordable housing district with multi-storey buildings, which was built in in the 6<sup>th</sup> ring zone of Beijing in the 2000s by the government. There is uniform residential landscaping maintained by the the propterty management company. Since the residents’ moving in, some of them started growing edible plants such as herbs, spices, vegetables and fruits in the public space of the residential area. The interviews to the 3 “urban hobby farmers” indicated that their motivations for growing food are mainly for improving and greening the environment, for fun and entertainment and for making shade. In addition, the edible landscapes provided organic and fresh food supplement for the urban residents, educated them agricultural knowledge and farming skill, offered cultural services to the urban residents and also promoted neighbors’ encounters and communications.



Source: a) Googleearth

## CASE A18 Hui Xin Homeland Residential

### Area

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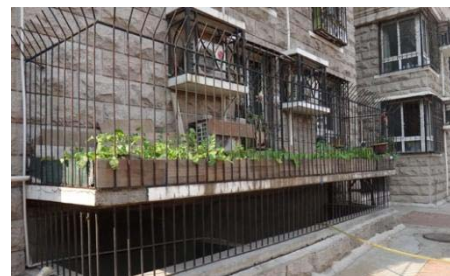
<b>Type</b>	Guerrilla garden
<b>Location</b>	Modern residential area (2004), 4 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2000s
<b>Size</b>	About 2-20 m <sup>2</sup> / guerrilla garden
<b>Status</b>	In progress
<b>Interviewee</b>	2 “urban hobby farmers”, 5 “neighbor”, 1 staff members in property management company

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This residential area with four high-rise buildings was built in the 2000s for the original farmers who lived here before. The peasants who have lost land still have profound affection for the land and farming traditions. Therefore, after moving in high-rise buildings, they still acted as “urban hobby farmers” and did everything possible to find a piece of land close to their houses for growing edible plants such as vegetables, spices, herbs and edible trees. The interviews to the 2 “urban hobby farmers” indicated that their motivations for growing food are mainly for fun and entertainment, for hobby and habit, for physical exercises and for producing food as supplement. In addition, the edible landscapes provided organic and fresh food supplement for urban residents and offered cultural services to them.



Source: a) Googlearth



## CASE A19 Balcony Garden in Brown

### Stone Apartment

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<b>Type</b>	Family garden (balcony)
<b>Location</b>	Modern residential area (2009), 4 <sup>th</sup> ring
<b>Organization</b>	Individual mode + designer
<b>Start date</b>	2010
<b>Size</b>	About 20 m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	-

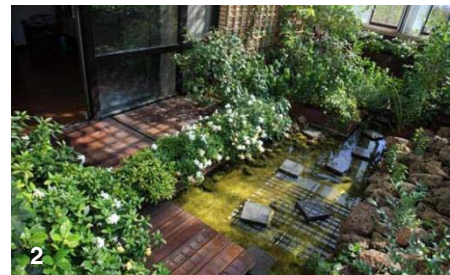
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The terrace garden was designed and built in 2010 by landscape architect Kongjian Yu in his apartment cooperated with his colleagues in Turenscape. It is located in a modern wealthy apartment with multi-storey buildings constructed in 2009. In the project, solar energy and rain water are harvested for the balcony garden that provides fresh fruits and vegetables for the kitchen. "It is also a demonstration garden showing how an ecological approach to fine scale urban design can reduce a home's carbon footprint". "In the vegetable garden, the owner has access to a mix of fruits, herbs, and vegetables available just a few steps away from the kitchen. The trellis system provides support for climbing fruits and vegetables such as peas, gourds, and squash". "For less than 10,000 US dollars, this project has improved livability in a dense urban community; has reduced energy consumption through water harvesting and solar panels; and provides fresh food in a charming living space. This home serves as an educational model for greener communities and as a source of inspiration for developers and homeowners for manageable green living upgrades." <sup>54</sup>

