

A Study of the Concept and Preservation Strategies for the Urban Agricultural Heritage:  
International Practices and Implications for China



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A Study of the Concept and Preservation Strategies for the Urban  
Agricultural Heritage: International Practices and Implications for China

Thesis approved by the Faculty of Architecture of the  
Rheinisch-Westfälische Technische Hochschule Aachen to obtain the  
academic title of Doctor of Engineering Sciences

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Date of the oral examination: 19 April 2021

This thesis is available online on the Central University Library website.

## **Acknowledgements**

I am very honoured to have the chance to study at RWTH Aachen University in Germany. I would like to thank my supervisors Professor Frank Lohrberg and Professor Carola Neugebauer, as well as Dr. Axel Timpe. They have given me great instructions and encouragements throughout the process of selecting the research topic of urban agricultural heritage, improving the outline, and writing the thesis. The thesis could not be finished without their patient guidance.

I am also honoured to have been given the opportunity to do a short period of research with Professor Lionella Scazzosi's team at Politecnico di Milano. They supported me to finish the fieldwork in Milan. Furthermore, Professor Jianming Cai from the Chinese Academy of Sciences inspired me a lot as well, and many thanks for his help and patience.

This work is based on theoretical elaboration and practical summary. It would not have been possible without the kindly provision of historical documents and materials relating to the case study. I would like to thank all the persons and that have provided related information. The complete list is given in the appendix.

I would also like to thank all the colleagues from the Institute of Landscape Architecture. Their kindly concerns support me to finish my work.



## List of abbreviations

|             |                                                                      |
|-------------|----------------------------------------------------------------------|
| BMC         | Business Model Canvas                                                |
| China-NIAHS | China's National-Global Important Agricultural Heritage System       |
| CPULs       | Continuous Productive Urban Landscapes                               |
| FAO         | Food and Agriculture Organisation of the United Nations              |
| GIAHS       | Globally Important Agricultural Heritage System                      |
| GXD         | People's Government of Xuanhua District                              |
| HLC         | Historic Landscape Characterisation                                  |
| HUL         | Historic Urban Landscape                                             |
| ICOMOS      | International Council on Monuments and Sites                         |
| IUCN        | International Union for Conservation of Nature and Natural Resources |
| KNS         | China Knowledge Resource Integrated Database                         |
| MOA         | Ministry of Agriculture of the People's Republic of China            |
| NSC         | Nationalities Service Centre                                         |
| OUV         | Outstanding Universal Value                                          |
| PASM        | South Milan Agricultural Park                                        |
| PRC         | People's Republic of China                                           |
| ROC         | Republic of China                                                    |
| SDGs        | Sustainable Development Goals                                        |
| UA          | Urban Agriculture                                                    |
| UNESCO      | United Nations Educational, Scientific and Cultural Organisation     |
| WH          | World Heritage                                                       |

## Summary

Urban agricultural heritage is a new research topic that has much potential, and as such, needs to be explored in-depth. It has had a direct bearing on the formation, development and distribution of cities, and therefore, the long history of urban agriculture development is worth investigating. In the past, suppliers around a city offered food, such as fruits and dairy products, every day to urbanites. Over the centuries, due to the development of modern science and technical applications, urbanites now have the opportunity to buy food from around the world daily. It is clear that traditional agriculture industries in or around cities are losing their status and original functions.

Nowadays, plenty of historical sites may exist in agricultural areas, either nearby or within the city. Occasionally, traditional agriculture is protected as a cultural heritage, which is a specific approach to agricultural conservation. Numerous potential urban agricultural heritage sites are embedded in urban or peri-urban areas, particularly in China. However, these places are largely neglected or have been reconstructed and exploited haphazardly; the main reason for this neglect lies in the lack of concern from the public and relevant researchers.

This research emphasises the concept and preservation strategies of urban agricultural heritage. It attaches importance to protecting and using innovation with existing urban agricultural heritage sites so that specific agricultural traditions can be inherited by future generations and, at the same time, culture homogenisation in the process of urban development can be avoided.

First, this study introduces the current types and characteristics of urban agricultural heritage. It offers the concept of urban agricultural heritage from manifestation, ecological, social, and economic dimensions.

Second, through three international best practices in China (the Xuanhua urban grape garden in Zhangjiakou Province), Germany (urban gardening in Bamberg), and Italy (traditional farmsteads in the Metropolitan City of Milan), the research summarises the current status of urban agricultural heritage preservation and management approaches. After the comparison of preservation strategies in different countries, this study formulates the criteria and procedure for the detection of urban agricultural heritage sites.

Finally, Hangzhou in China is used as a practice site. An overall preservation and development strategy for urban agricultural heritage has been proposed, which formulates the development goals for different districts of the city. Then, based on the detection procedure mentioned above, it goes further to explore a potential urban agricultural heritage site – the Xiaolin ginger growing area. Several suggestions have been proposed, which may contribute to urban agricultural heritage preservation and regional development in the future.

## **Zusammenfassung**

Das urbane landwirtschaftliche Erbe ist ein neues Forschungsthema mit großem Potenzial, das als solches eingehend erforscht werden muss. Es hat einen direkten Einfluss auf die Entstehung, Entwicklung und Verteilung von Städten gehabt, weshalb die lange Entwicklungsgeschichte der urbanen Landwirtschaft ein lohnenswertes Forschungsthema ist. In der Vergangenheit boten die Lieferanten aus dem Umkreis einer Stadt den Stadtbewohnern täglich Lebensmittel wie Obst und Milchprodukte an. Im Laufe der Jahrhunderte haben Stadtbewohner durch die Entwicklung der modernen Wissenschaft und Technik nun die Möglichkeit bekommen, täglich Lebensmittel aus der ganzen Welt zu kaufen. Somit wird klar, dass die traditionellen landwirtschaftlichen Betriebe in oder nahe den Städten ihren Status und ihre ursprünglichen Funktionen verlieren.

Es gibt heute viele historische Stätten in landwirtschaftlichen Gebieten, die entweder nahe bei oder innerhalb der Stadt liegen. Gelegentlich wird traditionelle Landwirtschaft als kulturelles Erbe geschützt, was einen spezifischen Ansatz zur Erhaltung der Landwirtschaft darstellt. Zahlreiche potenzielle Stätten urbanen landwirtschaftlichen Kulturerbes sind in städtische oder stadtnahe Gebiete eingebettet, insbesondere in China. Diese Orte wurden jedoch weitgehend vernachlässigt oder willkürlich rekonstruiert und genutzt, wobei der Hauptgrund für diese Vernachlässigung das mangelnde Interesse der Öffentlichkeit und der einschlägigen Forscher war.

Diese Studie betrachtet das Konzept und die Erhaltungsstrategien von urbanem landwirtschaftlichem Erbe. Sie legt Wert auf den Schutz sowie die Nutzung von Innovationen bei bestehenden Stätten urbanen landwirtschaftlichen Erbes, so dass spezifische landwirtschaftliche Traditionen an künftige Generationen weitergegeben werden können und gleichzeitig eine kulturelle Homogenisierung im Stadtentwicklungsprozess vermieden wird.

Zunächst stellt die Studie die aktuellen Arten und Merkmale des urbanen landwirtschaftlichen Erbes vor. Sie bietet das Konzept des urbanen landwirtschaftlichen Erbes aus Sicht der Manifestation sowie aus ökologischer, sozialer und ökonomischer Sicht.

Zweitens fasst die Studie anhand von drei internationalen Best-Practice-Beispielen in China (der urbane Traubengarten Xuanhua in der Provinz Zhangjiakou), Deutschland

(Urban Gardening in Bamberg) und Italien (traditionelle Gehöfte in der Weltstadt Mailand) den aktuellen Stand der Erhaltung des urbanen landwirtschaftlichen Erbes und ihrer Managementansätze zusammen. Nach dem Vergleich der Erhaltungsstrategien in verschiedenen Ländern formuliert diese Studie die Kriterien und das Verfahren zur Erkennung von Stätten urbanen landwirtschaftlichen Kulturerbes.

Schließlich wird Hangzhou in China als Praxisstandort verwendet. Es wird eine Gesamtstrategie zur Erhaltung und Entwicklung des urbanen landwirtschaftlichen Erbes vorgeschlagen, welche die Entwicklungsziele für verschiedene Stadtbezirke der Stadt formuliert. Dann wird auf der Grundlage des oben erwähnten Erkennungsverfahrens eine Stätte potenziellen urbanen landwirtschaftlichen Kulturerbes - das Ingweranbaugebiet Xiaolin - näher untersucht. Es werden mehrere Vorschläge unterbreitet, die in der Zukunft zur Erhaltung des urbanen landwirtschaftlichen Erbes und zur regionalen Entwicklung beitragen können.

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# 1 Introduction

*'In all areas of human endeavour, the past, present and future constitute a continuum. The history of agriculture and biodiversity conservation teaches us many lessons.'*

——Mankombu Sambasivan Swaminathan, 2017<sup>1</sup>

Since 2013, the Chinese Ministry of Agriculture (MOA) has selected 79 traditional agricultural production systems or landscapes as part of the China's National-Global Important Agricultural Systems (China-NIAHS). They represent the unique agricultural production systems created and inherited in the process of human development. However, few cases in or around the city are nominated in this official list: this raises the question of whether there is a relationship between urban agriculture (UA) and cultural heritage and whether this relationship needs to be discussed further.

Are there any specific strategies for exploring and promoting this kind of a site? The conservation approach to agricultural features, especially those in or around built-up areas, may be different from arable lands within the scope of rural areas. The intention of this thesis is to answer these questions.

Urban agriculture (UA) refers to agricultural practices in urban or peri-urban areas. This concept solves a variety of social and environmental issues, such as the decrease of farming land, the absence of natural resources and the food security crisis. Based on this issue, UA can be seen as an excellent tool for building up, designing and maintaining green and climate-active infrastructure. Furthermore, it can provide urbanites with high-quality recreational experiences, contributing significantly to sustainable cities.

In the recent years, a large number of researchers and experts have conducted an intense investigation of this topic and have achieved several goals in different research fields. However, after a literature review, it is obvious that there is a lack of study from a historical perspective. Is it possible and appropriate to explore the history of UA development? What is the reason and condition of the formation and development mechanism of UA? Can traditional UA sites or activities be identified as

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<sup>1</sup> In the book *Forgotten agricultural heritage: Reconnecting food systems and sustainable development* (1st Edition). Koohafkan, P., & Altieri, M. A. (Ed.). 2016. New York: Routledge. P xvi.

a type of heritage? Questions such as these inspired the author to discuss the linkage between UA promotion and heritage conservation.

As for heritage, this concept has been elaborated by a variety of institutional and non-institutional bodies at different levels, such as The United Nations Educational, Scientific and Cultural Organisation (UNESCO) and The International Council on Monuments and Sites (ICOMOS). Indeed, heritage is a complex concept that involves both tangible and intangible components: tangible heritage pertains to the material elements of the physical object, their historical authenticity, and their physical permanence over time; and intangible heritage pertains to the significance attributed by people to places, techniques and skills that have enabled the creation of landscapes and features dictated by economic and behavioural factors.

The relationship between heritage and UA is of particular relevance. The development process of UA has a long history, as agricultural landscapes around cities have always been a place of food production. Before the globalisation of the market during the second half of the 20<sup>th</sup> century, these places were the daily food suppliers for city dwellers: vegetables, fruits and dairy products were sold in the markets located in the main squares of the city. These types of UA heritage sites can be considered as a collective good with economic activities and are often exemplified as physical objects and areas influenced by agricultural land use in general, as well as in the sense of experience-based traditional knowledge of resource utilisation and management.

Today, in Asia, rapid urbanisation has led to a massive loss of farmlands and increased land fragmentation in the peri-urban area (Martellozzo et al., 2015). Especially in China, the area of agricultural land has been drastically reduced. However, the long history of agricultural civilisation in China cannot be neglected. The earliest evidence of Chinese agriculture can be traced back to 4000 BC (Zhou & Mair, 2006). It is widely considered that agriculture is of great importance to China as a vast agricultural country, and, to some extent, one can propose that the Chinese historical identity is based on a constant relationship with agriculture. Chinese scholar Min argues that Chinese farmers have carried out various agricultural practices suitable for different natural conditions, while creating a variety of agricultural heritage (Min, Dan, He, & Sun, 2011). In ancient China, markets and vegetable patches often existed in the city such as royal palaces and folk courtyards (N. Gao, 2015). At present, it is obvious that numerous potential UA heritage sites have been overlooked.

Scholars Yang and Cai point out that the demand for UA in most Chinese cities (especially metropolises) is focused on fulfilling the functions of sightseeing, recreation, and environmental protection (Yang & Cai, 2006). Many examples can be provided, such as the Chuangzhi community garden in Shanghai (Fig. 1-1) and the agricultural landscape at Shenyang Agricultural University campus designed by Kongjian Yu (Fig. 1-2). However, there are no cases where existing UA actions are combined with heritage conservation.



Fig. 1-1 Chuangzhi community garden in Shanghai.

Source: <http://www.yogeev.com/article/72506.html>. Accessed 30 August 2020.



Fig. 1-2 Shenyang Agricultural University campus.

Source: <https://www.turenscape.com/project/detail/324.html>. Accessed 30 August 2020.

## 1.1 Research questions and overall outline

Considering the current issues, especially in China, this research aims to describe the link between urban agriculture and heritage. The primary research questions are as

follows:

- What is the relationship between urban agriculture and heritage?
- What is the benefit, or benefits, of preserving UA heritage and how can one identify ways to recognise it?
- What is the appropriate approach to analyse UA heritage?
- What are the current preservation and development methods?
- What are the strategies for the preservation actions?

These specific questions will be answered as the results of this research (Fig. 1-3).

Point of departure is an examination of how heritage is defined by the actors studied through an analysis of value judgements in central concepts such as ‘heritage’ and ‘urban agriculture’. The approach includes all aspects of agricultural practice: tangible heritage and imprints in our surroundings (from objects, artefacts, and sites, to landscapes) and intangible heritage, such as specific knowledge of farming and management of natural resources.

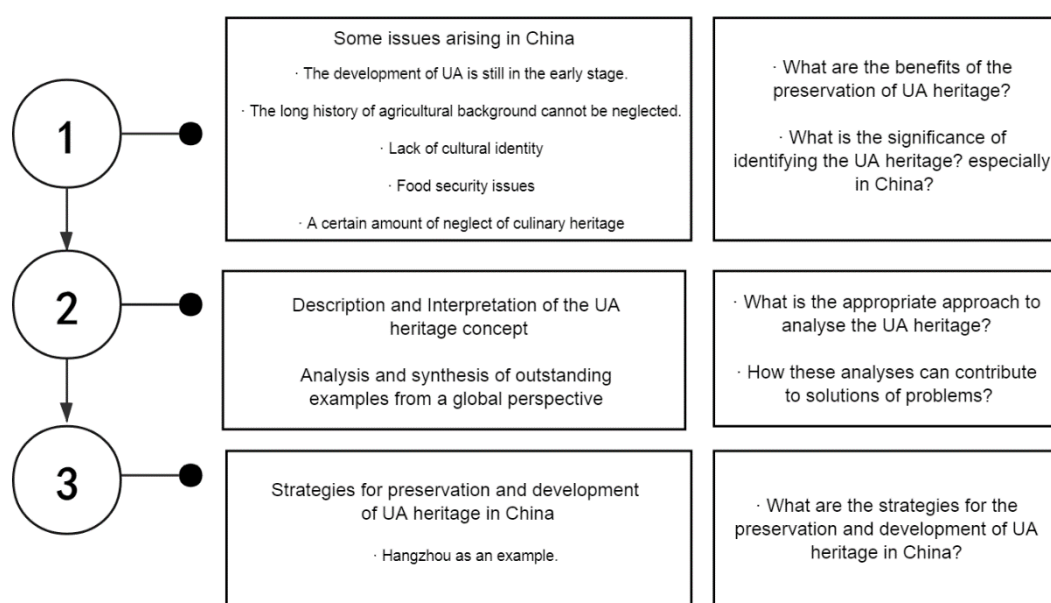


Fig. 1-3 Research questions of the thesis

In the view of the current social and ecological issues in China, this research introduces and expounds UA and heritage separately in Chapter 1 through a literature review. Then, the concept of UA heritage (including four characteristic dimensions) and a research methodology will be put forward in Chapters 2. Chapters 3 to 6 provide some practices that are excellent in order to explain how UA heritage has been identified in the past and their corresponding management approaches. Then the author explores the preservation and development method of UA heritage in Chapter 7.

Finally, in Chapter 8, the study takes Hangzhou as an example and proposes strategies for supporting the preservation of UA heritage. The overall outline can be seen in the figure below (Fig. 1-4).

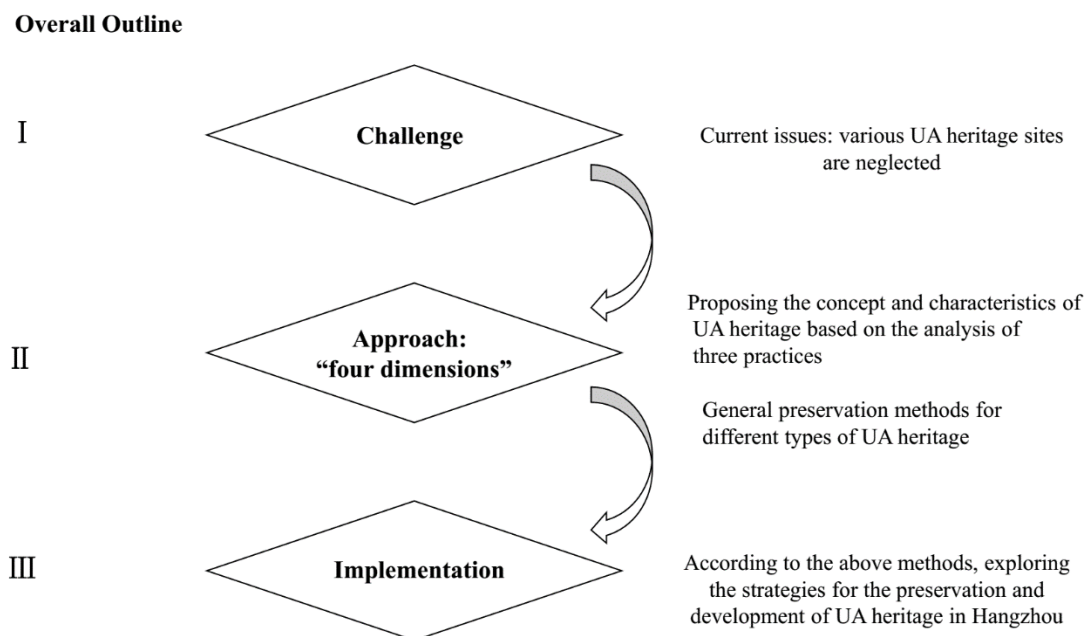


Fig. 1-4 The overall outline of the thesis

A lack of understanding of the UA heritage concept is not conducive to protecting traditional agricultural systems, agricultural ancient, and farming culture remains. Currently, research on UA heritage is in the preliminary stage. Thus, there is neither a unified conclusion on the basic theory nor adequate research on the topic. Additionally, there are few researchers in this field of study, which further underlines the relevance of this Ph.D. thesis.

## 1.2 Current status of relevant research

### 1.2.1 Urban agriculture

Currently, UA takes place in countless cities. According to the Food and Agriculture Organisation (FAO), UA includes ‘commercial operations that produce food in greenhouses and in open spaces; such production takes place on rooftops, community gardens, and public spaces’. The narrow definition used here deliberately excludes some of the crucial aspects of urban agriculture, such as fisheries, and the specific circumstances of peri-urban agriculture, which is frequently a more intensive variety

of rural agriculture. The interaction between the ecological system and urban economics has been established through UA development. Additionally, UA can be considered as a component of the urban food system, competing for land with other urban functions and influenced by urban policies and plans. It also contributes to the utilisation of public resources, such as organic waste compost recycling.

The definition of UA from the RUAF<sup>2</sup> has some similarities to FAO. UA is regarded as a component of Urban and Peri-urban Agriculture (UPA), which is defined as ‘the growing of plants and the raising of animals within and around cities’(RUAF, 2020). However, Mougeot argued that UA has both intra-urban and peri-urban characteristics (Msougeot, 2000). A similar definition of UA can also be found in the *Urban Agriculture Europe* published in 2015 (Lohrberg et al. Eds., 2015). The author argues that the definition proposed in the book is complete and comprehensive. This definition can be applied to the interpretation of UA in this thesis. It is shown in the text below:

*‘Urban Agriculture spans all actors, communities, activities, places, and economies that focus on biological production in a spatial context, which—according to local standards— is categorized as “urban”. Urban Agriculture takes place in intra- and peri-urban areas, and one of its key characteristics is that it is more deeply integrated in the urban system compared to other agriculture. Urban Agriculture is structurally embedded in the urban fabric; it is integrated into the social and cultural life, the economics, and the metabolism of the city.’*

The earliest and most systematic theoretical research on the layout of urban agricultural production is the agricultural location theory, which was proposed by German economist von Thünen: in 1826, he proposed a detailed analysis of the reasonable distribution of agricultural production in the city (Tran, 2018). Thünen assumed that spheres of agricultural production of six concentric circles will be formed in the plains in the outskirts of the city. Each circle has its own main products and farming systems. von Thünen rings have been well interpreted by Researcher Kathrin Fischer. She argues that dairy production and intensive farming should be found in the first ring. The second ring primarily contains firewood production. Crops (e.g. corn, wheat, and rice) could be found in the third ring. This ring can be subdivided into three circles, which include, from the inside to the outside, crop rotation, crop farming with fallow and pastures, as well as three-field system. The

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<sup>2</sup> The RUAF is a Global Partnership on Sustainable Urban Agriculture and Food Systems. It mainly supports the development of sustainable and resilient urban agriculture and city region food systems. Sources: <https://ruaf.org/what-we-do/>. Accessed 5 May 2021.



fourth ring shall be devoted to stock farming (Fig. 1-5) (Fischer, 2011).

Although this assumption is an ideal model, this circle pattern of agricultural production can still be found not only in the periphery of many large cities but also in small zones such as neighbourhoods and city blocks (Nolen, 2014). All things considered, Thünen's theory fully explains the dominance of horticultural production near cities, although it is widely acknowledged that modern transport has diminished the significance of the model. Thünen's theory is the essential concept for the development of UA.

