

Sep, 2016



# IMPACTS OF URBAN AGRICULTURE ON LOCAL SUSTAINABILITY

A Comparative Study of Two Cases of Urban Agriculture in the  
Netherlands and China

Tianyu YANG  
WAGENINGEN UR  
Wageningen



WAGENINGEN UNIVERSITY  
WAGENINGEN UR

MSc Thesis

# Impacts of Urban Agriculture on Local Sustainability

A Comparative Study of Two Cases of Urban Agriculture in the Netherlands and China

Name: YANG, TIANYU

Reg.No.: 891023980080

Supervisor: Prof. Arnold van der Valk

Sep, 2016

Land use planning group, Wageningen University

Wageningen



# Table of Contents

|   |      |
|---|------|
| Table of Contents.....  | iii  |
| List of Figures.....  | v    |
| List of Tables .....  | vi   |
| Acknowledgement.....  | vii  |
| Abstract.....   | viii |
| Key Words.....  | viii |
| 1. Introduction.....  | 1    |
| 1.1 Background: Urban Agriculture Worldwide.....                                  | 2    |
| 1.2 Problem Statement .....   | 3    |
| 1.2.1 Urban agriculture in the Netherlands.....                                   | 3    |
| 1.2.2 Urban agriculture in China.....   | 4    |
| 1.2.3 The blank of academic literature.....                                       | 5    |
| 1.3 Research Objectives and Research Questions.....                               | 6    |
| 1.4 The Construction of the Thesis.....   | 6    |
| 2. Literature Review .....  | 8    |
| 2.1 The Importance of Community .....   | 9    |
| 2.1.1 Community in urban agriculture .....  | 9    |
| 2.1.2 Social cohesion and social capital.....                                     | 10   |
| 2.1.3 The definition of urban farm and community garden .....                     | 11   |
| 2.2 Sustainability .....  | 12   |
| 2.2.1 Local sustainability.....   | 12   |
| 2.2.2 Two ways of assessing sustainability .....                                  | 14   |
| 2.2.3 The application of two ways on assessing local sustainability.....          | 14   |
| 2.3 Local Food Systems.....   | 16   |
| 2.3.1 The conventional food system.....   | 16   |
| 2.3.2 The alternative food system.....  | 17   |
| 2.3.3 The existence of conventional food system and alternative food system ..... | 19   |
| 2.4 Conceptual Framework.....   | 19   |
| 2.4.1 Local food system in local sustainability matrix .....                      | 19   |
| 2.4.2 The indicators and the standard.....  | 22   |
| 2.4.3 The conceptual framework.....   | 23   |
| 3. Research Methodology .....   | 25   |
| 3.1 An Explorative Study.....   | 26   |
| 3.2 Case Study .....  | 26   |
| 3.3 Research Process.....   | 29   |
| 3.4 Research Techniques.....  | 30   |
| 3.5 Research Validity.....  | 31   |
| 4. Case study in The Netherlands.....   | 33   |
| 4.1 The Local Context .....   | 34   |
| 4.2 Substantive Sustainability.....   | 35   |
| 4.2.1 Environmental health.....   | 35   |
| 4.2.2 Economic vitality.....  | 41   |

|  |    |
|--|----|
| 4.2.3 Social equity .....  | 44 |
| 4.3 Procedural Sustainability—Stakeholder Analysis .....   | 46 |
| 4.3.1 The identification of related stakeholders .....   | 46 |
| 4.3.2 The interconnections between stakeholders .....  | 48 |
| 5. Case Study in China .....   | 50 |
| 5.1 The Local Context .....  | 51 |
| 5.2 Substantive Sustainability .....   | 52 |
| 5.2.1 Environmental sustainability .....   | 52 |
| 5.2.2 Economic vitality .....  | 55 |
| 5.2.3 Social equity .....  | 57 |
| 5.3 Procedural Sustainability—Stakeholder Analysis .....   | 59 |
| 5.3.1 The related stakeholders .....   | 59 |
| 5.3.2 The interconnection between stakeholders .....   | 61 |
| 6. The Comparisons of Two Case Study .....   | 62 |
| 6.1 What are the impacts of the Dutch urban farm on local sustainability? .....                            | 63 |
| 6.1.1 A complicated circle of metabolism .....   | 63 |
| 6.1.2 The diversity of development .....   | 64 |
| 6.1.3 An open opportunity for forming a community .....  | 65 |
| 6.2 What are the impacts of the Chinese community garden on local sustainability? .....                    | 66 |
| 6.2.1 The simple circle of metabolism .....  | 66 |
| 6.2.2 The simple form of a particular community .....  | 67 |
| 6.2.3 The simple cooperation model .....   | 68 |
| 6.3 What are the similarities and differences of the two cases with respect to local sustainability? ..... | 69 |
| 6.3.1 The similarities .....   | 70 |
| 6.3.2 The differences .....  | 71 |
| 6.4 What lessons can be learnt from the two urban cases? .....   | 72 |
| 7. Conclusions and Recommendations .....   | 74 |
| 7.1 Conclusions .....  | 75 |
| 7.1.1 Conclusions for the Dutch case .....   | 75 |
| 7.1.2 Conclusions for the Chinese case .....   | 75 |
| 7.1.3 The General Conclusion .....   | 76 |
| 7.2 Recommendations .....  | 76 |
| 7.2.1 Recommendations for the Netherlands .....  | 76 |
| 7.2.2 Recommendations for China .....  | 77 |
| Bibliography .....   | 79 |
| Appendix .....   | 85 |
| 1: Questionnaires .....  | 86 |
| 2: Interview list .....  | 91 |

## List of Figures

|  |    |
|--|----|
| Figure 2.1: The theoretical framework of renewable energy project on local sustainability..... | 15 |
| Figure 2.2: The local food system.....   | 18 |
| Figure 2.3: The resources required in different food system processes.....                     | 20 |
| Figure 2.4: The local food system posited in local sustainability matrix.....                  | 21 |
| Figure 2.5: The indicators of local sustainability derived from local food system .....        | 22 |
| Figure 2.6: The conceptual framework .....   | 23 |
| Figure 3.1: Study area of Caetshage farm in Culemborg .....                                    | 27 |
| Figure 3.2: Study area of Sanyuanli community garden in Beijing .....                          | 28 |
| Figure 3.3: Research process.....  | 29 |
| Figure 4.1: The administrative area of Culemborg city .....                                    | 34 |
| Figure 4.2: The greenhouses on Caetshage farm.....   | 36 |
| Figure 4.3: The food products from Caetshage farm cover the residents need.....                | 38 |
| Figure 4.4: The preferable food resources around Eva-Lanxmeer area .....                       | 39 |
| Figure 4.5: The reasons that people purchase from their preferable food resources .....        | 39 |
| Figure 4.6: Residents' perceptions on the regards of price and products quality .....          | 42 |
| Figure 4.7: The Caetshage service scope.....   | 43 |
| Figure 4.8: The age groups distribution of questionnaires respondents .....                    | 44 |
| Figure 4.9: The participants on Caetshage farm .....   | 44 |
| Figure 4.10: The farming activities people participate on Caetshage farm .....                 | 45 |
| Figure 4.11: The frequency of people participates in farming activities.....                   | 45 |
| Figure 4.12: People's opinions on participating farming activities.....                        | 45 |
| Figure 4.13: The reasons of residents who do not take part in the farm activities.....         | 46 |
| Figure 4.14: The Stakeholders power-interest matrix of Caetshage farm.....                     | 48 |
| Figure 5.1: The administrative area of Sanyuanli.....  | 51 |
| Figure 5.2: Sanyuanli Community garden actual appearance .....                                 | 53 |
| Figure 5.3: Residents' perception on the products from community garden .....                  | 54 |
| Figure 5.4: The quantity coverage of residents' needs.....                                     | 54 |
| Figure 5.5: The preferred food resources in Sanyuanli neighbourhood.....                       | 55 |
| Figure 5.6: The reasons that people purchase from their preferable food resources .....        | 55 |
| Figure 5.7: Service scope of Sanyuanli community garden .....                                  | 56 |
| Figure 5.8: The income level of consumers in Sanyuanli community garden .....                  | 57 |
| Figure 5.9: The farming activities people participate in Sanyuanli community garden.....       | 58 |
| Figure 5.10: The frequency of people participates in farming activities.....                   | 59 |
| Figure 5.11: People's opinions on participating farming activities.....                        | 59 |
| Figure 5.12: The Stakeholders power-interest matrix of Sanyuanli community garden ....         | 60 |
| Figure 6.1: The metabolism flow of Caetshage farm .....  | 64 |
| Figure 6.2: The matebolism flow of Sanyuanli community garden .....                            | 67 |

## List of Tables

|   |    |
|---|----|
| Table 2.1: Sustainability in macro and micro level comparison.....  | 13 |
| Table 3.1: The list of interviewees in Caetshage farm.....  | 30 |
| Table 3.2 The list of interviewees in Sanyuanli community garden .....  | 30 |
| Table 6.1: The comparison of local resources/circumstances of two cases .....                                     | 69 |
| Table 6.2: The comparison between two different urban agriculture practices –<br>substantive sustainability ..... | 69 |
| Table 6.3: The comparison between two different urban agriculture practices –<br>procedural sustainability .....  | 70 |

## Acknowledgement

The Master thesis section is a journey mixed with efforts and pleasure. And I am very pleased that there are many kind and warm-heart people that support me to complete it.

First, I would like to thank my thesis supervisor Professor Arnold van der Valk who provide his professional knowledge, meanwhile, shed the light on thesis methodology. With his sincere devotion, patience and supports, I gained knowledge and restore my confidence during the research process.

Second, I express my special gratefulness to the interviewers and residents in two countries who provided me plenty of information with kind heart, though we never meet before. Their selfless support to my study is a great value for my research.

Last but not least, many thanks for my beloved family and sincere friends who have support and give a lot of strength, and guide me walk out of unconfident. We communicated with each other and share different opinions based on their knowledge, which always enlighten me.



## Abstract

This thesis explores the performance of disparate types of urban agriculture and the impact on sustainability on the local scale. The empirical part focuses on two cases, one in the Netherlands and the other one in China. The two cases are compared to bring out similarities and differences of urban agriculture.

The conceptual framework entails indicators deduced from five phases in the local food system and three dimensions of substantive sustainability. The ultimate criterion is the answer to the question if the agricultural enterprise has delivered a major contribution to urban metabolism and local circularity. Another concern is procedural sustainability which referred as stakeholder analysis. If the network of local stakeholders is identified, it may provide clues as to future development.

The study concludes that two different cases of urban agriculture have contributed to local sustainability by means of fostering circular metabolism. In both cases sustainability is enhanced by maximizing the value of all the inputs and creating a space for residents to enhance social cohesion. Both types of urban agriculture studies have their specific characteristics.

The Caetshage farm in the Netherlands is in a form of diversity. It forms the circular metabolism by maximizing the value of all the input resources; it provides open opportunities for different people to participate in farming activities; it accumulates economic incomes by attracting different consumers. With respect to involvement of stakeholders, local governments, primary schools, farmers, residents and other commercial sectors have multiple business cooperation.

The Chinese Sanyuanli community garden appears to be a simple but inflexible model. The circular metabolism is in a simple circle; the food production amount is limited; the social relationship is enhanced only within a particular group. Stakeholders such as local government, residents in the neighbourhood and project initiators cooperate together to initiate the project.

Both cases have strengths and weaknesses. But it is good to be learnt the strengths from different cases and remedy the weakness on the condition of taking the local contexts into consideration. The two different urban agriculture practices have provided different impacts on local sustainability, by discovering such differences of urban agriculture practices. It has a reference meaning for developing urban agricultures in a local level.

## Key Words

Urban agriculture; local sustainability; urban farms; community gardens.



# 1. Introduction

## 1.1 Background: Urban Agriculture Worldwide

Alongside the rapid urbanization seen globally over last century, urban agriculture has slowly gained traction, with the practice of growing plants and raising animals within or around cities increasingly recognised (Sjauw, 2015). Urban agriculture has been defined in a number of ways. Some define urban agriculture as a form of agriculture that uses small plots of land located within the urban area itself. Others consider any agricultural activities carried out in urban and peri-urban areas as urban agriculture (Viljoen and Bohn, 2014). Urban agriculture therefore acts as an overarching concept for a broad categorisation of agricultural activities related to urban areas, though there is divergence with respect to scale, location, activities and goals (Veen, 2015). However, there does exist consensus that urban agriculture is a modern form of agricultural system reflecting the level of economic and social development of a city (UN, 2010), a concept that has made this topic a popular theme in urban studies.

Sustainability is a widely acknowledged concept that calls for the integration of policy, and environmental, social and economic dimensions (Holland, 2004). It requires efforts from all levels of governance (Srinivas, 2015), from national level to local level. It is the tier of governments that is crucial for the development of sustainability. Thus, sustainability is always an important theme for urban planning to provide people with the best standard of living, one aspect of which is concern for the environment, assessed with regards to technical and political measures (Budge and Slade, 2009). Among all the sustainability planning topics, urban agriculture has gradually been studied widely. It is concerned as an alternative option for sustainable development and has applied around the world.

In developed countries, the development of urban agriculture began following the end of WWII (UN, 2010). With increasing demands for fresh and seasonal food and the growing problem of obesity, food has gradually become a priority again. Urban agriculture is one method that has been discussed as a way to solve these food-related issues. It is gradually infiltrating mainstream thought and establishing itself in the field of planning. Community-based agriculture has been adopted as the mainstream form of urban agriculture. In the US, urban agriculture is primarily family-based, however such small scale trials have only had a small impact on the large amount of vacant land that currently is not under used (UN, 2010). In the European context, in contrast, local agriculture has become a focus for urban development (Cai and Yang, 2008); with ventures consist of small urban farms, farmers' markets, CSA, farm-to-school programmes, community gardens and allotment gardens, etc. (Broekhof and van de Valk, 2012). Here local agriculture promotes the movement towards alternative food networks which seeks to reduce the distance between producers and consumers (Goodman and Goodman, 2009). The reason for the popularity of urban agriculture is believed to lie in a demand from citizens to connect with nature and increasing concerns about health (van der Schans, 2010).

In developing countries, the force of development in urban agriculture has also come from food-related problems, mainly: the lack of the guaranteed food security and the need for largescale food production. It is said that urban agriculture could help to improve both food intake and food quality (RUAF foundation, 2015). However, two contrasting form of urban agriculture exist, with increased urbanization and food requirements, in places such as Africa, inducing significant changes in urban agriculture. On the one hand, low income farmers conduct traditional practices working in the peri-urban areas. On the other hand, commercial

farmers with high productivity and market force have come to dominate urban agriculture. The co-existence of both traditional and urban agriculture will pose a great challenge for developing countries when people are seeking the promotion of multiple functional urban agriculture in the future (Wahba, 2013).

## 1.2 Problem Statement

### 1.2.1 Urban agriculture in the Netherlands

Traditionally, agriculture in the Netherlands has been motivated by global export markets (van der Schans, 2010), with access to fresh food no longer a pressing problem in the Netherlands (Veen, 2015). However, some citizens have become disillusioned by the large scale production of conventional food networks with food only accessible supermarkets. This sentiment has led to initiatives to develop urban agriculture. Further encouraged by political support and market demands, urban agriculture has gained more and more ground, as it has been promoted, developed, studied and researched by people in a range of disciplines.

Unlike the inefficient use of agricultural land in US and Canada, the Netherlands uses higher intensity land practices in order to deal with the competition from high population density (van der Schans, 2010). Urban agriculture has recently become a popular field in the Netherlands, with a shift from peri-urban farms to urban environment (van der Schans, 2010). This shift provides opportunities for farmers to develop on small plots which are also often close to the citizens in the neighbourhoods, as highlighted by Van der Schans (2010). These small plots used for agriculture within urban environment are normally recognized as a practice of urban farm. These urban farms not only reduce the burden of production, but also are required to have multi functions to be beneficial for urban development (van der Schans, 2010). There are a number of different examples of such urban farms. One example is the organic farm on the outskirts of Zoetermeer called 't Geertje'. With a public mandate, this organic farm has developed different functions such as a shop, restaurant and other services, such as hosting corporate events and parties, (Geertje, 2015). Other examples can be found in Rotterdam, where a project of urban farms (eatable Rotterdam) is under development to test the possibilities of food production in a metropolis (Sjauw, 2015). Such urban farms have gradually emerged in recent years.

In recent years, urban agricultural practices have been studied from a range of different perspectives. In a report published by Levenston in 2013, it was concluded that urban agriculture can not only provide more production opportunities for farmers, but also create more job opportunities for workers and improve social development in the neighbourhoods themselves. However, there is no conclusive evidence that these practices increase financial profits (Levenston, M., 2013). This report has proved the necessity of investigation and research, especially with regards the social and economic effect of urban agriculture, to discover the important contributions that urban farms can have on maintaining sustainable social development.

This is of increasing significance within the Netherlands, with evidence to suggest that social cohesion is in a strong decline within the urban areas. Dutch society is also experiencing a

transition from a welfare state into a participatory society (Veen, 2015). This participatory society requires active relationship between citizens, which could benefit from an improved social and physical environment (Veen, 2015). Under such circumstances, the issue of social cohesion is a more urgent topic of discussion than ever before. According to Veen (2015) and van Wetten (2010), urban agriculture could help to increase social contact between people, resulting in an enhancement of social cohesion. Therefore, it is worthwhile to discuss how urban agriculture practices can be used to improve social cohesion.

Nowadays in the Netherlands, cities such as Almere, Tilburg and Rotterdam have started to treat urban agriculture seriously as an important component of the urban planning process. It is necessary to conduct researches on studying different types of urban agriculture practices to adapt to the changes of urbanization in the future. To design effective agriculture practices for a city area, planners need research their impact at local level. Having a promising practice of urban agriculture is the first step. Small urban farm currently represents a popular type of alternative food network in the Netherlands, and expansion of this form of urban agriculture demands to be conducted in order to determine their influence on local sustainability. Such research is also of value for planners who work on urban agriculture.

### 1.2.2 Urban agriculture in China

China, as an ancient agricultural nation, started to pay attention to the development of urban agriculture from the early 1990s (Wahba, 2013). By 2005, the agri-business had developed a dominant position in urban agriculture within China, with this usually taking the form of agro-parks (Rong, 2013). Theoretically speaking, the core of agri-business is efficiency and productivity (Broekhof and van de Valk, 2012) with the use of advanced technology responsible for the massive yields of vegetables. Large agro-parks are normally located in peri-urban area. These are constructed as a circle of productive land around urban areas to support the daily needs within a city (Cao and Zhang, 2006). Most cities therefore have zones for urban agriculture located on the outskirts as a form of permanent land use (RUAF foundation, 2015). According to a report by the UN in 2010, China is able to produce more than 85% of its vegetables every year with this help of agri-business (UN,2010). In recent years, agro-parks have also transformed from the simple function of production to multi-functional developments, simultaneously combining food production with uses for leisure and tourism.

Alongside agri-business, Community Supported Agriculture (CSA) has also gradually emerged in China since 2010. As a community-based practice of alternative food networks, it offers citizens an alternative source of food. Because of its advantages regarding access to fresh, seasonal food and its reduction of the producer-consumer gap, it is soon becoming welcomed among citizens. However, CSA is currently only carried out in first and second-tier cities, e.g. Beijing, Shenzhen, Changzhou, etc. and the benefitting communities are in a minority (Qu and Jiao, 2013).

Though the agri-business and the emerging CSA contribute to the development of urban agriculture, they are not the only types in China. Some small ventures, such as rooftop and balcony planting, have gradually become preferable activities by citizens and this trend is getting more popular. In the last couple of years, there has also been news about citizens



spontaneously transforming green space in a community into small farms, e.g. planting vegetables and raising hens. However, these actions of changing public land into personal uses and consistently abusing the beautification of a community should be limited.

Such spontaneous actions are informal but have a vital energy (Veen, 2015). This phenomenon happens generally in China could raise a change in the food system. From a planning perspective, the community gardens formed by citizens themselves provide a decentralized way to supporting the development of alternative food network, which could further enhance the quality of life, and social safety (Veen, 2015). The concept of alternative food networks in China is still a fresh field and in a necessary process of formalization. The emergence of community gardens could be regarded as a new start of urban agriculture practices in China. Their appearance confirms a re-localizing of agricultural production, which will become more sustainable in order to meet local food requirements (Rong, 2013).

As the growth of such spontaneous actions in neighbourhoods gains momentum, it is worthwhile to discuss these new practices of urban agriculture in China in order to seek an alternative option. The extent to which community gardens in the Chinese context could provide an effective and positive contribution to local sustainable development and fit in China's circumstances needs to be studied.

### 1.2.3 The blank of academic literature

Nowadays, sustainability is the major underlying principle of urban development. At the beginning of this century, a growing mass of literature discussed the concept of 'urban agriculture', ranging from the benefits and impacts of urban agriculture on the functioning of local food system. There focused on the construction of local food systems and the role of urban agriculture in achieving sustainable development. Among all the practices of urban agriculture, community-based type is the mostly commonly cited, though this literature focused primarily on the western context. Holland, (2004) has studied the British community gardens under the policy context of Local Agenda 21; Firth, et,al (2011), have researched the community gardens on social aspects in Australia; and Hinrichs CSA case in Midwest community under the context of U.S. However, there is a lack of literatures on the community-based urban agriculture cases under the Chinese context. There is also little literature referring to how community-based urban agriculture have developed in the presence of uncertain changes which presents the opportunity to provide insights on the possible trends of community gardens that Chinese could refer.

Sustainability is a widely acknowledged concept that calls for an integration of policy and environmental, social and economic dimensions (Holland, 2004). It needs efforts from all government levels (Srinivas, 2015). Local sustainability policy-making depends on the local government who would combine the local endogenous resources and sustainable development in a higher level. It is the embodied form of instruction for the development of local sustainability.

Urban planning is intended to provide people the best way of living concern with environment by using technical and political measures (Budge and Slade, 2009). To guarantee people's quality of life, sustainability has become the main theme of the urban planning.

Overall, there is a lack of comprehensive conceptual framework used to examine various different practices of urban agriculture. Thus, it is beneficial to the wider body of urban agriculture research to conduct a comparison study of the urban agriculture practices in the developed and developing world. This research will use two cases, The Netherlands and China, to analyse their influence on and performance of local sustainability and explore the future development of urban agriculture practices in these two countries.

## 1.3 Research Objectives and Research Questions

The preceding considerations show the urge to conduct research which may bring the aforementioned practical and/or academic problems to a solution. The objective of this study stems from these considerations.

This thesis aims to

- study the characteristics of two cases of urban agriculture and the impacts on local sustainability in the Netherlands and China;
- explore similarities and differences of two different cases of urban agriculture;
- provide suggestions and recommendations for the future development of urban agriculture in the two countries.

by means of conducting a comparative case study between Caetshage farm in Culemborg and Sanyuanli community garden in Beijing.

In order to reach the research objectives, the following research questions will have to be answered:

- What are the impacts of the Dutch urban farm on local sustainability?
- What are the impacts of the Chinese community garden on local sustainability?
- What are the similarities and differences of the two cases with respect to local sustainability?
- What lessons can be learnt from the two urban cases?

The first three research questions pertain to the identification of the consequences of urban farming on local sustainability. The fourth question sheds light on the possible strategies in both countries which can contribute to the consolidation of urban agriculture.

## 1.4 The Construction of the Thesis

The thesis is constructed in three parts. The first part includes Chapter 1, 2 and 3. Through the demonstration of background and literature review, the theory will be provided. Meanwhile, the indicators will be identified and it will help to conduct the case study. In the second part, consisting of Chapter 4 and 5, gives the research results that find in the fieldwork. And in the third part, i.e. Chapter 6 and 7, it is going to interpret the results of case study and provide the final conclusions and recommendations for two countries. The specific contents of each chapter display following:

Chapter 1: introduces the background information and states the necessity of study.

Chapter 2: promotes a conceptual framework based on the literatures and applies it in two cases.

Chapter 3: describes the research methodology, research techniques, and research process.

Chapter 4 and Chapter 5 give the research results respectively in the Netherlands and China.

Chapter 6 is the analysis of comparison results including the answers to the research questions.

Chapter 7 gives the conclusions and the related recommendations to both cases.





## 2. Literature Review

This literature review is used to formulate an evidence based theoretical framework for community involvement, urban agriculture and local sustainability that will support my case study based approach looking at the impact of urban agriculture on local sustainability. This chapter is divided into three parts: the first section provides a definition of communities and describes the necessity of involving community study in urban agriculture practices; the second section will study sustainable food systems at local level, exemplified by two aspects of local sustainability and food systems. Building on these two sections, the third section will provide a theoretical framework that will be applied to the case study selected for this study.

## 2.1 The Importance of Community

### 2.1.1 Community in urban agriculture

Urban agriculture practices cannot be isolated from the communities in which and for which they are established. A community is defined as a common space that brings people together and inspires shared action (Linn, 2007). The form of urban agriculture can be further subdivided based on different prerequisites. For example, community gardens can be divided into school gardens, institutional gardens, residential gardens, etc. The categories are divided based on the condition where a garden is attached to (Mees and Stone, 2012). However, community gardens could also be divided into a share interest, such as Jewish community gardens based on culture interest, and academic community gardens based on academy interest. These differences were highlighted by a study by Dale, et al., (2010) who state that a community needs to be defined broadly - not only by place but also by practice, professional affiliation, shared interests and networks. Similarly, Firth, et al. (2011) also point out that two fundamental categories of communities: place-based communities and interest-based communities.

A 'Place-based' community usually refers to a community that is named after where it is located. It is a community that is formed due to geographical proximity most commonly in neighbourhoods or work places. Normally, in a neighbourhood or in a working place, the appearance of a community garden is mostly due to the fact that people live or work in the same environment.