<sup>54</sup> Source:  
<http://www.turenscape.com/English/projects/project.php?id=452>



Source: a) Googleearth;  
1), 2) and 3) Turenscape

## CASE A20 Feng Shang International

### Apartment

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<b>Type</b>	Urban greening with fruit trees, family garden (balcony), guerrilla garden
<b>Location</b>	Modern residential area (2002), 4 <sup>th</sup> ring
<b>Organization</b>	Commercial organization by companies + designers
<b>Start date</b>	2002
<b>Size</b>	About 3700 m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	1 "urban hobby farmer", 3 "neighbors", 1 staff member in property management company, 1 developer

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This is a modern wealthy apartment with four high-rise dwelling buildings, which was constructed in 2002. The landscapes in the residential area including the roof gardens were planned and designed by a Singapore planner and American designers, and constructed with a high standard. The central green space of the residential area was designed and planted with a Chinese pearleaf crabapple grove, which was maintained and managed by the property management company. In addition to the uniformly planted fruit trees, one interviewee mentioned that he has grown some chili pepper on his balcony for both achieving greening and producing food as well. The interviewed developer said that some residents had grown vegetables in the public roof top gardens, but they have been forbidden and cleaned away by the staff of the property management company. The grove created environmental amenities, provided creational service, educational service and cultural service to the residents, and also promoted neighbors' encounters and communications.



Source: a) Googlearth



## CASE A21 Wan Quan Xin Xin Residential

### Area

<b>Type</b>	Urban greening with fruit trees, family garden, guerrilla garden
<b>Location</b>	Moder residential area (2003), 4 <sup>th</sup> ring
<b>Organization</b>	Commercial organization by companies, individual mode
<b>Start date</b>	2003 - urban greening with fruit trees 2000s - family garden, guerrilla garden
<b>Size</b>	About 10-30 m <sup>2</sup> / family garden, About 8 m <sup>2</sup> - guerrilla garden Meso scale-urban greening with fruit trees
<b>Status</b>	In progress
<b>Interviewee</b>	1 "urban hobby farmer", 3 "neighbors", 2 staff members in property management company (one of them is also "professional urban gardener")



This is a modern wealthy residential area with multi-storey buildings, which was built in 2003. The landscapes in the residential area were planned, designed and constructed with a high standard. Persimmon trees were widely planted as the avenue trees and greening trees of the residential area. Many residents living on the first floor usually grow herbs, spices, vegetables and fruit trees in their private courtyards. Since the urban households are usually lack of knowledge and skill of growing vegetables, they sometimes employ time-workders who come from countryside and have farming experience to help them grow vegetable in their family gardens. Many households grow food on their balconies. One household has also made use of the public green space adjacent to her house for growing edible plants (guerilla garden), but it was criticized by the property management company through circulating a notice of criticism on the community information board. The interviewed "urban hobby farmer" said that she grew food mainly for producing pollution-free food.



Source: a) Googlearth

## CASE A22 Yuan Ming Yuan Villa District

.....

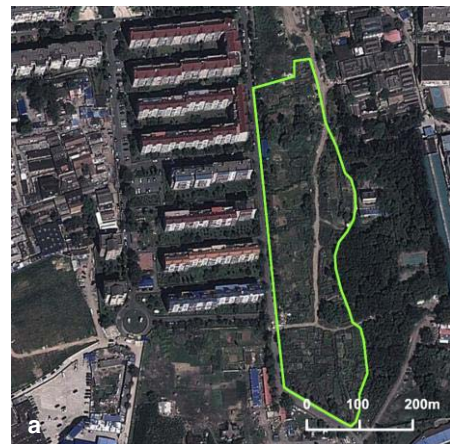
<b>Type</b>	Guerrilla garden
<b>Location</b>	Modern residential area (2003), 6 <sup>th</sup> ring
<b>Organization</b>	Self-managed mode of group organization
<b>Start date</b>	2012
<b>Size</b>	About 30-80 m <sup>2</sup> / guerrilla garden
<b>Status</b>	In progress
<b>Interviewee</b>	1 "urban hobby farmer", 1 "neighbor", 1 staff member of the property management company