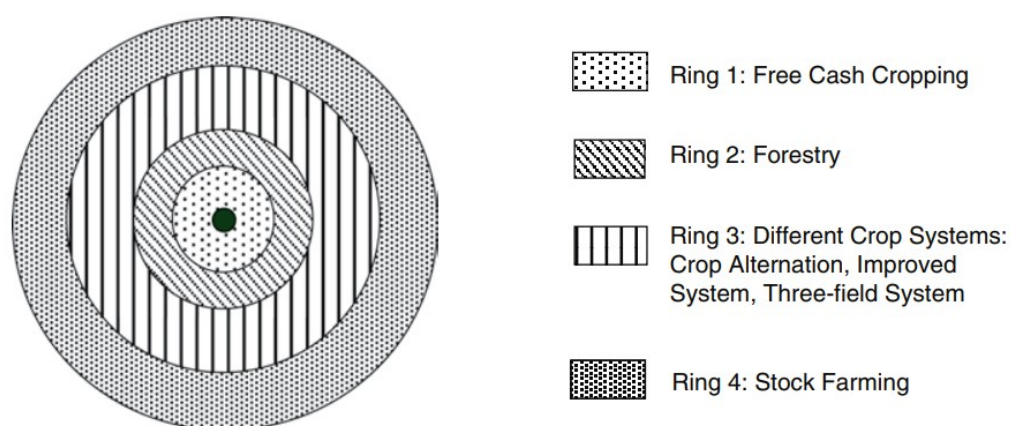


Fig. 1-5 von Thünen rings generalised by Kathrin Fischer (Fischer, 2011). P477.

In terms of the UA spatial structure, three theories elaborate it comprehensively. They include Continuous Productive Urban Landscapes (CPULs), Food Urbanism, as well as Agrarian Urbanism.

CPULs is a design concept that promotes the coherent introduction of interconnected and productive landscapes into the city. It was first proposed by architects Katrin Bohn and Andre Viljoen in 2005. According to their viewpoints, productive landscapes can be considered an essential component of sustainable urban infrastructure, and the theory proposes an urban planning and design strategy from the perspective of planning, architecture and landscape (Bohn & Viljoen, 2011).

CPULs promotes the introduction of farmlands into the city and creates multi-functional open urban space networks. By growing food in the built-up area rather than only in the rural environment, UA can reduce the need for industrialised production and packaging food products to city-dwelling consumers. The spatial network of productive urban landscapes consists of recreational or commercial spaces,

parks, urban forests, natural habitats, ecological corridors, as well as bicycle lanes.

In 2009, Andres Duany proposed the concept of Agrarian Urbanism (Czałczyńska-Podolska & Rzeszotarska-Pałka, 2016). He suggested that ‘the community contracts out to a second party to provide the food’, which highlighted the function of the everyday work of the local community. This concept encourages the development of a sustainable community around food production and sales, promotes the reduction of food miles and ensures residents with food independence and survivability. It further advocates the cropping pattern of small farms and yard gardens, such as container gardens in window boxes, rooftop gardens and community gardens for the sustenance and pleasure of all residents in or around the city (Hurst, 2013).

Andres Duany and Elizabeth Plater-Zyberk attempted to categorise UA activities and forms spatially. The research results show that from natural areas to the downtown area, the city can be divided into six zones: natural, rural, suburban, general urban, urban centre, as well as urban core (DPZ CoDesign, 2016) (Fig. 1-6). Each zone has different planting species and patterns of UA. Duany believes that Agrarian Urbanism can significantly balance the diversity of nature and socio-economics between urban and rural areas.



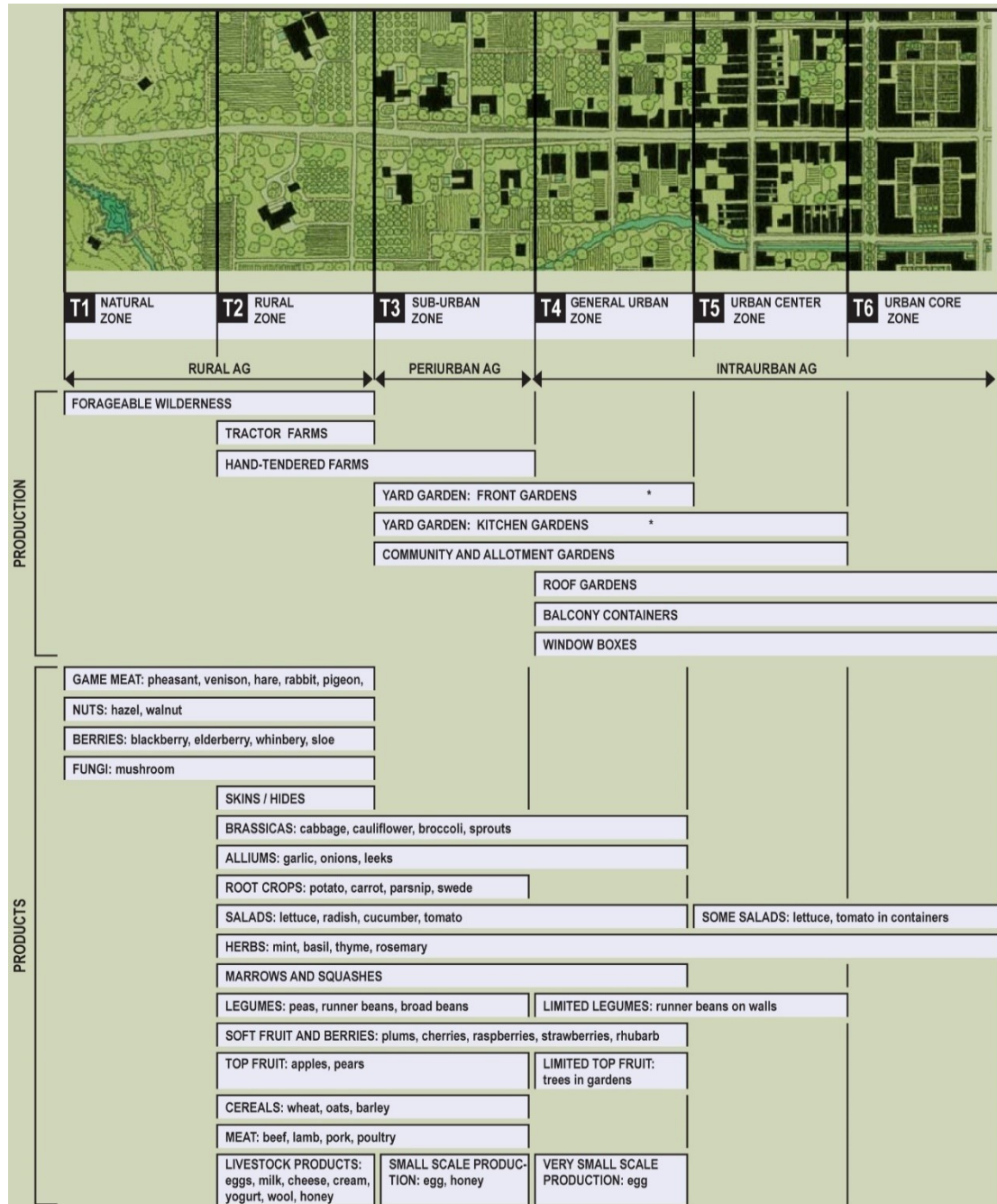


Fig. 1-6 A typical example of Agrarian Urbanism proposed by Andres Duany. In this image, each method of food production has been arranged appropriately. In general, the agricultural land around the city has been preserved in large areas, and UA takes the specific form of grazing, growing cereals, herbs, fruit, etc. In the city, spaces in residential yards, balconies, roofs, and driveways are fully utilised. UA is found in the form of yard (kitchen) gardens, balcony containers, window boxes, etc.

Source: DPZ CoDesign, 2016<sup>3</sup>.

<sup>3</sup> The original link <https://www.dpz.com/Initiatives/AgrarianUrbanism> (Accessed 3 December 2019) to the DPZ has expired in 2021. Please check <https://newhavenurbanism.wordpress.com/new-haven-planning/future-for-greater-new-haven/when>

Food Urbanism, a similar theory, was first systematically discussed in the book *Food Urbanism - A Sustainable Design Option for Urban Communities* by Jason Grimm in 2009 (Grimm, 2009). It argues that the food system is the foundation of urban development: this theory primarily aims to promote sustainable urban development and urban food security, which emphasises using as many available urban spaces as possible to produce food, including green spaces, public buildings, factories, and rooftops (Verzone, 2011). All individuals, associations and public administrations can be involved, instead of only professional farmers or local communities in the primary sector. For the urban spatial typology, with regard to Grimm's research, six different prototypes have been mentioned in Fig. 1-7. Moreover, the urban food system typology can be created with a variety of attributes.

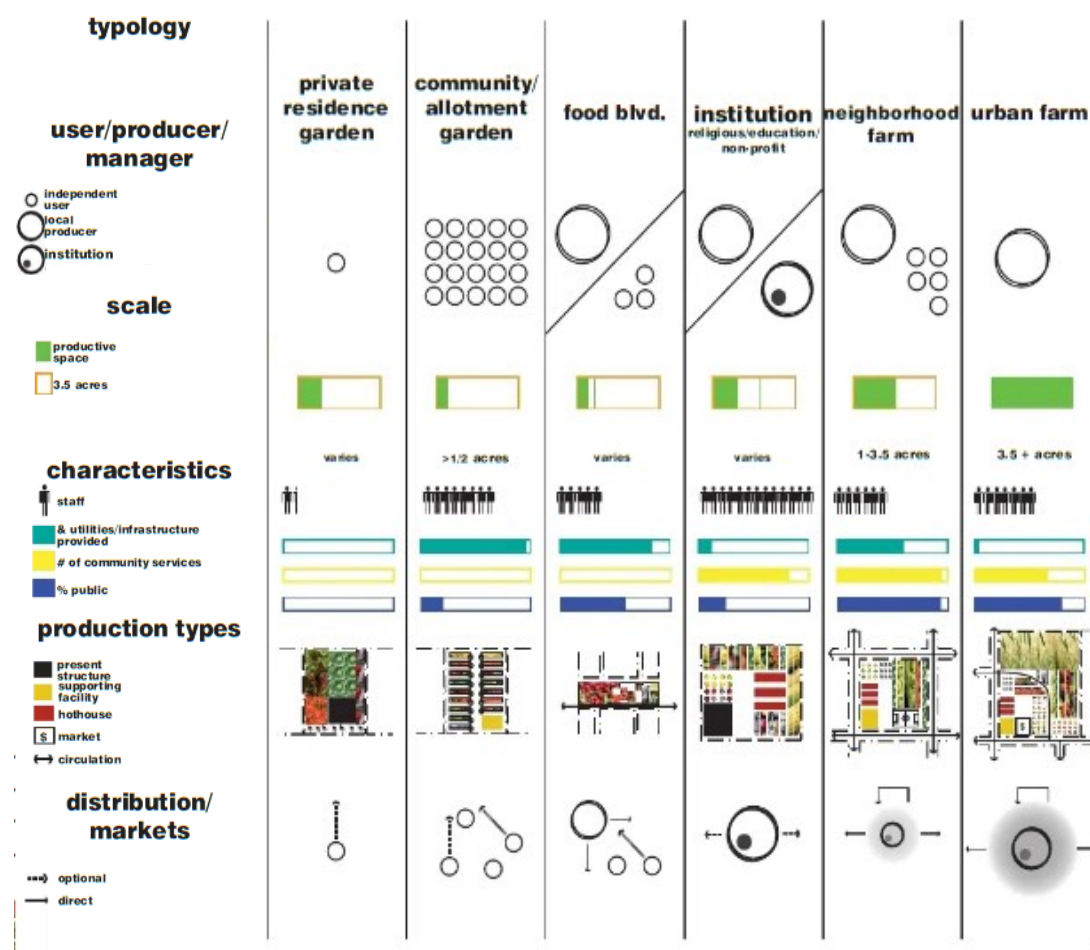


Fig. 1-7 Urban food system typology based on the Food Urbanism theory.

Source: Grimm, 2009. P32.

Another representative typology of UA was expounded in the *Urban Agriculture*

*Europe* published in 2015. This book has summarised typical UA types in Europe systematically (Lohrberg et al. Eds., 2015). In this book, the authors mainly divided the types of UA into two levels. One is ‘urban food gardening’ with low economic dependence on material outputs. This type of UA primarily uses the production of food for achieving other goals, such as creating a positive impact on society. It contains allotment gardens, family gardens, squatter gardens, educational gardens, therapeutic gardens, as well as community gardens. The other type is ‘urban farming’, which mainly consists of business models through dealing in local agricultural products or supporting services. It mostly exists as business practices with the intention of making a profit. This type of UA primarily includes leisure and educational farms, social farms, therapeutic farms, cultural heritage farms, experimental farms, local food farms, as well as environmental farms (Fig. 1-8).

## Gardening Level

### Urban Food Gardening

#### Individual Production



#### Collective Production



## Farming Level

### Urban Farming

#### On-site Experience



#### Flows



Fig. 1-8 Typology of urban agriculture in Europe. Source: Lohrberg et al. Eds., 2015. P23.

Regarding UA practices around the globe, the phenomenon of UA has appeared in a variety of countries, such as Europe, the U.S., and Japan. From the many theories that currently exist, it is obvious to see that UA is quite diverse and multi-scalar. The prevalence of UA inspires the author to explore more features and functions of UA.

### 1.2.2 Heritage

*‘The heritage of landscape is never inert, people engage with it, re-work it, appropriate it and contest it. It is part of the way identities are created and disputed, whether as individual, group or nation state.’*

Barbara Bender, 1993

Several definitions of ‘heritage’ have been declared by various organisations across the globe (Ahmad, 2006). However, concerning the concept of UA heritage, three essential organisations should be highlighted: UNESCO, ICOMOS, and FAO. UNESCO and ICOMOS principally focus on heritage preservation, such as the promotion of the establishment of the World Heritage (WH) list. Unlike the previous two organisations, FAO primarily emphasises food security, and specific items including agriculture, forestry, fisheries and almost all agricultural industries (GIAHS/FAO, 2021).

The selection criteria and evaluation standards proposed by the above mentioned world authoritative institutions are of significance, as they can help researchers understand the meaning of UA heritage in depth. Furthermore, after comparison, the retrospective study for each organisation cannot be neglected. For instance, the first version of *the Operational Guidelines for the Implementation of the World Heritage Convention* (hereafter referred to as Operational Guidelines) was produced in 1977 and has been revised almost every year in order to meet social demands and their cultural cognition of different ages.

UNESCO and ICOMOS both aim to protect the world’s cultural and natural heritage. UNESCO describes ‘heritage’ from an international perspective, and the whole procedure from protecting to managing WH sites is extraordinarily complex and rigorous (Kaldun & Rössler, 2011) (Fig. 1-9). As a precise recognition standard, the Outstanding Universal Value (OUV) plays a leading role in guiding the coordinators to measure whether the site meets the WH list (UNESCO, 2005a). The evolving process of the OUVs reflects the changing concept of world heritage conservation. The OUV content between 1977 and 2017 is compared in Table 1-1.



# World Heritage Convention

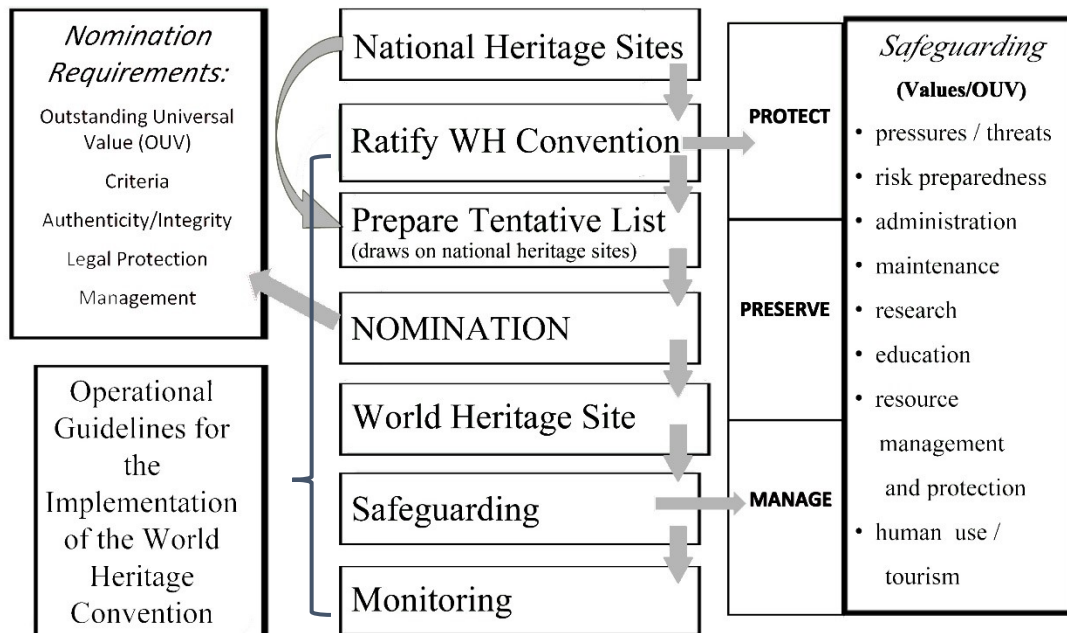


Fig. 1-9 Guideline for the Implementation of the World Heritage Convention.

Source: Kaldun & Rössler, 2011.

Table 1-1 Evolving process of the OUV (in 1977 and 2017)

| Operational Guidelines (1977) <sup>4</sup>                                                                                              | Operational Guidelines (2017) <sup>5</sup>                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| ‘(i) ... <b>artistic</b> or aesthetic achievement, a masterpiece...;’                                                                   | ‘(i) ...a masterpiece of human creative genius ...’                                                                                                      |
| ‘(ii) ... <b>exerted considerable influence</b> ...in architecture, monumental sculpture, garden and landscape design, related arts...’ | ‘(ii) <b>important interchange of human values</b> ...architecture or <b>technology</b> , monumental arts, <b>town-planning</b> or landscape design ...’ |
| ‘(iii) ...unique, extremely rare...of great antiquity...’                                                                               | ‘(iii) ... at least <b>exceptional testimony</b> ...;’                                                                                                   |
| ‘(iv) ...the type... important cultural, social, artistic, scientific, technological or industrial development...’                      | ‘(iv) be an outstanding example of a type of building, architectural or technological ensemble or <b>landscape</b> ...;’                                 |
| ‘(v)...architecture, method of construction, or human settlement...’                                                                    | ‘(v) ...a traditional <b>human settlement</b> , <b>land-use</b> ... <b>sea-use</b> ... a culture (or cultures),                                          |

<sup>4</sup> UNESCO. Source: <http://whc.unesco.org/archive/out/opgu77.htm>. Accessed 5 March 2019.

<sup>5</sup> UNESCO. Source: <http://whc.unesco.org/document/163852>. Accessed 5 March 2019.

| Operational Guidelines (1977) <sup>4</sup>                                                                                                                          | Operational Guidelines (2017) <sup>5</sup>                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                     | <i>or human interaction with the environment...</i>                                                                                                                                                        |
| <i>‘(vi) ...associated with ideas or beliefs, with events ... persons...of outstanding historical importance...’</i>                                                | <i>‘(vi) ...associated with <b>events or living traditions, with ideas... beliefs...artistic and literary works...</b>’</i>                                                                                |
| <i>‘(i) ...representing ... the earth's evolutionary history...include sites which represent ...geological history...’</i>                                          | <i>‘(vii) ...natural phenomena or areas of exceptional natural <b>beauty</b> and <b>aesthetic</b> importance...’</i>                                                                                       |
| <i>‘(ii) ...on-going geological processes, biological evolution and man's interaction with his natural environment...’</i>                                          | <i>‘(viii) ... major stages of <b>earth's history</b>...the record of life...on-going geological processes ...geomorphic or physiographic features...’</i>                                                 |
| <i>‘(iii) ...natural phenomena...eco-systems...natural features...spectacles...sweeping vistas... exceptional combinations of natural and cultural elements...’</i> | <i>‘(ix) ...on-going ecological and biological <b>processes</b> in the evolution and development of terrestrial, fresh water, coastal and marine eco-systems ... communities of plants and animals...’</i> |
| <i>‘(iv) ...habitats where populations of rare or endangered species of plants and animals still survive...’</i>                                                    | <i>‘(x) ...natural habitats for in-situ conservation of biological <b>diversity</b>...i’</i>                                                                                                               |

According to the OUV evolution, on the one hand, the definition of heritage has been expanded: from a ‘unique artwork’ to a type of ‘exceptional tradition’. Many new items have been considered, such as technology and town-planning. On the other hand, apart from the natural and cultural heritage, several correlative concepts have been proposed over the past years, including ‘cultural landscape’ and ‘intangible cultural heritage’ (Table 1-2). By the end of 2014, 33 agricultural properties were considered as the ‘cultural landscape’ in the WH lists (GIAHS/FAO, 2015)<sup>6</sup>. By the end of 2017, there were 150 sites listed under the category of 'technological & architectural properties' in the WH list (Albert, 2017). The majority of the nominated projects are situated in Europe or North America.

<sup>6</sup> ‘Cultural landscape’ by UNESCO is formed as a result of combined work of man and nature. Many agricultural producing areas have been designated as cultural landscapes. According to Professor Min and Professor Lu’s research, FAO made a list which summarised WH sites related to agricultural properties by 2014 (the category of ‘cultural landscape’).

Table 1-2 Concepts related to ‘heritage’ and ‘cultural landscape’ by UNESCO

| Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Source                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Article 1 &amp; 2</p> <p><i>‘...cultural heritage...:</i></p> <p><i><b>monuments:</b> architectural works, works of monumental sculpture and painting, elements or structures ...</i></p> <p><i><b>groups of buildings:</b> ... groups of separate or connected buildings... because of their architecture, their homogeneity or their place in the landscape...</i></p> <p><i><b>sites:</b> ...works of man or the combined works of nature and man...including archaeological sites...’</i></p> <p><i>‘...natural heritage...:</i></p> <p><i>...consisting of physical and biological formations or groups...</i></p> <p><i><b>geological and physiographical formations</b></i></p> <p><i><b>natural sites</b> or precisely delineated natural areas...’</i></p> | <p>Convention Concerning the Protection of the <b>World Cultural and Natural Heritage</b>, UNESCO, 1972. Paris</p>                                                                                                       |
| <p>Chapter 1</p> <p><i>‘A clearly defined landscape is one designed and created intentionally by man...embraces garden and parkland landscapes characteristically constructed for aesthetic, social and recreational reasons which are often associated with religious or other monumental buildings and ensembles...’</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>World Heritage <b>Cultural Landscapes</b> 1992-2002,<br/>Published in 2003 by UNESCO<br/>World Heritage Centre</p>                                                                                                    |
| <p>Intangible cultural heritage</p> <p>Article 2:2</p> <p><i>‘...The practices, representations, expressions, knowledge, skills...instruments, objects, artefacts and cultural spaces associated there with—that communities, groups ...transmitted from generation to generation...in response to their environments, their interaction with nature and their history, and provides them with a sense of identity and continuity...’</i></p>                                                                                                                                                                                                                                                                                                                          | <p>UNESCO. Convention for the Safeguarding of the <b>Intangible Cultural Heritage</b>. 32nd Session of the General Conference, Paris, 2003.</p>                                                                          |
| <p><i>‘...the cohesion and value ... from the <b>archaeological, architectural, prehistoric, historic, scientific, aesthetic, socio-cultural or ecological point of view....that include land uses and patterns, spatial organization, visual relationships, topography and soils, vegetation, and all elements of the technical infrastructure...</b>’</i></p>                                                                                                                                                                                                                                                                                                                                                                                                        | <p>Vienna Memorandum on ‘World Heritage and Contemporary Architecture – Managing the <b>Historic Urban Landscape</b>’.</p> <p>UNESCO. 15<sup>th</sup> session of the General Assembly of States Parties, Paris, 2005</p> |



As one of the UNESCO's technical-scientific committees, both ICOMOS's charters and doctrinal texts and the development process are quite similar to UNESCO. Table 1-3 shows the comparison results of ICOMOS doctrinal texts between 1964 and 2017<sup>7</sup>.