However, the perception of 'place-based' community has been challenged by the emergence of 'Community-Supported Agriculture' (CSA). CSA takes the form of one local agriculture farm which can be supported by multiple place-based communities. The different place-based communities form a new community around the farm which consists of groups of people that are interested in urban agriculture. An 'Interest-based' community is defined as a community within which people share the same value, goals, networks or enthusiasm for a specific thing (Linn, 2007). For this reason, therefore, the community created around CSAs appears interest-based rather than place-based.

The definition of a community therefore needs to be defined and re-defined within each different research context (Kingsley and Townsend, 2006). As demonstrated above, the definition of a community is now no longer only based on geographic location, but based on

personal connectedness between people sharing the same interests (Firth, Maye, et al., 2011). Within the context of urban agriculture, the place-based and interest-based communities cannot be separate entirely. In many cases, the concept of community may encompass both place-based and interest-based meanings. It is therefore important to address the foundation on which the community is based before studying urban agriculture, because this leads to a better understanding of social cohesion.

### 2.1.2 Social cohesion and social capital

Social cohesion is an ambiguous concept that is generally interpreted as a way that people connect with each other (Veen, 2015). It can be operationalized through the use of multidimensional elements, though they are all hard to measure in reality (Veen, 2015). Social capital is one element of social cohesion, and is understood as a way to examine the social networks of the people who make up a community (OECD, 2007). The level of social capital can predict the level of local participation when forming a community (Kingsley and Townsend, 2006) and it can indicate how a community will mobilize the social resources at their disposal to make full use of their skills within a certain area (OCED, 2007). Social capital is essential for maintaining the value of public goods, which only can be pursued through the community interest (Selman, 2001). Public services such as environmental preservation and traffic mobility requires social capital (Selman, 2001). Thus, from this perspective, the study of social capital could reflect the social coherence of a community.

According to OECD, (2007), social capital can be defined as a combination of the networks and shared norms, values and understandings that facilitate co-operation within or among groups (OCED, 2007). Using the research of Alaimo, et al., (2010), social capital can be understood on two levels, individual level and community level. Individual level social capital is described by Alaimo, et al., (2010) as:

*'generated by individuals for their own potential benefit, then neighbourhood community development projects designed to increase social capital should focus on promoting the development of individual social networks and attracting large numbers of neighbourhood residents to get involved in activities that increase networking, norms and trust'.*

The definition above implies that social capital at individual level could review the internal relationships within a certain community. It tends to consider the social capital from the individual point of view, focusing on what an individual could contribute to the group rather than a general impression of the public participation in a community.

At the community level, social capital can be understood to mean:

*'features of social organizations, such as networks, norms, and trust, which facilitate actions of cooperation for mutual benefit' (Kingsley and Townsend, 2006).*

From the definition, it can be regarded a community as an entity, considering the relationship of one community with others. It implies that if participators in one community have



established the community networks, norms, and trusts in a neighbourhood, the benefits it generates would spill over to non-participating neighbours (Alaimo, Reischl, et al., 2010).

The above understandings of social capital provide two different perspectives regarding social cohesions. The two levels of social capital give insights into the connectedness between individuals in a community. However, in order to describe the dynamic interaction within and between a community, we must consider the strength of the social capital. The stronger the social capital of a community, the stronger social cohesion will be. According to Firth, (2011), there are three categories that can be classified to evaluate social capital.

- **Bonding social capital** means networks established from dense and strong trust which form firm ties between individuals. This normally occurs between people who are in close-knit groups or share the similar social identities, such as family, friends and neighbourhoods.
- **Bridging social capital** refers to the distant ties between people who share similar social backgrounds, such as loose relationships between workmates. Bridging social capital tends to heal the gap between individuals.
- **Linking social capital** tends to describe the connectivity between people who are in dissimilar situations, such as the connection with authorities or with financially influential positions (Firth, Maye, et al., 2011, Alaimo, Reischl, et al., 2010).

These three categories can help to understand the social networks in a community. Through the study of these three social capitals, we can identify whether a community has virtuous social networks. Finding the balance between these three social capitals in a community is also crucial, with the balance often dependent on the number of people who participate in the same social network (Yates and Jochum, 2003). Through studying the three social capitals, it tells whether a community has established virtuous social networks, which could enhance the social cohesion in the urban agriculture.

### 2.1.3 The definition of urban farm and community garden

Urban agriculture practices are diverse in size, location, form and organisation (Clavin, 2011). Within this review, focus will be placed on two distinctive forms of urban agriculture, notably: urban farms and community gardens.

Regarding the urban farm, as its name suggested, it means a farm located in or in proximity to an urban area, often growing food on previously vacant land, though not typically dedicated to large scale food production (Watson, 2015).

Community gardens are another type of urban agriculture that are recognised as shared land plots where a collective group of people are farming a variety of vegetable while managing small stocks and plants (Bauermeister, Swain, et al., 2010). A complementary definition is that community gardens are a public field where the ownership, access and control are in a democratic way (Firth, Maye, et al., 2011). In the PhD research of Veen, (2015), a comprehensive definition of community gardens is provided:

*Community garden is a plot of land located in the urban area cultivated either communally or individually, by people from the direct neighbourhood or the wider city (Veen, 2015).*

The similarities between the urban farm and community garden lies on two aspects. First is that they hold similar definitions, i.e. people have agriculture activities on a vacant piece of land in the urban area. Second, is that from the community perspective, as discussed above, they share the same nature as well. Both community gardens and urban farms were originally established within place-based in a neighbourhood, but in this thesis, the communities are more concerned from interest-based networks, with a common interest existing within a wider group of people. This acts to explain the emphasis on the social aspect rather than on the purpose of profit making within these communities.

The similarities between urban farms and community gardens provide the possibility for comparison, fundamental to this thesis. The main distinction between the two types of urban agriculture mainly lies on the size scale. Pragmatically speaking, a community garden is normally limited to size of 100 m<sup>2</sup> (Bradly, et.al., 2012), while an urban farm is normally a number of acres (Watson, 2015). However, due to the fact that both types of urban agriculture is aimed to encourage constructing communities among people, they are comparable in this perspective despite the differences of size.

With basic understanding of the concepts above, the importance of studying communities is exemplified. By studying urban agriculture from a community perspective, we can better understand the definitions of different types of urban agriculture. From a social perspective, communities are seen as the public places where different ethnic groups can interact and overcome potential barriers (Kingsley and Townsend, 2006). Focusing this study on communities within urban agriculture can not only help to identify the internal level of public participation, but also aid the development between communities to improve social cohesion.

## 2.2 Sustainability

### 2.2.1 Local sustainability

The concept of sustainability is implemented through sustainable development at varying levels. In western countries, sustainable development has been strictly practiced following a hierarchical structure of national, regional and local initiatives, with both explicit or implicit motivations (Holland, 2004). However, currently, most attention has been paid on the local level. According to the research results from Dale, et al., (2010), the efforts about sustainability are desired to be done at the community scale. Due to the fact that the outcomes of international and national policies are the product of intense diplomacy, the outcomes or the impacts are not impacting the (local) scale as they are expected to (Dale, Ling, et al., 2010). However, when compared to the national level, the actual implementation and application of innovation is more effective at the community scale. When all these communities are then aggregated, the greatest impact on sustainability can be achieved (Dale, Ling, et al., 2010). From the research of Connelly, et al., (2011), a comparison between

sustainability in national/regional level and sustainability in local level has been summarized. Table 2.1 shows the differences in the manifestations of sustainability at different levels.

Table 2.1: Sustainability in macro and micro level comparison.

|  | <b><i>Sustainability in national /regional level</i></b> | <b><i>Sustainability in local level</i></b> |
|--|--|---|
| <b><i>Worldview characteristics</i></b>      | Anthropocentric  | Biocentric                                  |
|  | Rational individuals                                     | Collective action                           |
| <b><i>Role of economy</i></b>                | Economic growth  | Qualitative development                     |
|  | Centralized  | Community based                             |
| <b><i>Source of problem and solution</i></b> | Supply problem   | Demand Problem                              |
|  | Technocratic   | Social relationships                        |
|  | Use of EIA, cost-benefit analysis                        | Small scale decentralization                |
|  | Efficiency   | Self-sufficiency                            |

Source: (Connelly, Markey, et al., 2011)

From the table 2.1, it can be seen that sustainability at different levels focus on different points of interest. Local sustainability is more explicit and the environment is more central than that in the national/regional levels.

Sustainability is more concerned from the three dimensions of it, i.e. economy, society and environment. The three dimensions are independent but are not mutually exclusive. Generally, sustainability is to balancing the efforts to meet basic human needs without destroying or degrading the natural environment (Connelly, Markey, et al., 2011). As it is demonstrated above of what local sustainability is focused on, the understanding of three dimensions of local sustainability is also interpreted in a local way.

- ***Environmental*** dimension of local sustainability means the focusing on the development of the local endogenous resources which enable the reduction of local pollution and the exploitation of resources, along with making the territorial area more ecologically resilient; a state which increases the ability to adapt when facing local, regional or national changes (del Rio and Burguillo, 2008).
- ***Economic*** dimension of local sustainability intends to increase the local income and improve the standard of living, reducing energy dependence and diversifying the energy supply (del Rio and Burguillo, 2008).
- ***Social*** dimension of local sustainability can be reflected on the achievement of community peace through social cohesion, stability, social participation, respect for cultural identity and institutional development. Reducing unemployment and improving the quality of jobs, as well as increasing social cohesion and reducing poverty levels are the key actions at local level to achieve sustainability from a social perspective. On the one hand, activities such as community gardens, promotion of renewable energy within the local area could help to build up social capital to enhance social relationships. On the other hand, the activities can also increase local job opportunities to help solve employment issues. Local sustainability also has a particularly positive psychological impact on the prospects of the young local population. (del Rio and Burguillo, 2008)

### 2.2.2 Two ways of assessing sustainability

Local sustainability refers to within a specific small area, built and operated in a way that it uses natural resources efficiently and equitably, for both present and future generations of human beings and other species (Srinivas, H., 2015). Sustainability in the territorial context is emphasized. In the research paper by del Rio, (2008), it was shown that there are two conceptual frameworks to assess the sustainability in specific territorial areas, i.e. substantive sustainability and procedural sustainability.

As demonstrated above, local sustainability can be concluded as an area which is designed, built and operated in a way that it uses natural resources efficiently and equitably, for both present and future generations of human beings and other species (Srinivas, H., 2015). It is more territorial concerned. Sustainability is generally examined from the three dimensions of it. Seeking out the performance of economy, society and environment helps to improve the level of sustainability. However, based on the research paper of del Rio, (2008), he pointed out the assessment from three dimensions is essential. This kind of assessment can be regarded as substantive sustainability, which is explained as:

- **Substantive sustainability** is how a specific project contributes to the improvement of the economic, social and environmental dimensions in a specific territory (del Rio and Burguillo, 2008). It operates through the constant capital approach and triangular approach. Constant capital refers to the maintenance of a stock of capital under sustainable circumstances, such as natural resources; while the triangular approach is considered the interrelated three dimensions of sustainability (del Rio and Burguillo, 2008).

However, not only with the perspective of three dimensions, the other way of assessing sustainability is discussed often as well. That is procedural sustainability. It more focuses on the stakeholder analysis, which could have a review on the involvement of different stakeholders on a specific territory.

- **Procedural sustainability** means the participatory approach which can take the stakeholders' opinions into consideration, i.e. the stakeholder analysis. As sustainability is not the responsibility of any single group or agency, stakeholders like the local government, community citizens, local organizations, industries and other commercial companies are all allowed to get involved in local projects with their different viewpoints, obligations, skills, and resources (Binder, Feola, et al., 2010).

### 2.2.3 The application of two ways on assessing local sustainability

In the study of del Rio and Burguillo, (2008) about local renewable energy projects, the authors formulated a theoretical framework of how to assess the impacts of a local renewable energy project on local sustainability (Figure 2.1).

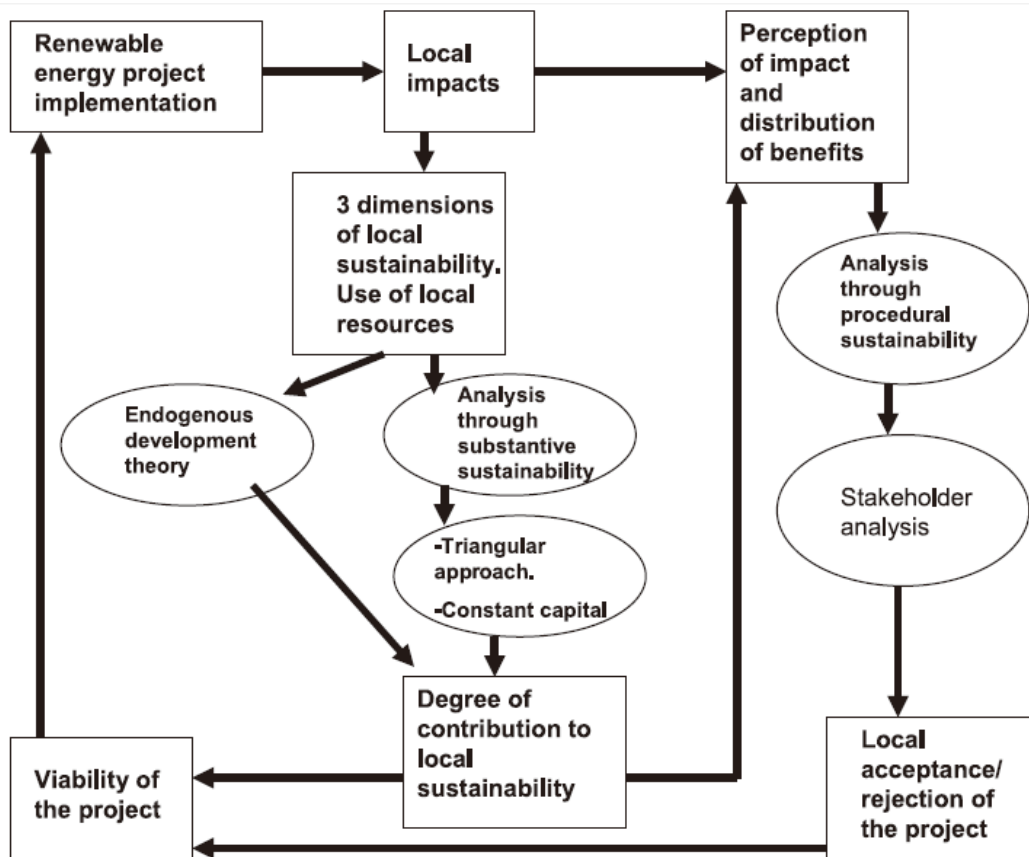


Figure 2.1: The theoretical framework of renewable energy project on local sustainability

Source: (del Rio and Burguillo, 2008)

In the study by del Rio and Burguillo, (2008), which focused on local renewable energy projects, the authors formulated a theoretical framework for assessing the impacts of different projects on local sustainability (Figure 2.1), which shows a logical process of using substantive sustainability and procedural sustainability. Both approaches are applied to assess comprehensively the impacts on local sustainability.

For the framework, on the one side, it is seen that the impacts of local sustainability are analysed through the three dimensions of substantive sustainability and endogenous development. Normally, endogenous development is conceptualised as

*'a process which raises the income levels of the population based on the intrinsic local resources and the respect for community values and traditions'* (del Rio and Burguillo, 2008).

The definition concerns with the main point of analysing the local resources. It focuses on studying the advantageousness of specific territories, which base the sustainable development projects on the use of local resource endowments (del Rio and Burguillo, 2008). Local sustainability lies within endogenous development because it is mainly locally driven (Binder, Feola, et al., 2010). Investigating local resources could have aware of the local advantages and disadvantages and what resources can be used in the urban development. Taken local resources into consideration is necessary as it helps to know whether full use of resources is being made.



On the other side in the framework, it uses the procedural sustainability approach to have a local stakeholder analysis, which provides the acceptance of a project. The analysis on local stakeholders are significant. It shows a project could impact the social network and cooperation which could imply the social sustainability among different local stakeholders.

The framework illustrates that the impacts on local sustainability depending on local conditions and local networks, which meant that the study of local resources and substantive sustainability, and procedural sustainability were inherently related (del Rio and Burguillo, 2008).

## 2.3 Local Food Systems

The food system is a topic that has been widely discussed. The food system refers to the process and activities of food production, processing, distribution and the choice by consumers (Holland, 2004). Two kinds of food system exist – conventional food system and alternative food system. The conventional food system has dominated urban agriculture globally, whilst the local food system has been raised as a counter movement and has gradually attracted more attention (Campbell, 2004). Though holding the different values and operating in different scales, the two food systems will be embedded within each other and promote the development of food planning in the future (Campbell, 2004).

### 2.3.1 The conventional food system

The conventional food system also known as the global industrialized food system, is mainly responsible for massive food production, in order to maximize the economies of scale and lowering overall the customers cost (Campbell, 2004). It is characterized by efficiency and externalized costs:

- Highly specialized and standardized commodity growing practices dependent on the biotechnology advances;
- Federal and corporate support for a large-scale conventional agriculture, such as forming agro-parks to produce food on a larger scale;
- Corporate control of raw agricultural materials produced, and the transformation into food products alongside distribution and marketing;
- Reliance on food imports and exports that travel enormous distance to consumers in different countries in the world, as known as food miles;
- Emerging global food monopolies in the biotechnology and seeds, commodities and food retailing (Campbell, 2004).

Based on the features listed above, it can be seen that the most important value of the conventional food system is the consideration of food as a commodity. Turner, (2011) argues that there is a disconnection between local food and consumers, especially as there is often a division between nature and the urban areas of developed countries. The reason is that, in urban areas, the large scale production that occurs within the conventional food system, with food positioned as a commodity, alienates urban citizens. Its aim is to maximize the profits of food production rather than integrate citizens, though plenty of people worldwide have seen benefits of this system.

The conventional food system has some benefits. First, it raises the yield of food production. Thanks to the massive-production of conventional food system, they help to resolve the problems of food shortage worldwide (Viljoen, 2005). In 1990s, the conventional food system was the dominant farming practice, which provided a way to make product chains and farming methods more efficient (Holtslag, 2010). Second, the conventional food system stimulates the interchange of global food. Due to the accelerated development of international business, the immigrants have become one of the anthropologic matters in the world. Conventional food systems with its feature of distance transportation, helps people to obtain the food from thousand miles away. Meanwhile, it meets the immigrants' requirements of accessing to the food from homeland more conveniently.

However, the conventional food system, with its advantages for large-scale production, also has some inevitable problems. On regards of the social and economic perspectives, first, it loses the connections between producers and consumers. While consuming the products, the consumers have not been provided or given any minimum clue of the food provenance (Wang, 2013a). The producers also know less about the exact demands of consumers. Second, market force stimulates the production from conventional food systems into a vicious cycle. In order to pay off the debts, the products as commodities are traded off and earn foreign exchange to accumulate financial capital in most countries. However, this promotes an insecurity to the growers, while lowered the environmental and social standards to cut the costs and to compete in the international markets (Viljoen, 2005). However, by this way, the development of local economies will be suppressed, and will further affect the resilience of local development. Third, the inequity of the food provision will be increased depend on the conventional food system (Wang, 2013a). Food price is determined by the food quality (Wang, 2013a). Normally, the high price of food is more fresh and organic, which is affordable by high-income groups of people. Whilst the low-income groups of people purchase the food with low prices. The access to the productions of the conventional food system is quite different between low-income and high-income groups of people (Holtslag, 2010), which leads to the inequity problem of food access.

There are also environmental issues attached to the conventional food system. For instance, the reliance on biotechnology that may cause chemical pollution which will further harm peoples' health (Wang, 2013b); the food miles may result in a large carbon footprint (Viljoen, 2005); it may also lead to the degradation of public landscape because of high volume of packaging disposed of (Wang, 2013a), etc. The emergence of the alternative food system is able to overcome some of these shortcomings.

### 2.3.2 The alternative food system

The emergence of alternative food system makes up the problems of the conventional food system. Alternative food systems are defined as 'providing access to affordable, nutritious and culturally appropriate food for people at all time' (Campbell, 2004). Unlike the conventional food system, alternative food system is aimed to put the value of food as a community right (Campbell, 2004). The alternative food system has several positive characteristics: shorter distances between producers and consumers; a small scale of production; and a commitment to the social, economic, and environmental dimensions of local sustainability (Jaroz, 2008).

The alternative food system has several sub-divisions. One of the most important is the local food system. The local food system is referred to the networks of food production and consumption that aim to be geographically and economically accessible and direct (Holtslag, 2010). It embodies the same characteristics of alternative food system.

Commonly, both conventional food system and alternative food system consist of five phases: production, processing, distribution, consumption and waste management. In the conventional food system, these phases are executed in a linear process, because food production and waste management normally occur at quite a distance. Sustainable process change the linear process of the conventional food system is into circular metabolism. For example, the nutrient flow from farmland to city, and then back to farmland (Viljoen, 2005); the alternative is the accumulation of waste.

Within the local food system context, the five phases of activity outlined above are limited by the boundary of the community and service to the community. Local food systems use a circular food system, where the food waste can be transformed into energy which contributes to further food production activity. A circular local food system can therefore make full use of local resources and reduce the ecological footprint of the agricultural area, which promotes the development of local sustainability. As it has already promoted in the book of *CPULs*, agriculture needs to move towards into more localized, efficient and circular urban systems. This scenario certainly includes the use of the land within/on the edge of cities for food production (Viljoen, 2005).



Figure 2.2: The local food system

Sources: <http://www.foodwellalliance.org/why-local-food-matters/>

### 2.3.3 The existence of conventional food system and alternative food system

Around the 2000, there was a debate about whether focus should be placed on the development of more localized food systems or whether efforts should be made to keep up the pace of globalization through conventional food systems. In 2003, Hinrichs argued that all the debates discussed from the only one side of the two food systems were a misleading (Campbell, 2004). He argued that both the conventional and the alternative food systems are dynamic and interrelated processes. They influence and feed back into each other, requiring system-level analysis in many aspects (Campbell, 2004).

If taken from a binary conceptualization (either the conventional food system or the alternative food system), there will be a loss of the dynamic processes that underpin the food system which makes the system more vulnerable to changes (Feenstra, 2002). Only a co-operation of the two food systems could provide the chance of creating effective social, political, economic and intellectual space. However, the two food systems do not reinforce each other (Morgan, 2006). They have their own purposes for food production. The conventional food system could meet the food amount requirement to promote the national economy development. Meanwhile, the alternative food system, especially local food systems, could fulfil the needs of the dairy and fresh and seasonal vegetables to keep the nutrient flow working in a circular and sustainable motion (Viljoen, 2005). The co-operation then could not only face the uncertainty of development, but also push the economic development at both the national/regional and local level.

## 2.4 Conceptual Framework

### 2.4.1 Local food system in local sustainability matrix

As described in the previous sections, the concept of sustainability consists of three aspects: environmental, social and economic dimensions. As the different phases of the local food system have different focuses and involve different resources, each phase has its contribution to the local sustainability (production, processing, distribution, consumption and waste management). Figure 2.3 below displays the resources and the focus of each phase in the local food system.

Food production directly concerns the environment, health and economic vitality. In this process, it demands local natural resources such as soil, energy, seeds and water as inputs to produce food. There are however also other resources desired such as finance and human resources. Fundamentally, the alternative food systems aim at building the short-supply chains and new relationships between producers and communities (Wang, 2013a). They can bring more job opportunities and higher incomes within the certain regions (Wang, 2013a). A shorter distance of transporting and less middlemen within the process and marketing phases also means more profit goes to local food producers.

In the food processing and distribution phases, the package adds to the value of the food while the dominance of marketing logic affects the social meaning of food (Turner, 2011).

The relationship between producers and consumers can become closer. It can reduce the conflicts between social classes and stakeholders with different purpose, as well as enhance the social capital in the community (Alaimo, Reischl, et al., 2010). Seeing this from the economic aspect, in local food system the costs of transportation can be saved, as the distance is shorter and more efficient, while the local farmers are able to have a decent income from these food system activities (Wang, 2013a). Regarding the environmental perspective, the generation of the greenhouse gas emissions can be reduced, and the usage of fuel can be decreased as well. Besides, local food also encourages the establishment of traditional markets, opposing large shopping centres.

The consumption process relates to the local economic dimension. Consumption emphasizes the social equity and accessibility. Different people with various identities are supposed to have a similar access and similar affordability to the fresh and seasonal food. Consumption on the local scale could also promote the development of the local economy.