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This is a modern wealthy residential area with multi-storey buildings, which was built in 2003. In the east of it, there was a piece of wasteland outside but adjacent to the residential area, which was originally planned to be used for real estate development but was temporarily in abeyance because of the incomplete land transfer formalities. The developer acquiesced people growing plants (ornamental plants) there temporarily for achieving greening and beautifying environment. Therefore, hundreds of residents started gardening in their territory enclosed by high fences, but most of them have grown food such as vegetables, herbs and spices, etc. The interviewed "urban hobby farmer" said that he grew food mainly for physical exercises and for fun and entertainment. In addition, the edible landscapes provided organic and fresh food supplement for the urban residents, created opportunities for them to learn agricultural knowledge and farming skills and also developed a sense of place.



Source: a) Googlearth



## CASE A23 Xiang Shan Qing Qin Villa

### District

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<b>Type</b>	Family garden, urban greening with fruit trees
<b>Location</b>	Villa residential area (2006), 5 <sup>th</sup> ring
<b>Organization</b>	Individual mode, commercial organization by companies
<b>Start date</b>	2000s
<b>Size</b>	About 20 m <sup>2</sup> / family garden, Meso scale-urban greening with fruit trees
<b>Status</b>	In progress
<b>Interviewee</b>	1 “urban hobby farmer”, 1 staff member in property management company

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This is a luxury modern villa area located in 5<sup>th</sup> ring zone, which was built in 2006. The landscapes in the villa area were planned, designed and constructed with a high standard. Persimmon trees were widely planted as the landscaping trees. In addition, each of the private courtyards was planted with one or two persimmon trees for the residents. Many residents usually grow herbs, spices, vegetables and fruit trees in their private courtyards or on the roof top of the garage. The interviewed “urban hobby farmer” said that she had planted fruit trees with her husband in Sichuan, her hometown, and she grew food mainly for fun and entertainment and for hobby and habit of gardening. In addition, she also mentioned that the edible landscapes provided organic and fresh food supplement for her family, provided them aesthetic enjoyment, and brought writing inspiration to her granddaughter.



Source: a) Googlearth

## CASE B1 Si Bo Lian Hua Neng

### Electromechanical Factory

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<b>Type</b>	Kitchen garden
<b>Location</b>	Danwei precinct, 5 <sup>th</sup> ring
<b>Organization</b>	Professional organization by Danwei
<b>Start date</b>	2010
<b>Size</b>	About 400m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	1 “professional urban gardener”, 1 initiator

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The kitchen garden is located in the courtyard of Si Bo Lian Hua Neng Electromechanical Factory, which is a private enterprise. It was initiated by the manager of the factory with the aim of both achieving greening and producing food. The gatekeeper, who was an original farmer, was designated to be responsible for the farming work, and sometimes other staff members also join in the farming activities. Varieties of common vegetables and spices were planted in the kitchen garden. The harvested foods were used in the kitchen of the canteen as cooking materials for the staff. The manager said that the kitchen garden not only provided food and created greening space for them, but also created opportunities for physical exercises and entertainment. In addition, the rain water and snow are collected for irrigation, and the human manure in toilet is roughly treated as fertilizers, which has reduced city's ecological footprint and closed the ecological loops.