Table 1-3 Relevant charters & principles by ICOMOS (1964-2017)

| Progress                                                                                                                                 | Contents                                                                                                                                                                                                                                                                                                                                                                                           | Source                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>I Original definition of the Monument was proposed.</b>                                                                               | Monument: <i>‘... not only the single architectural work but also the urban or rural setting...’</i>                                                                                                                                                                                                                                                                                               | International Charter for the Conservation and Restoration of Monuments and Sites (the Venice Charter), 1964      |
|                                                                                                                                          | Article 3:<br><i>‘... Monument shall include all real property.....having archaeological, architectural, historic or ethnographical interest. Site shall be ... either natural or man-made, or combinations of the two.....’</i>                                                                                                                                                                   | ICOMOS, Report on the constitutive assembly held in Waarsaw, 1965                                                 |
| <b>II During this period, ICOMOS started to add environmental and social factors into their documents.</b>                               | Article 3:<br><i>‘.....As a monument, the historic garden must be preserved in accordance with the spirit of the Venice Charter...’</i>                                                                                                                                                                                                                                                            | ICOMOS, Florence Charter, 1982                                                                                    |
|                                                                                                                                          | Article 1:<br><i>‘...all <b>urban communities</b>.....are an expression of the diversity of societies throughout history...’</i>                                                                                                                                                                                                                                                                   | ICOMOS, Washington Charter, 1987                                                                                  |
| <b>III Definition of heritage has been extended to multiple fields. (in particular, the proportion of landscape has been increased).</b> | Cultural Heritage Sites:<br><i>‘... a place, locality, natural landscape, settlement area, architectural complex, archaeological site, or standing structure... as a place of historical and cultural significance...’</i>                                                                                                                                                                         | ICOMOS, Charter on the Interpretation and Presentation of Cultural Heritage Sites, 2008                           |
|                                                                                                                                          | Historic towns and urban areas:<br><i>‘.....are made up of tangible and intangible elements. The tangible elements include... urban structure, architectural elements... <b>landscapes</b>... archaeological remains, panoramas, skylines, view - lines and landmark sites. Intangible elements include activities, symbolic and historic functions, cultural practices, traditions, memories,</i> | 2008, The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas, 2011 |

<sup>7</sup> The contents of Table 1-3 have been summarised based on Yahaya Ahmad's contribution.

| Progress                                                                                                     | Contents                                                                                                                                                                                                                                                                                          | Source                                                                  |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|                                                                                                              | <i>and cultural references...'</i>                                                                                                                                                                                                                                                                |                                                                         |
| <b>IV For the first time, the concept of heritage was extended to the agricultural landscape officially.</b> | <b>Rural landscape as heritage:</b> <i>'Refers to the tangible and intangible heritage of rural areas. Rural landscape... encompasses physical attributes...includes associated cultural knowledge, traditions, practices, expressions of local human communities' identity and belonging...'</i> | ICOMOS-IFLA principle:<br>Concerning Rural Landscapes as Heritage, 2017 |

The evolutionary process, as shown in Table 1-3, illustrates that the definition of heritage from ICOMOS has improved: more features related to agricultural heritage have been taken into consideration. For instance, in 2010, the International Day for Monuments and Sites Theme has been dedicated to agricultural heritage (ICOMOS, 2012).

In short, when recognising agricultural heritage from an international perspective, two different categories have been noted by UNESCO and ICOMOS (Fig. 1-10). The cultural landscape category, and some mixed natural and cultural heritage sites, highlight the connection between human activities and resource utilisation, especially the strong resemblance between agronomic practices, such as plantations, terraces, irrigation systems, farmhouses and agricultural systems.

Both UNESCO and ICOMOS noted the intangible value of agricultural heritage (for example, local activities from peasants, agronomy). However, due to globalisation and modernisation, indigenous knowledge of agriculture, as well as immaterial heritage, still lack widespread social concerns (Koochafkan & Altieri, 2016). Hence, it is crucial to conserve these non-object legacies. There is no doubt that the promotion of UA heritage can address this type of problem.

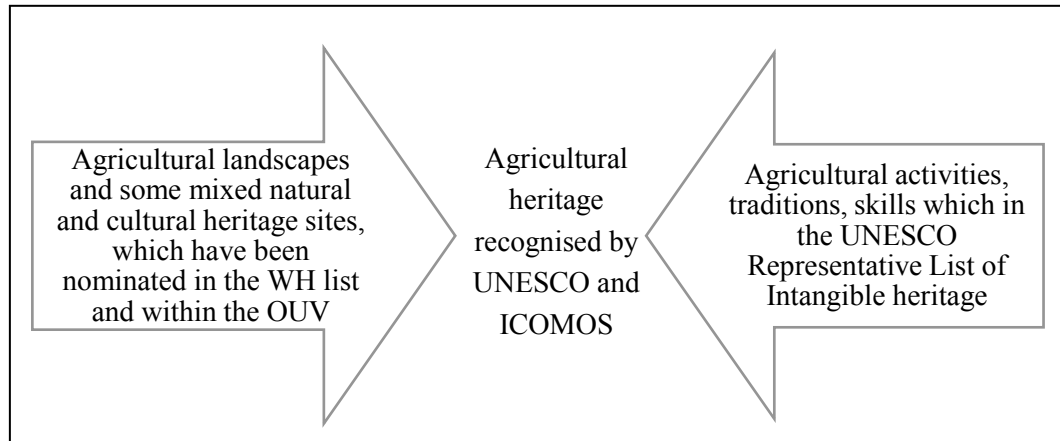


Fig. 1-10 Two different categories of agricultural heritage mentioned by UNESCO and ICOMOS. Source: Koohafkan & Altieri, 2016.

As for FAO, since 2002, it has paid attention to traditional agriculture, such as the proposition of the Globally Important Agricultural Heritage Systems (GIAHS) Programme (Fig. 1-11). GIAHS reflects local traditional features: traditional farming methods, technologies, and endemic species. Instead of the typical concept of a protected zone or agricultural landscape, it can be considered a dynamic system and includes human activity, environment, agronomic traits, and agrobiodiversity (GIAHS/FAO, 2018b).

The main goal of this program is to protect the outstanding agricultural systems that are threatened by a crisis, for example, environmental contamination, climate change and excessive exploitation of natural resources. By June 2021, 59 sites around the world have been nominated in the GIAHS list. Their valuable cultural, ecological, and agricultural diversity values have been fully inherited and supported. (GIAHS/FAO, 2018b). Unfortunately, the author's statistics indicate that few heritage sites included in the list are currently located within the urban limits (Table 1-4).

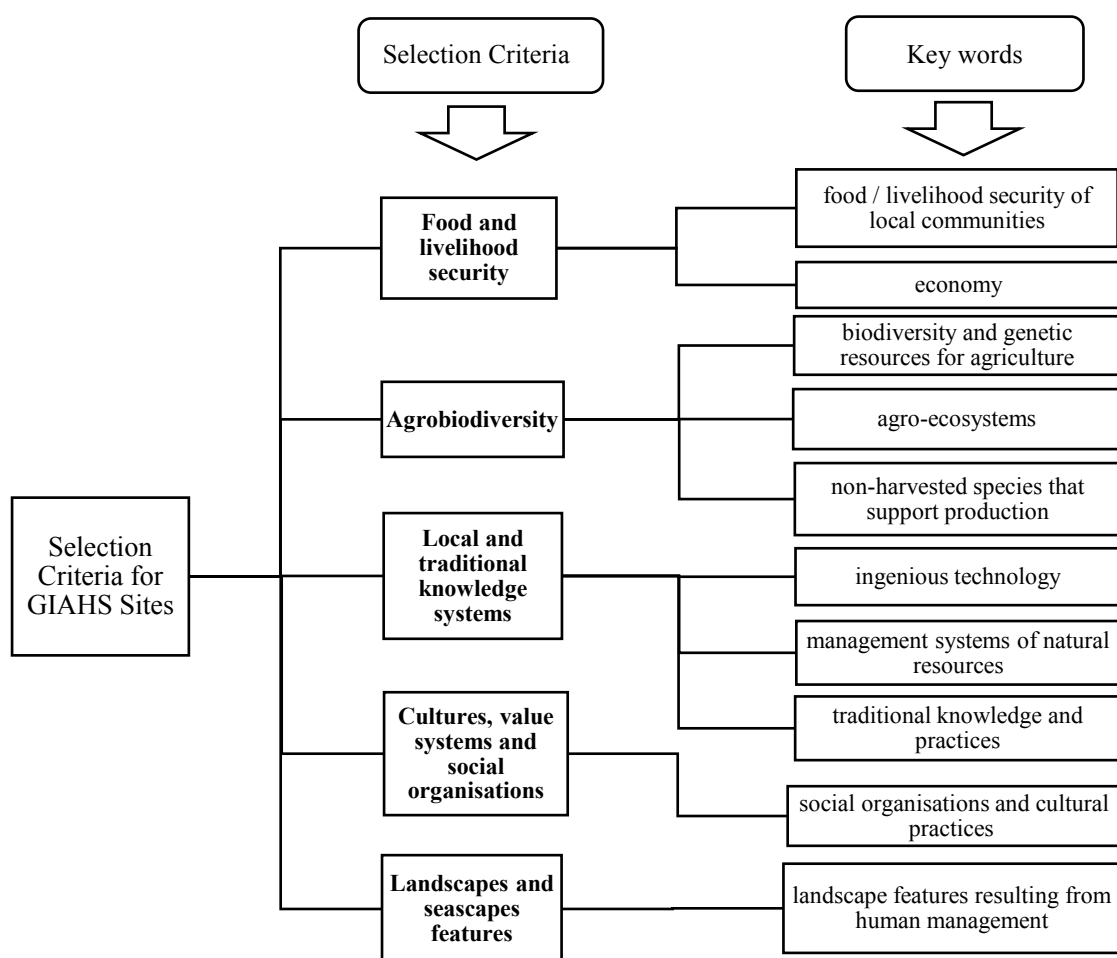


Fig. 1-11 Criteria for the selection of GIAHS Sites. Source: GIAHS/FAO, 2021.

Table1-4 List of GIAHS Programmes (by June 2021) and identification of their location (urban scope)

| Continent            | Country           | Name                                                          | Urban area |
|----------------------|-------------------|---------------------------------------------------------------|------------|
| Africa               | Kenya             | Oldonyonokie/Olkeri Maasai Pastoralist Heritage               |            |
|                      | Tanzania          | Engaresero Maasai Pastoralist Heritage Area                   |            |
|                      |                   | Shimbwe Juu Kihamba Agro-forestry Heritage Site               |            |
| Asia and the Pacific | Bangladesh        | Floating Garden Agricultural Practices                        |            |
|                      | India             | Koraput Traditional Agriculture                               |            |
|                      |                   | Kuttanad Below Sea Level Farming System                       |            |
|                      | Iran              | Qanat Irrigated Agricultural Heritage Systems, Kashan         |            |
|                      |                   | Qanat-based Saffron Farming System in Gonabad                 | +          |
|                      |                   | Grape Production System in Jowzan Valley                      |            |
|                      | Republic of Korea | Traditional Gudeuljang Irrigated Rice Terraces in Cheongsando |            |

| Continent          | Country  | Name                                                                               | Urban area |
|--------------------|----------|------------------------------------------------------------------------------------|------------|
|                    |          | Jeju Batdam Agricultural system                                                    |            |
|                    |          | Traditional Hadong Tea Agrosystem in Hwagae-myeon                                  |            |
|                    |          | Geumsan Traditional Ginseng Agricultural System                                    |            |
|                    |          | Damyang Bamboo Field Agriculture System                                            |            |
|                    | Japan    | Noto's Satoyama and Satoumi                                                        | +          |
|                    |          | Sado's Satoyama in Harmony with Japanese Crested Ibis                              |            |
|                    |          | Traditional Tea-grass Integrated System in Shizuoka                                |            |
|                    |          | Managing Aso Grasslands for Sustainable Agriculture                                |            |
|                    |          | Kunisaki Peninsula Usa Integrated Forestry, Agriculture and Fisheries System       |            |
|                    |          | Ayu of the Nagara River System                                                     |            |
|                    |          | Minabe-Tanabe Ume System                                                           |            |
|                    |          | Takachihogo-Shiibayama Mountainous Agriculture and Forestry System                 |            |
|                    |          | Osaki Kôdo's Traditional Water Management System for Sustainable Paddy Agriculture |            |
|                    |          | Nishi-Awa Steep Slope Land Agriculture System                                      |            |
|                    |          | Traditional Wasabi Cultivation in Shizuoka                                         |            |
|                    | China    | Rice Fish Culture                                                                  |            |
|                    |          | Wannian Traditional Rice Culture                                                   |            |
|                    |          | Hani Rice Terraces                                                                 |            |
|                    |          | Dong's Rice Fish Duck System                                                       |            |
|                    |          | Pu'er Traditional Tea Agrosystem                                                   |            |
|                    |          | Aohan Dryland Farming System                                                       |            |
|                    |          | Kuaijishan Ancient Chinese Torreya                                                 |            |
|                    |          | Urban Agricultural Heritage – Xuanhua Grape Garden                                 | ++         |
|                    |          | Jiaxian Traditional Chinese Date Gardens                                           |            |
|                    |          | Xinghua Duotian Agrosystem                                                         |            |
|                    |          | Jasmine and Tea Culture System of Fuzhou City                                      | +          |
|                    |          | Huzhou Mulberry-dyke and Fish Pond System                                          |            |
|                    |          | Diebu Zhagana Agriculture-Forestry-Animal Husbandry Composite System               |            |
|                    |          | Xiajin Yellow River Old Course Ancient Mulberry Grove System                       |            |
|                    |          | Rice Terraces in Southern Mountainous and Hilly areas                              |            |
| Europe and Central | Portugal | Barroso Agro-sylvo-pastoral System                                                 |            |

| Continent                       | Country              | Name                                                                                | Urban area |
|---------------------------------|----------------------|-------------------------------------------------------------------------------------|------------|
| Asia                            | Italy                | Olive Groves of the Slopes between Assisi and Spoleto                               |            |
|                                 |                      | Soave Traditional Vineyards                                                         |            |
|                                 | Spain                | The Agricultural System of Valle Salado de Añana                                    |            |
|                                 |                      | Malaga Raisin Production System in La Axarquía                                      |            |
|                                 |                      | The Agricultural System Ancient Olive Trees Territorio Sénia                        |            |
|                                 |                      | Historical Irrigation System at l'Horta de València                                 | +          |
| Latin America and the Caribbean | Brazil               | Traditional Agricultural System in the Southern Espinhaço Range, Minas Gerais       |            |
|                                 | Chile                | Chiloé Agriculture                                                                  |            |
|                                 | Peru                 | Andean Agriculture                                                                  |            |
|                                 | Mexico               | Chinampa system in Mexico                                                           | ++         |
| Near East and North Africa      | Algeria              | Ghout Oasis system El Oued                                                          |            |
|                                 | Egypt                | Siwa Oasis                                                                          |            |
|                                 | United Arab Emirates | Al Ain and Liwa Historical Date Palm Oases, United Arab Emirates                    | +          |
|                                 | Morocco              | Oases System in Atlas Mountains                                                     |            |
|                                 |                      | Argan-based agro-sylvo-pastoral system within the area of Ait Souab-Ait and Mansour |            |
|                                 | Tunisia              | Gafsa Oases                                                                         |            |
|                                 |                      | Hanging gardens from Djebba El Olia                                                 |            |
|                                 |                      | Ramli agricultural system in the lagoons of Ghar El Melh                            |            |

\* + indicates that the site is located in the peri-urban area, or part of the site is in the urban or peri-urban area.

++ indicates that the site is distributed within the urban area.

After comparing the above three organisations and their corresponding plans (Table 1-5), the similarity among them seems clear: they all concentrate on the inheritance of tradition, both tangible and intangible. However, there is still an apparent difference: the outstanding value (OUV) is required when UNESCO and ICOMOS evaluate the heritage value. On the contrary, during the evaluation process of the GIAHS sites, the personnel involved do not use extremely rigorous and detailed indicators to assess the heritage value of candidate sites in-depth. Because FAO is an agency that concentrates more on efforts to defeat hunger and endeavours to protect the quality of agricultural products and biodiversity (Table 1-6).

Furthermore, the *Vienna Memorandum* underlines that the economic development of the city should be linked to the goal of long-term heritage conservation (UNESCO, 2005b). It is the first time that UNESCO placed a particular emphasis on the historic environment in the vicinity of urban areas since 1972: there are few doctrinal texts that principally view heritage in the scope of urban areas, excluding the category of the Historic Urban Landscape (HUL) mentioned by the *Vienna Memorandum*. HUL shows that UNESCO has started to explore how to protect historical features in the process of urbanisation. Many conditions need to be considered during this research process, for example, urban topographic conditions, environment, urban-based economics and sociocultural values of societies.

Table 1-5 Category and orientation of three organisations

| Name of organisation | Program related to heritage                                       | Overall goals                                                                                                                            | Mainly strategies or measures                                                                                                                                                                                                                            |
|----------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UNESCO               | WH list                                                           | <ul style="list-style-type: none"> <li>· Preservation of natural or cultural sites with the OUV</li> </ul>                               | <ul style="list-style-type: none"> <li>· Monitoring and evaluation</li> <li>· Encourage and support (training, international assistance, World Heritage Fund<sup>8</sup>)</li> <li>· Research and education</li> </ul>                                   |
| ICOMOS               | Charters and other doctrinal texts<br><br>(no specific programme) | <ul style="list-style-type: none"> <li>· Monitoring and evaluation of world heritage</li> <li>· Risk preparedness of heritage</li> </ul> | <ul style="list-style-type: none"> <li>· Monitoring and evaluation</li> <li>· Collaboration with UNESCO</li> <li>· Formulation of principles, guidelines, policies, regulations, and techniques</li> <li>· Research and education<sup>9</sup></li> </ul> |
| FAO                  | GIAHS                                                             | <ul style="list-style-type: none"> <li>· Recognition and support of the traditional agricultural systems across the globe</li> </ul>     | <ul style="list-style-type: none"> <li>· Monitoring and evaluation</li> <li>· Technical collaboration,</li> <li>· Sharing of experiences</li> <li>· Policy and management proposals</li> <li>· Education<sup>10</sup></li> </ul>                         |

<sup>8</sup> UNESCO. Source: <http://whc.unesco.org/document/163852>. Accessed 15 August 2018.

<sup>9</sup> ICOMOS. Source: [www.icomoschina.org.cn/](http://www.icomoschina.org.cn/). Accessed 10 August 2018.

<sup>10</sup> FAO. Source: <http://www.fao.org/giahs/faq/zh/>. Accessed 28 August 2018.

Table 1-6 The emphasis of three organisations on agricultural heritage

| Aspect                                                                   | UNESCO | ICOMOS | FAO |
|--------------------------------------------------------------------------|--------|--------|-----|
| Agrobiodiversity                                                         |        |        | ++  |
| Genetic resources                                                        |        |        | ++  |
| Sustainable agricultural development                                     |        |        | ++  |
| Local knowledge related to agricultural production                       | +      | +      | ++  |
| Food & livelihood security                                               |        |        | +   |
| Cultural diversity of agriculture                                        | +      |        | +   |
| Agricultural landscape                                                   | +      | +      | ++  |
| Building units or groups of buildings related to agricultural production | ++     | ++     |     |
| Local traditions and customs                                             | ++     | +      | +   |

---

\* + indicates the level of protection and attention given to the corresponding item.

Additionally, in 2015, *Transforming Our World: The 2030 Agenda for Sustainable Development* was adopted by the United Nations. This is a global agenda on sustainable development that lasts from 2015 to 2030 and should be taken into account in all world regions and countries (Wiktor-Mach, 2020). It contains 17 Sustainable Development Goals (SDGs) and 169 specific targets. In the framework of this agenda, it is the first time that culture has been taken into consideration by mainstream discourse: this highlights the significance of heritage preservation (Jacobs, 2016).

For sustainable development of heritage, SDG 11.4 identifies the importance of ‘Strengthen[ing] efforts to protect and safeguard the world’s cultural and natural heritage’ (X. Wang et al., 2018). Fig. 1-12 shows three indicators that are covered by this goal, which emphasises economic management and investment during the process of sustainable development of heritage. Heritage by itself can hold tangible benefits if it is adequately managed, and further, appropriate management models of heritage sites may contribute to the development of economic potential (Šmid, Bolea & Pipana, 2015). Indeed, in the past few years, experts and scholars in Europe, North America and Australia have been attentive to evaluating the economic value of heritage (Larsen & Logan, Ch 5, 2018).



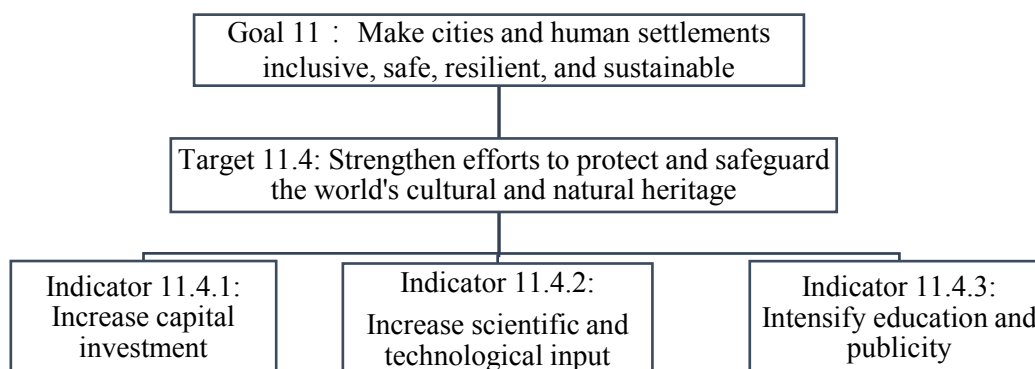


Fig. 1-12 Detailed interpretation of SDG 11.4.

Source: Wang, et al. 2018

*'It is as if the common people played no role in the development of society and culture. Small occupation and activity sites of the plebeian society are often under-valued or ignored.'*

Source: Grimwade and Carter, 2000.