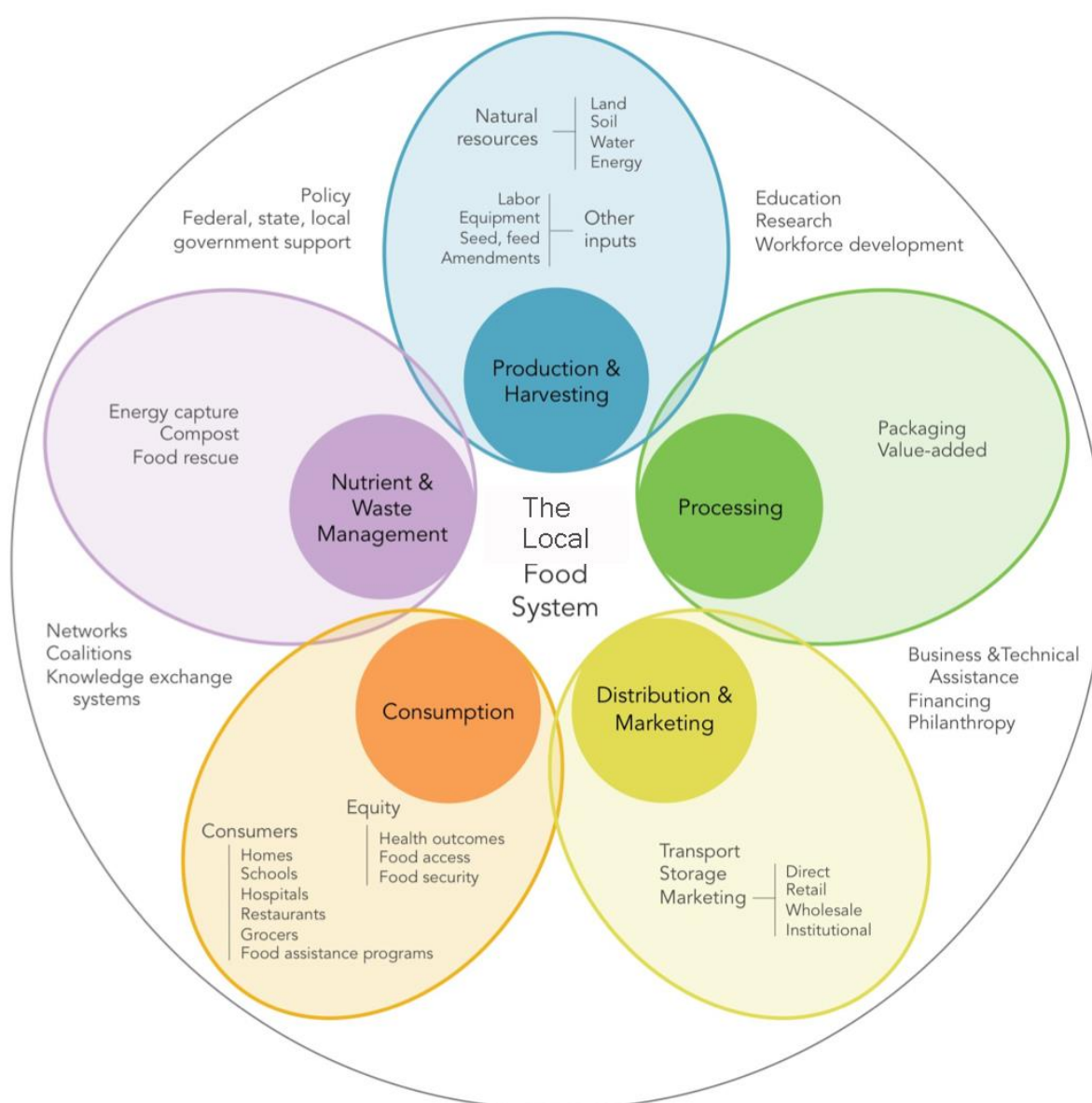


Figure 2.3: The resources required in different food system processes

Source: <http://nhfoodstrategy.weebly.com/about.html>

The waste management, as a way of resources management, has important effects on the environmental dimension of sustainability (Agudelo-Vera, Mels, et al., 2012). The central idea of the waste management is to avoid nutrient losing as much as possible, and as such uses different methods to maximize the value of waste resources (Wilson, 2007).

Figure 2.3 not only provides the required resources in each phase of local food system, but also implies the relevant stakeholders in processes. From the supports of government to the coalitions of different stakeholders, it provides the information about the importance of the stakeholders' relationships and the effect they could exert in local food systems.

Thus, based on the description of each phase above, when the local food system encounters the three dimensions of sustainability, a position of each phase could have been set. The different phases have been posited in the local sustainability matrix according to the required social and natural resources, and also display the possible impacts that will be generated (Figure 2.4).

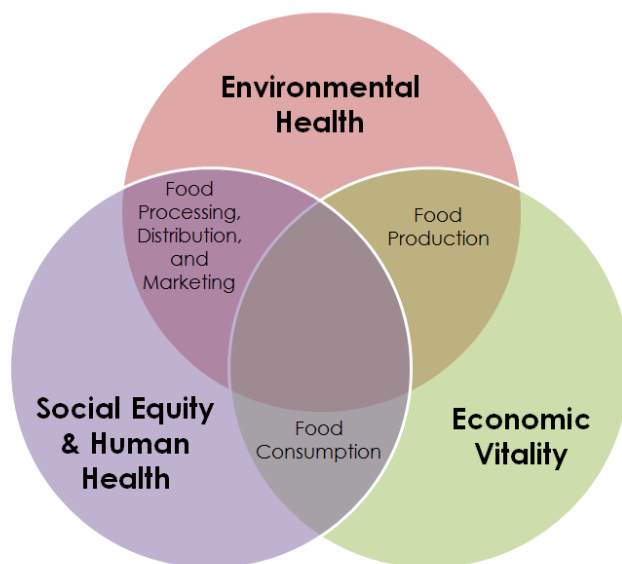


Figure 2.4: The local food system posited in local sustainability matrix

Sources: <http://www.foodsecuritynews.com/What-is-food-security.htm>

**Environmental Health** aims to ensure that food production and procurement do not compromise the land, air, or water at the present time, as well as for the future generations (FSN, 2014). As it is shown in the figure 2.3, the food production and waste management concerns with nature resources closely, such as land, soil, water, energy, etc. It relates to the environmental aspects essentially.

**Economic Vitality** means to make sure that the people who are producing our food are able to earn a decent living wages doing so. This ensures that producers can continue to produce our food (FSN, 2014). Food production and food consumption are the most related phases that could produce economic benefits. The financial flow within the two phases between producers and consumers could imply the economic significance in the local area.

**Social Equity** tries to ensure that particular importance is placed on the community development and its health events, making sure that healthy foods are available economically and physically to the community and that people are able to access these foods in a dignified



manner (FSN, 2014). Social relations have woven into the local food system. Any form of embodied engagement with the food system requires the recognition for the importance of the socio aspects of food (Turner, 2011).

Fitting the food system into a local sustainability matrix provides an overview to see the implementation of local sustainability in the field of urban agriculture. Through studying each phase of the local food system, the performance of local sustainability will be revealed. Based on the demonstration of last section, the indicators of assessing the impacts on local sustainability has been produced.

Figure 2.5: The indicators of local sustainability derived from local food system

In the study of sustainability, the principle of circular urban metabolism has become a standard in determining the levels of sustainability in specific regions (Vergara and Tchobanoulous, 2012). The standard of *Urban Metabolism* is a term evolved from biology, which indicates the materials flow within an urban system (Vergara and Tchobanoulous, 2012).

It includes two types of flows: linear metabolism and circular metabolism. Currently, most countries, especially developing countries, use a linear metabolism process, i.e. the model inputs raw materials and outputs waste. However, the circular metabolism makes the process a cycle, as much as possible, by using the various means, for example, cascading, recycling, etc (Agudelo-Vera, Mels, et al., 2012). The purpose of circular metabolisms is to save resources, and reduce consumption and pollution, moving agricultural systems towards more sustainable development.

### 2.4.3 The conceptual framework

Assessing the performance of urban agriculture (urban farms and community gardens) is to examine the contribution they make to the local food systems and see whether they are working towards local sustainability.

Taking inspiration from the theoretical framework promoted by del Rio and Burguillo, (2008) when assessing the impacts of renewable energy projects on local sustainability (Figure 2.1), this study will determine the contribution of urban agriculture (community-based projects) on local sustainability. The conceptual framework is intended to review the impacts of urban agriculture to local sustainability. As mentioned by Turner, (2011), urban agriculture has a significant role in facilitating the development of embodied and embedded relationships to place, the food system and consequently in promoting local sustainability. Figure 2.6 gives the flow chart of the conceptual framework.

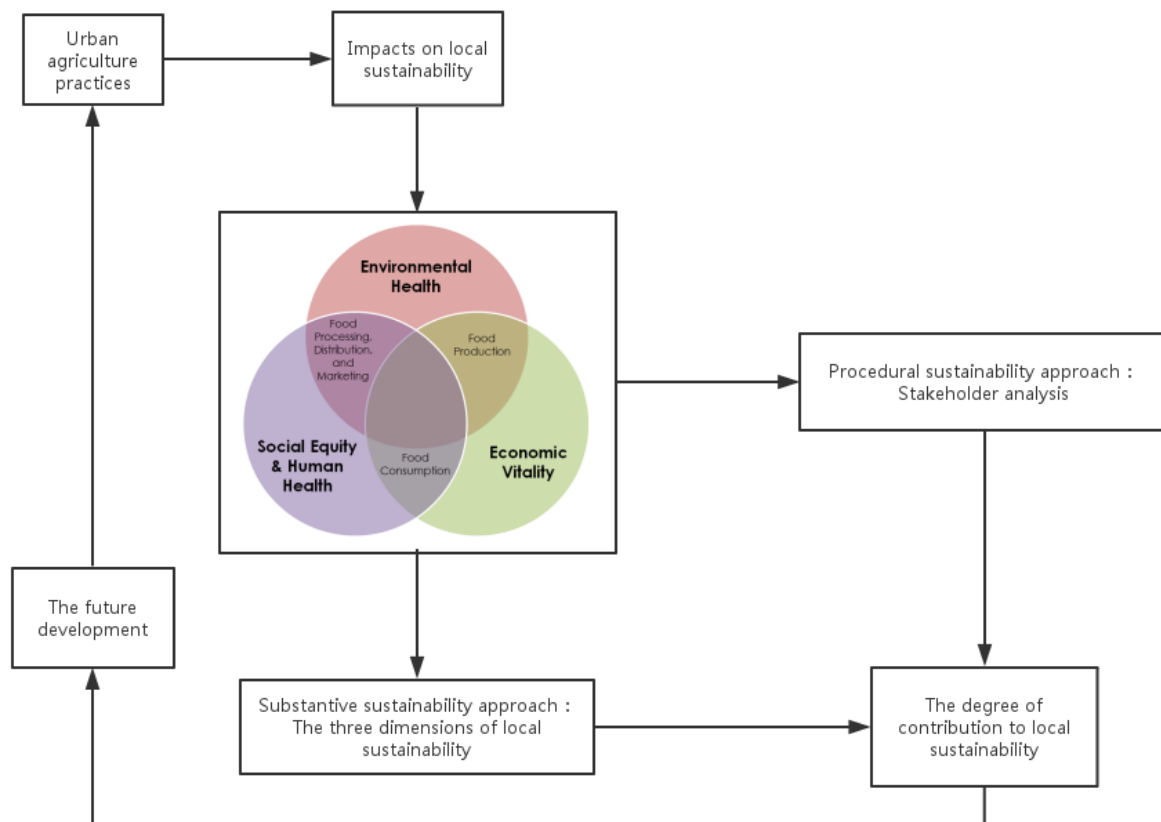


Figure 2.6: The conceptual framework



The conceptual framework is constructed by two approaches: substantive sustainability approach and procedural sustainability approach. The first approach is to study how an urban agriculture case can perform in the local food system to benefit the local sustainability. First is to investigate the local resources. Examine the local resources to have an overview of local conditions. Then, the substantive sustainability from three dimensions are applied. It is examined by the indicators displayed in Figure 2.5. By studying the three dimensions of local sustainability, it can reveal the features of the local food system where urban agriculture practices could be improved.

The second approach is the stakeholder analysis. It includes all the stakeholders, from citizens to the government and the commercial companies, whoever is interested in the initiatives involving the development of urban agriculture. By analysing the stakeholders, it not only could help to see the involvement of different stakeholders and their roles in the development process, but also knowing the efforts they would like to devote. This is a way to know their performances in urban agriculture and to provide suggestions for the future.

The conceptual framework above provides the results of the impacts on local sustainability. However, alongside the results, existing studies in the field of urban agriculture have developed the knowledge about how to maintain a local and sustainable food system (Feenstra, 2002). The potential for urban agriculture to promote local sustainability relies on their communal nature, with a communal will and desire to be expressed (Turner, 2011). The future development could be concerned from substantive sustainability and procedural sustainability.

Alongside the local resources, including nature and social resource, the future development of urban agriculture is able to be promoted. On the one hand, it is to improve the local sustainability through revitalizing and strengthening the indicators of substantive sustainability (Feenstra, 2002). On the other hand, the procedural sustainability is to enhance the stakeholders' cooperation and encourage more stakeholders to involve in the activities of urban agriculture. Additionally, from planners' perspective of view, based on the conclusions, alongside the knowledge of local resources, suggests on developing urban agriculture in local scale could be promoted.



### 3. Research Methodology

To plan a study properly, there are three questions needed to be answered: the intersection of philosophy, strategies of inquiry and specific methods (Creswell, 2009). Philosophy provides the view on how a thesis interacts with the rest of the world, which furtherly gives the reference of strategy of inquiry. After fixing the research strategy, research techniques could be used to translate the approach into practice (Creswell, 2009). Creswell, (2009).

### 3.1 An Explorative Study

According to Creswell, (2009), the worldview refers to a basic set of understandings within a discipline that could direct actions in practice (Creswell, 2009). He generalized four worldviews of philosophy foundation to guide the action of research work, i.e. post-positivism, constructivism, advocacy and pragmatism (Creswell, 2009). This thesis is used to explore the performances and roles of two different types of urban agriculture practices in local sustainability which is fit for the worldview of social constructivism, which seeks to understand the world where people live and work (Creswell, 2009). This worldview requests that qualitative research is conducted in order to achieve in-depth exploration.

Using the constructivism worldview, a qualitative strategy has been selected for this study. In qualitative research, Creswell, (2009) has displayed five strategies including ethnography, grounded theory, case study, phenomenology and narrative research (Creswell, 2009). As an exploratory research, this thesis use case study – a comparative case study - as a strategy of inquiry to study the urban agriculture practices in local sustainability.

### 3.2 Case Study

A case study is described as a way to explore in depth one or more programs, events or activities (Kumar, 2014). To do this research, two popular and promising cases in the Netherlands and China have been selected for study. These two cases represent the development of the present urban agriculture practices in their respective countries, revealing the current situation in the two countries. According to Yin, (2009), unlike other research methods, case study do not have a strict rules to follow (Yin, 2009). However, in order to develop case study research properly, it is important to be aware of the units of analysis. The research units are usually related to the research questions, and different units could cause different research design (Yin, 2009). In this thesis, the units of analysis is two different types of urban agriculture practices, i.e. the community garden and the urban farm. They are the group units that need to be studied.

There are two purposes for designing comparative case study. Firstly, a multiple case study could increase the external validity of the research (Yin, 2009). By studying two different practices of urban agriculture on local sustainability, this could provide a general model to other cases, which can function as a reference. Secondly, by comparing the two cases, the similarities and differences of their influences on local sustainability can be also compared, which allows for further exploration into the possible future of the current urban agriculture practices in the Dutch and Chinese context.

Among the development wave of urban agriculture, China has conducted several forms of urban agriculture. Sanyuanli community garden is a pilot trial in this field. While the urban farm in Culemborg provides a model of urban farming which has demonstrated the development of urban agriculture in The Netherlands. The two cases show the popularity of urban agriculture in the two countries respectively. The background of the two cases is demonstrated below.

### ***Case in the Netherlands – Caetshage farm in Culemborg***

Caetshage urban farm is located in the Culemborg in Netherlands. It is constructed on about 5 ha, but only about 2 ha. are under use. The farm is located near the neighbourhood of Eva-Lanxmeer which contains about 800 dwellings (Energy-cities, 2013), designed through a creative process with a bottom-up approach. It was built to promote sustainable development. The farm provides the food for the citizens in the whole Culemborg city. There is an ecological urban farm, aiming to provide fresh foods to the residents and bridge residents with nature (EVA-Lanxmeer, 2015). It integrates different functions, including living, working, recreation, education, etc. Studying the urban farm in Culemborg could help to identify the influences of the urban farms on the local food system.

Caetshage urban farm is successor to a pre-existing local community garden, which has evolved into the urban farm over the last few decades. Studing this case could have an insight into the different practices and provide the experience and alternative options for Chinese urban agriculture practice in the future.

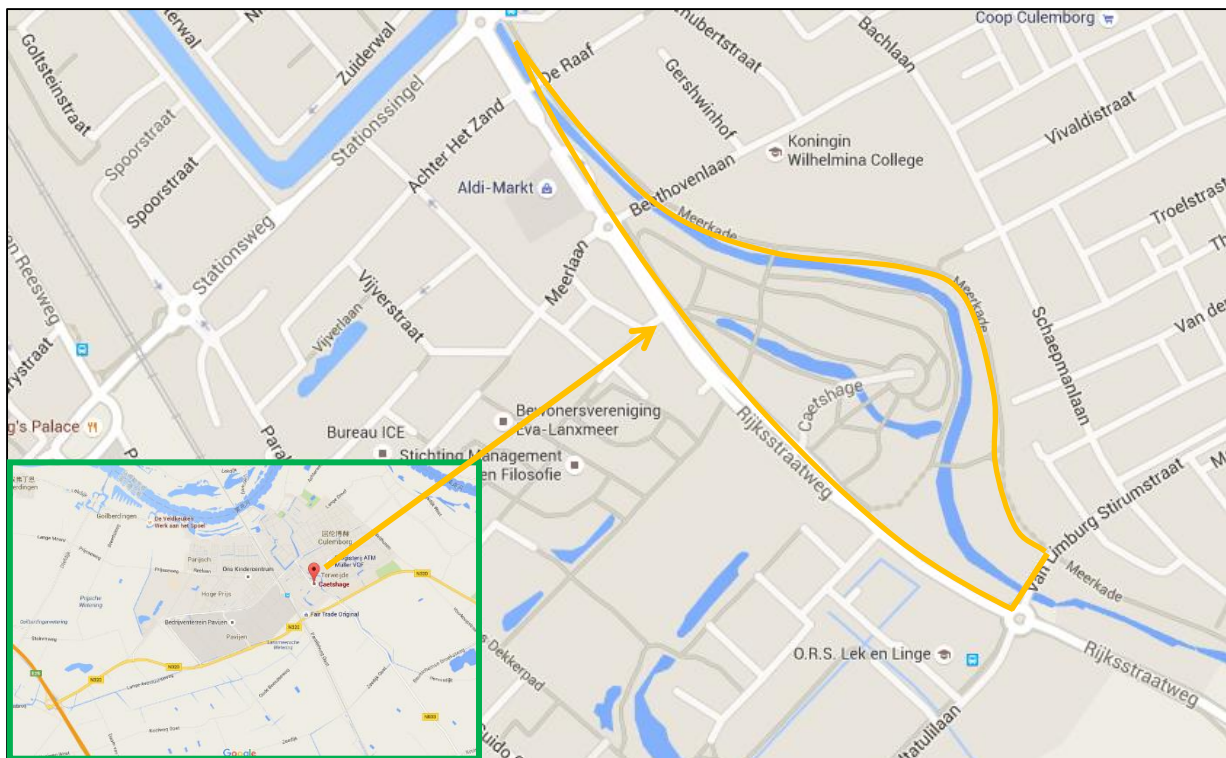


Figure 3.1: Study area of Caetshage farm in Culemborg

Source: Google map



### ***Case in China – Sanyuanli community garden in Beijing***

Sanyuanli is an old neighbourhood in Beijing which has been established for over 30 years. The neighbourhood is located in the third circle of Beijing which is surrounded by other urban green spaces and a convenient transport network. Around the neighbourhood, there is also located a vegetable market and a primary school.

Beijing Sanyuanli community garden was initiated by the French and supported by JCEF Green Commission. As a formal pilot project established in 2015, it was proposed to occupy 400 m<sup>2</sup> land in the community (Bernard, H., 2014). According to the latest report, the project has started with 10 m<sup>2</sup> and still in the expanding. It currently involves 10 households participating in the community garden. Each of the households could have 1 m<sup>2</sup> for individually planting. The initiators created the Sanyuanli community garden as experiment in Beijing in order to provide a case study to recommend the wider spread development of this type of activity and help people who would also like to set up community gardens in China (Bernard, H., 2014).



Figure 3.2: Study area of Sanyuanli community garden in Beijing

Source: Google map

### 3.3 Research Process

Based on the information above, the thesis research process can be seen in Figure 3.3. It follows the model of Yin, (2009). First, clearly outline the research questions, and then based on the research questions, a broad reviewing of literatures helps to construct a conceptual framework, which will be applied into the case studies. Then, the case studies show the research results of each case, and the comparisons of results will reveal the answer of research questions. Last, try to determine the future development trend of urban agriculture practices, within different national background.

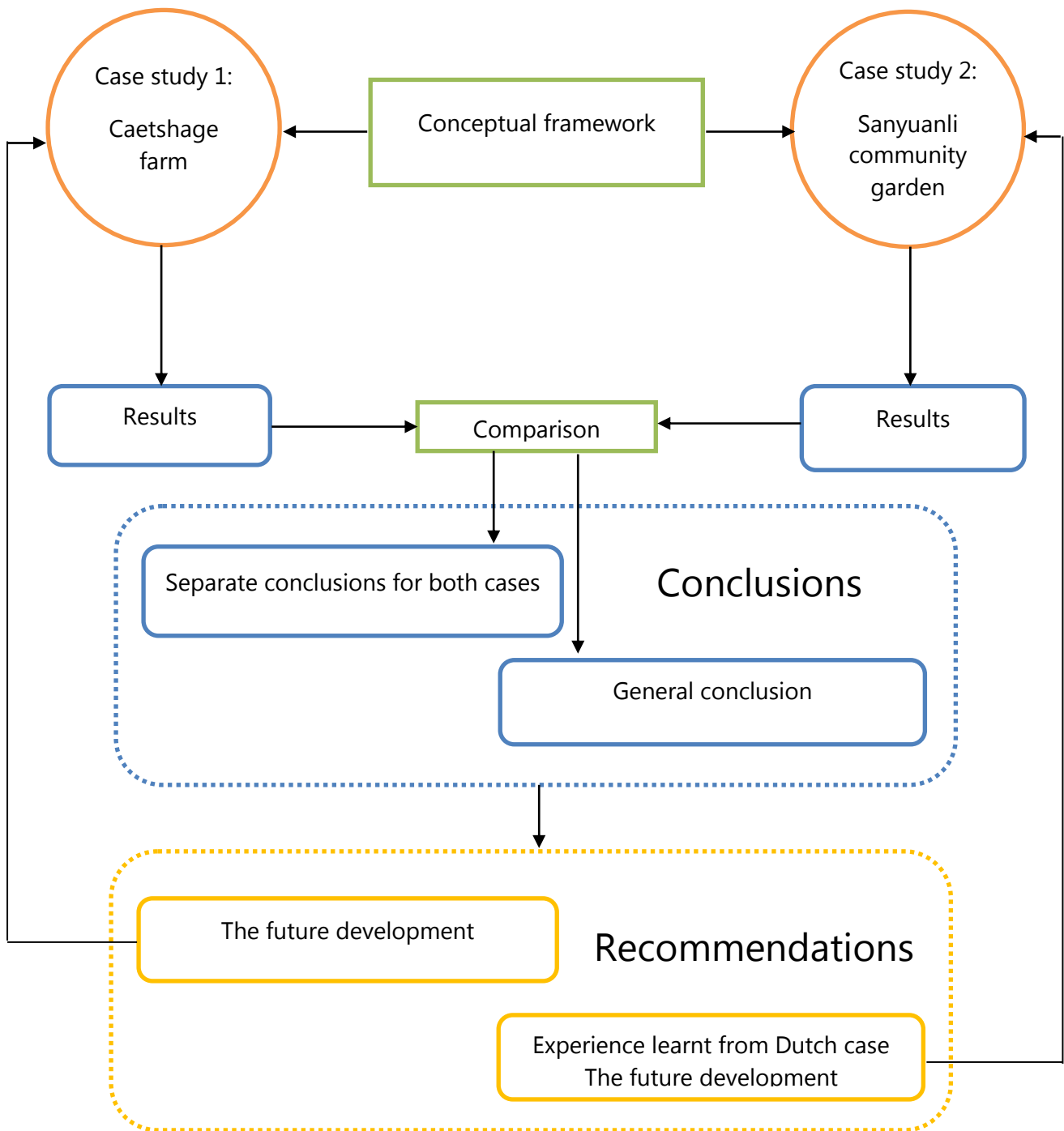


Figure 3.3: Research process

## 3.4 Research Techniques

The research results are derived from several methods as follows:

### **Literature review**

The literature review provides the theoretical foundation for this thesis. It helps to build the theoretical framework which identifies how to frame the research. The relevant literature and articles will focus on the concepts of 'community gardens', 'urban farms', 'local food system' and 'local sustainability'. Thus, a conceptual framework of how urban agriculture practices influence local sustainability can be formulated.

### **Interviews**

In this research, semi-structured interviews are used for two reasons. First, it can help interviewees to express their true feelings and opinions. Second, based on their different answers of previous questions, researcher can improvise and follow a line of reasoning to elicit other findings.

When interviews are the main resource for case study research, interviewees have to be select from relevant stakeholders (Yin, 2009). In the case of Caetshage farm, two main interviewees were selected. The first interviewee (Numbered as 1) is one of the member of residents' foundation living in Eva-Lanxmeer. And the other interviewees (Numbered as 2) are the Caetshage couple farmers. They are responsible for the development of Caetshage farm including all kinds of field and business works. Other support interviewees were conducted with residents who were met whilst collecting the questionnaires.

Table 3.1: The list of interviewees in Caetshage farm

| Name of Interviewees | Occupation   |
|----------------------|--|
| Interviewee 1        | Contact of residents' foundation                     |
| Interviewee 2        | Farmers  |
|                      | Random local residents on responding questionnaires. |

In the case of Sanyuanli community garden, three interviewees are selected. The first interviewee (Numbered as 3) is the initiator of the project, who came from France to bring the community garden idea in Beijing. The second interviewee (Numbered as 4) is the co-initiator and also the trainer of this project, who is also from France. The last one is a staff of local government, who works in the Zuojiazhuang local government and approved Sanyuanli community garden project (Numbered as 5). During the collection of the questionnaires, several short conversations happened with residents to find their opinions about the project.

Table 3.2 The list of interviewees in Sanyuanli community garden

| Number of Interviewees | Occupation  |
|------------------------|---|
| Interviewee 3          | Project initiator. (member of JEFC Green committee) |

|               |   |
|---------------|---|
| Interviewee 4 | Co-initiator, trainer. (member of JEFC Green committee) |
| Interviewee 5 | Staff of local government                               |
|               | Random local residents on responding questionnaires.    |

### **Questionnaires**

Questionnaires functioned only as supporting evidence for the interviews. They also provided the triangulation verification of the research to increase the research validity. As an alternative resource, residents' answers to the same questions could give greater comparative value. One questionnaire was designed to be applied in both cases.