Source: a) Googleearth



## CASE B2 The Institute of Semiconductor, Chinese Academy of Sciences (ISCAS)

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**Type** Urban greening with fruit trees

**Location** Danwei precinct, 5<sup>th</sup> ring

**Organization** Professional organization by the greening department of ISCAS

**Start date** 1980

**Size** Meso scale

**Status** In progress

**Interviewee** 1 initiator, 2 “neighbors”, 1 employed worker in the greening department of ISCAS

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The edible landscape of fruit trees is located in the courtyard of the ISCAS. In 1980, in order to achieve greening of the courtyard quickly, some fruit trees which have the characteristics of being cheap and growing fast, such as persimmon trees, peach trees and Cherry Plum were selected by the greening department of ISCAS as the greening trees. The director of the greening department of ISCAS said that 250 persimmon trees were planted in 1980, and around 50 to 60 of them were left in 2013. The edible landscapes with fruit trees not only created greening space and environmental amenities for them, but also created recreational opportunities for the staff and students. Every year when persimmons are mature, many students picked them, which have brought a lot of fun for them. In addition, the information label hung on each tree marking its species, family, characteristics and functions could extend people’s knowledge on plants.



Source: a) Googlearth

## CASE B3 Roof Farm in Tsinghua

### University

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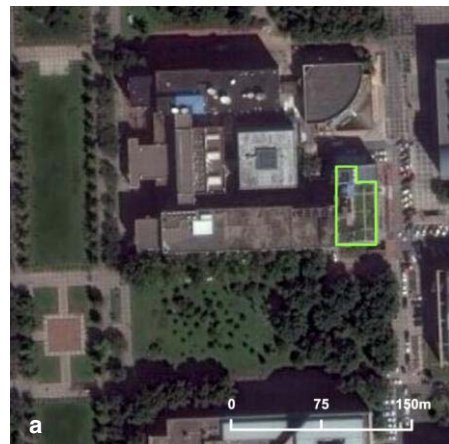
<b>Type</b>	Educational/demonstration garden
<b>Location</b>	Danwei precinct, 5 <sup>th</sup> ring
<b>Organization</b>	Scientific organization by research institutes
<b>Start date</b>	2014
<b>Size</b>	50 m <sup>2</sup>
<b>Status</b>	In progress, continue growing
<b>Interviewee</b>	9 “neighbors”, 1 director of the project,

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The roof farms are located in rooftops of the high school affiliated with Tsinghua University and the Energy Efficiency Building of Tsinghua University. It is a research project and also a demonstration program initiated by teachers and students in the school of environment, Tisinghua University. Inspired by some urban farming projects in HongKong, some exchange students applied and launched this roof farm project after their coming back form HongKong, with the aim of studying, demonstrating and popularizing the harmonious community and low-carbon life with growing vegetables. Common herbs, vegetables and fruits, such as tomato, cucumber, eggplant, leaf beet and fig tree, are planted in the roof farm. Volunteers are annually recruited to help doing the farming work, guide the visitors and explain the significance of the project.



Source: a) Googleearth;  
1), 2) and 3) Zixin Lv

## CASE B4 The Experimental Farmland of CAAC

<b>Type</b>	Experimental farm, guerrilla garden
<b>Location</b>	Danwei precinct, 3 <sup>rd</sup> and 4 <sup>th</sup> ring
<b>Organization</b>	Scientific organization by research institutes
<b>Start date</b>	1938 – experimental farm
<b>Size</b>	About 114,000 m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	7 “neighbors”, 2 employed worker (also 2 “urban hobby farmers” )



The Experimental farm is located in the 3<sup>rd</sup> and 4<sup>th</sup> ring zones of Beijing. It is the only farm in the central urban area of Beijing. This experimental farm was established in 1938 by Japanese for agricultural research, and mainly grew crops, vegetable and pastures. After the Chinese people’s victory in the war against Japanese aggression in 1945, it was taken over by the Kuomintang government. After the founding of People’s Republic of China in 1949, it was expanded into the Chinese Academy of Agricultural Sciences (CAAS) in 1957, about 4,000 acres. At that time, the location of the experimental farm still belonged to the suburbs of Beijing. Along with the continuous urban expansion, more and more original experimental farm was encroached on by the urban construction. Today 400 acres (including greenhouses) are preserved and continuously used for agricultural research. The farming work is usually completed by the scientific researchers and the employed farmers together based on the research requirements. Many new crop varieties with both high quality and yield, such as better type of maize, winter wheat and soybean, were bred in this experimental field.