Furthermore, heritage can be treated as a social selection based on the particular value accorded by social communities (Bessière, 1998). Excluding authoritative ordinances, the local community's attitude should also be considered as a vital part when assessing the historical value of heritage. For example, culinary heritage and local food manners not only represent the daily lives of local residents, but also reflect the tradition of the community. Views from people in society and locally situated heritage understandings could help official heritage institutions, especially the FAO, to strengthen the local understanding of heritage (Grimwade & Carter, 2010; Mydland & Grahm, 2012).

### 1.2.3 Urban agricultural heritage

*'We have to look deeper into our past, not only into [the] history of built environment, but also of rural environment and agriculture....Urban agriculture heritage is to be seen as a basis for the formation of future strategies....'*

Lionella Scazzosi, 2019<sup>11</sup>

<sup>11</sup> Conference summary of *Herrenhausen Conference on Urban Agricultural Heritage and the Shaping of Future Cities* in 2019.

Source:

[http://www.ua-heritage.com/wp-content/uploads/2019/08/Conference-Summary\\_Urban-Agricultural-Heritage.pdf](http://www.ua-heritage.com/wp-content/uploads/2019/08/Conference-Summary_Urban-Agricultural-Heritage.pdf). Accessed 12 October 2020.

Although the GIAHS Programme is closely related to the field of urban agricultural heritage, to some extent, some GIAHS selection criteria, such as ‘food and livelihood security’, seem unimportant for UA heritage (GIAHS/FAO, 2018b). This research places more emphasis on how GIAHS evaluates traditional agriculture, rather than considering its strict ecological standards.

Currently, UA heritage has not yet been defined. This research is in a pioneering phase as depicted by the *Herrenhausen Conference on Urban Agricultural Heritage and the Shaping of Future Cities* (Hereafter, it is referred to as *Herrenhausen Conference*) and its approach of collating cases and involving different disciplines and perspectives on UA heritage to get the first rough concept. Specific characteristics of UA heritage are summarised in the following chapters. In Chapter 2, the concept of UA heritage will be identified and further research will be conducted.

### **1.3 Urban agricultural heritage sites around the globe**

There are currently some UA heritage sites or potential areas spread across the globe. The theoretical knowledge and practice of UA have matured in European countries. Previously, although less evident and clear concepts of UA heritage were presented, many UA projects connected with heritage preservation had been established. Furthermore, in 2019, the *Herrenhausen Conference* was held in Hanover; during the conference, interdisciplinary communications toward the subject of UA heritage were held (Volkswagen Stiftung, 2019). The conference affirmed the critical value and significance of the preservation and development of UA heritage. For instance, Table 1-7 shows some of the European excellent practices that have been introduced during the conferences.

Table 1-7 Some UA heritage sites in Europe

| Country | City     | Site                                          | Main traditional elements                                  | Recognition                                                 |
|---------|----------|-----------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|
| Spain   | Elche    | <i>Palmeral</i>                               | Irrigation system for agrarian production                  | UNESCO site: cultural heritage                              |
| Italy   | Milan    | Traditional farmsteads<br>( <i>Cascina</i> )  | <i>Marcita</i> : Irrigation system for agrarian production | Prepare for the GIAHS list                                  |
| Germany | Bamberg  | Urban horticulture                            | Nursery and market gardens                                 | World heritage and national intangible heritage             |
| Turkey  | Istanbul | Market gardens<br>( <i>Bostans</i> )          | Market gardens                                             | Gained the attention of the local authorities <sup>12</sup> |
| France  | Amiens   | Floating gardens<br>( <i>Hortillonnages</i> ) | Market gardens                                             | Inventaire national UNESCO site                             |
| France  | Paris    | Montreuil's Peach Orchards                    | Traditional and special technique for production           | /                                                           |

From Table 1-7, it is clear to see that a proportion of the heritage sites have already been recognised by authoritative organisations. Others are only identified by local or relevant researchers. However, in either type, from the author's point of view, they all have a certain UA heritage value in a variety of dimensions.

Besides, not only in Europe but also in Asia, North America, and other regions where there are certified or unidentified heritage sites. General descriptions of some examples are given in the following contents, which can reflect and illustrate the UA heritage characteristics of different sites.

### 1.3.1 Sites with authoritative recognition

Elche, in Spain, is a city with a Muslim cultural background. The *Palmeral* of Elche (Fig. 1-13) has been added to the UNESCO World Heritage List since 2000 (UNESCO, n.d.). Tracing history, it is known that varieties of palm, with the unique irrigation technique, were found within the city as early as the 5<sup>th</sup> century BC. The *Palmeral* of Elche is not an artificial palm forest, but a complex of ecological

<sup>12</sup> In 2014, the *Report of Concern on the Conservation Issues of the Istanbul Land Wall World Heritage Site/With a Special Focus on the Historic Yedikule Vegetable Gardens* has been published and distributed to Turkish government agencies, as well as (UNESCO) WH centre (Çorakbaş, Aksoy, & Ricci, 2014; Timpe, 2013).

communities for the purpose of agricultural production. There are terraces for the cultivation of vegetables and fruit. The planting of palm trees stabilises the soil and reduces water evaporation, while protecting agricultural land distributed in the forest from strong winds (Ballesteros Huesca, 2015). The original irrigation system and plant varieties are now preserved, and the overall agricultural landscape has become a popular destination for tourists from around the world (Visit Elche, 2017).



Fig. 1-13 The *Palmeral* of Elche, photographed by Gregorio Alemañ García.

Source: UNESCO, [whc.unesco.org/en/documents/180460](http://whc.unesco.org/en/documents/180460). Accessed 1 January 2021.

In Mexico City, the *Chinampas* (a type of raised beds) of Xochimilco is also a typical UA heritage site in shallow lakes (Clauzel, 2009). *Chinampas* were recognised as a GIAHS site in 2018. As part of the urban heritage and also an essential component of life quality through pleasure and spiritual relaxation, *Chinampas* has been regarded as a traditional agricultural system and productive landscape. It has cultural value as a source of knowledge based on the co-evolution of farmers and eco-systems (Merlín-Uribe et al., 2013).

The traditional construction method of *Chinampas* is based on oral wisdom transmitted since the time of the Aztecs (14–16<sup>th</sup> Century) (GIAHS/FAO, 2018a). Mesoamerican agriculture was pioneered by the indigenous people to grow crops on cultivated land in the shallow lakebed. Due to the large number of lakes in the Mexican valley, farmers would often use soil to raise shallow lakebeds in order to expand their arable land area: farmers would build fences under the lake, using water plants and stakes, and then fill them with soil and water plants until the soil is exposed

above the water. New arable land is often surrounded by canals, whose overall visual effect resembles a floating artificial island (Fig. 1-14, Fig. 1-15).

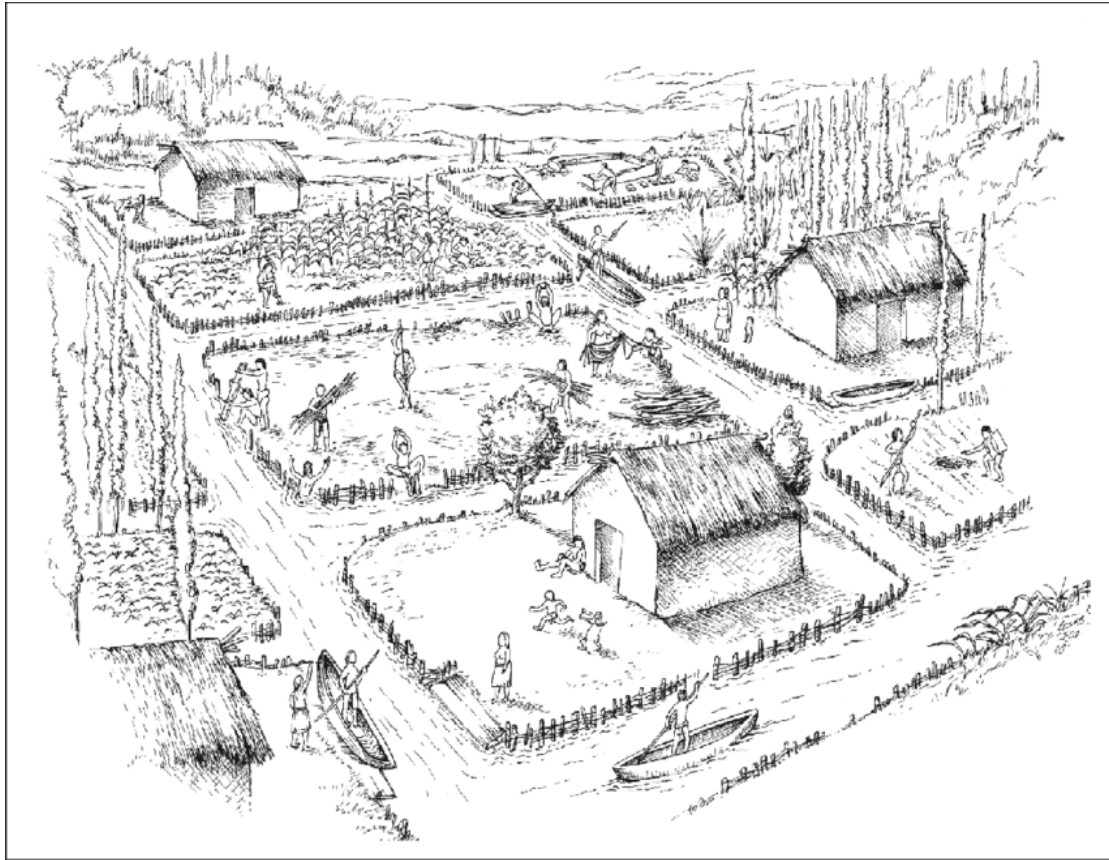


Fig. 1-14 *Chinampas*, canals and houses in Xochimilco during the Late Postclassic period. Drawn by César Fernández. Based on the study, the author of the drawing hypothesized, through this diagram, the representative form of *Chinampas* and the living and agricultural behaviours of farmers during the period 1150-1521.

Source: Serra Puche & Lazcano Arce, 2009.





Fig. 1-15 Image of *Chinampas*.

Source: Mexican routes, 2018. <https://mexicanroutes.com/chinampas/>. Accessed 15 October 2020.

### 1.3.2 Sites without authoritative recognition<sup>13</sup>

UA has a long historical background in Istanbul. The *Bostans*, an integral part of Istanbul UA, has long been regarded as a representative feature throughout the city (Kaldjian, 2004). For centuries, a network of market gardens called *Bostans* provisioned the city with fresh vegetables (Fig. 1-16). They held an important place in Istanbul life and contributed to the city's food and employment needs.

Istanbul's old city walls have been built in 413 AD, and have been nominated in the WH site list since 1985 (Timpe, 2013). Commonly, *Bostans* were grown alongside old city walls because of that the arable land cannot be built on for military reasons. In addition, wells near the city walls have been the main source of water for the maintenance of *Bostans*. Although the area of vegetable gardens has decreased, many historians, urban planners, as well as non-profit associations are dedicated to the preservation and revitalisation of *Bostans* (Quinn, 2013).

---

<sup>13</sup> Before 3 July 2021.

*‘As you pass through one of the gates entering into the ancient city, you might catch a glimpse of a thin strip of emerald-green vegetable orchards along these monumental walls.’*

Source: Andrea Quinn, 2013



Fig. 1-16 *Bostans* in 2013.

Source: Axel Timpe 2013, Institute of Landscape Architecture, RWTH Aachen University.

As an example of protection and management of agricultural areas in urban environments (de la Cal, 2018), Montreuil’s Peach Orchards can be traced back many centuries. In the 17<sup>th</sup> century, Paris became home to a thriving peach farming industry that produced up to 17 million fruits per year, and still today, communities of cultivators continue to grow in small orchards (Messynessy, 2014). The specific construction in the peach orchard is named *Murs à pêches*: a type of wall embedded with peach trees to protect the trees and adapt them to a much colder environment than the fruit is typically accustomed to (Fig. 1-17, 1-18). As an agricultural landscape, as well as a type of cultivation technique, the *Murs à pêches* still create something very unique in the heart of Paris (France Today Editors, 2015).



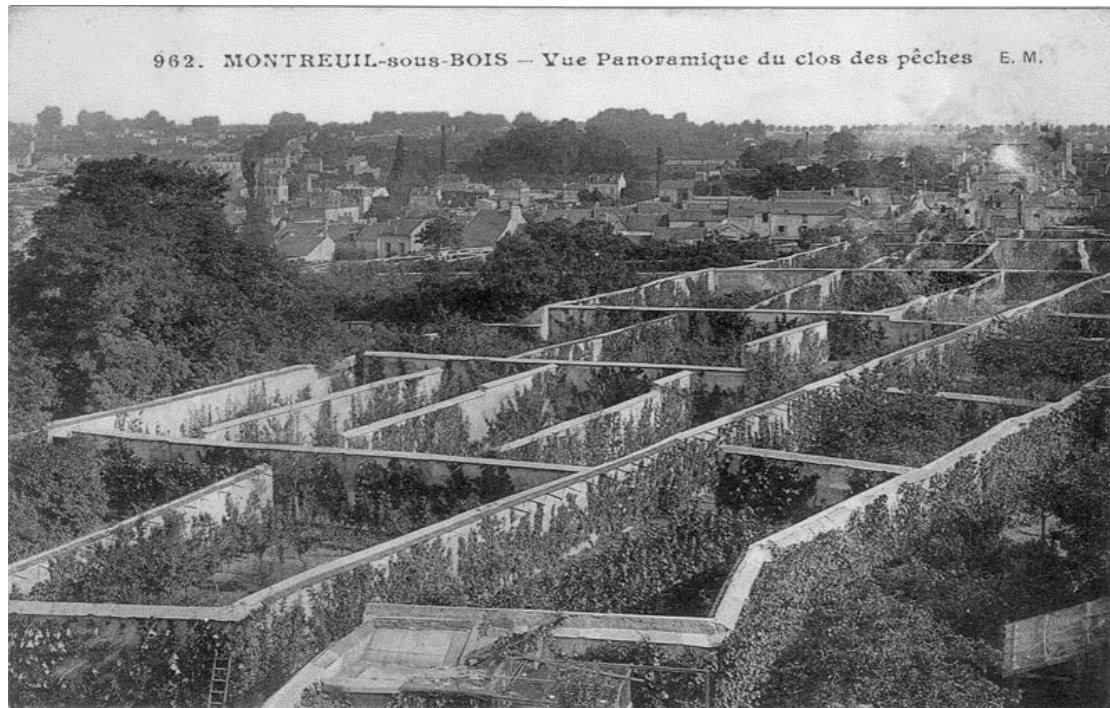


Fig. 1-17 Peach Orchards in Montreuil. Source: de la Cal, 2018.



Fig. 1-18 *Murs à pêches*. Source: Messynessy, 2014.

The three-metre high wall is over half a metre thick and is coated with limestone plaster. The old image above reflects the workers picking peaches from the wall.  
<https://www.messynessychic.com/2014/03/04/the-last-peach-orchards-of-paris/>.  
 Accessed 10 April 2021.

In Japan, some UA heritage sites have been inherited. Nerima ward is a part of Tokyo's prefecture (urban area). According to the report from the Urban Agriculture World Summit Committee, Nerima has a long history of farming and agriculture



within the area that can be traced back to the Edo period (1603–1868) (The Urban Agriculture World Summit Committee, 2018). When the capital was relocated from Kyoto to Tokyo in 1603, the population was rapidly increasing. In order to meet the food demand, rice fields began to be cultivated in Nerima: the soil in Nerima was particularly suitable for the farming activity, which motivated farmers to protect their farmlands (Sioen, Sekiyama, Terada & Yokohari, 2017).

‘There was no big change in land use in Nerima for about 200 years’ (The Urban Agriculture World Summit Committee, 2018). Policies also promoted the inheritance of UA in Nerima. For instance, the government avoided railway-led large-scale development and large-scale housing development after World War II.

According to Sioen’s research, in 1968, the government enacted the *Urban Planning Act*, which specified Tokyo’s green spaces (including farmland) as urbanisation promotion zones (Fig. 1-19). In addition, the *Productive Green Land Act*, enacted in 1974, reduced land taxes for farmers if they committed to operating UA for a period of 30 years. It has resulted in a large area of agricultural land being preserved in the outer belt of special wards (Fig 1-20). In the meantime, UA has been protected and inherited (Sioen, Sekiyama, Terada & Yokohari, 2017).



Fig. 1-19 A map of Tokyo in 1968. The black areas indicate green spaces.  
 Source: Nerima City 'Midorito Mizuno Nerima', The Urban Agriculture World Summit Committee, 2018. P25.

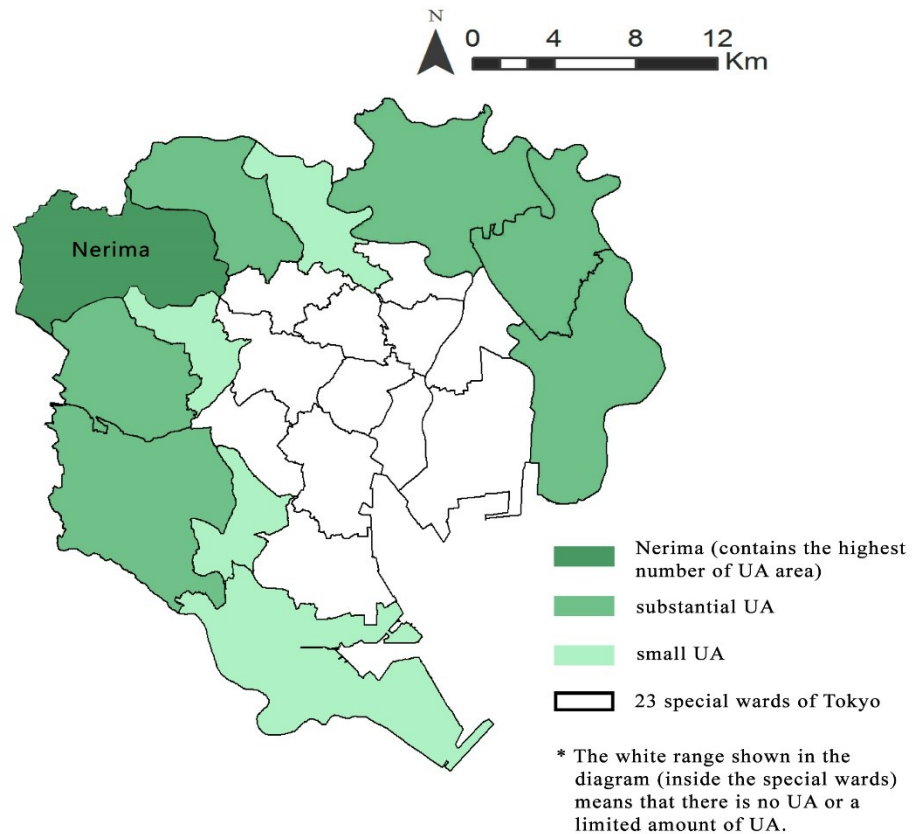


Fig. 1-20 A map of Tokyo in 2017. Twenty-three special wards<sup>14</sup> where UA can be found. Source: Sioen, Sekiyama, Terada & Yokohari, 2017.

### 1.3.3 China

China is another country with a long history of farming. It is a large agricultural country endowed with abundant agricultural resources. The oldest agricultural production in China can be traced back more than 7000 years (Y. Liu, Duan & Yu, 2013). Since 202–220 BC, hunger has been recognised as a cause of political turbulence: the motto ‘food is the paramount necessity of the people’ is considered one of the major principles for governance (Xu, Li, Qi, Tang & Mukwereza, 2016). As one of the representative works for traditional agriculture introduction, *The Agricultural Book of Zhen Wang* should not be neglected. It consists of three parts – farming and sericulture, crop and agricultural machine – and is considered an essential reference for experts and scholars when conducting related research (Z. Wang, Miu & Miu, 2009). From his book, the overall features of traditional

<sup>14</sup> ‘Special wards’ are a special form of municipalities in Japan under the 1947 *Local Autonomy Law*.

agriculture in China have been vividly depicted. China's traditional agriculture is intensive agriculture, which is characterised by intensive farming in accordance with climates and locations. Under the feudal landlord economic system, the smallholder business model has occupied the mainstream position for a long time. There is a striking difference between Southern and Northern China. Besides, numerous images and paintings were created that depicted landscape information on land use, ancient technological invention, peasant activity, irrigation system and crop planting (Chen, Pan & Xiao, 2019). Fig. 1-21 shows a painting from one of historical stages.



Fig. 1-21 *Painting of Genghou (cultivation and harvesting)*. Drawn by Wei Yang, in the Southern Song dynasty (1127-1279).

Source: The Palace Museum.

As shown below, UA was utilised in the past, and, in ancient China in particular, cities were symbiotic with agriculture. Within the cities and near the palaces (especially the capital), specific places were used to grow crops. In addition to the capital city, small and medium-sized cities had farmland everywhere around (Tang & Guo, 2015).

Primarily based on Kexin Shi's research, there is much evidence of UA existence in several ancient capital cities (K. Shi, 2012). From 581 to 907 AD, some households in Chang'an (today is known as Xi'an) had yards with vegetable or fruit gardens (Fig. 1-22). During the Song Dynasty (960–1127), UA with agricultural activities could be found in royal gardens, streets and civil courtyards or yards (N. Gao, 2015). In the Ming and Qing Dynasties (1368–1911), the construction of gardens and landscapes reached its peak development. This phenomenon also promoted and brought more opportunities for further development of UA, and the acreage of UA was further expanded.

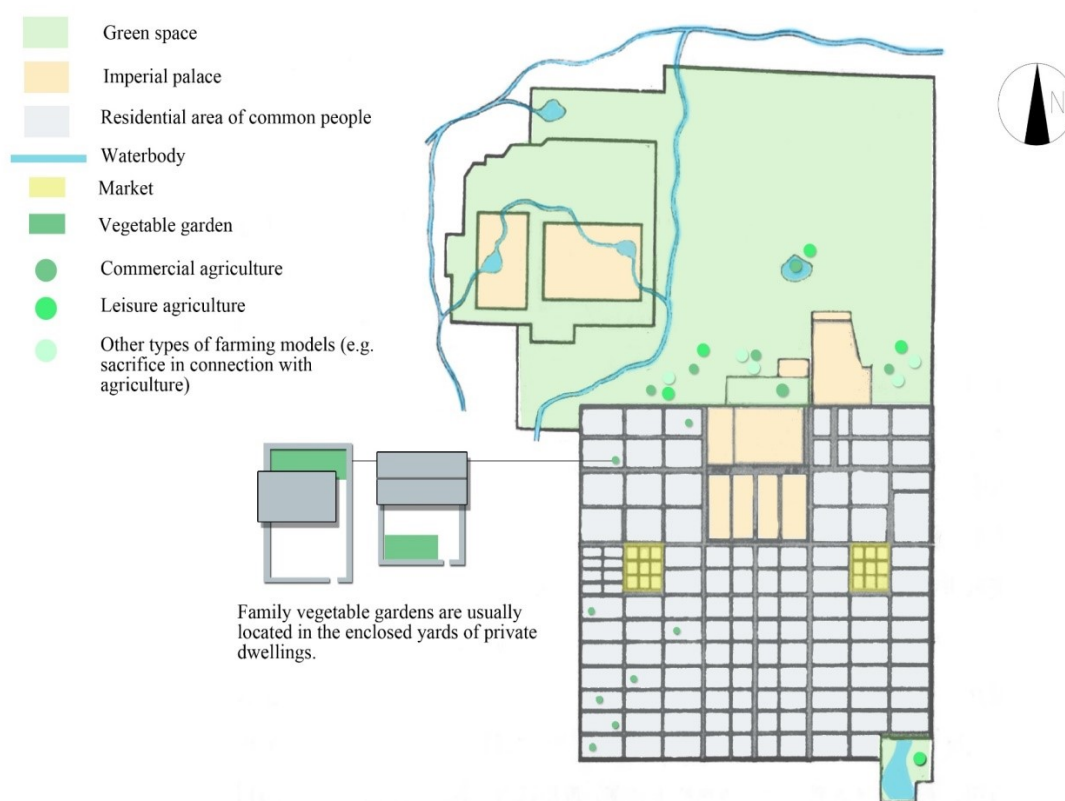


Fig. 1-22 The historical map of Chang'an (581-907 A.D). Source: Shi, 2012.