The questionnaires were targeted at the residents living in the communities. Two groups of respondents are identified when collecting questionnaires. The first group were the residents who are currently part of urban agricultural practices to see their satisfaction with such forms of urban agriculture. The second group of respondents were the residents who are not involved in the current urban agricultural activities in the rest of the city. Their answer to the questionnaires can be analysed to see the potential for developing urban agriculture practices.

The collection of questionnaires is achieved through both an online survey and by hand. For the Dutch case, 33 questionnaires are collected, and for the Chinese case, 29 samples are gathered.

### **Secondary data**

There are two purposes for using secondary data. On the one hand, inevitably, every study has missing information, secondary data can help to fill in the gap. On the other hand, organizing and reading relevant documents and articles can also increase the research validity because the use of historical materials can determine the development of urban agriculture practices<sup>1</sup>.

## **3.5 Research Validity**

As in the Yin's book stated, a research design is supposed to represent a logical set of statements, When using case studies, four validity should be referred to: construct validity, internal validity and external validity (Yin, 2009). As this is an exploratory research, the internal validity could not take into consideration (Yin, 2009).

---

<sup>1</sup> Research limitations:

- i. Due to the time limitation, personal resources and personal limitations such as inherent knowledge, the exploration contained within this research may lack depth in presenting the facts.
- ii. To determine the impacts of an urban agriculture practices on local sustainability research should use multiple case studies to determine the general rules. By taking each independently, the result of each case in this research is inevitably unilateral on some level.



The construct validity normally indicate the operational measures for the concepts (Yin, 2009). One way to verify the construct validity of data is to have a triangulation verification to encourage convergent lines of inquiry (Kumar, 2014). Triangulation verification means to use multi-resource, multi-methods and multi-respondents, which the data could verify the validity with each other. In this research, the main information comes from interviews with relevant stakeholders, but questionnaires and secondary data as support resources are also able to have a cross investigation to raise the construct validity of the research.

The external validity is to ensure that the research can be generalizable beyond the immediate case study (Yin, 2009). In another word, external validity is that the research conclusions not only fit for the cases in the study but also can be applied in other normal cases. In this thesis research, two cases with different context and conditions are selected, a conceptual framework replication is applied. It shows the external validity of the research, especially on the conceptual framework level, is surely can be applied not only limited in a single case study.



## 4. Case study in The Netherlands



This chapter displays the sustainability of urban agriculture practices in Caetshage farm in Culemborg. The first part demonstrates the general local resources and the brief history of the birth of Caetshage farm. The second part is described the substantive sustainability of the farm from the indicators that listed from Literature Review. These aspects provide a holistic view of the performances of urban farm in local food system. At last, the third part shows the stakeholder analysis to reveal the involved stakeholders and their relationships in the development of the urban farm.

## 4.1 The Local Context

Occupying about 31 km<sup>2</sup>, Culemborg is a city containing approximately 27500 populations. According to the latest data, it is a dense city with more than 900 inhabitants per km<sup>2</sup>, and people are mostly living inside the residents' area of the city<sup>2</sup>. There are plenty of farm lands surrounding the residents' areas. Located in the south bank of the river Lek, the city has



Figure 4.1: The administrative area of Culemborg city

<sup>2</sup> <https://nl.wikipedia.org/wiki/Culemborg>

enough water resources. With around 20 km straight distance from Utrecht, one and the only rail way running across the city from north to south. As well as from the west to east, the national main road of N320 goes through the city.

With the support of enough water resources, broad farm lands, convenient transportation and plenty of residents, Caetshage farm has assimilated these local resources advantages, and developed smoothly within a decade. Figure 4.1 is the map showing the administrative boundary of the city, as well as the general land use of the city.

Caetshage farm is a small farm, setting in the centre of residents' area. The red dot in the Figure 4.1 shows the exact location of the farm. Caetshage farm was started along with the Eva-Lanxmeer neighbourhood project around 2007. Before that time, about two decades ago, the area was in the charge of private owners. They provided the opportunities to the residents in participating the farming activities in community garden of 500 m<sup>2</sup>. At the beginning of 21<sup>st</sup> century, the local government decided to take back the ownership of this piece of land. However, it was out of use as well as the surrounding areas for few years, but it was listed on the development schedule by the municipality. Till the year of 2007, with the establishment of Eva-Lanxmeer residents' area, as well as to meet the requests of local food from local residents, the municipality decided to construct the 5 ha into a small urban farm, which is intended to promote the urban sustainable development.

Since then, Caetshage farm began the development process. During the last eight years, the farm started from scratch to a popular urban farm in the Netherlands. The land area of the farm is about 5 ha in total, only 2 ha of which is used for the food production, and the rest 3 ha is in a using for the landscape as a local park. Apart from the development of the farm land, the other facilities such as barn and houses have been constructed to meet the requirements of daily activities of urban agriculture.

## 4.2 Substantive Sustainability

### 4.2.1 Environmental health

#### ***The demanded resources***

Energy is one of the most important sectors in running the farm. It provides the essential supports to the food production on the farm. The energy resources not only limited in natural energies which can be absorbed by plants directly, but the converted energies, such as gases, electricity, and heats can also be used for supporting the food production and food storage. Apart from the energies, other resources such as water and fertilizers are also the necessity in the food production. As the essential resource for the plants growing, water has an irreplaceable position. The resources and the treatment of water indicate the direction for managing and developing a farm. Meanwhile, the requirements of fertilizers, which provide the necessary nutrition for the plants growing, play a significant role in the agriculture productions. It mainly discusses the Caetshage farm from the energies, water resources and wastes concerning on the environmental aspect.

#### *a. The supply of converted energies*



The converted energies are mainly required in the indoor productions (greenhouses). To have a steady food production in the greenhouses, it normally demands a stable temperature environment. Two approaches of heating up the greenhouse ambient is applied. One is the greenhouse naturally absorb the sunlight heating up the internal ambient. The other way is to use heating infrastructures to warm up the internal temperature.

All of the greenhouses in Caetshage farm are in simple structures – with walls and roofs made by transparent plastic materials or glasses (see Figure 4.2). These materials keep the internal ambient in the greenhouse a regulated climatic condition for plants growing. From the field investigation, it is found out that there are no heating pipes installed. Based on the explanation of the Residents' Foundation Member Interviewee 1, the temperature of the greenhouses fully depends on the synergy of the direct sunlight and the GHG (greenhouse gas) emitted by the plants within the house. Two reasons are explained for not installing heating up pipes. One is the farm lacks financial support to construct correspond facilities. The other reason is the heat infrastructures in the neighbourhood cannot support the heat demand in the greenhouse. As the farm is constructed as an affiliated area to Eva-Lanxmeer, the energies are provided by the neighbourhood itself. However, from current situation, the neighbourhood could not fully afford to the amount of farm and the neighbourhood.



Figure 4.2: The greenhouses on Caetshage farm

However, the lack of heat within the greenhouses did not bring too much concerns for the farmers. According to the farmers who are responsible for the running of Caetshage farm, the production activities in the greenhouses are only responsible for the food supplying in the winter, along with the storage amount in the barn. The barn on the farm is the another main sector of energy consumption. It was established 3 years ago, which is still in a fresh status and under completion. The barn is a multi-functional house which combines the food storage function with other services. The storage room maintains a low temperature to keep the products fresh. The cooling machine used in the storage room entirely relies on the electricity provided by public sector. There are other services such as group meetings, gathering parties,

etc. which requires the use of kitchen and conference room. The energies of gases and heats supporting for the services comes from public sectors as well. Furthermore, there are several small solar panels which have been installed on the roof of the barn, in order to provide extra energies for the precaution use.

#### *b. Water supply*

Water is the other sector that concerns the environmental health closely. The irrigation in Caetshage farm depends on the water providers. The sprinkling irrigation is used as a main method.

However, it is worthwhile to mention that the Caetshage farm does not intentionally harvest rain water for the daily irrigation. It mainly keeps the rainwater harvesting in a natural way. During the rainy season, the rain water is naturally absorbed by the ground, while in the dry season, the water use mainly depends on the fresh tapping water. Explained by the farmers, it is on one hand, currently on the farm, there are not complete technical conditions and not enough space to collect rain water for irrigation. The water resources that used on the farm is considerably simple. On the other hand, the major amount of fresh water is used on the food production field, which takes account of a considerably small percentage of total amount of water demand. The need of rest amount of water for landscape parks is not as frequent as the other, which is mainly relied on the use of rain water.

#### *c. Fertilizer resources*

The fertilizer as the nutrition resources of the plants plays an important role in the growth of plants. However, the use of fertilizers concerns the environment as well as people's health. The overuse of chemical fertilizers would not only harm the soil quality and reduce the food production yield, but also raise the potential of side effects on human's health through the food quality (Cao, Hou, et al., 2011).

According to the farmers, the fertilizers for plants in Caetshage farm comes from two ways. One source is retrieved by composting the organic waste produced from the farm, and the other way is by purchasing from the closed farm land. The composted fertilizers can contribute about 20 tons each year, which accounts for 1/3 of the total amount. The fertilizers are applied to the non-production fields such as the grass lands for landscape function. For the rest 2/3 of fertilizers, about 60 tons, are all purchased from the farm lands in Culemborg nearby. These fertilizers are treated meticulously and used to the food production lands, which are able to enhance the soil quality and food quality.

In a word, based on the facts found from the field, the energy resources in Caetshage farm have not been reached to a self-sufficient level. The farm is still limited in a primary stage that mostly relies on the external resources to keep up the food production. The burden that farmers do not focus on developing the energy sectors always lies on the reason of poor soil quality. As quoted the farmers' words:

*"...Soil here is in a poor quality. Without good soil, there will be no proper food productions. So till now, our primary issue is still focusing on the soil quality*



*improvement. We think that the plan on developing the sustainable energy will happen in the next coming five years."*

The focus on the improvement of soil quality has resulted in Caetshage farm a basic way of accessing and using the resources, rather than seeking out alternative resources and solutions locally. However, through the farm resources mostly rely on the external sources, it can be recognized that the farm is intentionally maximize the use of resource they receive.

### **Products quantity and quality**

On Caetshage farm, the food products are diversified. It has reached over 80 kinds of vegetables, more than 40 kinds of fruits and around 20 types of ornamental flowers, as well as so far approximately 10 different kinds of livestock. The farm follows a planned planting calendar about time, amount of the seasonal vegetables and plants should grow. For instance, lettuce as the mostly consumed vegetable, it grows about 23 times a year. While other vegetables like broccoli grows 8 circles a year, and potatoes is only grow once time a year. The farmers make sure that the amount of food production is able to support the residents' amount.

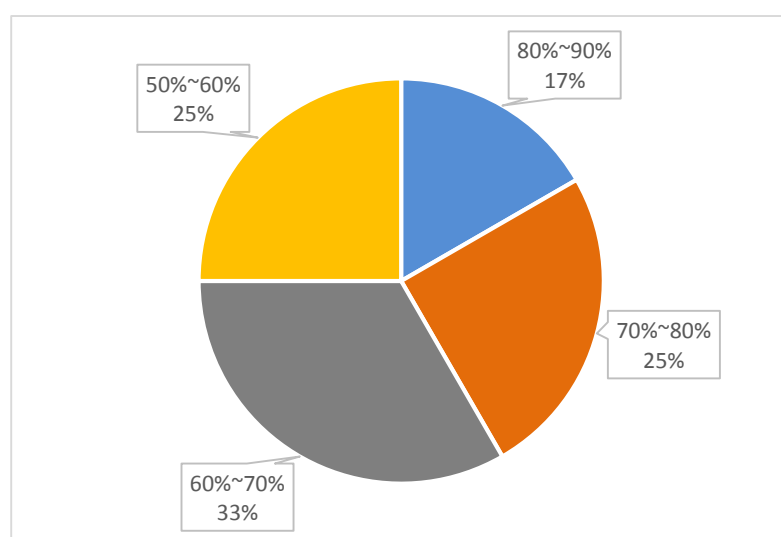


Figure 4.3: The food products from Caetshage farm cover the residents need

The demand amount is indicated by the consumers' responses. According to the statistical result of investigated samples, there are about 55% residents in Eva-Lanxmeer have purchased vegetables from Caetshage farm. Among these people, the food products they purchase from Caetshage farm fulfil their demand amount differently. Figure 4.3 shows the coverage of farm products meet their demand amount. About one fourths of people assume that the Caetshage farm supply their food amount

for 50% -- 60% of the total demand. Another one fourths of people think the coverage of the farm products on their food demand has reached 70% -- 80%. But about one thirds of people agree that the farm could cover around 60%-70% of their daily needs. It can be seen that the food products from Caetshage farm could cover a majority part of people's food demand, but cannot supply them completely.

Besides the Caetshage farm, the rest amount of food demand people purchased from other different resources. Figure 4.4 displays the preferable food resources that people purchase. Over half of the respondents show their preference of Caetshage farm products. The other food resources, supermarkets, grocery stores and open markets are popular as well. Supermakets are the most preferable alternative food resource, which over 38.89% people

express their favourability. Grocery stores and open markets are compared to be less preferred as the other two food resource.

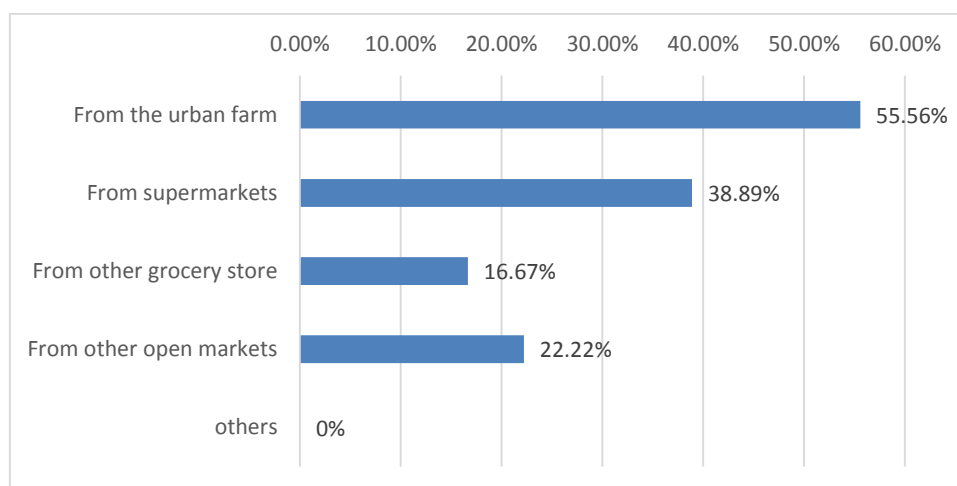


Figure 4.4\*: The preferable food resources around Eva-Lanxmeer area

Residents have their reasons of purchasing food products from their preferable resources. Figure 4.5 shows the reasons that residents like the Caetslage farm mostly. They concerned highly on the freshness and healthiness of the food products. The convenient accessibility is also an important reason, which almost 40% answers agree with it. Apart from these two reasons, the diverse choices and affordable prices are also taken into consideration.

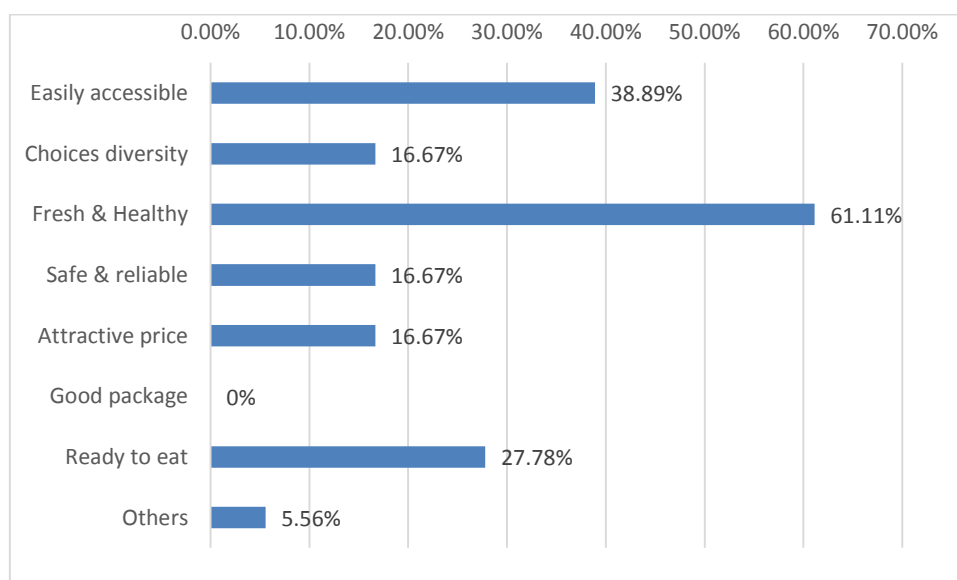


Figure 4.5\*: The reasons that people purchase from their preferable food resources

---

\* Respondents are allowed to have more than one answers which leads to over 100% in total.

Not only provides the farm enough amount of food production for the residents, the freshness and healthiness of the food products shows the quality of their food. The farmers process the food products with four classes to ensure the food quality.

The first class is the products harvested from the field with the best quality, which are directly ready for sale. All the products in this class do not need involving any other processing procedure apart from water cleansing. There is no extra packaging decorated in terms of keeping the freshness of the food products.

The second level of products means that the vegetables or fruits are in a quality that are not good enough for consumption directly, but neither too bad to consider it as a waste yet. This class of vegetables or fruits usually comes from two resources. The first one is, some are the vegetables stored or have stayed for a while after harvested and need to be replaced. The second one is, the quality of some produces in harvesting was already found not good enough. To deal with these products, the farmers treat these vegetables and fruits into processed food products such as pickles and jams. The process needs extra resources and procedures to have a proper treatment which leads to a considerably higher prices of the products. It is a way of maximize the value and increases the efficient use of food products, which can be regarded as an extension of the first class products.

The third classification indicates that the vegetables or fruits are still have some values but are not appropriate for people's consumption. These products are normally the residues from last two levels of products. This group of products are considered as the fodder for the livestock. Moreover, there is a forth level of vegetables and fruits. As the last and the lowest level of products, they are concerned as the residues from last three classifications and has to be treated as organic waste for composting use.

Overall, the Caetshage farm treated the food production strictly, in order to ensure the values of all the food production could have been fully used. The strict quality classification formulates a close nutrition loop of the production by having the reduction of useless waste as much as possible. Residents also have the same consensus of the food quality, as fresh and healthy is the reason of preference among residents. However, there is also a deficiency on the quantity of food products that the amount for residents cannot meet the full requirements.

### ***Waste treatment method***

As previously mentioned, about 1/3 of the fertilizers come from the composted organic waste. It comes from the forth level of food productions and other organic wastes which have fully lost the value of utility. Composting is the only way of waste treating method on Caetshage farm. They use the basic Bokashi composting method to take control of the composting smell.

Bokashi composting method is a way that uses a mix of microorganisms to cover food waste to decrease smell. Most practitioners obtain the microorganisms from the product Effective Microorganisms (EM1) first sold in the 1980s. EM1 is mixed with a carbon base (e.g. sawdust

or bran) that it sticks to and a sugar for food (e.g. molasses). The mixture is layered with waste in a sealed container and after a few weeks, removed and buried (Cao, Hou, et al., 2011). To start a proper composting should be separate organic wastes detail and pre-treated with the sickness wastes. A good environmental-friendly composted fertilizer requires a strict pre-treatment and the composting compartment must maintain in a stable temperature around 70 degree and constant moisture level during composting process.

On Caetshage farm, there are three composting compartments. Each of them takes up about 5m by 10m, which three compartments in total occupy 150 m<sup>2</sup> of the farm land. For the farmers, three compartments are used in turn to deal with the wastes yearly. Once the end of products produced, they are thrown into the compartments. However, lack of technical and tools, the treatment of composting is staying in a primary level. There is no pre-treatment step but concentrate all the organic waste together doing composting. The farmers tell that they mostly leave the wastes composting simply, maintaining the composting work for a regular time every year. The composting temperature is controlled around 60 to 70 degrees to make sure no fatal diseases survive. However, it is acknowledged that the quality of composting fertilizers is unpredictable as there is no sure about the nutrition completion, which is not suitable for the growth of vegetables.

Applying the composting organic waste is the final step of forming a nutrition close-loop, but it only. But it is the fact that it has not formulate a self-sufficient yet, the rate of recycle organic waste is 100%, which indicates that the circular metabolism has been carried out in the waste management.

#### 4.2.2 Economic vitality

Caetshage farm has become an independent urban farm that all the resources supported for the development should be found by themselves. Among all the resources, the economic resources are one of the most important sectors. In this section, here mainly displays the financial events including the sources, expenditures and services. The financial development also keeps the diversity identity of the farm. The farmers devoted themselves into the farm are considered as a contractor who take the full responsibility of the farm development.

##### ***Incomes and costs***

Generally speaking, there are three sources to contribute the incomes of Caetshage farm.

The first source, which is also the main source, is the consumption on purchasing the production from the store of Caetshage farm. Consumers consist of different groups, including regular residents, individual guests, institutions, supermarkets and other grocery stores.

The regulars as customers are the residents who living in the Eva-Lanxmeer. As there are over 800 people living there, more than 200 households (approximately 400 people) depends on the food products from the farm. Other individual guests come from the city out of Eva-

Lanxmeer who come and visit now and then. The farm also exports their products to local supermarkets so that more people could get in touch with their products.

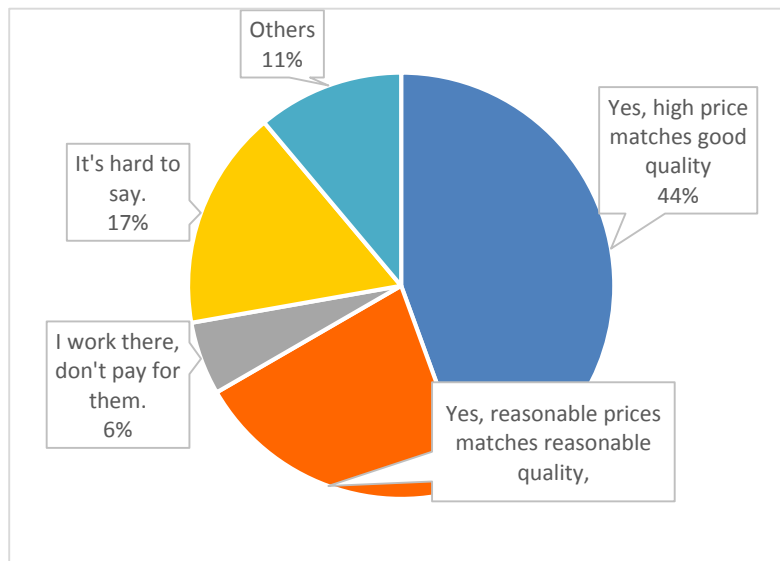


Figure 4.6: Residents' perceptions on the regards of price and products quality

Naturally, as the farm has a stable customer source, the price level is also considered carefully. According to the farmers, the price of the farm products they set mostly follows the market price, which is neither too high to affordable nor too low to lead in a financial loss. Compared with the products in the supermarket and other grocery stores, the farmers believe their products qualities are better and the prices are in a good match with it, which has been approved by customers of Caetshage farm.

Based on the results from the residents' samples of questionnaire (Figure 4.6), over 60% of residents consider the food products from the farm is in a good quality, but it also matches a high price level at the same time. There are also 30% people have their opinions reservation as they do not know well about the price and quality matches properly. The matches of quality and price depend on the time period, as some of them explained. Though, the quality and price has been approved by the residents, more than 40% of them also state their opinions that the farm still have the potential to improve the quality and prices. But residents still prefer to buy vegetables and fruits from the urban farm, because they believe compared with other reasons such as products are ready to eat from supermarkets, the farm can guarantee the products fresh and healthy, which is the most important standard.

The second source is from the service industry. As the farm also focuses on developing the service industry. With the primary schools located around, the farm provides an opportunity for school education. As well as other institutions and groups, they keep a cooperation relationship with the farm in return for some compensation to the farm. For example, a welfare institution which helps the handicap people to receive few fieldwork opportunities on the farm for getting in touch with nature, and in return, they pay for the farm for compensation. Not only cooperate with public interest institutions, the farm also charges for the tour visiting and renting spaces for interested companies or social groups. The service incomes have gradually increased the occupation in the total income amount, which reached about over 1/4 of total incomes now.

The third financial source is from municipality for the maintenance work of landscaping. The park as a part of the farm, it is the farmers' responsibility for keeping the park functioning. However, this part of income only takes up small percentage among the whole farm incomes.

With the support of incomes, the financial expenditures also mainly spend on three aspects, two of which are the largest parts of cost.

The first one is the investments on the food production. It includes the energy consumption and fertilizers import. On one hand, due to the poor soil quality, the farmers invest a relatively large amount of incomes on the soil improvement, e.g. the purchase on good fertilizers and the seeds or seedlings in good qualities. On the other hand, the energy supports for plants storage and the other services also costs high. Thus, there is not enough budgets left for the development a circular system of energy, which is why the farm currently still depends on the external resources mostly. In addition, to save money and to seek for a way of more sustainable self-sufficient circle, the farmers start researching on growing plants from the seeds that harvested by themselves, instead of importing cultivated seedling. Though it will cost a longer period, it is considered as a new trial in the farm development.

The second largest expenditure is spent on the rent of lands and buildings. As the 5 ha of lands belong to the Culemborg municipality, the farmers only have the use right of lands. They are obligated to pay the renting fee of the farm land for the government to continue the farm development.

The third part is used as the private incomes. The farmers as a contractor are in absolute charge and responsibility of all the development work of the farm. The earned incomes not only include the investment on the farm work, but also the farmers' private salary.