Source: a) and b) Googlearth



## CASE C1 Vegetable Field along the Street adjacent to Shang Di Flower Market

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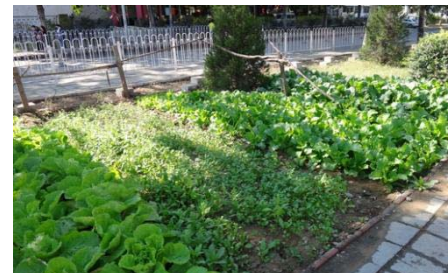
<b>Type</b>	Guerrilla garden
<b>Location</b>	Traffic area, 6 <sup>th</sup> ring
<b>Organization</b>	Self-managed mode of group organization
<b>Start date</b>	2007
<b>Size</b>	About 300 m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	2 "urban hobby farmer", 4 "neighbor",

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The vegetable field is located in one street corner in the 6<sup>th</sup> ring zone of Beijing. This place was originally the precinct of Shang Di Flower Market. Along with the urban expansion, it was encroached on by the urban construction but was still lack of management. In order to achieving greening, improving the environment and producing food, three staff members of the market started growing common crops, herbs, spices and vegetables, such as coin, green Chinese onion, chilly pepper, Chinese cabbage, carrot, leaf beet, sweet potato, etc. along the street. The interviews to the 2 "urban hobby farmers" indicated that their motivations for growing food are mainly for hobby and habit of farming, for achieving greening and beatifying the environment and for producing organic foods which are pollution-free.



Source: a) Googleearth



## CASE C2 The Vegetable Field along Shang He Road

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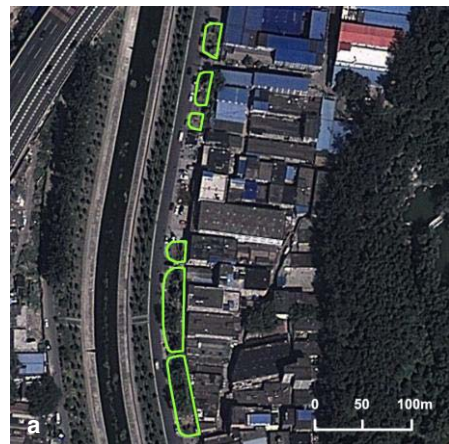
<b>Type</b>	Guerrilla garden
<b>Location</b>	Traffic space, 6 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2011
<b>Size</b>	About 60 m <sup>2</sup> / guerrilla garden
<b>Status</b>	Terminated because of urban demolition
<b>Interviewee</b>	5 “urban hobby farmer”, 3 “neighbor”,

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The vegetable field is located in the public green space along the Shang He Road in the 6<sup>th</sup> ring zone, which is also in the precinct of embankment. The space was originally planted with ornamental plants, and patches of grass grew knee-high. Since the 2000s, some residents nearby cleaned away thorn-bush in the public green space and started growing common crops, herbs, spices and vegetables there, such as coin, green Chinese onion, chilly pepper, coriander, Chinese cabbage, carrot, potato, eggplant, edible rape, water spinach, Chinese chive, pumpkin, luffa, labla and Chinese toon, etc. The interviews to the 5 “urban hobby farmers” indicated that their motivations for growing food are mainly for enriching life, for fun and entertainment, for producing organic foods which are pollution-free, for physical exercises, for appreciation, for food supplement, for improving the wild environment .