The layout of the city's spatial pattern is drawn by Shi. The author recreates the classification of agricultural land, and redraws the yards of private dwellings.

(In the absence of rigorous historical evidence, the three coloured dots in the diagram can only represent agricultural activities that should be present in the presumption, not determine the size of the agricultural land area.)

According to Shi, in general, before the Qing dynasty, most of the royal residences were privileged to live in the city centre. Lots of agricultural lands were available for their use. They can even use parts of their royal gardens to grow vegetables, grains, and fruit. For residences of government officials, they have the right to live at any address other than the city centre. Their urban farming activities mainly involve the growing of vegetables in or near their yards in the city, or in their yards on the outskirts of the urban area.

Other citizens and farmers usually lived away from the city centre. A large proportion of their settlements were spread along the outer city wall. Farmlands on the peri-urban area of the city can be seen as a concentration of their vegetable and fruit cultivation. They also carry out agricultural activities in their yards. Besides, they sold vegetables and foodstuffs in relatively regular locations such as markets or streets (K. Shi, 2012) (Fig. 1-23).

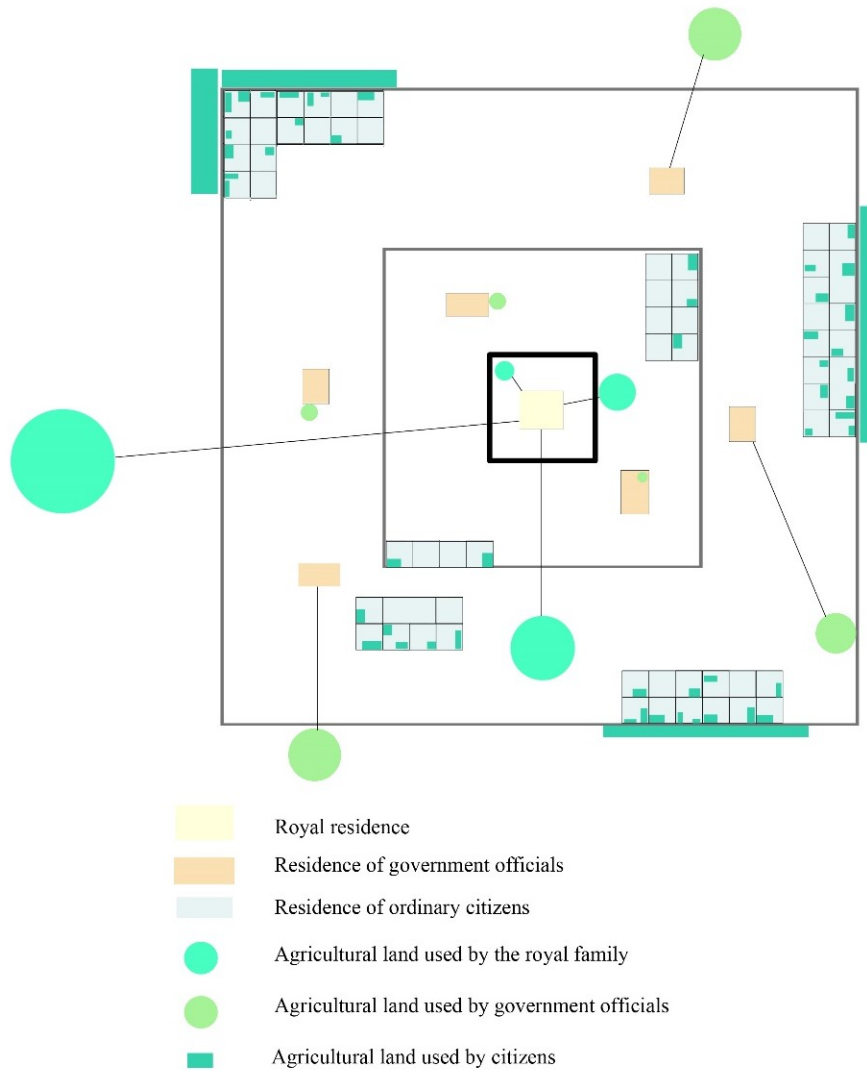


Fig. 1-23 The morphology of a typical Chinese city before the Qing dynasty. It reflects the relationship between different classes of people and the location of the distribution of UA activities. Source: Shi, 2012.

Indeed, in modern times, the potential for UA heritage detection and development is vast due to the long history of agriculture in China. Unfortunately, as stated in Chapter 1, various issues remain to be resolved. As mentioned above, the Tsai-Tai farming area in Wuhan (Fig. 1-24) is a representative case of UA heritage in China: however, the farming area of origin is at risk of vanishing due to the absence of social concern, regulatory controls and financial support. Although the China-NIAHS has been established in support of the GIAHS Initiative, few UA heritage sites can be found in the nomination list. Thus, more efforts should be made to promote the preservation and development of UA heritage.





Fig. 1-24 The Tsai-Tai farming area in Wuhan

#### 1.4 Purpose and significance of research

The significance of identifying UA heritage sites is profound, as there is no doubt that UA is multi-functional and can address numerous urban issues. However, there is the potential to explore the historical background of UA. UA heritage is considered a specific category that focuses on the combination of urban planning strategy and agricultural heritage preservation. It has the ability to solve urban problems and spread agricultural knowledge simultaneously. Additionally, the preservation of urban agricultural heritage contributes to highlighting the cultural identity and diversity of cities.

For China, on the one hand, a large number of farmlands are being lost due to rapid unplanned urbanisation. Fragmented agricultural features in urban or peri-urban areas urgently need protection. On the other hand, the passion for country life from urbanites is ongoing (K. Shi, 2012). The promotion of UA heritage contributes to the improvement of the above two situations.



It is important to remember that UA is not a new invention: its history can be traced back to an earlier period. Many lessons can be learned from history: for example, how can the forms of agriculture in some cities persist over hundreds of years? Why have some cultivation techniques lasted for so many years? And why do they have a unique conservation and management model?

Hence, it is urgent to address these issues through the preservation of UA heritage. The history of UA should inspire its future, UA heritage has the ability to inspire municipality and city planners to manage and plan the city with a new idea.

## **2 Interpretation of urban agricultural heritage**

### **2.1 Concept of urban agricultural heritage**

What is the Urban Agricultural (UA) heritage?

UA heritage is a type of world heritage that reflects the wisdom, production experiences, or knowledge of the daily lives of local farmers and residents. It is defined by the traditional agricultural landscape and agricultural production systems with a long history. Nevertheless, today, as the development of modern science and technical applications accelerates, traditional agriculture is losing its status. This research focuses on the relationship between UA and heritage, exploring ways to effectively combine agricultural, historical and spatial aspects in the city areas.

UA heritage is primarily a type of cultural heritage, as human participation has played an active and significant role in the process of its development. However, natural factors cannot be ignored, especially agrobiodiversity or specific environmental conditions. Cultural and natural elements exist simultaneously, with a strong relationship between them. Moreover, heritage with local community value should also be considered. Generally, UA heritage sites are situated in urban or peri-urban areas.

Professional urban agriculture and urban gardening are primarily considered as existing primary agri-activities. Forms of UA include community gardens, micro-farming (in/around the house), small-scale commercial horticulture, small-scale commercial livestock or aquatic farming, agri-enterprise, market, farmstead, institutional farmland and vacant land away from the residences. In more depth, UA heritage can be illustrated from four conceptual dimensions: manifestation, ecological, social and economic aspects.

### **2.2 Four conceptual dimensions of urban agricultural heritage**

Four dimensions of UA heritage can be illustrated in Fig. 2-1. Each of these four dimensions is described and analysed in the following section.

#### **2.2.1 Manifestation Dimension**

*‘It is not just that “places” serve to remind us of the stories associated with them; in*

*certain respects, the places only exist (in the sense that that can be identified by name) because they have stories associated with them. But once they have acquired this story-based existence, the landscape itself acquires the power of “telling the story”.*

E. Leach, 1984

The tangible fabric of a place and the intangible aspects that give it meaning are inseparable. UA heritage is formed not only as a physical reality as manifested through the process of agricultural production but also through intangible elements, which can profoundly shape local community life. On the one hand, the preservation of UA heritage has the potential to contribute to the safeguarding of historic sites and to assure that people can continue to eat the food that is part of their tradition. On the other hand, UA heritage also includes the knowledge of farming and resource utilisation, as well as cultural and artistic creations based on agronomic activities (e.g. poetry, drama, folklore, local festivals).

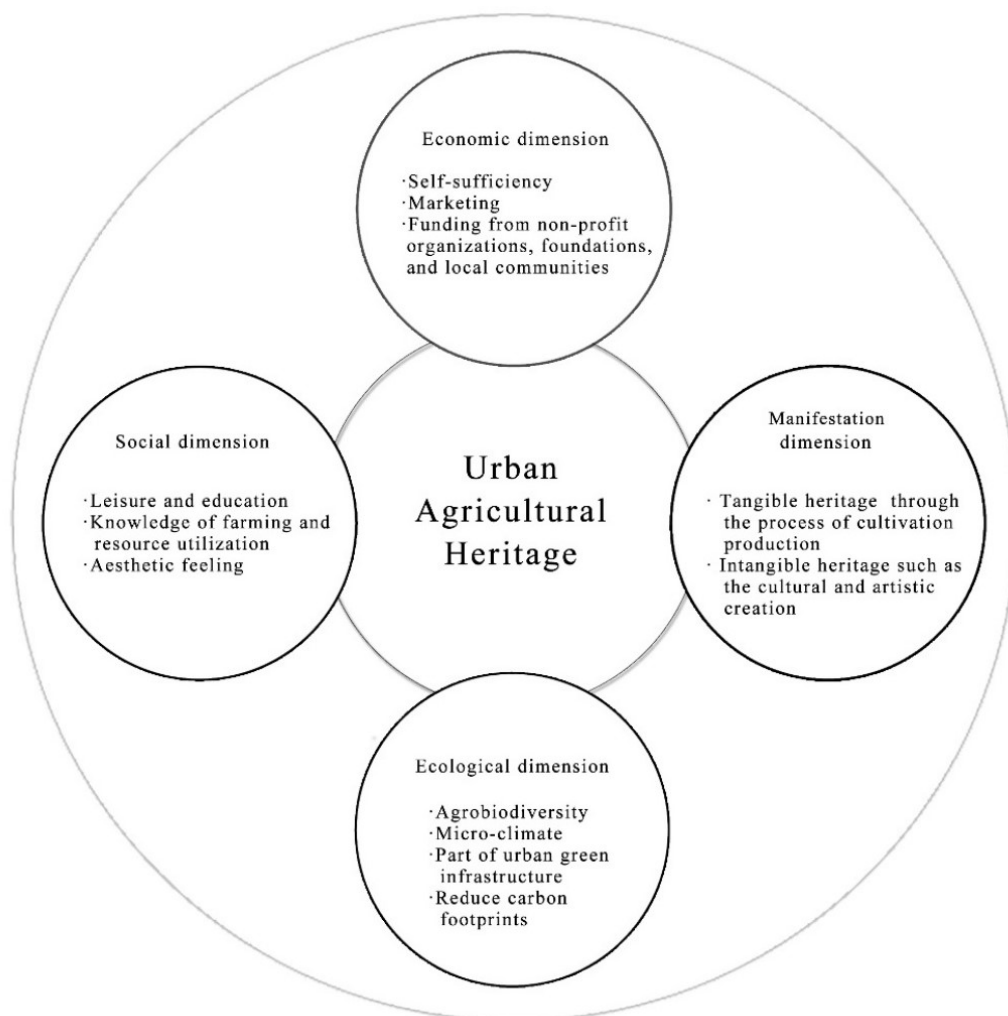


Fig. 2-1 Four conceptual dimensions of UA heritage.

When detecting the UA heritage sites around the city, the heritage features of the site are as follows (Fig. 2-2):

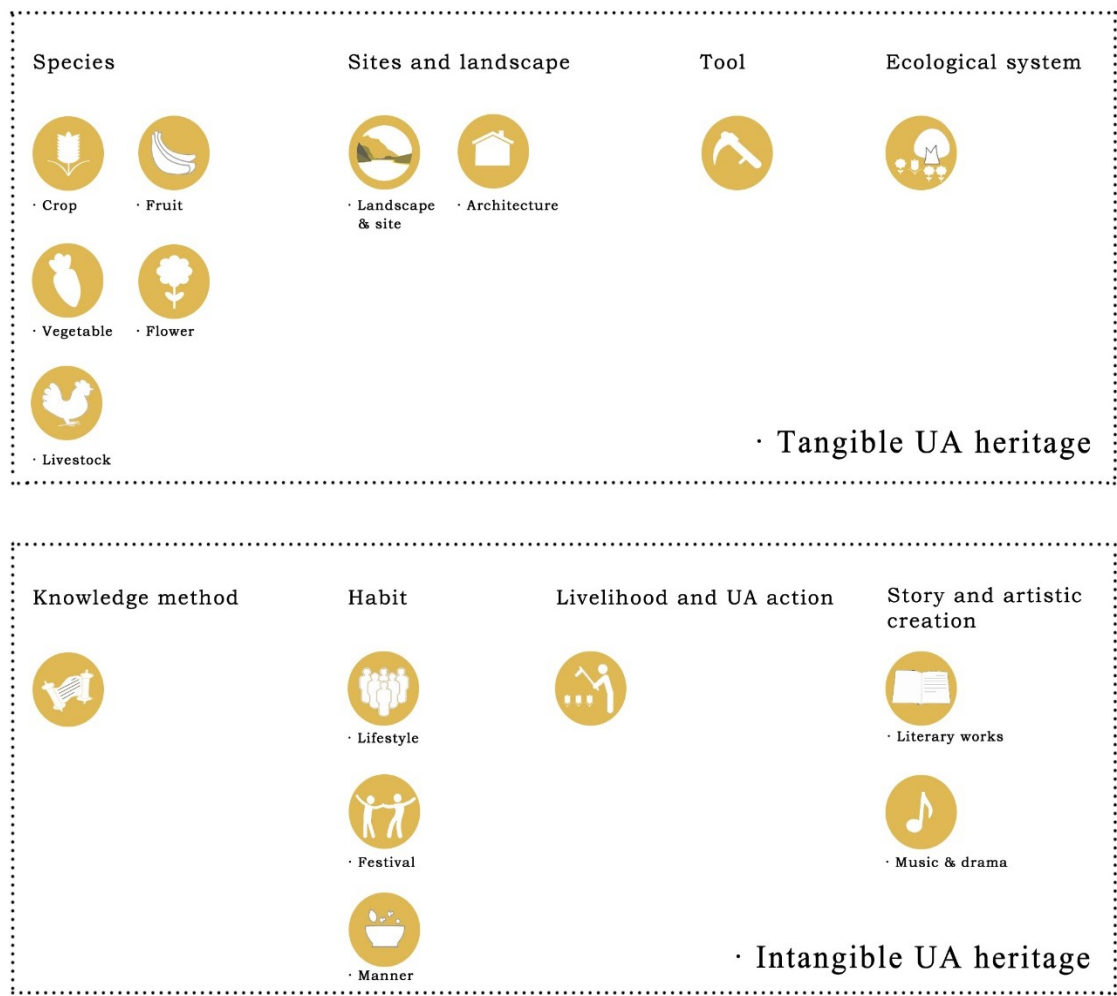


Fig. 2-2 Manifestation dimension of UA heritage

**Genetic species:**

Traditional species and gastronomy specialties are crucial when inheriting local memory because they are historical witnesses to regional agricultural development. Some species can be considered a culinary heritage.

**Sites and landscapes:**

Historic sites and landscapes with agricultural elements can provide particularly ingenious or practical solutions to environmental or social constraints, such as terraces, nature-based farmhouses, or commemorative architecture.

**Tools:**

A wide variety of farm tools should be evaluated. In different countries, hatchets,

sickles, pitchforks, spades, shovels, trowels, hoes, forks and rakes have different shapes and appearances in detail. Tools inherited by various groups of farmers can represent the wisdom of ancestors during the process of utilisation of natural resources.

**Ecological systems:**

Traditional stable eco-systems can provide resource conservation or provide habitats for valuable biodiversity and recreational values for collective or non-commercial valuable uses (aesthetic, artistic, educational, spiritual and/or scientific values of the ecosystem).

**Habits:**

Everyday life, customs, human relationships, clothes and accessories, production practices and languages, as well as festivals by local groups, communities and individuals, should be considered as a part of UA heritage.

**Knowledge methods:**

Practices and knowledge, institutions, technologies, and skills are of great significance, such as irrigation water management systems and cultivation techniques.

**Stories and artistic creations:**

Local folklore refers to the traditional beliefs, myths, stories, tales, and practices of a people: it is a valuable and precious inheritance from ancestors. Artistic creations, such as folk music (agricultural work songs) and dances, are created to increase productivity while reducing feelings of boredom.

**Livelihood and UA actions:**

A livelihood comprises the capabilities, assets (stores, resources, claims, and access), and activities required for a means of living (Wikipedia, 2020b). It focuses on the incomes or resources that can be used or exchanged by individuals, families, or other social groups in order to satisfy their daily requirements. Most indigenous peoples have developed highly specialised livelihood strategies and occupations, which include fishing, gathering plants, community management, and business patterns. Furthermore, UA activities were carried out over a long period; thus, acts such as these can also be considered as a vital feature of UA heritage sites.

### 2.2.2 Ecological dimension

The agroecological system of farmlands is of great value when considering the potential improvements to the environment and protecting the local ecology. Furthermore, the farming area is located in or around the city, allowing for shorter transportation distances, which reduces the carbon footprint. Hence, there is no doubt that UA has an ecological function. From an ecological perspective, as a specific type of UA, UA heritage sites can provide benefits for urban green infrastructure. For instance, local species can be protected by farmers, thereby increasing agrobiodiversity. Additionally, some UA heritage sites can also play a significant role in beautifying the environment, improving soil quality and regulating urban air quality and climate.

### 2.2.3 Social dimension

The social dimension considers UA heritage with regard to its impact on public and social life. UA heritage sites can be viewed as a platform for people to enjoy the leisure and educational activities. Furthermore, it provides social interaction between citizens and farmers through agricultural activities, which can enrich the lives of citizens. Citizens also have the chance to acquire knowledge on farming and resource utilisation.

### 2.2.4 Economic dimension

UA heritage has multiple economic benefits. For example, historic landscapes can indirectly contribute to economic development and tourism, as it attracts businesses and promotes commercial development. Furthermore, if a UA heritage site is located in a residential area, it may increase the value of the property. UA heritage can also create local employment and income. For example, preservation work has the potential to help people find jobs and overcome employment barriers.

UA heritage sites principally supply agricultural products to urban residents. They have been closely linked with urban dwellers' everyday lives, from ancient times up to the present day. Several business and management models exist, such as food self-sufficiency, marketing, as well as the agritourism industry.

## 2.3 Methodology

### 2.3.1 Research framework

The research framework is shown in the following fig. 2-3.

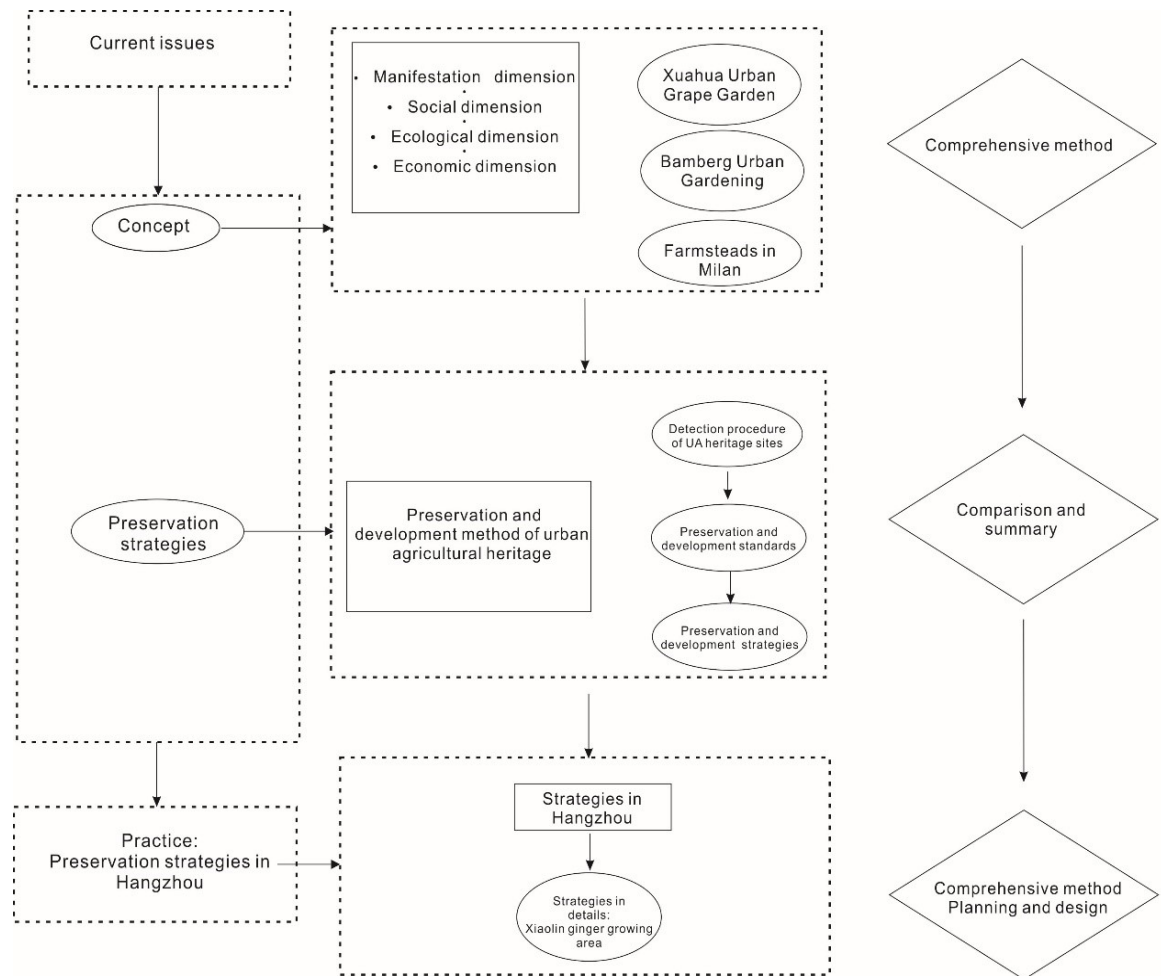


Fig. 2-3 Research framework of the thesis

### 2.3.2 Comprehensive method for analysing urban agricultural heritage

Chapter 2.2 has shown the four conceptual dimensions of UA heritage. However, how to capture these? Are there specific methods for this? Dedicated analytical methods also deserve further discussion.