Based on the descriptions above, it shows the farm develops concerning variable possibilities. They develop the farm combining with service industry and landscape maintenance rather than simply depend on the food products. Meanwhile, it also exposes a financial deficiency that restricts the development of the farm. The incomes and the costs are currently in a steady balance that implies there is no surplus for the farm constructing other facilities. It limits the sustainable development concerning on the environmental aspect (section 4.2.1).

### **Service scope**

The food delivery as one the important links also plays a role in local food system. Though the urban farm faces to the entire population of Culemborg, the food delivery service is still limited in the area around Caetshage farm. Referred to



Figure 4.7: The Caetshage service scope



the farmers, out of the consideration of delivery cost, they do not have the delivery service often, which is one of the reason that restrict the expansion of the service scope. For the regulars, they come to the farm and pick up their products by themselves, and for the other individual customers, they also help themselves coming and buying products. Delivery only happens when the supermarkets or for the needs of schools. The limited service scope of Caetshage is shown in the yellow circle of Figure 4.7, which is the considerable range of the farm could influence.

### 4.2.3 Social equity

#### **Consumer groups**

Among the customers as mentioned above, they are the residents includes different age groups and social classes.

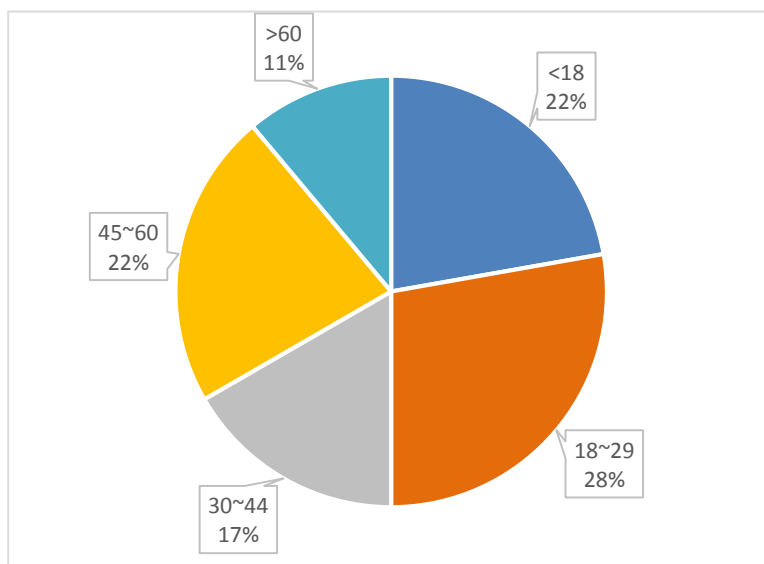


Figure 4.8: The age groups distribution of questionnaires respondents

There are over 30 respondents of customers who shows that they know about the Caetshage farm. All the respondents are randomly collected from website via Eva-Lanxmeer and on the field, e.g. train station, communities, etc.

Different groups of social citizens participate in the questionnaires. About 28% of respondents are young people in the age of 18-29. While the least age group of respondents are senior people over 60 (Figure 4.8). The other respondents lie in the rest age

groups averagely. Among all the questionnaires, it finds out that people in different social classes decide the different quality of products they are buying. Most people purchase in Caetshage farm are middle-class people whose incomes are over 3000 EUR per month at least.

#### **The activities**

Apart from the different social classes



Figure 4.9: The participants on Caetshage farm

of citizens consume the food products from the farm, the activities also attract different social class of people involve in. Caetshage farm is open to all the citizens who intend to participate in the activities in contributing the local food system, which provides people the same opportunity for involving in the development of the farm. For example, citizens in different age groups will help farmers to have food production activities, while the young children and handicap people will help to do the food process, e.g. classifying products into different levels, labelling products of jams, preparing sample products as gifts, etc. Figure 4.9 shows the children and handicap people participate in the Caetshage farm of food processing activities.

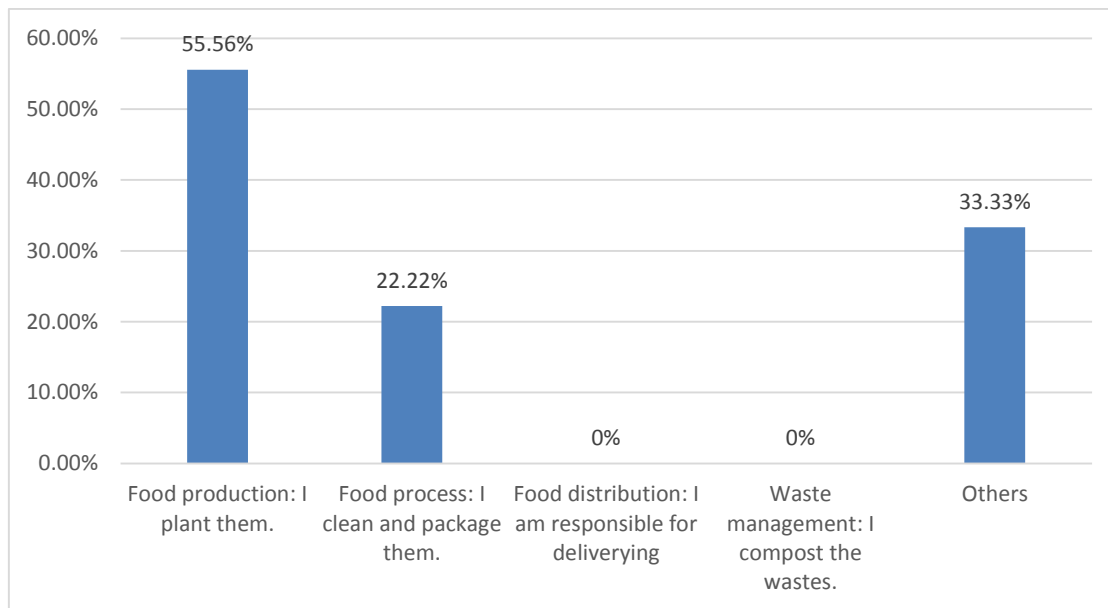


Figure 4.10: The farming activities people participate on Caetshage farm

According to the answers from the respondents, it finds out that the citizens' participation of the activities compared to those who do not participate activities on the farm is in a half-half percentage.

For the half of people who participate in the activities, they normally involve in one or more activities. There are over 55% answers that they involved in the production activities, which is that they help farmers to grow vegetables and fruits. The rest about 22% of people participate in the food process activities, and over 30% of them have other different activities

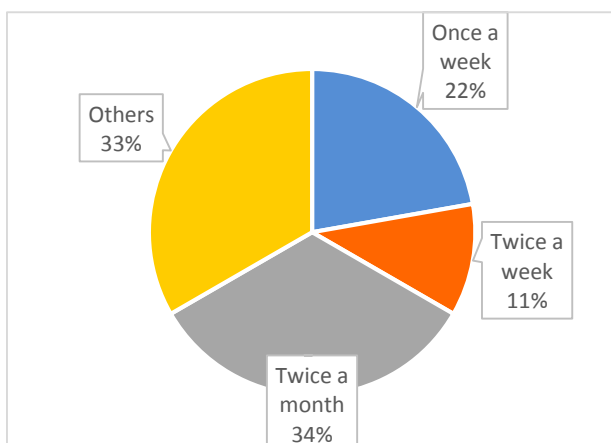


Figure 4.11: The frequency of people participates in farming activities

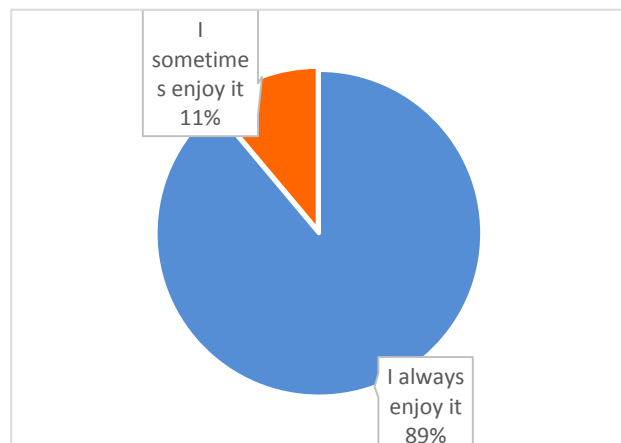


Figure 4.12: People's opinions on participating farming activities

(Figure 4.10).

People have different farming activities frequently. One third of people joins the activities about twice a month, and the other one third of people do not have a certain settled time (Figure 4.11). However, almost all the people, near 90%, who join the activities considers that it is meaningful and they enjoy the activities. And the rest 11% of people enjoy the activities sometimes (Figure 4.12). It shows that Caetshage farm have successfully attracted a number of people participating in the farming activities.

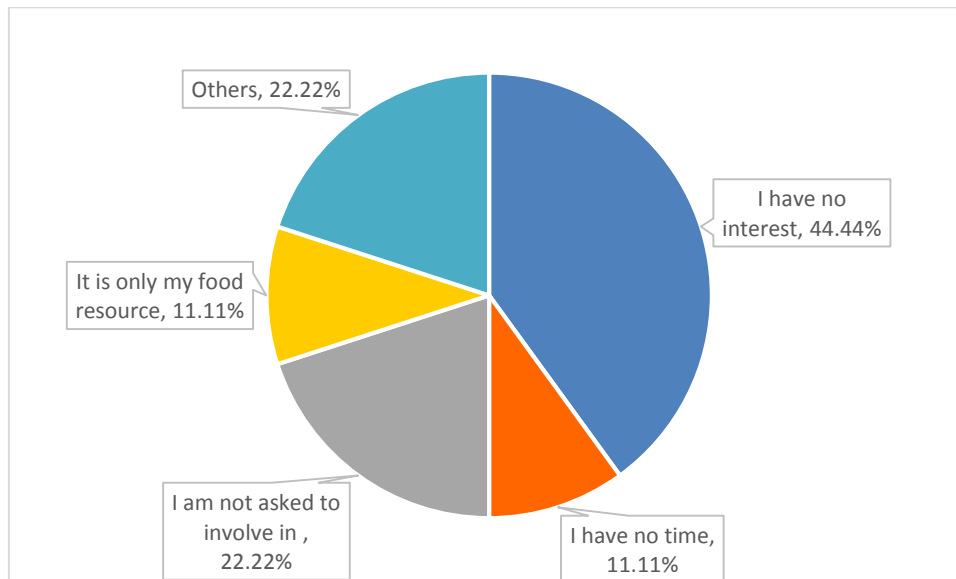


Figure 4.13: The reasons of residents who do not take part in the farm activities

However, for the other half of people who do not participate in the activities, their reasons for not involving activities are that they have no interest, which accounts for over 40% of the total amount; that they do not have enough time and some of them think they are not invited to. This result shows that the farm still need to work on the advertising to attract more local residents to participate the activities.

Generally speaking, residents with different backgrounds are welcomed to join the farming activities and they enjoy the activities overall. It can be seen that the Caetshage farm provides the open opportunities for people to participate in farming activities, which shows the equality on the social aspect.

## 4.3 Procedural Sustainability—Stakeholder Analysis

### 4.3.1 The identification of related stakeholders

During the development of Caetshage farm, different stakeholders have been involved in the entire process. According to Yates, et.al., (2003) the stakeholder analysis starts with the

identification of related stakeholders. Four important sectors have been identified: government, beneficiaries, influencers and providers. About Caetshage farm, from the initiative phase till now, six large groups can be categorized into four sectors within the Culemborg local area.

*Government: The Culemborg local municipality*

Local Culemborg municipality is the owner and the decision maker of the urban farm. The government plays an important role in the entire process. At the initial phase, the government listened to the ideas of different groups of people and weighed the balance of advantages and disadvantages of all the alternatives. And they finally made the decision of developing an urban farm on this location. They help to hire the farmers and seek for the sponsors. According to the farmers, the local municipality helps them apply the subsidies from EU at the beginning, to help them overcome the initial time. The government has extremely high level power, but their interests on the urban farm do not as high as the power.

*Beneficiaries: Local residents / Foundation*

Local residents are the most beneficiaries in the entire process. The development of Caetshage farm is to provide more local production to the residents. Thus, local residents as the main subject group, their opinions and suggestions are the most important ones need to refer.

Foundation is the other beneficiary in the entire process. The foundation represents the interests of residents living in Eva-Lanxmeer. And they keep a cooperation with the farm as well.

So in a word, the beneficiaries are the group of stakeholders who have a strong interest on the development of urban farm, but they do not have power to manipulate the project.

*Influencers: Public interest groups / other commercial stakeholders*

Public interest groups include the primary schools and institution who make full use of the urban farm. The public interest groups mainly work with the farm from the service perspective.

And the other stakeholders refer to the local supermarkets and other stores. They keep a business cooperation with the farmers, so that both of them could earn their economic profits.

Generally speaking, the influencers plays their role in all the stakeholders to gain the benefits. The mutual cooperation achieves a win-win model to expand the sustainable economic circle. Their power in developing the urban farm is relatively low, and but they do have a lot interest in the development process.

*Providers: Farmers.*

Farmers as the most important stakeholder plays an important and unreplaceable role in the urban farm. They are chargers who are responsible for all the production activities, process activities, selling the products, organizing educational events, touring the visitors, negotiating business, etc. The development of Caetshage farm cannot live without the farmers' works. As the one and only provider in the centre of Culemborg, farmers holds the local urban agriculture resources but burden a lot of pressures from the stakeholders of the other three sectors as well. They are in an absolute high power and high interest box.

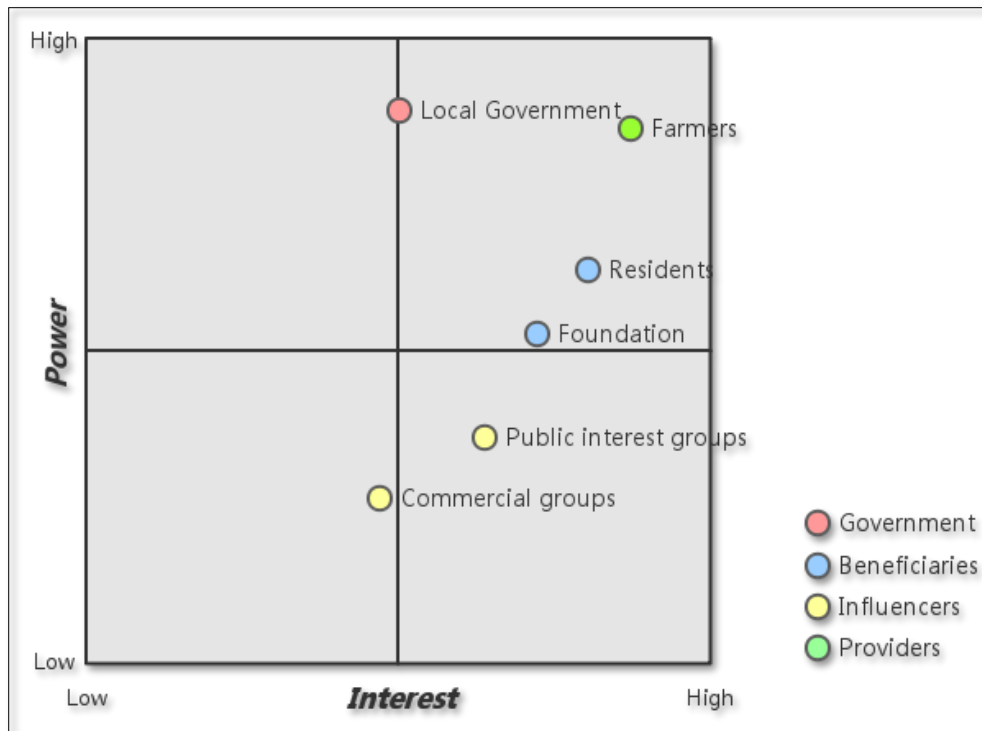


Figure 4.14: The Stakeholders power-interest matrix of Caetshage farm

### 4.3.2 The interconnections between stakeholders

Different stakeholders have different functions in any project. And the stakeholders' interconnections stimulate the development of project (Connelly, Markey, et al., 2011). Caetshage farm as a project, its development cannot live without the cooperation between different sectors of stakeholder. Based on the information collected from fieldwork, the cooperation that mostly affect the development of the farm can be concluded into three categories.

#### a. The cooperation between farmers and the local government

The farmers' cooperation with government is tight and close.

The government meet with the farmers normally twice a year. The meetings help government to keep up the pace of development of urban farm, in order to knowing the development goals and the obstacles to prepare for certain events. Supervise and guide the development of the urban farm towards the planning objective enhance the relationship between them.

The farmers consider themselves to develop a diversity farm, which not only embodied on the products, but also the involved stakeholders, the different cooperation models and so on.

#### *b. The cooperation models*

As service business has become one of the most important income method, two cooperation models has been carried out. One is the non-profit cooperation with schools and handicap institutions, the other one is commercial cooperation model.

The non-profit cooperation model is that the farmers collaborate with local primary schools and welfare institutes. The cooperation with schools are executed regularly. Every Thursday, primary schools will bring students studying the knowledge about nature on the farm. They also join the activities of production and processing. In return, the farmers provide amount of products to school. The cooperation with handicap people is organized by welfare institutes. The institutes pay for the farmers to provide handicap people with working opportunities. The amount of money the institutes cost is compensated from governments or the handicap people's parents.

And the other is a commercial business model. The farmers send their products to local supermarket or grocery stores. The cooperation could provide several advantages. First, speaking from the farmers on one hand, can promote their products through the sale stores and raise their reputations. On the other hand, it is another income source for the farmers. Second, regarding from the local stores, the products from the farm is an alternative import source.

#### *c. The cooperation with residents*

The farm is open for the residents. They can go to the farm and park freely, but within a particular time limitation. The citizens not only could involve in the activities equally, but they could also take part in the other activities on the condition of several rules. Due to the consideration for the workload of the farm and keeping the environment clean, the farmers have a set of rules for people who intend to hold activities e.g. ceremony, group parties, visiting issues, etc. on the farm. For example, the park as a part of the farm land, it is open for all the citizens to have a leisure time. But there are rules for the opening time for citizens in order to preventing the loss of livestock. If someone intends to hold a private party, it is not allowed either. Only the group requisition is considered.

The residents also provide their feedback to the farmers, either on the development of the farm, or on the products from the farm. For example, based on the answers from questionnaires, most of the residents have strong suggestions that the farm and the farm stores should last for a longer time. Because some of the residents consider that time confliction between the farm opening time and their working period has caused them losing plenty of opportunities to get in touch with the nature or buying daily fresh fruits and vegetables.





## 5. Case Study in China

This chapter is mainly discussed about the Sanyuanli community case in Beijing. Similarly, it discussed first from the local resources, introducing the location and surrounding environment. Then, the following sections are demonstrated the sustainability from the referred indicators of environmental, economic and social perspective of view, along with stakeholder analysis.

## 5.1 The Local Context

Sanyuanli community is located in the southeast of 3<sup>rd</sup> Ring road, which is one of the bustling area of the city. Speaking from administrative level, it is one of nine sub residents community of Zuojiashuang (左家庄). Zuojiashuang is the basic government body that administrates nine communities within an area about 4.17 km<sup>2</sup>, holding with more than 67000 inhabitants. The density has reached over 16000 people per km<sup>2</sup>. Sanyuanli community as one of the oldest neighborhood, consisting of different age groups of people and most of them are native citizens in Beijing. The aged people take a great percentage in this community and there is a kindergarten and a primary school nearby.

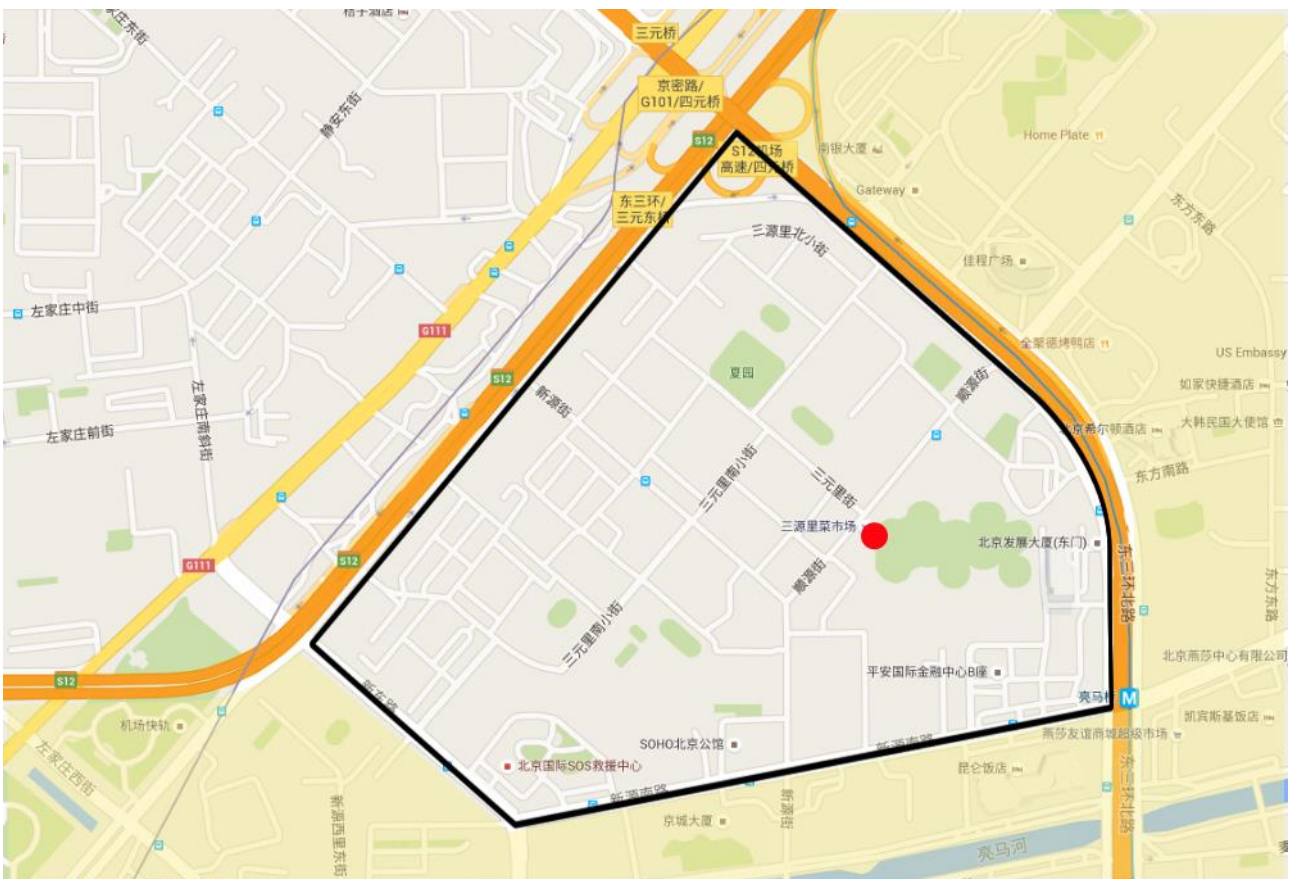


Figure 5.1: The administrative area of Sanyuanli

The Sanyuanli community sets with two main roads – the 3<sup>rd</sup> ring road and airport express road (orange line in Figure 5.1). There is also a metro line running through the area, which

provide a convenient transportation condition. Outside the area, the lands are under business uses as different international hotels, offices and squares are surrounded.

Within the Sanyuanli community, there is a big market store where provides food resources. The neighbourhood is old constructed in 1970s when the planning of the land use is not efficient. There are large and scattered unused patches of land. Sanyuanli community garden is developed based on the idea of making full use of these unused area and try to promot the movement of community garden as the new urban agriculture practice needed in China.

The Sanyuanli community garden is initiated by JCEF (*Jeune Chambre économique française*<sup>3</sup>). JCEF is a French youth organization that conduct movements on global scale. In the case of Sanyuanli community garden, a group of young people from JCEF Green Commission consider the Sanyuanli community is a perfect location due to the geo location, resources, and the enthusiasm of residents.

Sanyuanli community garden is an official and registered project in Zuojiashuang government offices. It is a government procurement projects, which is referred to the procurement of goods or services on behalf of the public sector (Han, 2010). Sanyuanli community garden is a project that initiator commences with a responsibility for the operation and implementation of the project.

## 5.2 Substantive Sustainability

### 5.2.1 Environmental sustainability

#### ***Energy resources***

##### *a. The supply of energies*

Sanyuanli community garden selected a quiet place in the whole residents' area. The community is an old neighbourhood that there are unused field. It is a waste of land that leave these fields doing nothing. To improve the efficient of land use, the community garden occupies the lands by using seedling plots to raise the plants. Due to administrative reasons, it cannot be changed for planting directly from ground. The community garden is set in the open space where there are no greenhouses established. Thus, the energy is mostly concerned receiving from sunlight. (Figure 5.2 shows the appearances of Sanyuanli community garden.)

Due to the community garden is located in front of the residents' buildings, the distance of the buildings and the height of buildings decide the sunlight that gardens can receive. As the initiator mentioned in the interview that they gradually find out the deficiency of the location. It lacks of sunlight because the location is not good enough that the shadows of the buildings and arbours block the sunlight to provide for the plants and the area is constantly in a wet condition, which furtherly has influences on the growth of plants.

---

<sup>3</sup> <http://www.jcef.fr/index.aspx>





Figure 5.2: Sanyuanli Community garden actual appearance

#### *b. water resource*

The water resource is the other important sector. The water resources for the community garden are from three ways.

The first way, which is also the main resource, comes from public pipes. In the Sanyuanli community, there is a property management agency that is responsible for the maintenance of public green space. They normally use the public pipes to irrigate the green space. The community garden has taken the advantage of this using the public pipes to water the plants, as it is a way of avoiding the charge. It has become the main resource to water the community garden.