Source: a) Googlearth

## CASE C3 River Revetment and Public Green Space along Sha River

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<b>Type</b>	Guerrilla garden
<b>Location</b>	Traffic space, 6 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2013
<b>Size</b>	About 20-100 m <sup>2</sup> / guerrilla garden, total about 13,480m <sup>2</sup>
<b>Status</b>	Terminated in 2013 because of urban administration
<b>Interviewee</b>	11 "urban hobby farmer", 7 "neighbor",

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The guerrilla gardens were built in the public green space of the river revetment along the Sha River in the 6<sup>th</sup> ring zone. The space was originally planted with thornbushes and weeds. Since the 2010s, a lot of limited property houses were constructed nearby. In 2013, many residents started reclaiming the revetment and growing food there. The interviews to the 11 "urban hobby farmers" indicated that their motivations for growing food are mainly for hobby and habit of gardening and farming, for fun and entertainment, for producing organic foods which are pollution-free, for enriching life, for physical exercises, for improving the wild environment, for creating recreation space shared with friends, for food supplement and for relaxing and thinking.



Source: a) Googleearth



## CASE C4 The Public Space along Subway

### 13

.....

<b>Type</b>	Guerrilla garden
<b>Location</b>	Traffic space, 6 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2003
<b>Size</b>	About 10-50 m <sup>2</sup> / guerrilla garden
<b>Status</b>	In progress
<b>Interviewee</b>	1 “urban hobby farmer”, 1 neighbor

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The guerrilla gardens are located along the subway 13 in the 6<sup>th</sup> ring zone. The place was originally wasteland. Along with the urban expansion, the subway 13 was constructed here in 1999 and was open in 2002, and greening belts were built along the subway. Since 2000s, some residents started growing vegetables and crops in the greenbelt along the subway. The interviewed “urban hobby farmer” said that he grew food mainly for hobby and habit of farming, for fun and entertainment and for food supplement.



Source: a) Googlearth

## CASE C5 The Public Space around a Parking Lot

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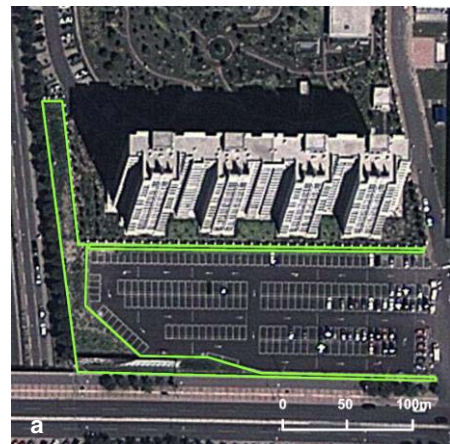
<b>Type</b>	Guerrilla garden
<b>Location</b>	Residential area, 6 <sup>th</sup> ring
<b>Organization</b>	Individual mode
<b>Start date</b>	2003
<b>Size</b>	About 1400m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	1 "urban hobby farmer", 3 "neighbors"

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The guerrilla garden is located around a car park in the 6<sup>th</sup> ring zone. The place was originally wasteland. Since 2003, a man aged 81, who moved from the countryside in Shandong province to Beijing following his son and lived nearby, started reclaiming the wasteland for growing food. Along with the urban expansion, large quantities of real estates were constructed here in the 2000s. Urban public greening was also gradually completed along with the urbanization, but usually they still lack management temporarily. After the car park was constructed, the resident continued growing vegetables and crops in the verges around the car park. The interviewed "urban hobby farmer" said that he grew food mainly for hobby and habit of farming, for fun and entertainment and for food supplement.



Source: a) Googlearth

## CASE C6 The Avenue Trees around the Embassy District

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<b>Type</b>	Urban greening with fruit trees
<b>Location</b>	3 <sup>rd</sup> ring
<b>Organization</b>	Professional organization by the governmental institutions
<b>Start date</b>	1980s
<b>Size</b>	Meso scale
<b>Status</b>	In progress
<b>Interviewee</b>	-

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The Xiushui North Street in the embassy district in the 3<sup>rd</sup> ring zone was planted with persimmon trees as avenue trees. These trees were uniformly planted in the 1960s by the government. The fruit trees not only created greening space and provided aesthetic beauty to urban residents, but also brought fun of picking persimmon when they are mature