This research proposes a scientific method to explore and interpret UA heritage that is based on two existing analytical approaches for cultural heritage. First, the method of historic landscape characterisation (HLC), which has been principally developed in England with the purpose of identifying historical characteristics of a landscape



(Turner, 2006). It identifies different historical features in a region by integrating large amounts of data into a GIS platform according to specific criteria. By using the HLC method, researchers can divide landscape components (e.g. road network, settlement pattern, farmland) into zones on drawings with regard to their historic characters (Štular, 2011). And then the predominant historic features of the whole area could be represented and illustrated (Herring, 2007).

However, the HLC method is usually used for the analysis of landscapes on a large scale within a quantitative framework. For this reason, the feasibility of this application for UA heritage (particularly the small-scale site) is a controversial issue.

Second, Italian scholars have reached a certain depth in their exploration of the rural landscape. It is worth mentioning that the ‘rural landscape’ in Italian approaches could be understood as a synthesis, including agricultural activities, ecological environment, cultural knowledge, transportation, infrastructure, and the local community (Balestrieri, 2015; Cevasco & Moreno, 2013).

Italian researcher Lionella Scazzosi and her team proposed a method for recognising rural landscapes as heritage (Scazzosi, 2018), which has been applied to highlight the heritage value of UA in Italy, Spain, the UK, and other countries (Lohrberg et al. Eds., 2015; Laviscio 2014). This method includes the following aspects: spatial distribution, historical background, and sensory and social perception of the landscape.

These approaches have some limitations when applied to UA heritage. Interestingly, the economic dimension of UA as a farming activity is lacking in the landscape-centred approach. This particular business and management model is a necessary and distinctive component of UA (Pölling et al., 2017). Researchers should treat UA as a dynamic and sustainable heritage with fruitful social and economic factors (Landorf, 2009).

Furthermore, the sensory evaluation from Scazzosi’s approach might not fit into the process of analysing all UA cases. For instance, farmers operate business mainly as purely commercial activities, such as selling traditional local vegetables. In this case, the act of sensory analysis and evaluation by researchers from an aesthetic perspective might be less reasonable.

Thus, these existing methods do not fit when analysing UA heritage (Table 2-1). Hence, a new approach is needed. Based on the analysis and synthesis of the above

approaches, a comprehensive method for the exploration of UA heritage has been proposed and applied to analyse several cases. This comprehensive approach encompasses four sections: intangible and intangible analysis, ecological analysis, social perception analysis, and business model analysis. These four dimensions of UA heritage are shown in the following three case studies. Compared to other methods, this method presents a shift in heritage evaluation from the focus on the heritage farm to the role of urban agricultural heritage in the integral development of the territory.

Table 2-1 A comparison of the two methods from the aspect of UA heritage preservation

| Method                                             | Manifestation dimension | Ecological dimension | Social dimension | Economic dimension |
|----------------------------------------------------|-------------------------|----------------------|------------------|--------------------|
| HLC method                                         | ●                       | ●                    | ●                | ○                  |
| Method for recognising rural landscape as heritage | ●                       | ○                    | ●                | ○                  |

Note: ● This means the corresponding content has been taken into account.

○ This means that the corresponding content has not been taken into account.

**The tangible & intangible features analysis:** A historical land-use study is founded on historical maps. Modern cartography can be based on Google Earth satellite images. Data on characteristics were predominantly gathered from the local chronicles and related documents (these parts will be included in the content of each chapter of the case study). Through several fieldwork campaigns and collections of historical maps, images, and texts, the pattern of the study area has been drawn. Folklore and other intangible elements have been gathered simultaneously through interviews and historical material collection.

**Ecological analysis:** Regarding UA heritage, the ecological benefits primarily include agrobiodiversity and other functions (e.g. the abilities of the micro-climate construction and soil quality improvement). Data chiefly came from fieldwork, local official documents, and scientific articles.

**Social perception analysis:** This research aims to describe public attitudes towards various characteristics of UA heritage. It considers public views of the study area. Interviews with different practitioners such as public officials, researchers, citizens, households, farmers, as well as archivists have been carried out. Through a series of interviews, general grasps on public attitudes have been gathered.

**Business model analysis:** The Business Model Canvas (BMC) is mainly used to help

entrepreneurs build, visualise and test the feasibility of their business models (Fig. 2-4). It has been used widely in the field of UA exploration (Pölling et al., 2017). In this study, BMC is applied to reflect the general current business model of farming activities in the study area. The data predominantly come from previous research results, as well as from interviews with households with different cultivation livelihoods.

|                |                |                    |                        |                   |
|----------------|----------------|--------------------|------------------------|-------------------|
| Key Partners   | Key Activities | Value Propositions | Customer Relationships | Customer Segments |
|                | Key Resources  |                    | Channels               |                   |
| Cost Structure |                |                    | Revenue Streams        |                   |

Fig. 2-4 BMC template.

Source: <https://online.visual-paradigm.com/diagrams/templates/business-model-canvas/basic-bullet-points/>. Accessed 1 October 2020.

This comprehensive approach encompasses four sections: the intangible & intangible analysis, ecological analysis, social perception analysis, as well as business model analysis. These four dimensions of UA heritage will be shown in the following case study.

This research selects three outstanding and notable cases from three countries (Fig. 2-5). From Chapter 3 to Chapter 5, the comprehensive method has been applied for them to make full interpretation of them (Fig. 2-6). The follow-up summaries and discussions are referred to in chapter 6.



Fig. 2-5 Research targets on the three countries

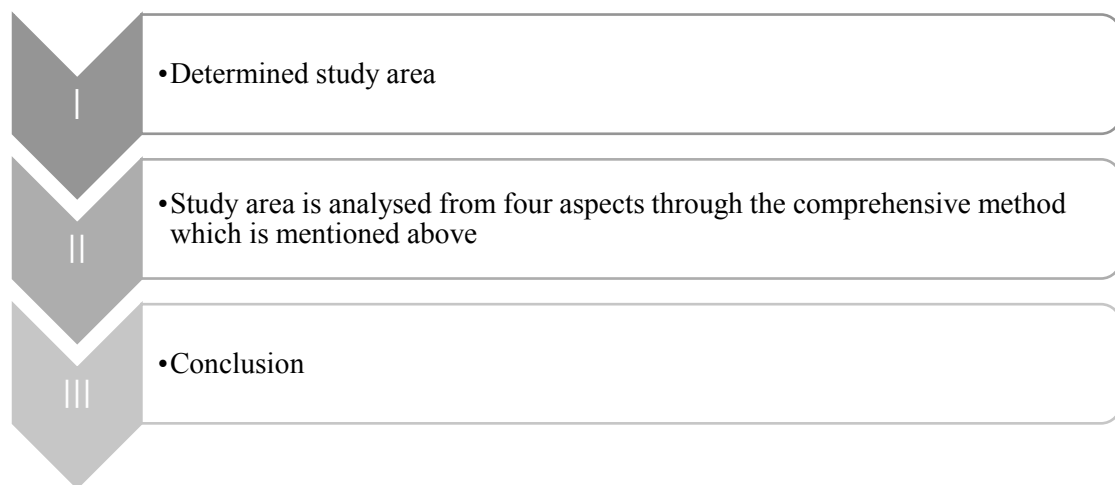


Fig. 2-6 Research procedure of three case studies from Chapter 3 to Chapter 6.

The main reasons for selecting these cases are, firstly, that they have all been certified by authoritative organisations or scientific institutions as outstanding UA heritage sites; and secondly, that they are representative typical UA heritage cases in Europe and China. Detailed analyses of them can express the existence of forms and characteristics of UA heritage, as well as current conservation strategies and existing challenges.

### 3 Case Study: Xuanhua urban grape garden, China<sup>15</sup>

#### 3.1 Introduction

The administrative district of Xuanhua is located in the southeast of Zhangjiakou, which lies in north-western Hebei Province of northeast China. Xuanhua is 150 kilometres west of Beijing and 282 kilometres east of Hohhot. The district occupies 2,371 km<sup>2</sup>. In the past, ‘the Old City of Xuanhua’ in this area (Fig. 3-1), was widely planted with grapes using traditional techniques based on funnel-framed structures. It is considered as the study area.

In 2013, the Xuanhua traditional grape garden was officially nominated by FAO (Food and Agriculture Organisation) as a GIAHS (Globally Important Agricultural Heritage System) site, primarily due to its traditional species and unique cultivation technique. Grape seeds were found in a tomb from the Liao Dynasty (907–1125) excavated in 1993. The Ministry of Agriculture of the People’s Republic of China (MOA) elaborated that the origin of the Xuanhua milk grape species dates back over 1,300 years (MOA, 2013). According to MOA, during the Tang Dynasty (618–907), grapes were mostly grown in temples. From the 900s to the 1230s, grapes began to be planted extensively in the gardens of the wealthy. Besides, the ‘milk grape’ (the name of local species) was regarded as an imperial tribute during the Qing Dynasty (1644–1911) (Sun & Min, 2015).

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<sup>15</sup> The contents of this chapter have been summarised in a journal article. It is currently (09.09.2021) in the ‘final acceptance’ and ‘final author proofreading’ period for the *Journal of Urban History*.



Fig. 3-1 Location of Xuanhua District and the old city of Xuanhua.

Source: Google Earth.

Traditional planting techniques involve growing grapes on a trellis structure that resembles a funnel. The funnel structure allows the vines to spread outward from the initial growth point and along the trellis from the ground to the top.

The origin of this growing technique, however, is still debated. According to an interview with Li Dayuan, a researcher working at the Xuanhua Grape Garden Institute, the author learned that two prevalent hypotheses of its origin exist. The first is that a military officer introduced this cultivation approach, and the other is that a monk introduced the first frame during the Tang Dynasty. Later, grapes were gradually planted around ordinary residents' dwellings (People's Government of Xuanhua District, 2013. Hereafter, it is referred to as GXD, 2013).

The Xuanhua District is located in the Xuanhua basin. Several geographic advantages, such as small elevation differences and convenient transport infrastructure make the

Xuanhua District become a suitable place for human habitation (Y. Wang, 2010). With regards to surface water, the Liuchuan River used to flow all year round with low river discharges. Besides, the location of the Xuanhua basin determines that there are abundant groundwater resources.

Since the 1970s, a gradual decrease in the volume of surface water became evident (Ma, 2012). Subsequently, the sources of irrigation water (especially for grape gardens) were gradually switched towards water taken from wells. In 1989, groundwater in the Xuanhua District began to be considered as the primary water source of industrial and agricultural production (Local Chronicles Committee of Xuanhua District, 1998).

However, the growing scarcity of water resources has become a severe issue. In 2017, the average annual water availability per capita (both surface water and groundwater) was less than 400 cubic meters; this is only 1/4 of the national average (People's Government of Zhangjiakou, 2017).

Additionally, the Xuanhua District is in a warm temperate zone. It has a semi-arid continental monsoon climate, which is affected by a strong cold airflow in spring. In summer and autumn, the weather is relatively beneficial for agricultural production. Concerning the climatic conditions, which can affect the agricultural industry, related factors did not change dramatically (compared to the climatic conditions of the 20<sup>th</sup> century). However, precipitation showed a declining trend (A. Liu, Li, & Yang, 2007).

### **3.2 Analysis results**

The urban form and land use have changed significantly over time. The morphology of the old city of Xuanhua followed the typical structure of a 'square-shaped city with square walls' (Tang & Guo, 2015). According to the data collection, numerous temples were scattered throughout the study area during the Qing Dynasty (Fig. 3-2). Building density in that era was very low. In terms of spatial pattern, almost all of the building complexes (temples, public places, homes, etc.) existed mostly in the form of courtyards enclosed by buildings on three or four sides.

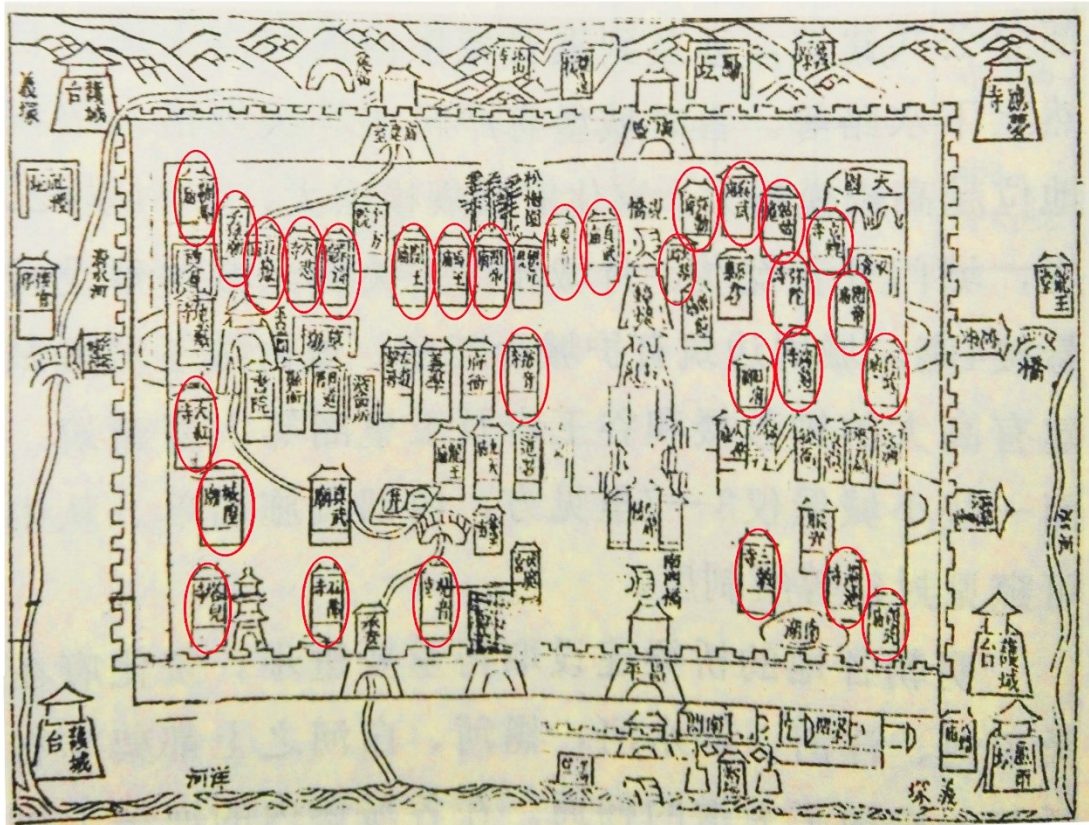


Fig. 3-2 Historical map of the Old City of Xuanhua in 1711. Ovals show the temples which existed in the old city of Xuanhua. The other signs not explained as temples include the official residence, the school, and some buildings that cannot be identified.

Source: Chronicle of Xuanhua of the Qing Dynasty, 1757. P56.

After the fall of the Qing Dynasty, many temples disappeared, and by 1922, many public places and buildings (e.g. police stations, schools) had been constructed. After the establishment of the People's Republic of China (PRC) (1949–present), the spatial form of the city began to change dramatically. By 2002, almost all of the old dwellings had been demolished. However, some traditional courtyard patterns were preserved.

### 3.2.1 The tangible and intangible aspect

‘If there are temples, there are grapes’ (Sun & Min, 2015). It is how Chinese scholars describe the relationship between the Old City of Xuanhua and grape cultivation in ancient eras. Moreover, based on several historical photographs (such as Fig. 3-3), it can be inferred that a large number of temples, as well as grapes grown within them, were indeed distributed in the Old City of Xuanhua during the Qing dynasty. It is



worth mentioning that at this time, the primary function of the grapes planted on the funnel structure was to decorate the temple and the courtyards (Sun & Min, 2015).

Fig. 3-1 has marked the exact location of Guanhou village, a small area located to the north of the Old City of Xuanhua. When focusing on the early Republic of China (ROC) (1912–1949), for instance, taking the historical map in 1922 as an example (Local Chronicles Committee of Xuanhua District, 1998), Guanhou village was the primary place where grapes were planted during that period.

The name 'Guanhou Village' should be originated in the ROC. The image in Fig. 3-2 shows that there was no concentration of villages distributing in the old city during the Qing Dynasty. Therefore, Guanhou Village was still part of the city during the Qings. After the ROC, a new spatial pattern began to change in the city. Some small farmlands and villages started appearing, as they functioned as essential crop suppliers for city dwellers.

The prominent ancient building in Fig. 3-3 is the Qingyuan building, situated in the centre of the old city. This image illustrates that the distribution of traditional grapes across the city during that period was not limited to Guanhou village.

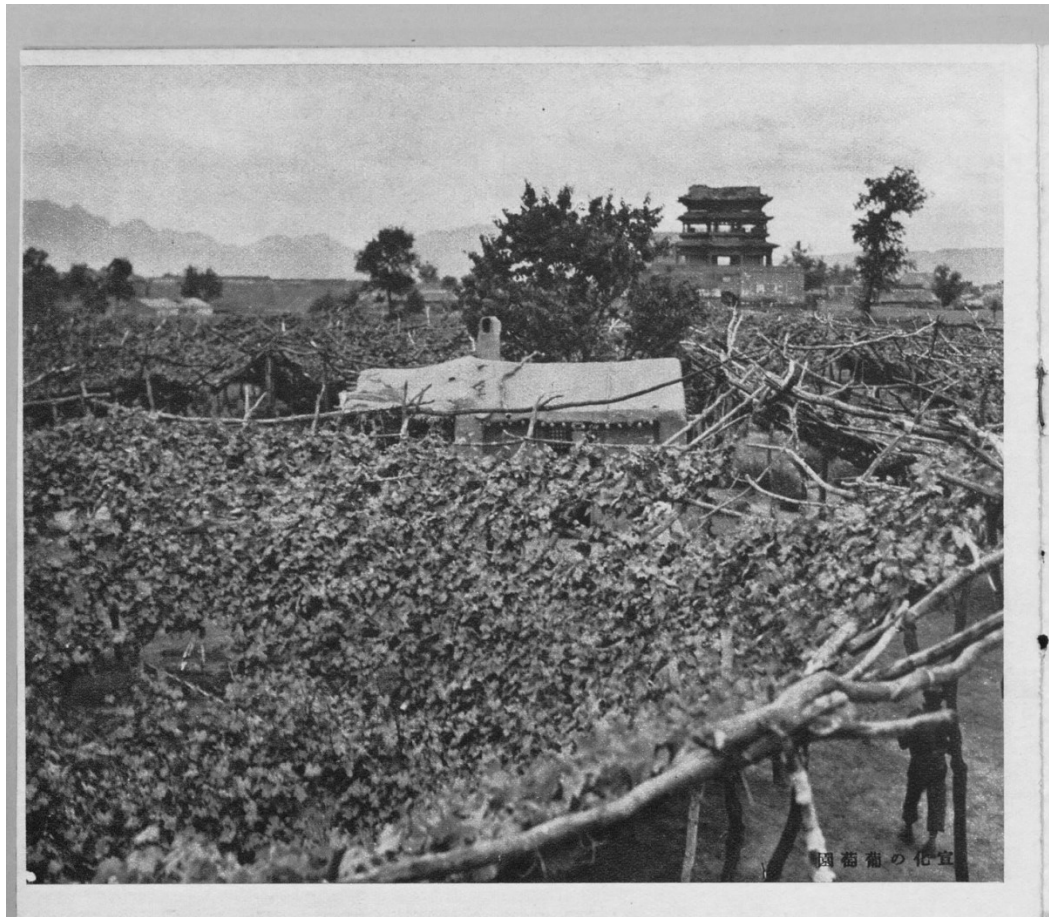
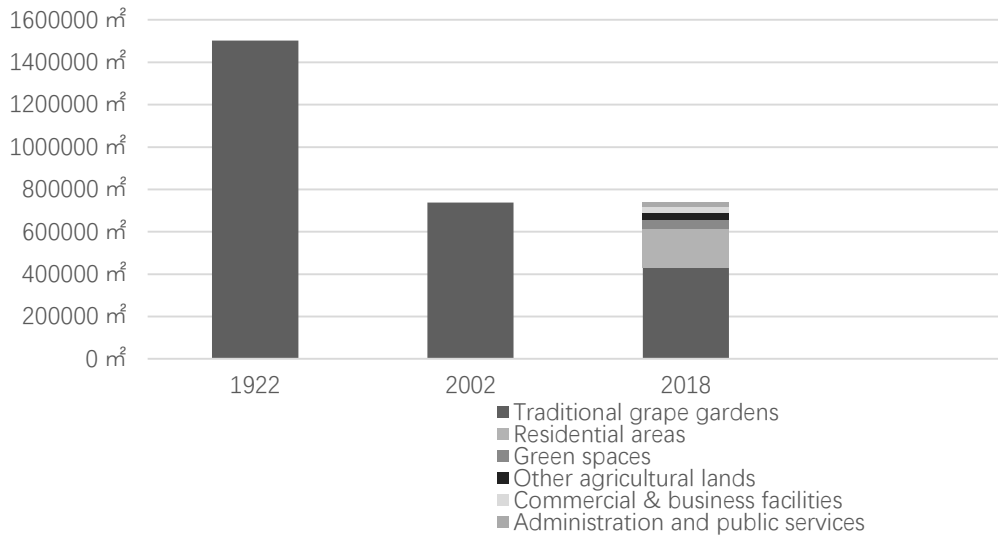


Fig. 3-3 Photo in 1939. Qingyuan building, which is situated in the centre of the old city. Source: *Magazine of North China*, 1939, North China Transportation Company, Japan.

Moreover, some grape funnels started appearing outside of the city. At present, there are mixed farming areas with funnel-structured grapes in the north beyond the city wall. These areas also belong to the heritage site, which was nominated within the GIAHS Programme.