The second resource is from the rain harvest water. The summer in Beijing has plenty of rain water. But due to the limitations of infrastructures in the community, the project initiators simply guided the residents use bins and barrels to harvest water for the agriculture use.

The third resource is from the residents. This part of water resource does not account for the main supplier for the plants.

#### *c. The fertilizer resource*

The fertilizers are also the responsibility of the participants. Currently, at the beginning phase, the fertilizers are bought from the markets, with the money supplied by the sponsors. To start the projects and have a function of training residents, the supply of fertilizers could help the first batch of products. It helps residents to know more about the use of fertilizers.

Part of fertilizers now are also provided by residents themselves. They compost the organic waste by conducting Bokashi composting method. With accessible bins and ferments, the residents are able to compost the fertilizers in the community garden and use it for the plants they grow.

### **Products quality and quantity**

Residents are satisfied by the products they produced by themselves. Due to the plot plant, the soil is not as thick as natural ground. The community garden cannot grow deep-rooted plants, only shallow-rooted plant can survive, such as carrots, onions, radish, spinach, coriander, rapeseed, Chinese chives and string beans.

The quality of the products fully depends on the energy and nutrition the plants receive. From the respondents of residents, majority of them, over 80%, confirm that the quality of products from community gardens are better than the products in other selling sectors, such as supermarkets, and grocery stores (Figure 5.3). Only few people, around 17% think there is not big differences between them.

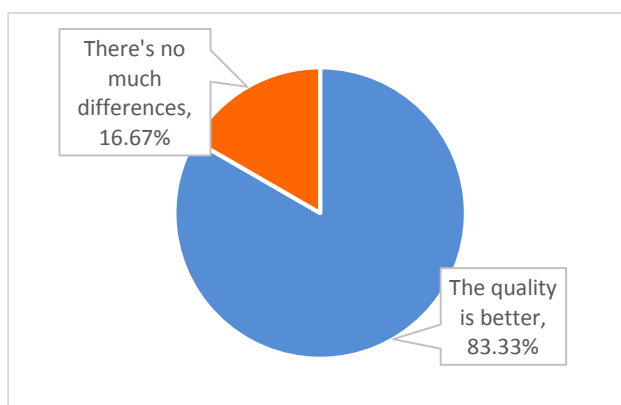


Figure 5.3: Residents' perception on the products from community garden

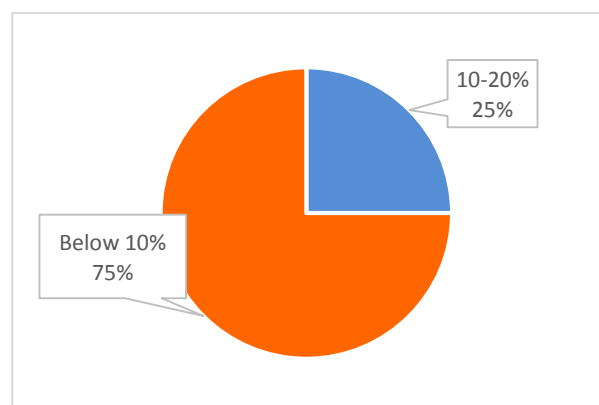


Figure 5.4: The quantity coverage of residents' needs

However, the quantity of the community garden products is limited (Figure 5.4). The quantity of products only covers 20% of residents' needs at most. About 75% of participants estimated that the production amount could only cover 10%, the rest 25% of people think it could fulfil their demands 10%~20%. All the participants still depend on the other food resources like supermarkets, and open markets. Residents admitted that the amount of products from community garden could not use as a main course, but only use as some side dishes.

When asked about the preferred food resources, most respondents choose the products from the community garden. Apart from this, the market in Sanyuanli is also a popular food resource in the neighbourhood (Figure 5.5). Despite of the deficiency of insufficient amount, the products from community garden is most favoured among all the food resources. It is because people value the safety and reliability of food products, as the food security is one of the most concerned issues currently in China. About half of the people also consider the importance of accessibility, as the reason of preferring community garden food products (Figure 5.6).

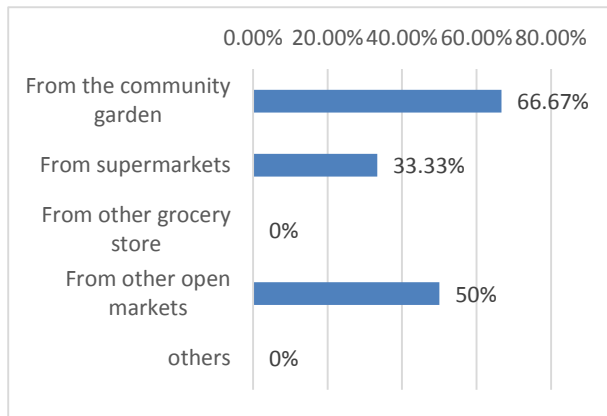


Figure 5.5: The preferred food resources in Sanyuanli neighbourhood

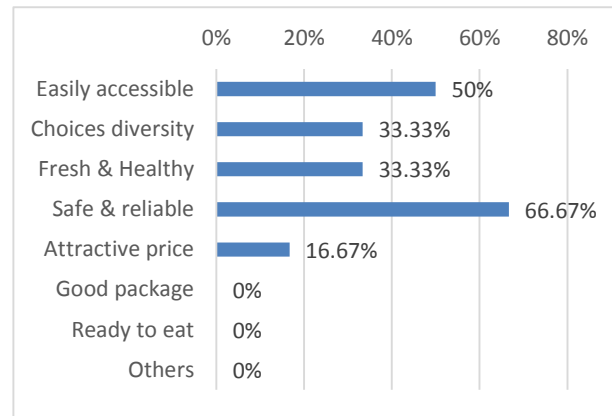


Figure 5.6: The reasons that people purchase from their preferable food resources

### **Waste treatment method**

The residents are also responsible for the composting of the organic waste. But in Sanyuanli community garden, without enough land space, the composting is mostly done by residents at home. And the composting products are not used as fertilizers but as enzyme, which is mainly for the utility of dish washing and odour cleaning. According to the trainers, the residents suggest this way of composting due to the reason of efficiency and easy to do. The process is quite simple. First they find and clean some glass bottles. And then fill in water and mix with brown sugar properly. The final step is to put in the organic waste and close the bottle tightly. The ratio of composting materials: water, sugar and organic waste for enzyme is 10:1:3. And it must leave some air in the bottle. The composting may last around 3 months. During the period, it needs to release the gases slowly once a while. This way not only can treat the waste efficiently but also it won't cause any composting smell. And this method does not require the separation of organic waste as it is suitable for any kinds of organic waste.

Overall, the energy resources for food production is not in a full circular loop yet. The conditions for the current development of the community garden are simple and basic, which the material flow is going simply and directly. It currently could not form a circular metabolism, but the material flows are in a low impact as much as possible.

## **5.2.2 Economic vitality**

### **Cost and benefit**

At the start of the project, Sanyuanli community garden received the financial support from sponsors. And most of the money is used for purchasing the soils, planting plots, seeds and fertilizers. However, the products produced from the community garden do not for sale. They consume by themselves or give to other neighbours. Thus, the incomes for that community garden is very limited after the cutting off of the sponsors at the beginning phase. But to



keep running the community garden, the financial demands come from the crowd funding which people participate in the community garden. They will keep up the demands of fertilizers and seeds, which accounts for the most cost. The economic perspective of view, the community garden does not form into a recycled loop, but a simple linear path with crowd funding to cost. The community garden currently is too small to revenue from it, which has a great potential to develop from the economic aspect.

However, the community garden is non-profit project and its purpose is to start such community garden movement in China. Because of this, the community garden does not have economic benefits but provide a new model for the other communities to start the urban agriculture.

### Service scope

The very limited residents in the communities, mainly the people who participated in the community garden project. As reviewed by the citizens, the community garden is only for their use. The products are also only for the people who grow them. When there is an extra amount, they will give to other neighbours but the service scope will not exceed the boundary of community.



Figure 5.7: Service scope of Sanyuanli community garden

From Figure 5.7, the solid circle is where the food products of the community garden serve for, while the dashed circle indicates the area of the community garden influences. It can be seen that the food products are served in the limited area of neighbourhood while the influence of the community garden could spread further till the surrounded primary school and markets.

Overall, from the economic perspective of view, the community garden could only feed up the people who are participate in the community garden. Strictly speaking, the food process and food delivery phases do not exist in community garden, as the project is limited in the small area of Sanyuanli neighbourhood. The economic financial cycle has not been formulated yet because there are no financial benefits come into the community. However, such urban agriculture movement could have a social influence. Because there is a plenty of lands unused, the potential for the development of such community garden could have a promising economic benefits in the future.

### 5.2.3 Social equity

#### **Consumer groups**

As demonstrated above, the consumers are limited in the participants of Sanyuanli community garden. After discussed with the local residents and learnt from the questionnaire samples, it is shown that all the involved residents are workers aging around 35 to 55. Almost all the participants at least obtain a Bachelor degree, and three of them have the Master degree. The group of people also earn the income averagely 6000 RMB per month<sup>4</sup> (Figure 5.8). In 2015, the average

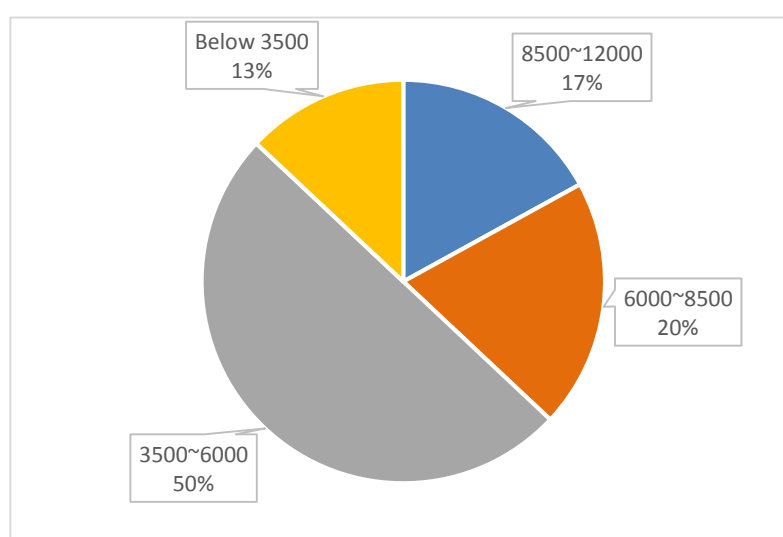


Figure 5.8: The income level of consumers in Sanyuanli community garden

income in Beijing is 7086 RMB per month<sup>5</sup>. It can be seen that the participants' income level in Sanyuanli community garden is generally lower than the average level of Beijing.

#### **The activities**

The activities that happen in Sanyuanli community garden are open to residents. Training activities are open to all the residents. Those people who are interested in how the plants are growing or how to start their own planting could have signed for the training class. These always attracts more than 30 residents attending training sessions at one time. Sometimes the children from primary school also come to visit and learn from the community garden. The purpose of training sessions and education activities is to raise residents' awareness of

<sup>4</sup> 6000 RMB is approximately 800 EUR, under the calculation of EUR/RMB currency exchange 1:7.5.

<sup>5</sup> Source: [http://www.bjstats.gov.cn/zxfb/201606/t20160603\\_351994.html](http://www.bjstats.gov.cn/zxfb/201606/t20160603_351994.html) . Approximately 945 EUR.

this form of urban agriculture practice and start the urban agriculture movement in the community scales.

However, compared with training and education activities, the local food system activities that happen in the community garden are not in an equal chance. It is not socially equal for the residents who participate the activities in local food system. They have to sign up for whether to participate in the community garden at the beginning. And once the participants are selected, they are the people who are daily responsible for running and maintaining the community garden. If other people would like to join the work of community garden, the person has to be approved by the other participants. Thus, the access to the community garden activities is not equal enough, which limits the opportunities for most residents who are interested in joining the activities.

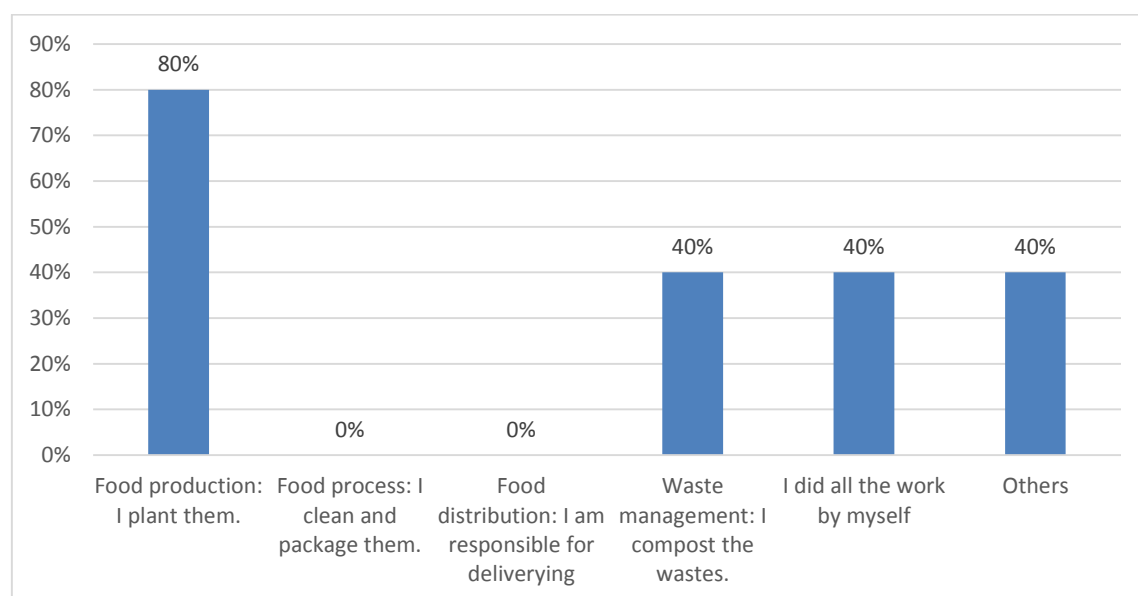


Figure 5.9\*: The farming activities people participate in Sanyuanli community garden

For the participants, they take the whole responsibilities of community garden together. There will be a detailed to do list for the participants and each of the households will take turns of all the works. For example, from the interview of a resident, the residents explain that they will contact with each other and decide who and what to take care of the community garden. Normally, there will be one or two persons every other day to take care of the plants. Among all the participants, most of them have the farming activities of food production (Figure 5.9). While there are few people having other farming activities, waste management, etc. as well.

According to the questionnaire samples, the frequency of participants having the farming activities is different. About 40% of people have the farming activities in the community garden once a week, and the others goes to the community garden several times a month. And another 20% people do not have a fixed time (Figure 5.10). However, all the people who

\* Respondents are allowed to have more than one answers which leads to over 100% in total.

participate in the community garden enjoy themselves in the farming activities (Figure 5.11). 60% of them expressed their opinions of enjoyments constantly while the rest 40% of them enjoys sometimes.

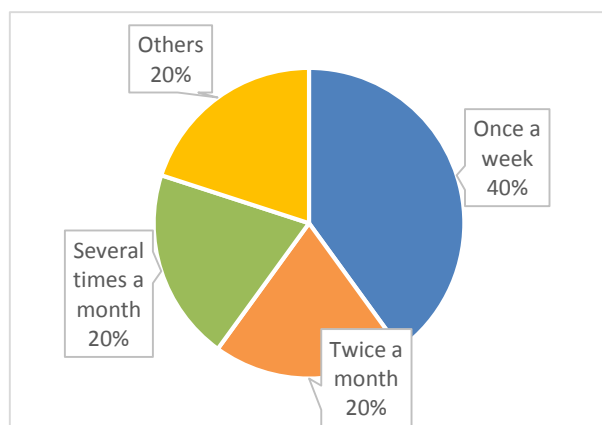


Figure 5.10: The frequency of people participates in farming activities

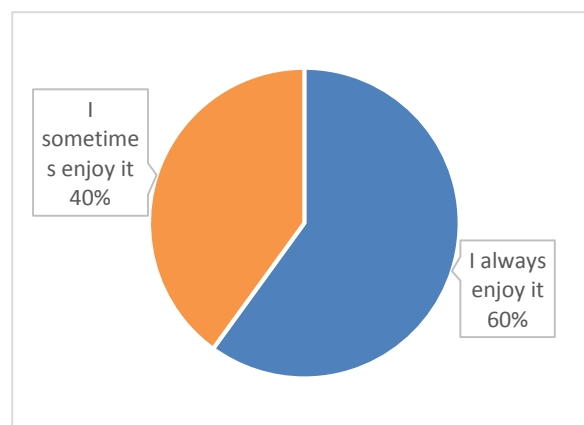


Figure 5.11: People's opinions on participating farming activities

Overall, the social equity is limited in the training some education activities. Not all the residents could take part in the farming activities in the community garden. The participants who take part in the farming activities need to be signed up for it. The farming activities mainly concentrated in the food production, which participants quite enjoy of it.

## 5.3 Procedural Sustainability—Stakeholder Analysis

### 5.3.1 The related stakeholders

Procedural sustainability is discussed from stakeholder analysis to reveal the relationship of stakeholders. Normally, the stakeholders still can be examined from the four sectors, namely, government, beneficiaries, providers and influencers. However, in this project, there are no specific influencers involved from other fields as the initiators and government have considered the feasibility of the project from professional and practical perspectives.

#### *Government*

The local government is Zuojiashuang government, which is the basic branch of Beijing government. Its purpose is to conduct their power by approving development projects. Local government is mainly responsible for the administration of community projects, in order to investigate to ascertain whether these proposed projects are legal and suitable for development within Chinese context. They have the ultimate power of approving or aborting a project. In starting such a community garden project in Sanyuanli, Zuojiashuang government has revealed the most interest in practising urban agriculture, as it is a new way

of combining urban greening and infrastructure at the community level. The government plays the role of approval in order to find out whether the project is appropriate and legal for urban development.

*Beneficiaries: Residents / Public sector primary schools*

The residents are the best beneficiaries among all the stakeholders. It also benefits the public interest sectors such as the children in primary schools. The community garden initiates the movement for urban agriculture in community scale. They could directly receive the benefits either from the education or from substantive level. However, though their opinions of such projects will be considered, they are in a passive position to express themselves. Thus, the residents do not have enough high power among all the stakeholders but they are highly interested.

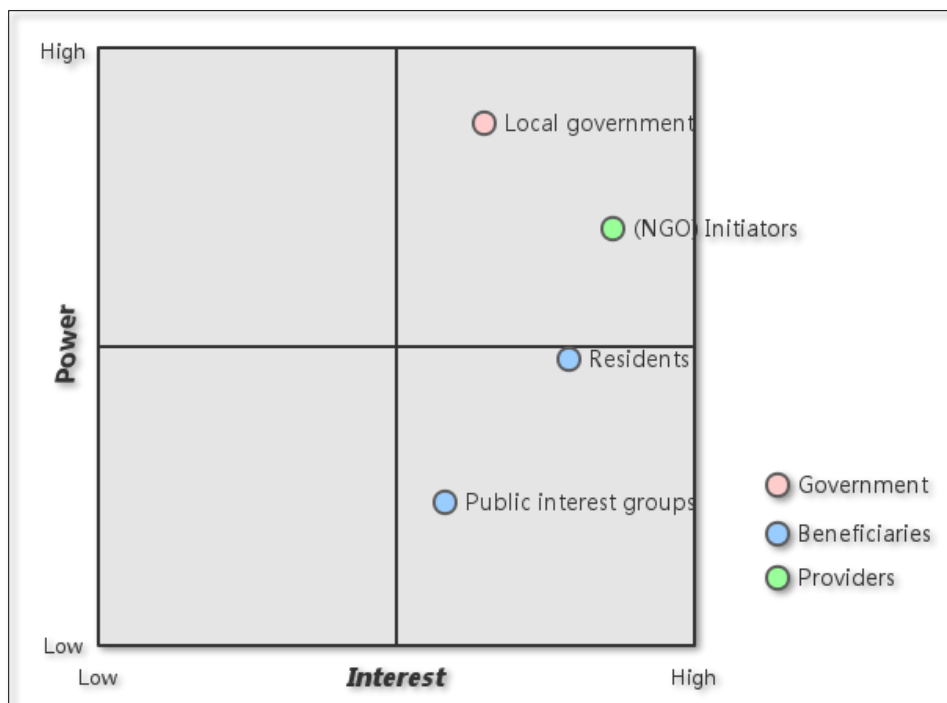


Figure 5.12: The Stakeholders power-interest matrix of Sanyuanli community garden

*Provider: The JCEF Green Commission*

The providers are mainly played by the initiators from JCEF Green Commission. The JCEF provides the financial support for the project. As the initiator of the project, the commission is responsible for providing the initial financing resources for the commencement. They contact with local companies, who can provide the basic substantive materials for the development of community garden, such as seeds and soils.

### 5.3.2 The interconnection between stakeholders

#### *a. The cooperation between project initiator and governments*

The local government is the authority of approving all different projects. Sanyuanli community garden as a “bottom-up” project is proposed by the initiators from JCEF Green Commission. In commencing the project, the initiator should submit a project proposal to the local government, in this case Zuojiashuang office. Zuojiashuang office study the project proposal and give the suggestions to the initiators to make it suitable within Chinese development circumstances. For example, when asked about the land use of the community garden, one of the officers who works in the Zuojiashuang government mentioned that it will not be possible for the project to use the ground directly. As listed in Chinese law, the use of public space in a community should receive over half of the residents’ permission in the community and also have the approval signed by the Green Management Office, to allow for its use. Mostly, in old and constructed communities, the reuse of public space does not easily happen. However, in the new communities, land for community gardens has to be planned during the designing phase.

The project will be registered on a record in the government as soon as approval is given. Once the project is approved by the local government, it needs to be followed up every year. The follow up investigation is also conducted by a third party, as one of the government procurement projects. Sanyuanli community garden has not been followed up yet, as the project has not reached one year since commencement.

#### *b. The cooperation between project initiators and residents: the education/ trainee model*

As the project has been formed in a new shape, the school children will come and have a tour of the community garden, which provides a new way for them to connect with nature.

The trainee sessions are the other cooperation between the project initiator and residents. The trainee sessions are held every month, discussing the events of how to provide seed for the plants, how to prevent pests, how to compost the wastes, etc. The trainee sessions welcome all the residents who are interested in gaining the knowledge of community gardens. There are also some education sessions held for the young children in Zuojiashuang primary school. The initiators and the residents work together to guide a tour for the young children introducing them to nature and the environment. It has achieved some preliminary results in which the children have gained understood the concept of voluntarily participation in growing plants.

Overall, the stakeholders’ relationships are clear. Government plays a powerful role in the process to decide whether to approve the implementation of projects. The responsible organizations are influencers who have impacts on government decisions. With enough financial supports from providers, they on one hand carry out the projects under the instruction of government, whereas on the other hand, bring benefits to the residents to meet their interests.





## 6. The Comparisons of Two Case Study

In this chapter, through answering all the research questions, the performance of two urban agriculture practices in local sustainability can be discussed. In order to have these two practices to be compared, the characteristics of each urban agriculture case will be summarized, and concluded with the similarities and differences between them. At last but not least, the lessons of both cases will be illustrated with each other and their contribution to urban planning will be discussed as well.

## 6.1 What are the impacts of the Dutch urban farm on local sustainability?

Urban farms have seen several trials around the country. Caetshage farm as one of these trials and is a popular case for research study. It has been chosen for this study because it represents the main features of urban farms in the Netherlands. From the data analysis conducted in previous chapter, the characteristics of this urban farm can be summarized into the following points.

### 6.1.1 A complicated circle of metabolism

One of the characteristics of the Caetshage farm, on the regards to environmental aspects, is the establishment of a circular metabolism flow of food production. In the entire metabolism process, there are three main producing sectors, i.e. the growth food plants, the maintenance of landscape plants and the cultivation of livestock. Through these three sectors, a circular system of energy and nutrition is created. These three sectors not only absorb energy and nutrition inputs but also act as convertors to transform the resources into these uses for the other sectors. They complement existing inputs to close the loop on the farm.

Generally, it can be concluded that the circular metabolism on the Caetshage farm cannot leave without the well management of resources. The resource management is to handle energies and materials by transformation, consumption or disposal of resources (Agudelo-Vera, Mels, et al., 2012), which has been applied well on this case. From the Figure 6.1, it can be seen that all the inputs including water, energies are mainly from outside the Caetshage farm. They are devoted into the food production field and the landscape field. The classification of the food products on the farm is a key element as a way of resource management to contribute to the sustainability. It cascades the quality of food production. The energies and materials out from the food production are all transformed into different usages, aiming to recycle the use resource. It is intended to reduce the amount of inputs. As it is shown in the figure, the food production is the only output. The less amount of other residual waste produced, the lower harm of output will impact on the environment.

However, the farm has not achieved self-sufficiency yet. The large amount of energy resources and part of nutrition still depend on outside providers. This is where development on the farm's needs to occur in order to reduce the inflow of energy. This rests on two points, first, this could be achieved by raising the proportion of farm income generated by the energy sector. Energy is one of the most important sectors in food production, with vast quantities of energy necessary for both food storage and greenhouses. Greater financial investment is needed therefore to improve the infrastructure providing energy and increase

the efficiency of energy intensive sectors within the urban farms. Second regards the proper treatment of the energy sector and ensures that usage is strictly controlled. This requires more attention to be paid to saving the energy, with appropriate use wherever possible.