Source: a) and 1) Googlearth;  
2) map.baidu.com; 3) sina.com



## CASE D1 One Acre Paddy Field in Haidian

### Park

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<b>Type</b>	Educational/demonstration garden, urban greening with crops
<b>Location</b>	Urban park, 5 <sup>th</sup> ring
<b>Organization</b>	Professional organization by the governmental institutions
<b>Start date</b>	2003
<b>Size</b>	About 666.7m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	7 "neighbors", 1 director of the project

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The paddy field is one scenic attraction in the Haidian Park. Haidian Park was built in the site of Chan Chun Garden, which was ever one of the royal gardens in Qing Dynasty, where large areas of Jingxi rice were cultivated for royal consumption. When the park was constructed in 2003, one acre of the original rice field was preserved as the epitome of the spectacular imperial rice field of former times, which can on the one hand pass on the culture of Jingxi rice and on the other hand offer visitors a place to experience the joy of farming. Since 2004 the park held the sowing and harvesting festival annually with different themes of rice culture which include different programs such as farming experience and the exhibition of the traditional agricultural tools, which offered the visitors especially the teenagers an opportunity to experience the charm of the traditional Chinese farming culture from childhood.



Source: a) Googleearth

## CASE D2 Fruit Trees in the Temple of

### Heaven Park

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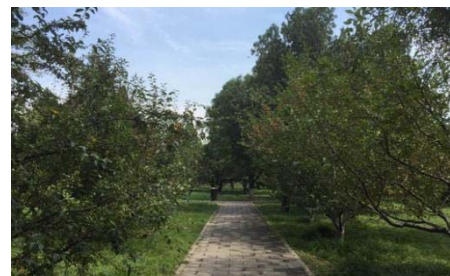
<b>Type</b>	Urban greening with fruit trees
<b>Location</b>	Urban park, 2 <sup>nd</sup> ring
<b>Organization</b>	Professional organization by the governmental institutions
<b>Start date</b>	1950s
<b>Size</b>	Meso scale
<b>Status</b>	In progress
<b>Interviewee</b>	2 "neighbors"

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The Temple of Heaven Park, with a size of about 2,730,000 m<sup>2</sup> is located in the southeastern part of central Beijing in the 2<sup>nd</sup> ring zone. The complex of religious buildings was constructed in 1420 and was an important place visited by the emperors of the Ming and Qing dynasties for annual ceremonies of prayer to Heaven for good harvest. In the Ming and Qing dynasty, most of the trees were ornamental trees such as pine trees, cypress trees, locust trees and elm. In the early of the republic of China, fruit trees were started Beijing cultivated in the Temple of Heaven Park, but in very small quantities. Until the 1950s, large quantities of fruit trees were cultivated in the Temple of Heaven Park. In the late 1950s, about ten thousand edible trees, including apples trees, peach trees, pear trees, walnut trees, plum-leaf crabapple trees, apricot trees, etc., were planted. However, in the 1980s, the Temple of Heaven didn't plant fruit trees any more, and the fruit trees were gradually replaced by evergreen trees in the next few years, but there are still some fruit trees preserved until today. The interviews to the 2 passersby indicated that they like the fruit trees especially when they bear fruits. They usually come to pick mulberry and apricot when they have time; most of the time they pick them from the ground, but sometimes they also climbed up to the trees to pick them although it's forbidden. They said they have a lot of fun picking.