In modern times, due to unavoidable urbanisation in China, numerous farmlands have disappeared from the city (Table 3-1). By 2018, approximately 40% of the grape gardens that existed in 2002 had been transformed into residential areas, administration and public services, green spaces, commercial and business facilities, and other agricultural lands. Even now, old grape gardens in Xuanhua within the traditional cultivation technique continue to be under threat.

Table 3-1 Changes of the distribution area of grape gardens from 1922 to 2018



\* Based on the related literature, the distribution area of grape gardens in 1922 (Local Chronicles Committee of Xuanhua District, 1998) was general and spanned the entire city. The most concentrated area of grape gardens was Guanhou village.

Figs. 3-4, 3-5, and 3-6 show how the distribution area of grape gardens has been reduced from the entire Old City of Xuanhua to the limited space of Guanhou village. Furthermore, there is a growing trend towards reduced planting areas due to frequent construction activities. Currently, the area of traditional vineyards remains dramatically reduced.



Fig. 3-4 The distribution of grape gardens in the Old City of Xuanhua in 1922.

Sources: Xuanhua Museum, Google Earth; Annual Xuanhua District, 1998.

(Due to the lack of historical information, it is not possible to determine the actual area and boundaries of Guanhou village during this period, so the author did not mark the exact spatial limits here.)

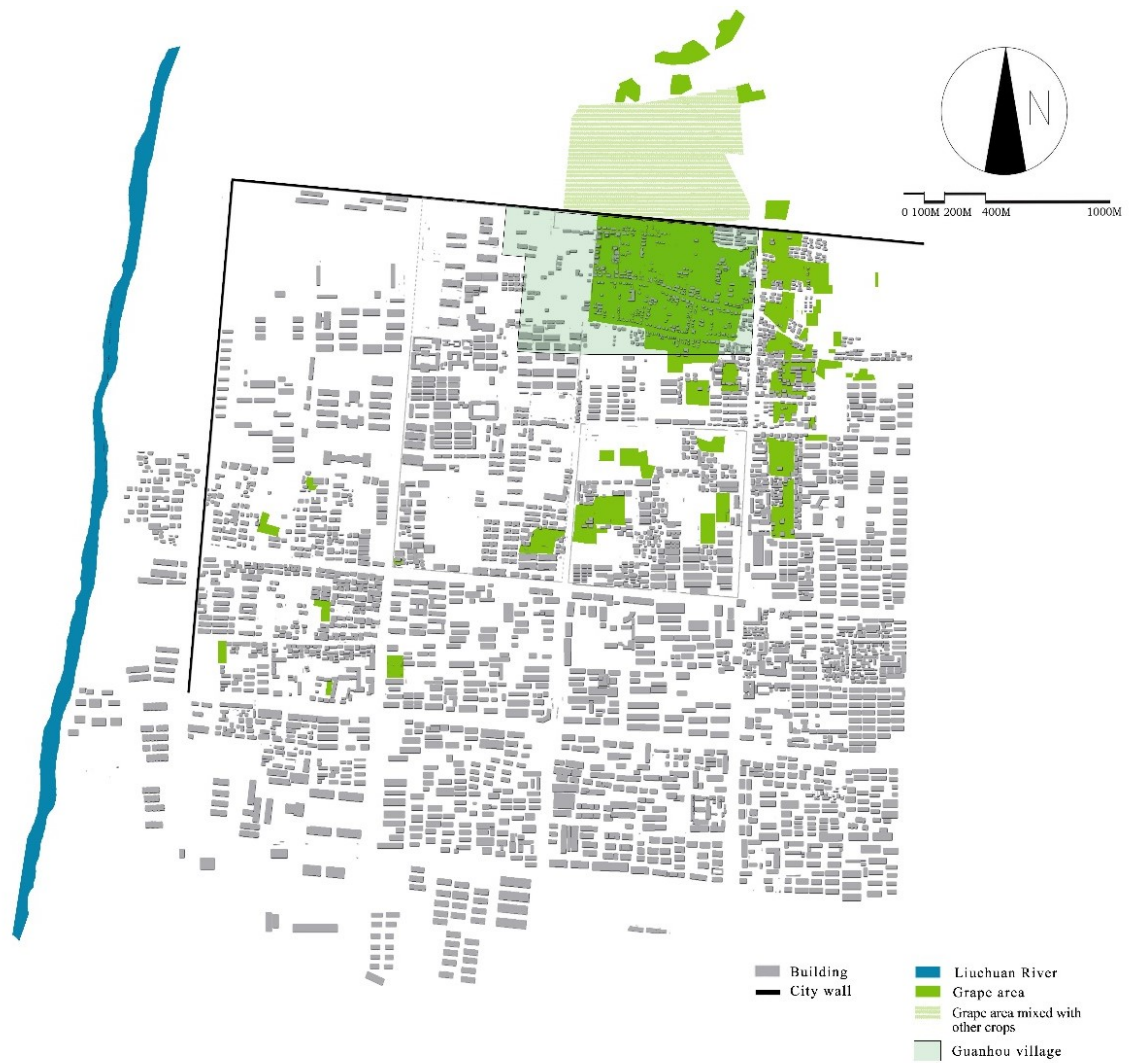


Fig. 3-5 The distribution of grape gardens in the Old City of Xuanhua and beyond the walls in 2002.

Source: Annual Xuanhua District, 1994-2003 (Han, 2017). Google Earth.



Fig. 3-6 The distribution of grape gardens in the Old City of Xuanhua and beyond the walls in 2018.

Source: Google Earth.

As for tangible heritage features, the urban pattern of Guanhou village was preserved until the early ROC. Since then, the original village road and courtyard layout have been retained.

Few original dwellings exist in the study area. For instance, Merchant Ma's house, which was built during the Qing Dynasty, has been preserved as a representative of a traditional residence, which can be visited as a museum. Most of the farmhouses can be traced back to the late 20<sup>th</sup> century, the majority of which are built of brick, stone, adobe, or rammed earth. Generally, they are now in poor condition (Fig. 3-7). Most are low-slung single-storey buildings with a few new double-storey buildings interspersed amongst them.



Although the form and structure of the individual buildings have evolved through history, the courtyard layout has been preserved. Courtyards can be seen as enclosed spaces (Fig. 3-8). Several families may share a courtyard to grow grapes. Each has its own management boundaries (Fig. 3-9), although sometimes there is no physical fence to divide the field.



Fig. 3-7 Typical single-storey building in the study area.

Source: Photographed by the author in 2017.

As a rare species, the Xuanhua milk grape has been passed down from generation to generation since its original spread in China during the Tang Dynasty (Xinhua News Agency, 2009). In relation to this, Guanhou village has some outstanding intangible heritage. One such instance is the grape cultivation method in the form of funnel-shaped frames (Fig. 3-10), which has been inherited and applied by farmers in Xuanhua (Fig. 3-11). It includes not only the specific funnel-framed cultivation technique but also the management and sheltering method for winter, which has been adapted to the local climate conditions. The farmers bury grapevines in the centre of the funnel for winter protection. Grapevines are placed in a ditch, and then farmers disassemble the grape trellises and lay them across the ditch. Finally, they put a layer of straw (now waterproof sheets) on top of the trellises and cover them with soil.

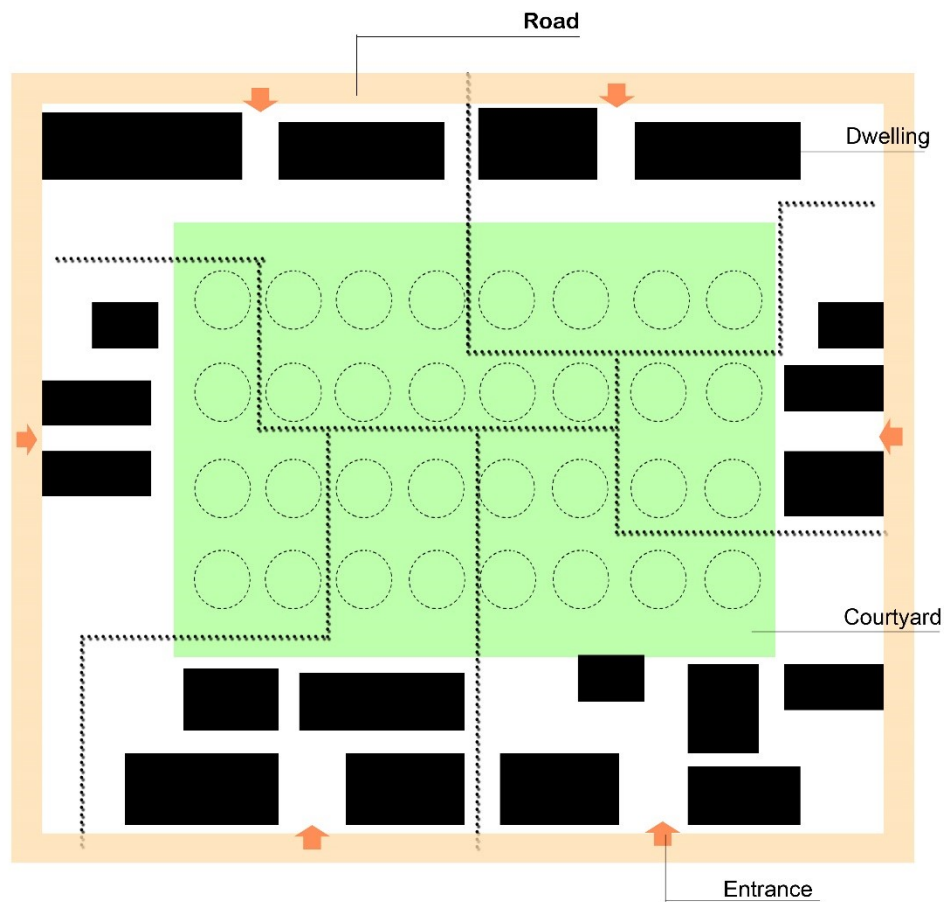


Fig. 3-8 Courtyards can be seen as enclosed spaces. Several families may share a courtyard for growing grapes. The boundaries dividing the courtyard may be fences, brick walls, or invisible borders formed by the families themselves after negotiation. For the green area in the diagram, there may be a number of single-storey adobe buildings. They were mainly used to store agricultural tools or other miscellaneous items.



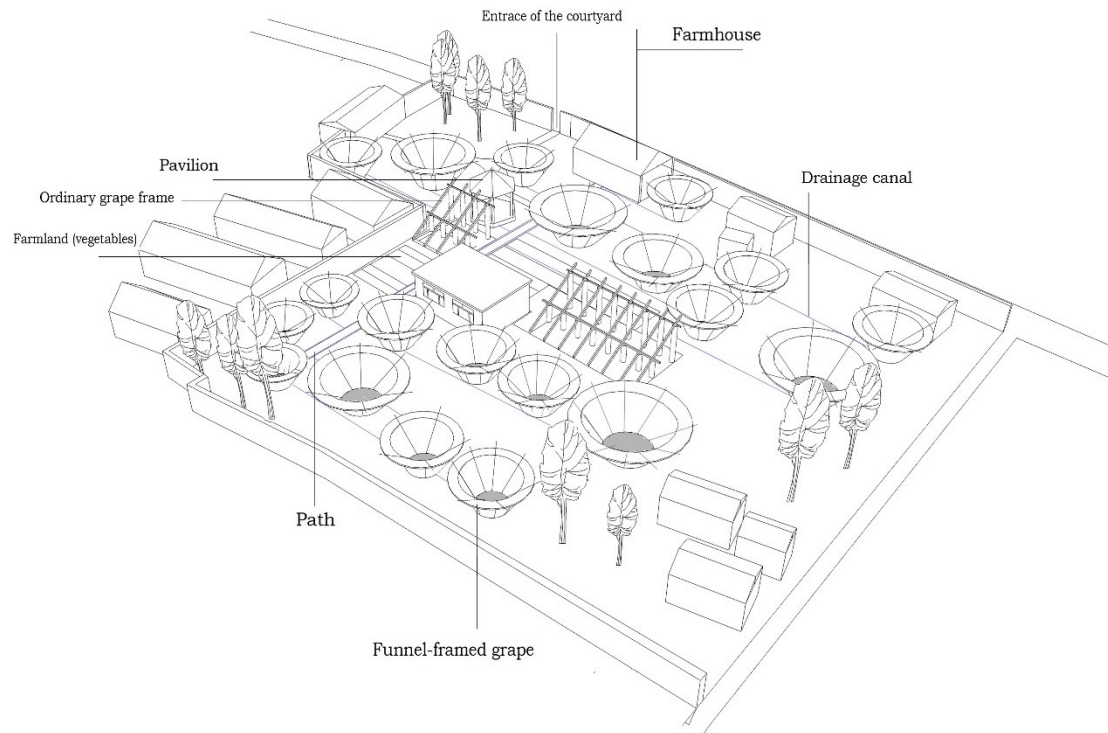


Fig. 3-9 A detailed sketch of a typical yard of one family.



Fig. 3-10 The funnel-shaped grape in the study area  
Source: Photographed by the author in 2017.

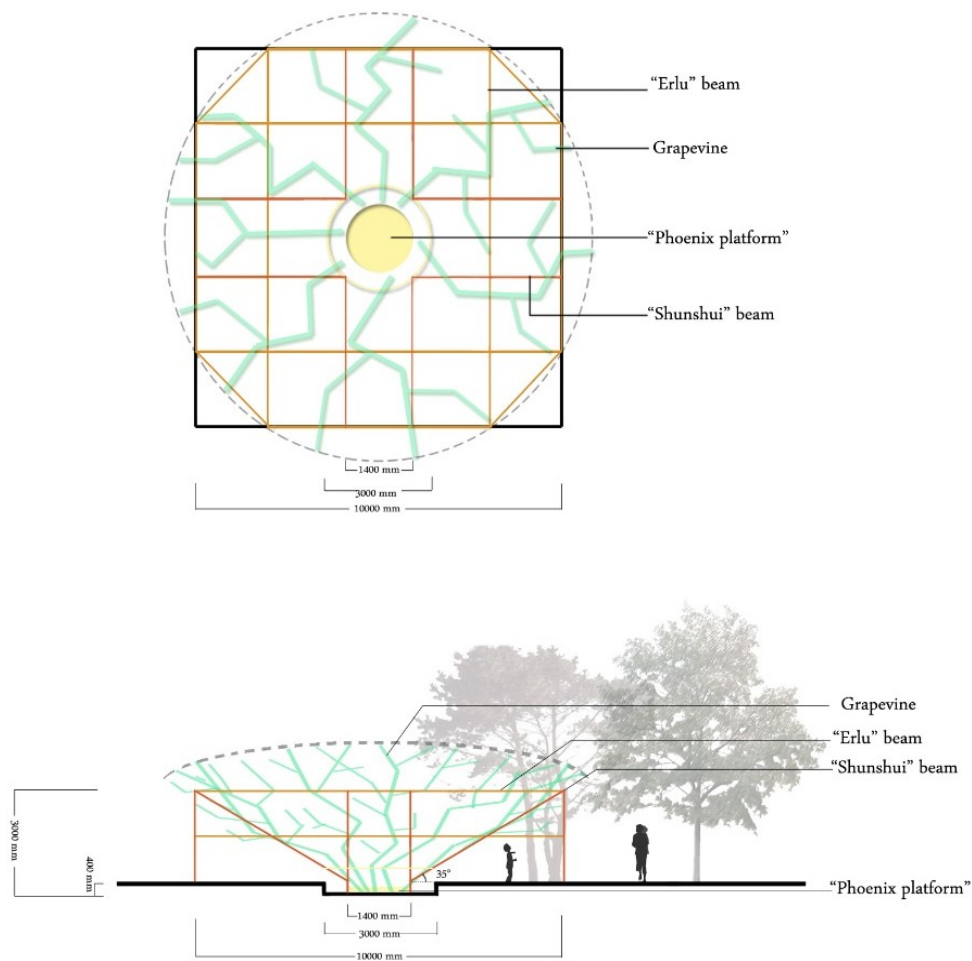


Fig. 3-11 The structure model of the funnel-shaped grape. Source: The top view is based on the funnel-shaped model in the GIAHS proposal drawn by GXD in 2013. The specific size is based on the field measurement results by the author in 2017.

The Xuanhua Grape Research Institute, established in 1976, attaches great importance to traditional cultivation techniques. For example, it researches the breeding of grape varieties and trains farmers individually in viticulture. Besides, it has carried out scientific research in the field of disease control and the increase of the sugar content of Xuanhua grapes. In addition to preserving traditional cultivation methods and local varieties, the Institute also has carried out experiments to optimise traditional funnel-shaped frame modifications and pruning methods to increasing grape yields.

According to the results of a measurement campaign performed by the Xuanhua Grape Research Institute, this storage approach is effective because it functions to keep the grapevines warm and protected during the winter (Sun & Min, 2015). Besides, it is possible to promote the funnel-shaped grape cultivation method in other

places (Li, 2011).

As another component of intangible heritage, the names of roads and places, Buddhist legends, as well as folklore, are inherited and dispersed. There are also various literary and artistic works, such as poems, folk songs, paintings, and calligraphy praising the Xuanhua grape garden.

It is worth mentioning that when declaring the GIAHS Programme, GXD tended to present the detailed planting method and germplasm resources than to explore the historical evolution of the region. Instead, this chapter builds on the GXD discussion by exploring the historical value of the Xuanhua grape garden in a deeper way. In terms of tangible heritage, the layout of the Old City of Xuanhua and the grape courtyard pattern have been drawn and analysed in-depth. As for intangible heritage, cultivation techniques, local place names, legends, and Buddhist backgrounds have been summarised.

### 3.2.2 Ecological aspects

As for the ecological advantages of the funnel-shaped cultivation technique, on the one hand, the shape of the funnel protects the grapes from exposure to the cold and wind (Hu, 2016). On the other hand, because all the vines start from the centre of the funnel, the funnel structure makes fertilisation and watering much easier than in the case of an ordinary grape frame. In this process, the vines can absorb more nutrients.

The temperature in the grape garden could be lower than that in the other courtyards. It can prove that in the summertime, the funnel-framed grape could efficiently lower the high temperature of surrounding areas and moisturize the air to achieve the effect of adjusting the micro-climate (GXG, 2013)

The milk grape species is a popular gastronomic speciality. Today, it plays a stimulating role in promoting domestic agritourism industry, supporting jobs and economic growth.

Besides, numerous crops, fruits, vegetables, and flowers are cultivated in the study area (Fig.3-12), contributing to agrobiodiversity. Additionally, the water demand of the grapes produced by the funnel-framed technique is 40% less than that of grapes grown on the common<sup>16</sup> grape trellis (GXG, 2013).

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<sup>16</sup> 'Common grape trellis' mentioned here usually refers to a row of posts (wooden or metal) connected by several wires.



Fig. 3-12 Towel gourd (left) and Lettuce (right) in the grape garden.

Source: Photographed by the author in 2017.

### 3.2.3 Social perception aspect

The productive landscape is preserved integrally (Fig.3-13). However, outside the courtyards, some construction waste and household garbage exist throughout the village. Traffic and construction noise in the area around Guanhou village also has a negative impact on the entire community to some extent.

As for public perspectives on the historical value of the grape garden, after the Xuanhua urban grape garden was nominated within the GIAHS Programme, two documents were promulgated by the GXD during the same year to encourage the conservation of grape gardens. The dominant attitudes in official and social media about the Xuanhua grape garden are positive, although few reports have been written about the Xuanhua grape garden and Xuanhua grapes. All authors regarded them as an iconic feature that reflects the local culture.<sup>17</sup>

Unfortunately, some migrant workers and local citizens are not aware of the heritage value of grape gardens. In particular, the younger generations pay little attention to grape gardens.

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<sup>17</sup> Search content largely comes from news reports on mainstream Chinese websites, such as Sina Weibo and Baidu. The author also takes into account the dominant survey social platform in China, i.e. the China Knowledge Resource Integrated Database.





Fig. 3-13 A bird-eye view of the traditional grape garden.

Source: Photographed by the author in 2017.

#### 3.2.4 Business model aspect

Relevant research results reflected that by 2018, more than half of the households living in Guanhou village relied on viticulture (including grape sales) as their sole income source. For those households whose livelihoods centre on full-time grape cultivation, average annual incomes are quite low (Su et al., 2018). Hence, driven by the GIAHS Programme designation, some households have begun to explore new business models (e.g. tourism) for their livelihoods. To understand the reasons that this kind of phenomenon has appeared, the author interviewed two households with different livelihoods.

The first is a household with a full-time viticulture-based livelihood (Table 3-2). Their primary income relies on marketing. The main expenses include labour and garden pest control. This household considers the cultivation technique an essential resource of their business model. Customers, who mainly come from Beijing or other nearby areas, usually pick grapes in the grape garden and purchase them directly.

The second household has updated its livelihood with the development of agritourism (Table 3-3). It also joined an agricultural marketing co-operative to increase production and income. Grapes are sold directly to natives and tourists as well as through online social media platforms. The productive landscape is regarded as one of the essential resources of the business model. The main activity of this household is the grape picking festival, which is held in the autumn each year.

Table 3-2 BMC results from a household with a full-time grape cultivation livelihood

|                                                                                                    |                                                                               |                                                                                                         |                                             |                                                                                             |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Key Partners</b><br>- self-employed                                                             | <b>Key Activities</b><br>- self-sufficiency<br>- promote historical knowledge | <b>Value Propositions</b><br>- tasteful<br>- local/regional<br>- traditional<br>- branded<br>- seasonal | <b>Customer Relationships</b><br>- personal | <b>Customer Segments</b><br>- indigenous inhabitant<br>- mainly come from surrounding areas |
|                                                                                                    | <b>Key Resources</b><br>- technique                                           |                                                                                                         | <b>Channels</b><br>- direct selling         |                                                                                             |
| <b>Cost Structure</b><br>- pruning, pest control<br>- purchases of farm tools and other facilities |                                                                               |                                                                                                         | <b>Revenue Streams</b><br>- marketing       |                                                                                             |

Table 3-3 BMC results from a household with new marketing channels as livelihood

|                                                                                                                                 |                                                                            |                                                                                                                         |                                                                         |                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Key Partners</b><br><br>- self-employed<br><br>- cooperatives                                                                | <b>Key Activities</b><br><br>- self-sufficiency<br><br>- festival activity | <b>Value Propositions</b><br><br>- rare<br><br>- tasteful<br><br>- local/regional<br><br>- traditional<br><br>- branded | <b>Customer Relationships</b><br><br>- personal                         | <b>Customer Segments</b><br><br>- indigenous inhabitant<br><br>- tourists<br><br>- different individual clients |
|                                                                                                                                 | <b>Key Resources</b><br><br>- technique<br><br>- productive landscape      |                                                                                                                         | <b>Channels</b><br><br>- direct selling<br><br>- social media platforms |                                                                                                                 |
| <b>Cost Structure</b><br><br>- labour cost<br><br>- pruning, pest control<br><br>- purchases of farm tools and other facilities |                                                                            |                                                                                                                         | <b>Revenue Streams</b><br><br>- marketing<br><br>- agritourism          |                                                                                                                 |

Results show that for the former household, the most significant source of customers is indigenous inhabitants or people who live in or near the Xuanhua District. As all income generated comes from a single source, the process of increasing income is developing slowly. For the latter, the development of tourism provides the household with many opportunities to increase their income. For this reason, there has been a new trend for households in the Xuanhua grape garden to adjust and update their management patterns.