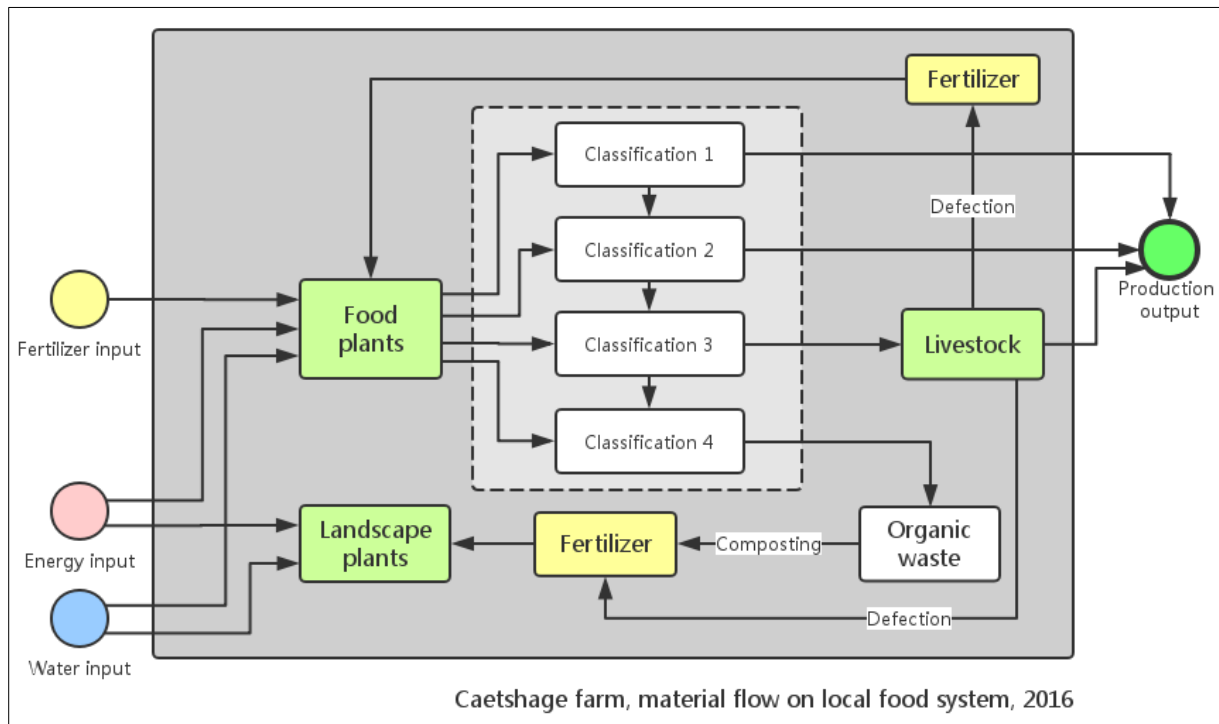


Figure 6.1: The metabolism flow of Caetshage farm

## 6.1.2 The diversity of development

The other characteristic of Caetshage farm is diversity. This can be categorised as both a principle for the development of, as well as the identity of Caetshage farm. The diversity is evident in a number of different aspects, notably variety of food produce, engagement outside the farm, inter-industry cooperation and diversification of functions.

### ***The variety of food products.***

The farm's production is not limited to producing only fresh vegetables or fruits. They also have ornamental plants and dairy productions. Over 100 varieties of vegetable and fruits species are produced, with the option for both unprocessed processed food productions. This gives residents a range of an options to access healthy, fresh food production in different forms.

### ***The collaboration with tertiary industry***

A collaboration with tertiary industry that only depends on the profits of food production could not support the Caetshage farm for long. The business of cooperating with the service industry has become a way for promoting the brand of Caetshage farm. Through cooperation with local schools, the farm has attracted children and handicap people to get involved. The commercial cooperation also provides an alternative way to spread the farm's production and

build the farm's brand. Such cooperation models have also diversified the farm's income streams. The service industry has become the main financial resources after food production. Such diverse financial resources provide a multi-development function of the farm and spread the risk associated with any one stream.

### ***The farm's diverse functions.***

Caetshage farm not only has the function of food production, but also serves as a landscape function, service function, aesthetic function, and leisure function for the residents. As a result, it could be considered to increase the wellbeing of the residents of Caetshage. The diversification of functions also enhances the economic independence of the farm. If there was unexpected emergency, the urban farm could be more resilience. For example, if there was low production of a specific kind of vegetable due to unexpected weather condition the diverse financial resources could prevent a critical shortfall in income. It is this resilience that characteristic of what an urban farm should possess.

However, such diverse function also adds an additional pressure on the farmers. They not only have to arrange the production tasks but also need to deal with service issues. If the workload exceeds the endurance of the farmers, it could result in a decreased quality of food production, which is an important factor in the viability of such urban farms.

Additionally, such diversity is the way for promoting the brand of the farm and reducing the risks of a particular aspects. For example, the variety could avoid a low production of a kind of vegetable due to unexpected weather condition. The diverse financial resources could prevent the short income, the different people participating could ensure that there are enough human resources available for farming activities.

### **6.1.3 An open opportunity for forming a community**

The opportunity for all the residents to participate helps to develop a community, specifically, the interest-base community. Interest-base community help to gather people with similar interest who have a tighter personal connectedness (Alaimo, Reischl, et al., 2010). This makes it possible to build strong communities, creating community members who are engaged, participate and feel capable of working through problems, supported by strong social networks (Connelly, Markey, et al., 2011). The open reception for the residents of Culemborg to get involved in the urban farm's activities has provided such an opportunity to build up their community. The relationship between residents and other group of people has changed noticeably, especially with regards the bridging and linking of social capital.

The bridging social capitals mainly happen among the people who are interested in the farming activities. As it is demonstrated in the research results, people from different background and age groups are involved self-willingly. The bridging social capital is reflected on the farmers and the residents. They have formulated a working relationship with the residents through cooperative farming activities and business relationship through food products trading. The relationship is also reflected on the residents from different background. There have been more interactions through the farming activities.

When considering the linking social capital, this is mainly achieved through the interaction of residents and handicapped people. As residents learned about the difficulties suffered by these people they paid more attention to them, with handicapped people benefitting through connection with the social networks. This helps to develop social relationships and form a bond between people that reduced class divergence between different groups.

To summarize, the Dutch urban farm mainly contributes to the local sustainability by improving the metabolism from environmental aspects, having diverse functions from economic aspects and establishing open and equal participation opportunities from social aspects. The circular metabolism lowers the inputs and outputs for the urban farm and maximize the utility of all the materials. The diversity of the functions and collaborations could enhance the resilience of the development of the urban farm. Meanwhile, the open opportunities for the citizens could increase the social capitals within the community, which would further raise the level of social cohesion. Overall, the Caetslage farm has positive impacts on the local sustainability.

## 6.2 What are the impacts of the Chinese community garden on local sustainability?

Sanyuanli Community Gardens is a movement of urban agricultural practice in China with an aim to use unused urban areas to grow food. These gardens are part of a formal project that has been approved by the local government, however, their structure is representative of many currently informal cases and hence provides a reference to the future cases. The word that best describes the Chinese community garden is 'simple', and this is evident in several aspects of urban metabolism, social relationship and stakeholder cooperation.

### 6.2.1 The simple circle of metabolism

The circle of material flow is rather simple. The figure below shows the metabolism flow in Sanyuanli community garden. Within the community garden there exists only the products-waste circle. The organic waste undergoes only a simple treatment through onsite composting, mostly converting wastes into enzyme and fertilizers through the application of the Bokashi composting method.

There are two reasons that these community gardens have such a simple sustainability circle.

First, is the size limitation of the community gardens. The community gardens usually occupy land that was previously underutilised or inefficiently used, using raised beds as growing spaces. This restricts the both the number of plants species and volume of production. These characteristics however result in a very low demand for both energy and fertilizer, and a limited stream of organic waste output.



Second, is the lack of local infrastructure for waste treatment in the community. The design and administration of land use regulation within the community means that residents are not allowed to change the use of land without prior approval from the residents' committee and local government. This is inclusive of more permanent infrastructure for waste treatment within community gardens. Currently, residents use simple plastic boxes to compost organic waste with the small scale of existing community gardens making this a manageable solution. However, organic waste management should be taken into consideration when considering expansion or new project development to ensure that proper infrastructure is available, a factor crucial when considering the scaling up of this movement.

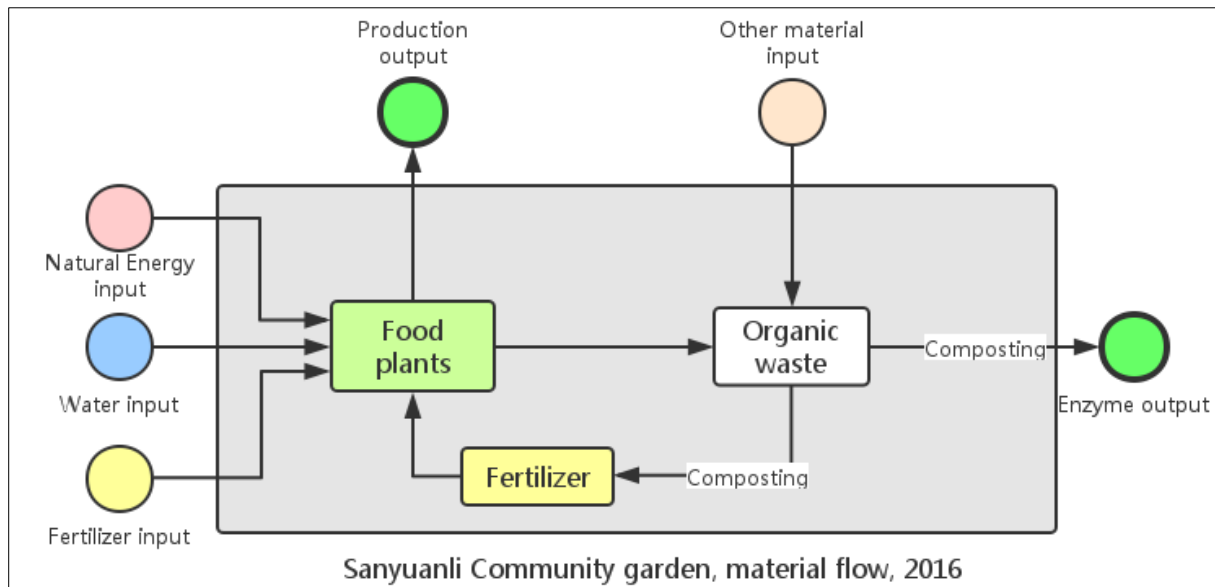


Figure 6.2: The metabolism flow of Sanyuanli community garden

## 6.2.2 The simple form of a particular community

The establishment of a community is also another characteristic of Sanyuanli Community Gardens. Unlike urban farms, participation in the community garden is not open to all the residents, with limited membership creating a predefined community between participants. Sanyuanli Community Gardens are not an allotment garden where each household is only responsible for their own plot but it is a community garden in the sense that all the participants take collective responsibility for the plot. Such community gardens help build a particular interest-based community within a group of people. There are a number of advantages and disadvantages resulting from the creation of a social network in such a way.

One of the advantages of a community garden is that people can make full use of spaces and take care of the growing plants, rather than individual responsibility which may cause the problems with inefficient land use.

The second advantage is that the people working in the community garden communicate more with each other and therefore it is easier to develop social capital within the group. The initial development of the community garden involved a discussion amongst the residents. These discussions stimulate the establishment of social networks, especially through the



establishment of bonding social capital and bridging social networks. Bonding social capital is created when a family in the community garden project develop tighter relationships among themselves by communicating in the garden. Bridging social capital develops between the participating residents. Together, they determine roles of responsibility and decide the future development of the community garden, which stimulates a close neighbourhood relationship regardless of pre-existing social identities.

However, this relationship development is restricted to a particular group. For those who are interested but do not participate in the community garden project it is hard to get involved. Such a structure therefore hinders the broader social network development of the community. This can be seen, in part, however to result from the community garden's limited size, with limited land preventing the community network including all residents.

### 6.2.3 The simple cooperation model

The simple cooperation model stems from the limited number of stakeholders, with cooperation between the local government, residents and initiators.

The development of urban agriculture practices in a community is considered a government procurement project. Therefore, the local government is the absolute decision maker who is ultimately responsible for the project's approval. It then assigns the project to a third party to construct and implement. The initiator in Sanyuanli community garden also as the project implementer works under the instruction of government and maintain a simple collaboration with the residents, by providing them with providers, providing farming opportunities or even educational activities.

To summarize, the Sanyuanli community garden as a pilot case in China reveals some of advantages. First, from the environmental aspect, the community garden increases the efficiency of unused land and help to establish a circular metabolism in the neighbourhood. All the energies and materials, including wastes, go into the process turn into new products. Second, it forms an interest-based community which makes the people involved has a tighter relationship with each other. Thirdly, it stimulates the cooperation with local stakeholders, including local government, citizens and schools.

However, the case also reveals some weaknesses that can be concluded as simple. The participators are only allowed the citizens who sign up for, which makes the community simple and excludes the chances for the others' participation. The simplicity of cooperation with stakeholders is vulnerable when providers cut off the resources, for instance. But overall, though the impacts on sustainability are in a simplicity form, Sanyuanli community garden has contribute to the use of resources and social cohesions in the neighbourhood scale. It suggests potential impacts on the local sustainability will be made if more community gardens projects such as Sanyuanli will be developed.

## 6.3 What are the similarities and differences of the two cases with respect to local sustainability?

Based on the research questions answered above, a comparison of these two urban agriculture practices can be found from tables 6.1 to 6.3, shown below. Table 6.1 shows the divergence of local circumstances within the cases. Table 6.2 compares the substantive sustainability in two urban agriculture practices. Table 6.3 concludes the participatory sustainability of the stakeholders' involvement in two cases.

Table 6.1: The comparison of local resources/circumstances of two cases

| Local situation                       | Caetshage farm in Culemborg                                 | Sanyuanli community garden in Beijing        |
|---------------------------------------|---|--|
| <b>Density</b>                        | 900 people / km <sup>2</sup>                                | 7000 people / km <sup>2</sup>                |
| <b>Size of urban agriculture area</b> | 5 ha (2 ha for food production, 3 ha for landscape)         | 10 m <sup>2</sup> and still in expansion     |
| <b>Previous land uses</b>             | Community garden  | Unused community lands                       |
| <b>Transport condition</b>            | Different transport types: railway, waterway and high road. | Close to the main road.                      |
| <b>Educational resources</b>          | Primary schools surrounded                                  | Kindergarten and Zuojiashuang primary school |
| <b>Commercial resources</b>           | Supermarket in Culemborg                                    | Sanyuanli grocery market                     |

Table 6.2: The comparison between two different urban agriculture practices – substantive sustainability

| Substantive Sustainability  | Indicators                    | The urban farm of Dutch case   | The community garden of Chinese case  |
|-----------------------------|-------------------------------|--|---|
| <b>Environmental health</b> | Energy resources              | <ul style="list-style-type: none"> <li>• Large requirements.</li> <li>• Depend on natural energy and electricity supply.</li> </ul>              | <ul style="list-style-type: none"> <li>• Small requirements.</li> <li>• Depend on natural energy</li> </ul>                               |
|                             | Products quality and quantity | <ul style="list-style-type: none"> <li>• Good quality with strict classification.</li> <li>• Sufficient quantity</li> </ul>                      | <ul style="list-style-type: none"> <li>• Good quality</li> <li>• Insufficient quantity</li> </ul>   |
|                             | Waste treatment method        | <ul style="list-style-type: none"> <li>• Bokashi waste treating method on the farm.</li> <li>• Used as fertilizer.</li> </ul>                    | <ul style="list-style-type: none"> <li>• Bokashi waste treating method at home.</li> <li>• Produced as fertilizers and enzyme.</li> </ul> |
| <b>Economic vitality</b>    | Costs and benefits            | <ul style="list-style-type: none"> <li>• Farmers have full responsibility.</li> <li>• Cooperative partnership with local supermarket.</li> </ul> | <ul style="list-style-type: none"> <li>• Fully depend on the involved residents.</li> </ul>   |
|                             | Service scope                 | <ul style="list-style-type: none"> <li>• Culemborg city scale</li> </ul>   | <ul style="list-style-type: none"> <li>• Sanyuanli</li> </ul>   |

|                      |                 |  |   |
|----------------------|-----------------|--|---|
|                      |                 |  | community scale   |
| <b>Social Equity</b> | Consumer groups | <ul style="list-style-type: none"> <li>Residents in the whole Culemborg.</li> </ul>  | <ul style="list-style-type: none"> <li>Participants maintaining the community garden.</li> </ul>  |
|                      | The activities  | <ul style="list-style-type: none"> <li>Farming activities are open to all groups of people, including children, students, elder people and handicap people.</li> <li>Other activities have rules regulated.</li> </ul> | <ul style="list-style-type: none"> <li>Farming activities are limited to the residents who signed up to participate.</li> <li>Trainee activities are open to all the residents and students from primary school.</li> </ul> |

Table 6.3: The comparison between two different urban agriculture practices – procedural sustainability

| <b>Participatory sustainability</b> | <b>Indicators</b>      | <b>The urban farm</b>  | <b>The community garden</b>                            |
|-------------------------------------|------------------------|--|--|
| <b>Stakeholders</b>                 | Government             | The Culemborg local government                                     | The Zuojiazhuang local government                      |
|                                     | Beneficiaries          | Residents and foundation   | Residents and schools                                  |
|                                     | Influencers            | Schools  | NGOs   |
|                                     | Providers              | Farmers  | Sponsors   |
| <b>Cooperation</b>                  | Business cooperation   | Between farmers and supermarket                                    |  |
|                                     | Non-profit cooperation | Between farmers and handicap people<br>Between farmers and schools | Between NGOs and schools<br>Between NGOs and residents |

### 6.3.1 The similarities

From the tables listed above, it can be seen that there are a number of consistent themes present between both urban agriculture practices which contribute to the performance of local sustainability. These similarities can be summarized into two points.

Firstly, both cases emphasise to the role that the formulation of a circular metabolism has on local sustainability. Environmentally speaking, these metabolism cycles reduce the raw material flow with the higher the metabolism cycle, the less materials used. Economically speaking, such a circular metabolism increases the efficiency of resources use. This can not only lower the financial cost of purchasing raw materials but can also result in high returns from production. These circular flows are achieved through closed waste treatment cycles. Both cases use the Bokashi method for the organic waste composting which allows a simple method for creating usable materials from waste products. Overall, with regards to environmental and economic sustainability, these two urban agriculture practices have contributed to local sustainability through relatively closed circular metabolisms.

Secondly, there are similarities in the prioritisation of social equity. The two urban agriculture practices help to improve bridging social capital through the involvement of the community in the urban agriculture practices. Activities such as farming and educational activities provide residents with equal chances for communication. This improves the relationship between different groups of people, not only the residents in the neighbourhood but also the people in different social levels and abilities.

Generally speaking, the urban agriculture practices have positive influence on the development of local sustainability achieved through closed material cycles and outreach into the community.

### 6.3.2 The differences

Though the two urban agriculture practices have proved their contribution to local sustainability, their contribution to substantive and participatory sustainability differs.

Environmentally speaking, the metabolism cycle of the two cases performs quite differently. As the scale of the urban farm is relatively larger than that of the community garden, different kinds of production methods are applied, with different agriculture products available. The urban farm integrates and cascades resources such that all the materials are circulated in production activities and landscape activities. In the community garden, on the other hand, due to the limitation of size, resources use and reuse is also very limited as there only exists a single cycle of production and waste treatment. Such comparison reveals how the scale of urban agriculture practices influences local sustainability with the urban farm formulating a sustainability circle with multiple small loops while the community garden's circle is simple and direct.

Though similarities can be identified between the creation of bridging social relationships in the community, the way in which social equity is addressed by the urban farm and the community garden differs. The urban farm is open to all the residents living in the city which results in different kinds of people gathering on the farm. Within this environment, different social classes of people are able to communicate with each other which improves linking social capital through the shared task of volunteering in the farming activities. However, in the community garden, emphasis is placed on the development of bonding social capital. Since a community garden is open to a limited group of households, who then form a close community across neighbourhoods, the capacity for linking social capital to occur is more limited. However, such a structure enables the exchange of opinions and organization of activities, which increases the involvement of each participant in the farming activities and help to consolidate or build social capital.

Differences also exist with regards stakeholders' cooperation as well. Both cases work with non-profit organizations such as schools and NGOs to influence students and other important people to take part or recognise the role of urban agriculture. However, the case in the Netherlands also has business cooperation with other commercial sectors, which contributes financially to the urban farm's development. The scale of Sanyuanli community gardens however means that the households are the primary beneficiaries of the products grown on the farm.

In other words, both of the cases have achieved a circular metabolism, in a complicate or a simplicity form. However, the differences between the two cases regarding local sustainability lie in their service scale. The urban farm develops in diversity and is fully open to the residents, while the community garden is simple and close to a limited group at the neighbourhood scale.

## 6.4 What lessons can be learnt from the two urban cases?

Caetshage farm in the Netherlands developed from a community garden and it therefore hold experiences that could help shape the development of the Sanyuanli community garden in China. The primary experiences to be learned from the Dutch case is the diversification of incomes. The benefit of diversification to the community garden is that it could have more cooperation opportunities for the development. This can be explained in a few points.

Firstly, cooperation with commercial sectors helps to both support the project economically but also diversify risk. The community garden in China has not yet started developing a method for raising the yield of food production or working with local markets. Financial support is secured from the initiators' sponsorship and the participators themselves. However, such financial incomes cannot support the development of the community garden in the long term.

Secondly, the cooperation with service sectors can promote outside interest. Sanyuanli community gardens could cooperate with service industries by organizing tour guides for other communities and instructing them how to start their own community garden. By branding and advertising the community garden they could promote the development of urban agriculture in new urban areas.

On the other hand, though the Chinese case is in its infancy, there still exist things that the Dutch case can learn.

The organization of the residents' involvement in farming activities is the main area of improvement. Currently, farming activities are voluntarily which means that the communication between residents may be limited, with most people only communicating with the farmers. Similarly, because of the voluntary and somewhat detached nature of the farm from everyday life, some people are not aware of the possibility to get involved in the farming activities at all. Thus, the Chinese experience of organizing residents to get involved in activities can be applied in Caetshage farm. The farmers could regularly organize farming activities or trainee sessions so that the residents could participate together at the same time. This could first improve the opportunities for communication among residents because residents could meet more people then when they were independently volunteering. Secondly, such regular organization could raise people's interest to participate in the farming works and disseminate the basic knowledge of how to do farm work.



From all above, it can be seen that both cases have strengths and weaknesses. But it is good to be learnt the strengths from different cases and remedy the weakness on the condition of taking the local contexts into consideration.



## 7. Conclusions and Recommendations

## 7.1 Conclusions

Globally, the booming development of urban agricultural practices around the world reflects an awareness that it stimulates sustainable development at the local level. Based on the circumstances of the different cities, different urban agricultural practices have different local sustainability performances. Realizing the influence of different urban agricultural practices in local sustainability could provide a reference for other cities in their future development.

Using the theoretical framework and selected indicators listed in this paper, an analysis of the impact of urban agricultural practices on local sustainability can be examined. This framework can be applied to different urban agriculture practices, with this thesis applying the framework to two different urban agriculture practices in The Netherlands and China. By studying their similarities and differences it can be seen that urban farms and community gardens have different local sustainability characteristics, though they share the same fundamental objectives.

### 7.1.1 Conclusions for the Dutch case

The Dutch urban farm contributes to the local sustainability in a way of raising the environmental circular metabolism and increasing the social cohesion in the community. It is implemented by forming a diverse and open model of urban farm.

The diversity of the urban farm is reflected on different aspects, especially on the environmental perspective with a circular metabolism. With different planting methods, they raise the yield of food production. They also use different methods to process the food production and reduce the amount of waste. Such diversity keeps the environmental metabolism in a close loop as much as possible and provide the positive influence on the surroundings. It proves the theory of Connelly, et al., (2011) in the literature review that the local sustainability is more environment-centred (Connelly, Markey, et al., 2011).

Meanwhile, when speaking of increasing social cohesion, it is reflected on two points. On one hand, due to the location of the urban farm, all the citizens from local city areas are welcome to participate in the activities on the urban farm. It initially provides the condition of place-based community. However, with further interactions, diverse social groups of people who are interested in the urban farming naturally lead to an interest-based community. On the other hand, the kinds of business operations happen on the urban farm are also diverse. The involvement of stakeholders in the urban farm are from different social groups. The diverse interactions among people increase the social capital, which further reinforces the level of social cohesion.

### 7.1.2 Conclusions for the Chinese case

On the contrary to the Dutch case, the Chinese community garden is a simple and closed model. This means that that once the responsible participants are involved, the members do not easily change. It does not link social relationships very well between different groups of

people, but it has enhanced the relationships within the participating groups. Due to the size limitation of community gardens, it can also contribute at the local level of sustainability with a simple metabolism circle. Although, the involvement of schools is executed simply, it has influenced the participating children by instilling a sense of environmental protection.

Not only from social scale, the performance from the environmental aspect is also simple. Though the community garden is merely close the loop with the help of different external input, the circular metabolism provides the fertilizer to the community garden, in order to maximize the use value of food waste.

So conclusively speaking, on a fundamental scale therefore local sustainability is achieved, however the wider effects on the community are more moderate.

### 7.1.3 The General Conclusion

Even though the two practices have display different characteristics and play differently in local sustainability, both urban agricultural practices have contributed to local sustainability by formulating a circular metabolism. Both of the cases have use resources efficiently and maximize the value of all the inputs. Additionally, they also create a space for residents to enhance social cohesion. Conclusively, the both cases not only provide an alternative way of accessing food production, but also contribute to local sustainability as well.

## 7.2 Recommendations

### 7.2.1 Recommendations for the Netherlands

Based on the previous conclusions about the urban agriculture practices in local sustainability, there are several recommendations for the two countries on their development of urban agriculture in the future.

#### *Recommendations for the Netherlands*

Urban agriculture in the Netherlands has developed into a booming enterprise (van der Schans, 2010). From the Caetshage farm, it can be seen that the urban farm can have a significant benefit for local food systems sustainably. However, there are several recommendations for the improvement of urban farms:

#### *For the farmers:*

- Before the construction of an urban farm, examine the local circumstances and design an achievable metabolism circle.
- Build a proper farm identity and have target group appropriate advertisements.