Source: a) Googlearth



## CASE D3 The Landscape of Sun Flower in Chao Yang Park

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<b>Type</b>	Urban landscaping with crops
<b>Location</b>	Urban park, 4 <sup>th</sup> ring
<b>Organization</b>	Professional organization by the governmental institutions + designers
<b>Start date</b>	2007
<b>Size</b>	Meso scale
<b>Status</b>	In progress
<b>Interviewee</b>	3 “neighbors”

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Sun flowers were used for urban greening and landscaping by Turenscape in the project of *Chaoyang Park Beijing Beach Volleyball and Sunbathing Landscape Design*. The project, taking up 14.8 ha, is located in Chaoyang Park in the 4<sup>th</sup> ring zong of Beijing, the former location of Yanshan Gas Appliances Facoty. When this lot was assigned for use as public green space in the urban master plan of Beijing, the factory moved away and left behind all its industrial buildings and infrastructure<sup>55</sup>. In the project, native plant species of trees and ground cover vegetation were used throughout these areas. In which, large areas of sunflower were planned and planted with the aim of emphasizing the significance of the productive landscape in the background of the coming energy crisis and food crisis.

<sup>55</sup> Source:  
<http://www.turenscape.com/English/projects/project.php?id=384>



Source: a) Googlearth;  
1),2) and 3) Turenscape

## CASE E1 Xi Shan “Happy Farm”

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<b>Type</b>	Renting farming garden (“Happy Farm”)
<b>Location</b>	Leisure farm at the edge of city, 5 <sup>th</sup> ring
<b>Organization</b>	Commercial organization by companies
<b>Start date</b>	2007
<b>Size</b>	26,680 m <sup>2</sup> , expanded to 40,020 m <sup>2</sup> in 2014
<b>Status</b>	In progress
<b>Interviewee</b>	2 “urban hobby farmers”, 1 “professional urban gardener” (also initiator of the project)

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Xi Shan “Happy Farm” is a leisure farm enterprise in the 5<sup>th</sup> ring zone. It was developed by the original farmers by transforming the original farmland that was swallowed by the expanding city during the rapid urbanization. In the 2000s, in order to improve the agricultural economic income, the preserved farmland changed the nature of its property from traditional farmland to “Happy Farm”. The land is divided into small plots and rented to the urban citizens for growing edible plants, mainly common vegetables. The renting fee for a plot of 15m<sup>2</sup> annually costs 1000 yuan (in 2012). The staff members supply necessary supports to assist the “urban hobby farmers”, including sale of the seeds and seedlings, water suppl, tool supply and necessary agricultural knowledge guide, etc. The enterprise director, who is one of the original farmers here, said that the “Happy Farm” has greatly increased their income. Relying on the traditional vegetable agriculture before, they only had a salary of around 1200yuan, however, after the “Happy Farm” was developed, their salary have increased to 2600yuan<sup>56</sup>.



Source: a) Googlearth

<sup>56</sup> Source: <http://sjqclp.com/park/3/news/52>.



## CASE E2 Si Ji Qing Agrotourists' Picking and Sightseeing Farm

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<b>Type</b>	Agrotourists' picking farm
<b>Location</b>	Leisure farm at the edge of city, 5 <sup>th</sup> ring
<b>Organization</b>	Commercial organization by companies
<b>Start date</b>	2000s
<b>Size</b>	About 140,000 m <sup>2</sup>
<b>Status</b>	In progress
<b>Interviewee</b>	1 "professional urban gardener" (also initiator of the project)

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Si Ji Qing agrotourists' picking and sightseeing farm is a leisure farm enterprise in the 5<sup>th</sup> ring zone. It was developed by the original farmers by transforming the original farmland that was swallowed by the expanding city during the rapid urbanization. In the 2000s, in order to improve the agricultural economic income, the preserved farmland changed the nature of its property from traditional farmland to agrotourists' picking and sightseeing farm. It was mainly cultivated with cherry trees, and over hundreds of cherry species were planted here. In addition, a few other fruit trees such as apricot trees, nectarine trees, plum-leaf crabapple trees and jujube trees were also cultivated. In the agrotourists' picking and sightseeing farm, urban residents can pick the fruits or vegetables and buy them, and all the other farming work is completed by the (employed) farmers who work there. The interviewed initiator said that the agrotourists' picking and sightseeing farm was very popular when the fruits are mature; there were around 4000-5000 customers and visitors every year.



Source: a) Googleearth

## Acknowledgement

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