#### *For the planners and government:*

- Have a plan of different functional urban farms, e.g. service-function and production-function urban farms working separately in order to reduce the burden of one particular urban farm.
- The number of farmers should be hired and adjusted based on the size of the urban farm and workload.

*For citizens:*

- Get involved in the urban agriculture activities actively.

## 7.2.2 Recommendations for China

China's accelerated economic development has stimulated the high requirements of environmental management. In recent years, the authorities have proposed several new principles which are currently under a trial in different cities. These new experiments may influence the development of urban agriculture in the future.

For example, the Sponge city movement has been promoted in China in recent years. It has become one of the popular themes in urban planning and landscape designing projects. The core principle of the Sponge city is to have low impact development and formulate a circular metabolism, in order to save resources for the future. It requires the proper integrated collaboration of the natural environment and infrastructure. Speaking from this level, urban agriculture could fulfil the requirements of a Sponge city.

Additionally, in February, the national government of China has promoted a new planning policy that tears down the boundary walls of the community (Liu, X., 2016). This means that Chinese neighbourhoods will no longer be established within a restricted area but constructed openly with public spaces. In this way, land use is more integrated and less isolated. This raises efficiency and endows multi-functionality to land use. Thus, the policy could stimulate the development of urban agriculture through the creation of shared land. One vision possible within this new framework is the assistance in developing an interconnected local food network at a city scale, which may provide a chance for urban farms to emerge within the city. From a personal perspective, this is a promising future for the development of urban agriculture.

Even though the policy could be positive on the development of urban agriculture, there is still a long way to go before having a ubiquitous urban agriculture practice in China. The case of Sanyuanli community garden which is a reference for the current state of development of China's urban agriculture has a number of potential improvements. Based on China's current development, there are several recommendations for this situation:

*For the government:*

- Encourage the development of community gardens in old neighbourhoods with proper incentives where necessary.
- Set strict regulations of different urban agriculture practices for development.



- Propose articles to legalize different urban agriculture practices.
- Keep abreast of residents' opinions.

*For planners/designers:*

- Invest in infrastructure to meet the requirements of a circular metabolism for a community gardens.
- Take urban agriculture practices into account during the planning phase and at the beginning of the construction of a new neighbourhood.
- Popularize urban agriculture knowledge to raise the awareness of sustainable development.
- Promote new urban agriculture practices and enhance current practices to reinforce the local food system at the city scale.

*For citizens:*

- State their opinions to related authorities positively.
- Follow the regulations to establish proper urban agriculture practices.
- Increase the awareness or knowledge of urban agriculture.



# Bibliography

- Alaimo, K., Reischl, T. M. and Allen, J. O. 2010. Community gardening, Neighborhood meetings, and Social capital. *Journal of Community Psychology*, 38 (4), pp. 497-514.
- Bauermeister, M., Swain, S. and Rilla, E., 2010. Marin county community garden needs assessment. California: University of California Cooperative Extension-Marin. Available at: [http://ucanr.edu/sites/MarinMG/Community\\_Service\\_Projects/Marin\\_Community\\_Gardens/Marin\\_County\\_Community\\_Garden\\_Needs\\_Assessment/](http://ucanr.edu/sites/MarinMG/Community_Service_Projects/Marin_Community_Gardens/Marin_County_Community_Garden_Needs_Assessment/) .
- Bernard, H. (unpublished) 2014. Sanyuanli community garden project proposal.
- Binder, C. R., Feola, G. and Steinberger, J. K. 2010. Considering the normative, systemic and procedural dimensions in indicator-based sustainability assessments in agriculture. *Environmental Impact Assessment Review*, 30 (2), pp. 71-81.
- Bohn, K. and Viloen, A. 2011. The Edible City: Envisioning the Continuous Productive Urban Landscape (CPUL). *Field Journal*, 4 (1), pp. 149-161. Available at: <http://www.field-journal.org/uploads/file/2011%20Volume%204/10%20The%20Edible%20City%20Katrin%20Bohn%20and%20Andre%20Viljoen.pdf> .
- Bradly, L. and Baldwin, K. 2012. How to Organize a Community Garden. North Carolina State University: North Carolina Cooperative Extension. Available at: <http://content.ces.ncsu.edu/how-to-organize-a-community-garden> .
- Broekhof, S. M. and van de Valk, A. 2012. Chapter 32 Planning and the quest for sustainable food systems: explorations of unknown territory in planning research. In: A. Viljoen and J. S. C. Wiskerke eds., 2012. Sustainable food planning: evolving theory and practice. Wageningen: Wageningen Academic. pp. 393-404.
- Budge, T. and Slade, C., 2009. Integrating Land Use Planning and Community Food Security. Melbourne: La Trobe University. [Accessed 2015].
- Cai, J. and Yang, Z. 2008. Developing China's urban agriculture by learning from international experiences. *Geographical Research*, 27 (2), pp. 362-374.
- Campbell, M., 2004. Building a Common Table: the role for planning in community food systems. *Journal of Planning Education and Research*, 23 (4), pp. 341-355.
- Cao, E., Hou, X., Li, G., Huang, Q., et al., 2011. Effect of combination bacteria on soil physicochemical properties and soil microbial activity by pot tomato experiments. *Ecology and Environmental Science*, 20 (5), pp. 875-880.
- Cao, L. and Zhang, L. 2006. The industrial form research on the sustainable development of urban agriculture in Shanghai. *Chinese Agriculture Science Bulletin*, 22 (1), pp. 400-404.
- Clavin, A. A., 2011. Realising ecological sustainability in community gardens: a capability approach. *Local Environment*, 16 (10), pp. 945-962.

- Connelly, S., Markey, S. and Roseland, M. 2011. Bridging sustainability and the social economy: Achieving community transformation through local food initiatives. *Critical Social Policy*, 31 (2), pp. 308-324.
- Creswell, J. W., 2009. Research design: Qualitative, Quantitative, and Mixed methods approaches. 3rd. London: Sage.
- Dale, A., Ling, C. and Newman, L. 2010. Community Vitality: The Role of Community-Level Resilience Adaptation and Innovation in Sustainable Development. *Sustainability*, 2 (1), pp. 215-231.
- del Rio, P. and Burguillo, M. 2008. Assessing the impact of renewable energy deployment on local sustainability: towards a theoretical framework. *Renewable and Sustainable Energy Reviews*, 12 (5), pp. 1325-1344.
- Dubbeling, M., 2013. Linking cities on urban agriculture and urban food systems. <<http://www.ruaf.org/sites/default/files/Text%20city%20food%20systems.pdf>> [Accessed 2015].
- Energy-cities, 2013. 9. EVA-Lanxmeer (Culemborg - NL). Available at: [http://energy-cities.eu/IMG/pdf/Sustainable\\_Districts\\_ADEME1\\_EVA-Lanxmeer.pdf](http://energy-cities.eu/IMG/pdf/Sustainable_Districts_ADEME1_EVA-Lanxmeer.pdf) [Accessed 2015].
- EVA-Lanxmeer, 2015. Ontwerp stedenbouwkundig plan. Available at: <http://www.eva-lanxmeer.nl/over/ontstaan/ontwerp-stedenbouwkundig-plan> [Accessed 2015].
- Feenstra, G., 1997. Local food systems and sustainable communities. *American Journal of Alternative Agriculture*, 12 (1), pp. 28-35.
- Feenstra, G., 2002. Creating space for sustainable food systems: lessons from the field. *Agriculture and Human Values*, 19 (2), pp. 99-106.
- Firth, C., Maye, D. and Pearson, D. 2011. Developing "community" in community gardens. *Local Environment*, 16 (6), pp. 555-568.
- FSN, 2014. Food security network. Available at: <http://www.foodsecuritynews.com/index.html> [Accessed 2015].
- Geertje, 2015. Boerderij 't Geertje'. Available at: <http://www.hetgeertje.nl/> [Accessed 2015].
- Goodman, D. and Goodman, M. K. 2009. Alternative Food Networks. pp. 1-13. Available at: [http://www.academia.edu/1484156/Alternative\\_Food\\_Networks](http://www.academia.edu/1484156/Alternative_Food_Networks) .
- Han, J., 2010. A comparison analysis of three models of NGO involving government procurement in China. <http://www.cctb.net/llyj/xswtyj/zdjs/201001/P020130613372159488013.pdf>. Beijing: Central Compilation and Translation Bureau. Available at: <http://www.cctb.net/llyj/xswtyj/zdjs/201001/P020130613372159488013.pdf> .

- Hinrichs, C. and Kremer, K. 2002. Social inclusion in a midwest local food system project. *Journal of Poverty*, 6 (1), pp. 65-87.
- Holland, L., 2004. Diversity and Connections in Community Gardens: a contribution to local sustainability. *Local Environment*, 9 (3), pp. 285-305.
- Holman, N., 2009. Incorporating local sustainability indicators into structures of local governance: a review of the literature. *Local Environment*, 14 (4), pp. 365-375.
- Holtslag, W., (unpublished) Planning for (local) food systems: Understanding the development of local food chains in the Dutch context. Master of Science. Wageningen: Wageningen University.
- Jaroz, L., 2008. The City in the Country: Growing Alternative Food Networks in Metropolitan Areas. *Journal of Rural Studies*, 24 (3), pp. 231-244.
- Kingsley, J. and Townsend, M. 2006. 'Dig in' to Social Capital: Community gardens as mechanisms for growing urban social connectedness. *Urban Policy and Research*, 24 (4), pp. 525-537.
- Kumar, R., 2014. Research methodology: a step by step guide for beginners. 4th edition. Britain: Sage publication.
- Kuo, F. and Sullivan, W. 2001. Aggression and violence in the inner city: Impacts of environment via mental fatigue. *Environment & Behavior*, 33 (4), pp. 543-571.
- Levenston, M., 2013. Netherlands's Report: Urban agriculture beneficial to society. Available at: <http://www.cityfarmer.info/2013/10/09/netherlands-report-urban-agriculture-beneficial-to-society/> [Accessed 2015].
- Linn, K., 2007. Building commons and community. Oakland: New Village Press.
- Liu, X., 2016. China State Council on further strengthening urban planning and construction management<sup>6</sup>  
(In Chinese: 中共中央 国务院关于进一步 加强城市规划建设管理工作的若干意见). Available at: [http://news.xinhuanet.com/politics/2016-02/21/c\\_1118109546.htm](http://news.xinhuanet.com/politics/2016-02/21/c_1118109546.htm) [Accessed 2016].
- Macias, T., 2008. Working toward a just, equitable, and local food system: the social impact of community-based agriculture. *Social Science Quarterly*, 89 (5), pp. 1086-1011.
- Mees, C. and Stone, E. 2012. Chapter 35 Food, homes and gardens: public community gardens potential for contributing to a more sustainable city. In: A. Viljoen and J. S. C. Wiskerke eds., 2012. Sustainable food planning: evolving theory and practice. Wageningen: Wageningen academic. pp. 431-452.

---

<sup>6</sup> English is translated by the author.

- Morgan, K., 2010. Feeding the city: the challenge of urban food planning. *International Planning Studies*, 14 (4), pp. 341-348. Available at: <http://dx.doi.org/10.1080/13563471003642852> .
- Mubvami, T. and Mushamba, S. 2006. Integration of agriculture in urban land use planning. Integration of agriculture in urban land use planning. 2006. Cities Farming for the Future; Urban Agriculture for Green and Productive Cities. RUAF foundation. Available at: <http://www.ruaf.org/sites/default/files/Integration%20in%20urban%20land%20use%20planning.pdf>.
- OCED, 2007. A bigger picture. In: A. Gurria ed., 2007. Human capital. OECD. pp. 102-105. Available at: <https://www.oecd.org/insights/37966934.pdf>.
- Pollan, M., 2008. Farmer in Chief. Available at: <http://www.nytimes.com/2008/10/12/magazine/12policy-t.html> [Accessed 2015].
- Pothukuchi, K., 2004. Community food assessment: A first step in planning for community food security. *Journal of Planning Education and Research*, 23 (4), pp. 356-377.
- Qu, X. and Jiao, L. 2013. Research progress of community supported agriculture in China. *Guangdong Agriculture Science*, (9), pp. 214-217.
- Rong, W., (unpublished) The development of urban agriculture situation, problems and countermeasures. Jingzhou: Yangtze University.
- RUAF foundation, 2015. Urban agriculture: what and why? Available at: <http://www.ruaf.org/urban-agriculture-what-and-why> [Accessed 2016].
- Selman, P., 2001. Social capital, sustainability and environmental planning. *Planning Theory and Practice*, 2 (1), pp. 13-30.
- Sjauw, A., 2015. Urban agriculture. Available at: <http://www.urbangreenbluegrids.com/agriculture/> [Accessed 2015].
- Srinivas, H., 2015. Frequently Asked Questions about Community Sustainability. Available at: <http://www.gdrc.org/uem/la21/sustfaq.html> [Accessed 2015].
- Tansey, G. and Worsley, T., 1995. The food system: a guide. Routledge.
- Turner, B., 2011. Embodied connections: sustainability, food systems and community gardens. *Local Environment*, 16 (6), pp. 509-522.
- UN, 2010. Urban Environment Food. Available at: <http://www.un.org/ga/Istanbul+5/72.pdf> .
- van der Schans, J., 2010. Urban agriculture in the Netherlands. *Urban Agriculture Magazine*, pp. 40-42. Available at: <http://www.ruaf.org/sites/default/files/UA%20Magazine%2024%20sept2010web%2040-42.pdf> [Accessed 2016].



- van Timmeren, A., Röling, W. and Kaptein, M., eds., 2004. Sustainable Implant and EVA Centre, Culemborg, a hub for Sustainable Development, [The 21th Conference on Passive and Low Energy Architecture.]. Eindhoven, Sep, 2004. pp. 1-6.
- Veen, E., 2015. Community gardens in urban areas: a critical reflection on the extent to which they strengthen social cohesion and provide alternative food. PhD. Wageningen: Wageningen University.
- Viljoen, A., 2005. CPULs: Continuous productive urban landscapes. 1st edition. UK: Elsevier.
- Viljoen, A. and Bohn, K., 2014. Second Nature Urban Agriculture: Designing productive cities. London: Routledge.
- Wahba, S., 2013. Urban agriculture: findings from four cities case studies. 80759), Washington: World Bank. Available at: <http://www.ruaf.org/sites/default/files/Worldbank%20report%20on%20urban%20agriculture.pdf> [Accessed 2015].
- Wang, K., 2013a, (unpublished) Introducing Food Re-localisation to China. Master of Science. Wageningen: Wageningen University.
- Wang, Z., 2013b, (unpublished) Gardens of the east and west: New path towards sustainable local food system in Beijing and Amsterdam. Master of Science. Wageningen: Wageningen University.
- Watson, M., June, 4th, 2015. What Is an Urban Farm? Available at: <http://localfoods.about.com/od/localfoodsglossary/g/What-Is-An-Urban-Farm.htm> [Accessed 2016].
- Wilson, D. C., 2007. Development drivers for waste management. *Waste Management & Research*, 25 pp. 198-207.
- Yates, H. and Jochum, V., 2003. It's who you know that counts. The role of the voluntary sector in the development of social capital in rural areas. London: NCVO Publications.
- Yin, R., 2009. Case study research design and methods. 4th edition. USA: Sage Publications.



## Appendix

# 1: Questionnaires

## Part I. Basic information

1. What is your age?

- |          |          |
|----------|----------|
| A. <18   | D. 45-60 |
| B. 18-29 | E. >60   |
| C. 30-44 |          |

2. What is your gender?

- |           |         |
|-----------|---------|
| A. Female | B. Male |
|-----------|---------|

3. What is your current occupation?

- |             |            |
|-------------|------------|
| A. Students | C. Retired |
| B. At Work  |            |

4. What is your highest education level?

- |   |  |
|---|--|
| A. Master or higher degree (University) | C. High school degree (MBO)              |
| B. Bachelor degree (HBO)                | D. lower than high school degree (< MBO) |

5. What is your monthly income level?

- |  |                                   |
|--|-----------------------------------|
| A. I have no incomes.                      | D. 2000-3000 EUR (6000-8500 RMB)  |
| B. Less than 1000 EUR (less than 3500 RMB) | E. 3000-5000 EUR (8500-12000 RMB) |
| C. 1000-2000 EUR (3500-6000 RMB)           | F. Over 5000 EUR (Over 12000 RMB) |

## Part II. Involvement in the community garden

6. Do you involved in the activities in the urban farm (community garden)?

- |                 |                      |
|-----------------|----------------------|
| A. Yes (skip 7) | B. No (go to 7 only) |
|-----------------|----------------------|

7. Why do you not involve in the activities of the urban farm (community garden)?

(You can have more than one choice, then go to 12)

- A. I have no time.
- B. I have no interest.
- C. I am not asked to involve in.
- D. I only regard it as one of my food resources.
- E. Other reasons: \_\_\_\_\_.

8. What is the reason that you involved in the activities of the urban farm (community garden)?

(You can have more than one choice)

- A. It is my work.
- B. It sometimes is a requirement from my work.
- C. It is the way how I spend my leisure time.
- D. It is the way where my interest lies.
- E. It is the way how I make new friends.
- F. Other reasons\_\_\_\_\_.

9. What kind of activities do you usually involved in the activities of the urban farm (community gardens)? (You can have more than one choice)

- A. Food production: I plant vegetables/fruits. / I harvest them.
- B. Food process: I clean and package vegetables/fruits.
- C. Food distribution: I am responsible for delivering vegetables to the households.
- D. Waste management: I deal with the food waste to benefit the community garden.
- E. Other activities: \_\_\_\_\_ (e.g. educate children, special celebration, guidance of visitors, etc.)

10. How often do you involved in the activities in the urban farm?

- A. Everyday
- B. Once a week
- C. Once a month
- D. Twice a week
- E. Twice a month
- F. Others\_\_\_\_\_

11. Do you enjoy involving in the activities in the community gardens?

- A. I always enjoy it.
- B. I sometimes enjoy it.
- C. I hardly enjoy it.
- D. I never enjoy it.

### Part III. Consumption from the community garden

12. Do you purchase the fresh vegetable produced from the urban farm?

A. Yes (skip 14)

B. No (skip 13)

13a. How much amount do you think it covers the needs of vegetables/fruits in your life?

A. 100%

E. 60%-70%

I. 20%-30%

B. 90%-100%

F. 50%-60%

J. 10%-20%

C. 80%-90%

G. 40%-50%

K. Below 10%

D. 70%-80%

H. 30%-40%

L. 0

13b. The rest I purchase \_\_\_\_\_.

A. from supermarket

C. from other open markets

B. from other grocery store

D. Others\_\_\_\_\_.

14. I normally purchase from \_\_\_\_\_.

A. from supermarkets

C. from other open markets

B. from other grocery store

D. others \_\_\_\_\_.

15a. I prefer to purchase from \_\_\_\_\_.

A. from the urban farm

D. from other open markets

B. from supermarkets

E. others \_\_\_\_\_.

C. from other grocery store

15b. Because the resource(s) is/are more \_\_\_\_\_.

A. Easily accessible

E. Attractive price

B. Choices diversity

F. Good package

C. C. Fresh and healthy

G. Ready to eat

D. Safe and reliable

H. Others \_\_\_\_\_

16. Compared with the vegetables you purchase from 13b, what do you think the quality of the vegetables/fruits produced in the urban farm?

- A. It is better.
- B. It is worse.
- C. There's not much differences.
- D. I don't know
- E. Others \_\_\_\_\_.

17. Overall, do you think the quality of fresh vegetables/fruits produced in the urban farm matches the prices?

- A. No, high price but low quality.
- B. No, low price but high quality.
- C. Yes, low price matches low quality.
- D. Yes, reasonable price matches reasonable quality.
- E. Yes, high price matches good quality.
- F. I don't pay for them, because I plant them.
- G. It's hard to say
- H. Others \_\_\_\_\_.

18. I would advise the urban farm to \_\_\_\_\_

- A. Improve the quality, keep current price.
- B. Lower the price, keep current quality.
- C. Improve the quality and the price.
- D. Keep current quality and price.
- E. Others \_\_\_\_\_.

#### **Part IV. Suggestion for the urban farm**

19. Do you think the waste from the urban farm have been treated well?

- A. Yes, I know it is also used as fertilizer in the urban farm / community garden.
- B. Yes, but I don't know where it goes.
- C. No, I don't think it treated well.
- D. I'm not sure.
- E. Others \_\_\_\_\_.

20. Do you think community garden changed your lifestyle?

(You can have more than one choice)



- A. Yes, I feel eating healthier.
- B. Yes, I save more money
- C. Yes, I feel it is more convenient.
- D. Yes, other reasons\_\_\_\_\_
- E. No, I always live like this.
- F. No, I don't feel much differences.
- G. No, other reasons\_\_\_\_\_.

21. Please give three tips for current urban farm (community garden).

(What three benefits do you think the urban farm /community garden can provide?)

22. Please give three tips for the development of the urban farm (community garden) in the future.

(What three aspects do you think the urban farm / community garden need to be improved mostly?)

(Chinese version only:

23. Do you think community garden should be widely promoted and institutionalized in China?)

## 2: Interview list

| Objective        | NL (Eva-Lanxmeer)  | CN (Sanyuanli) <sup>7</sup>   |
|------------------|--|---|
| Economy          | <ul style="list-style-type: none"> <li>What kind of vegetable/fruits do you produce?</li> <li>What are the price level of these products compared with other resources?</li> <li>Who are the buyers of these products?</li> <li>What is the economic contribution to the development of Culemborg?</li> <li>How much is your yearly income?</li> <li>How do you deal with these income?</li> </ul>   | <ul style="list-style-type: none"> <li>都种哪些果蔬产品？</li> <li>果蔬产品定价吗？</li> <li>如果定价价格是怎样的？</li> <li>面向群体是谁？</li> <li>对小区的经济发展有起到作用吗？</li> <li>这些收入会用于何处？</li> </ul>  |
| Waste management | <ul style="list-style-type: none"> <li>Is there a model of treatment referring to?</li> <li>What kind of techs has been applied?</li> <li>How are wastes produced in community garden treated?</li> <li>Is it a circular process?</li> <li>About ___% they are reused.</li> </ul>  | <ul style="list-style-type: none"> <li>垃圾是同普通垃圾一起处理？</li> <li>还是雇佣专门的人进行单独处理？</li> <li>是否有专门的处理方式？</li> <li>用到了什么技术？</li> <li>是一个循环过程吗？</li> <li>大概循环利用率是百分之多少？</li> </ul>  |
| Amount           | <ul style="list-style-type: none"> <li>The amount of producing veg/fruits.</li> <li>How many people have been benefit?</li> </ul>  | <ul style="list-style-type: none"> <li>产量怎么样？</li> <li>大概有多少人受益？</li> <li>占百分之多少？</li> </ul>  |
| Activities       | <ul style="list-style-type: none"> <li>What kind of activities there is?</li> <li>Production? Process? Distribution? Waste treatment?</li> <li>Or other education? Leisure time? Visiting/introducing? Celebration?</li> <li>How people feel about these activities?</li> <li>Those people who work in the community garden are citizens?</li> <li>Or there is also someone come from other places/companies?</li> <li>How do you normally do the management?</li> </ul> | <ul style="list-style-type: none"> <li>都开设一些怎样的活动？</li> <li>生产加工运输管理？</li> <li>或是教育，参观，庆典？</li> <li>居民对这些活动的评价是怎样的？</li> <li>有没有发生过居民间不和谐的情况？</li> <li>平时种植工作都是小区居民吗？</li> <li>有外聘人员吗？</li> <li>平时的工作管理是怎样的？</li> </ul> |
| Administrative   | <ul style="list-style-type: none"> <li>What is your normal administrative process?</li> <li>Are there some rules/policies that people could refer to?</li> <li>Effective? Efficient? Equity?</li> </ul>  | <ul style="list-style-type: none"> <li>在开始项目时是否有矛盾？</li> <li>是否有和当地有关部门联系过？</li> <li>他们的态度是怎样的？</li> <li>(是否可以给一下他们的联系方式？)</li> </ul>   |

<sup>7</sup> The same questions with English and Chinese translation

|                            |  |  |
|----------------------------|--|--|
| Stakeholders               | <ul style="list-style-type: none"> <li>• What is the role of residents?</li> <li>• What is the role of you?</li> <li>• What will you do when citizens have some new ideas/suggestions?</li> <li>• Or they would like to initiate something new?</li> <li>• What is the role of government in the whole process?</li> </ul> | <ul style="list-style-type: none"> <li>• 居民的作用/地位是怎样的？</li> <li>• 你们的作用/地位是怎样的？</li> <li>• 你们与居委会的关系？</li> <li>• 当地物业的作用/地位？</li> <li>• 你们与物业的关系是怎样的？</li> <li>• 开始时遇到过什么样的问题？</li> <li>• 你们是怎样克服的？</li> </ul> |
| Sponsors                   | <ul style="list-style-type: none"> <li>• Who are the sponsors?</li> <li>• What resources they provide?</li> <li>• Where are the sponsors come from?</li> <li>• What aspects they help with?</li> </ul>   | <ul style="list-style-type: none"> <li>• 谁赞助？</li> <li>• 都能提供哪方面的优势？</li> <li>• 是否需要权威的认可和批准？</li> </ul>   |
| Suggestions for the future | <ul style="list-style-type: none"> <li>• What develop do you think will be?</li> <li>• Could you provide me several suggestions about how do you think the community garden in Eva-Lanxmeer would develop?</li> </ul>  | <ul style="list-style-type: none"> <li>• 现在面积大吗？</li> <li>• 群众参与度怎样？</li> <li>• 你觉得这种模式在中国发展有前景吗？</li> <li>• 如果要大规模或者规范化发展，阻碍是什么？</li> <li>• 你的建议/观点是什么？</li> </ul>  |