### 3.3 Conclusion

Table 3-4 The analysis results of the Xuanhua grape garden

| Dimensions              | Analysis                                                                     | Description                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manifestation dimension | Tangible elements                                                            | <ul style="list-style-type: none"> <li>·Territory's pattern of Guanhou village</li> <li>·Old pathways</li> <li>·Pattern of the courtyard</li> <li>·Grape species</li> <li>·Old grapevines</li> </ul>                                                                                                                                                         |
|                         | Intangible elements                                                          | <ul style="list-style-type: none"> <li>·Grape cultivation technique</li> <li>·Names of roads and places</li> <li>·Buddhist legends</li> <li>·Folklores &amp; stories</li> <li>·Artistic creation (poems, paintings, calligraphy, etc.)</li> <li>·Neighbourhood relationship</li> </ul>                                                                       |
| Ecological dimension    | Agrobiodiversity                                                             | <ul style="list-style-type: none"> <li>· A variety of species</li> </ul>                                                                                                                                                                                                                                                                                     |
|                         | Others                                                                       | <ul style="list-style-type: none"> <li>· Micro-climate</li> </ul>                                                                                                                                                                                                                                                                                            |
| Social dimension        | Social perception analysis based on the interview results from the residents | <ul style="list-style-type: none"> <li>·Outstanding panoramic view and courtyard landscape</li> <li>·Noise from neighbourhoods</li> <li>·Poor accessibility</li> <li>·Positive attitudes from GXD, the Xuanhua grape Research Institute, as well as the households</li> <li>·Negative perspectives from some migrant labours and young generation</li> </ul> |
| Economic dimension      | Business model canvas (BMC)                                                  | <ul style="list-style-type: none"> <li>· For the household with a full-time grape cultivation livelihood, the increasing income process is moving slowly</li> <li>· Some farmers have begun to use new marketing channels as their livelihoods (e.g. agritourism)</li> </ul>                                                                                 |

## 4 Case Study: urban gardening in Bamberg, Germany

### 4.1 Introduction

Bamberg, a municipality of Bavaria, is situated in the south of Germany. In 1007, Emperor Henry II founded the Bishopric of Bamberg. At that time, the city was the centre of the Holy Roman Empire of the German Nation (Kloos & Alberth, 2018). According to UNESCO, Bamberg was selected as a WH Site in 1993, primarily due to the typical characteristics of the medieval urban spatial structure, as well as the well-maintained medieval and baroque buildings (both secular and ecclesiastical architecture). It lies approximately 200km to the north of Munich and 100 km to the east of Würzburg (Fig. 4-1). The entire area is 54,62 km<sup>2</sup>. Bamberg is divided into three sections: the central district is called the 'Island City' (*Inselstadt*), the 'Hill Town' (*Bergstadt*) is in the southwest, and the 'Market Gardeners' District' (*Gärtnerstadt*) is in the northeast. The nomination of the UNESCO site includes all three districts (Fig. 4-2).

In this research, the study area is the Market Gardeners' District because of its outstanding agricultural tradition. It is worth mentioning that, since the Middle Ages, this area has been cultivated by Bamberg gardeners for over 600 years (Spiegel Online, 2016). During that period, horticulture, supported by Bamberg monasteries, used to be an essential part of the economic income of the city (Bredenbeck, 2014).

Part of the Market Gardeners' District has been an essential part of the World Heritage Site since 1993 (Fig. 4-3). Moreover, by 2016, the inner-city commercial urban gardening in Bamberg was nominated as the UNESCO German National Inventory of Intangible Cultural Heritage (Spiegel Online, 2016) and is accompanied by various social, religious and corporate traditions of gardeners (e.g. housing, clothing and language). Concerning these two nominations, we can clearly see that both fruitful material and immaterial heritage factors exist in the study area. Today, it represents a remarkable interdependence of urban-village characteristics within the inner city.

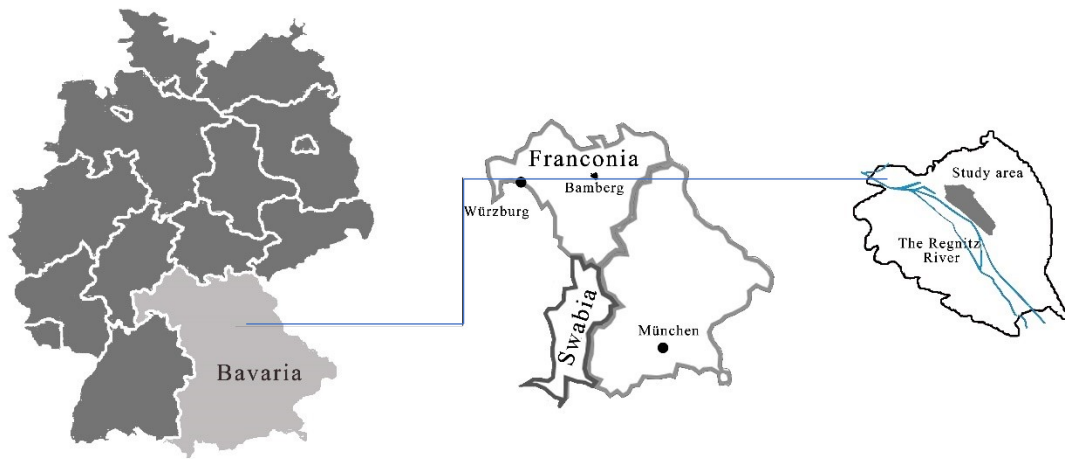


Fig. 4-1 Location of Bamberg in Germany

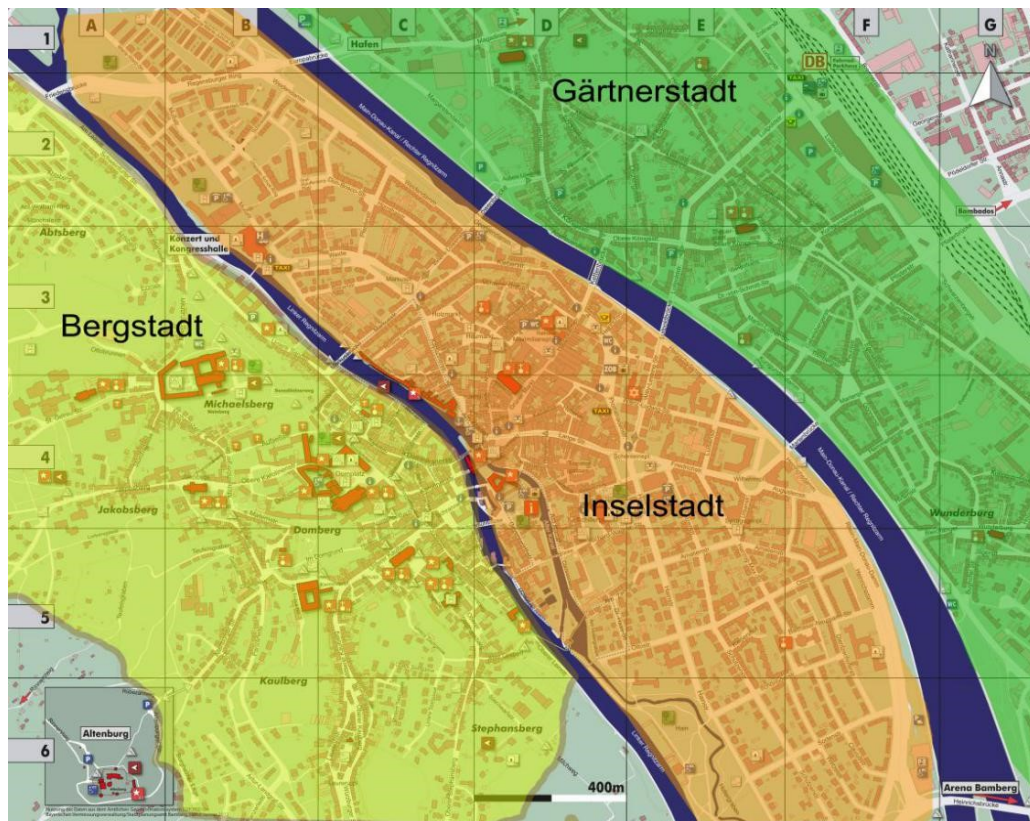
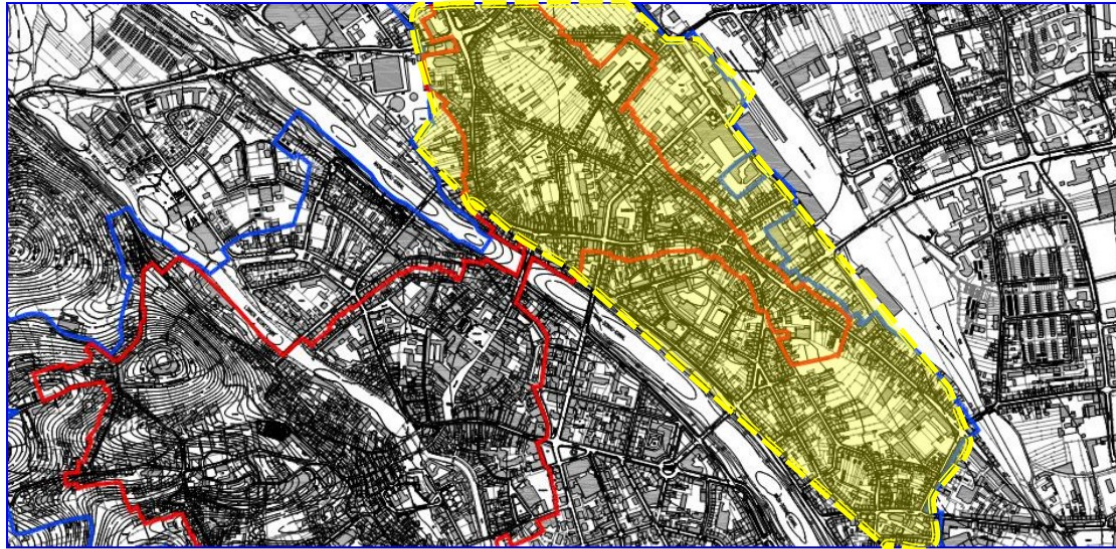


Fig. 4-2 Three sections of Bamberg (city centre).

Source: Stadt Bamberg.



- Official border according to the UNESCO Convention (the protection area of world cultural and natural heritage)
- Official border of the buffer zone according to the UNESCO Convention (the protection area of world cultural and natural heritage)
- The Market Gardeners' District

Fig. 4-3 The UNESCO site of Bamberg. Source: UNESCO World Heritage Centre.

Geographically, Bamberg lies in the core zone of the Bamberg Basin (*Bamberger Becken*), which is a flood plain within streams of the Regnitz River flowing into (Schöpplein, 2016). It is situated in the middle of the South German Scarplands (*Südwestdeutsche Schichtstufenland*), and the main composition of the sediment is river gravel, sand, or aeolian (wind sediment) and fly dust (Bender et al., 2001).

The Regnitz River is located in Franconia and has a length of approximately 60km. Based on the interview with Dr. Hubertus Habel, the curator of the Gardeners' and Vintners' (*Gärtner- und Häcker*) Museum in Bamberg, the overall context can be learned. It is believed that due to the fertile land near the Regnitz River, farmlands in the Market Gardeners' District have received excellent nutrients and irrigation water from ancient times until now. The sandy soils in the alluvial region of the Regnitz River offer the best conditions, particularly for the cultivation of vegetables (Bredenbeck, 2014). Therefore because of the fertile soil, this region has always been, and continues to be, suitable for growing crops and farming activities. Additionally, the Regnitz River can be seen as a traffic route connecting different places and provided abundant resources for water transport, which promoted the flourishing of Bamberg.



Fig. 4-1 illustrates that there are two branches of the Regnitz River and that the Market Gardeners' District is in the north. It is worth mentioning that the flood of the Regnitz River used to pose a threat to the city for centuries. The most significant flood occurred on February 27, 1784: during that time, various bridges and buildings were damaged (Flussparadies Franken e. V., 2019). Since then, the water has remained below the highest water level. Furthermore, the *Jahnwehr* (a reservoir in Bamberg) and the dam were established to control the flood and hold back the rising water in 1964 (Wikipedia, 2020). Thus, there could be little threat of a flood during the development of agriculture in the Market Gardeners' District.

As for groundwater, based on the research from Horst Gehringer, who worked in the Bamberg City Archive, agricultural irrigation once depended on groundwater resources (Krings et al., 2009). On the first city map of Bamberg, *Zweidlerplan* (Fig. 4-4), many wells are distinctly drawn and delineated in the back gardens of gardeners' houses (Fig. 4-5). However, over the past decade, the level of underground water has declined (Bayerischer Rundfunk, 2019). According to fieldwork, gardeners today no longer use well water to irrigate their fields.

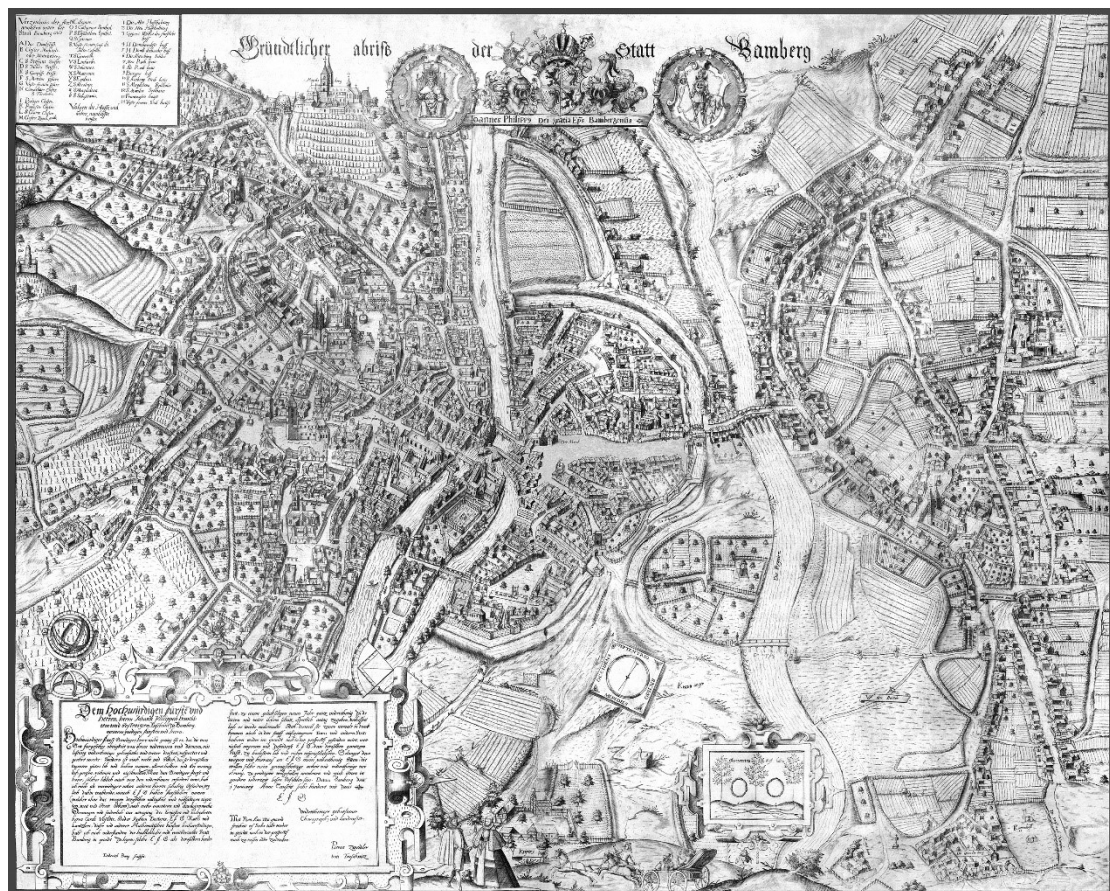


Fig. 4-4 *Zweidlerplan* of Bamberg, 1602. Source: Bamberg Archive.

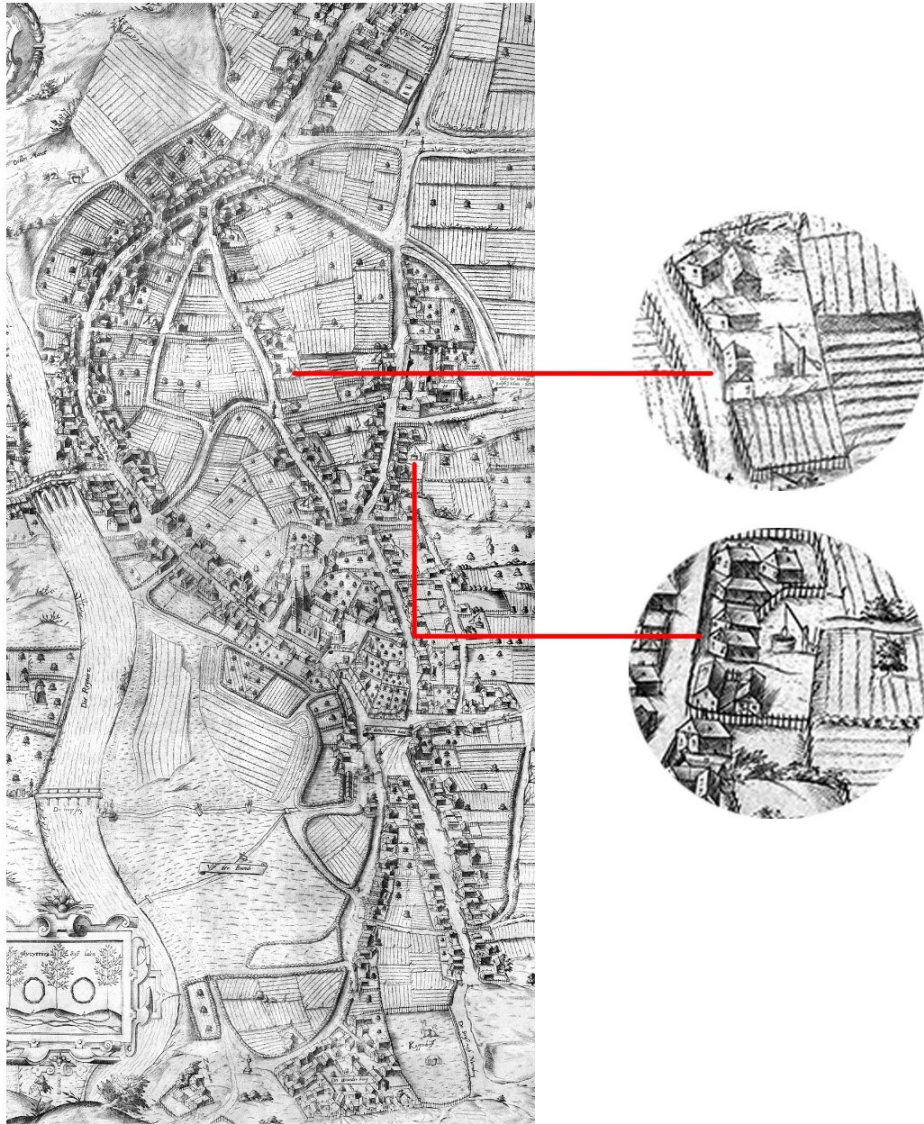


Fig. 4-5 In 1602, there were often wells in gardeners' back gardens. It is reasonable to say that well water was used to irrigate the nursery and vegetable plot during that era. Source: *Zweidlerplan* of Bamberg, 1602. Bamberg Archive.

Bamberg has a marine climate with generally cool summers and cool, but not cold, winters. According to 29 years' (1931–1960) worth of precipitation data, the average annual precipitation was 643mm and the average annual temperature was 8.5°C (Bender et al., Ch 15, 2001). The climate data from Bamberg from 1981 to 2010 shows that the average annual precipitation is now 650.9mm and the average annual temperature is 9.2 °C (Wikipedia, 2020). Thus, the climatic conditions, which can affect the agricultural industry, did not change dramatically.

With regard to the urban morphology of Bamberg, several documents and scientific articles have been summarised. Primarily based on the research results from Horst Gehringer, Marina Scheinost and Ralph Lessmeister, the settlements of gardeners begun to take shape in the 13<sup>th</sup> and 14<sup>th</sup> centuries: the earliest forms were mainly garden fields, plant gardens, or seed gardens ( Lessmeister, Scheinost, Grabner, Scherle & Gebhardt, 2009). Until now, the original appearance of the urban morphology of the Market Gardeners' District has been largely preserved.

## **4.2 Analysis results**

### **4.2.1 The tangible and intangible aspect**

As mentioned above, Bamberg is composed of three sections. This pattern can be traced back to 1007, when Emperor Henry II founded the Bishopric of Bamberg (Kloos & Alberth, 2018). During that period, estrangements between clergies and citizens were embodied in both the psychological aspect and the geographic boundary (Suzuki, 1996). Therefore, different social groups came into being: the clergy occupied Hill Town, which came to be known as the Bishop Town, whilst the majority of citizens lived in Island City.

At the end of the 14<sup>th</sup> century, 30 gardener families were founded, living in the *Theuerstadt*. Dr. Marina Scheinost proposed that gardeners had started to carry out cultivating activities to supply of vegetables and cereals to citizens in the Middle Ages, which made a significant contribution to the economic development of Bamberg during that era (Krings et al. & Lessmeister, Scheinost, Grabner, Scherle & Gebhardt, 2009). Based on the *Zweidlerplan* of Bamberg in 1602, it is obvious that the building density was extremely low during that period, and many cultivation areas existed in the east of Bamberg (see Fig. 4-6).

One can see, particularly in Dr. Ralph Lessmeister's research, that the timeline of land utilisation change is noticeable after the Middle Ages. By 1844, many farmlands were transformed to construction lands: however, the areas directly belonging to the gardeners' houses were still used as exclusive fields for horticultural activities (the typical pattern is shown in Fig. 4-6. In the middle of the 19<sup>th</sup> century, Bamberg gardeners had approximately 430 hectares of cultivation land for growing cereals and vegetables (Lessmeister, Scherle, et al., 2009). Subsequent to this, several buildings were established due to the demands for military barracks, and the number of gardeners slowly decreased during the 19<sup>th</sup> century. Before World War I , approximately 334 hectares of fields were exclusively cultivated for vegetable



production. Although green spaces (including a large proportion of farmlands) dramatically reduced in the years leading to World War II, the area of fields for growing vegetables remained relatively constant (Fig. 4-7). In the 1970s, the Bamberg gardeners still used 308 hectares for growing vegetables.

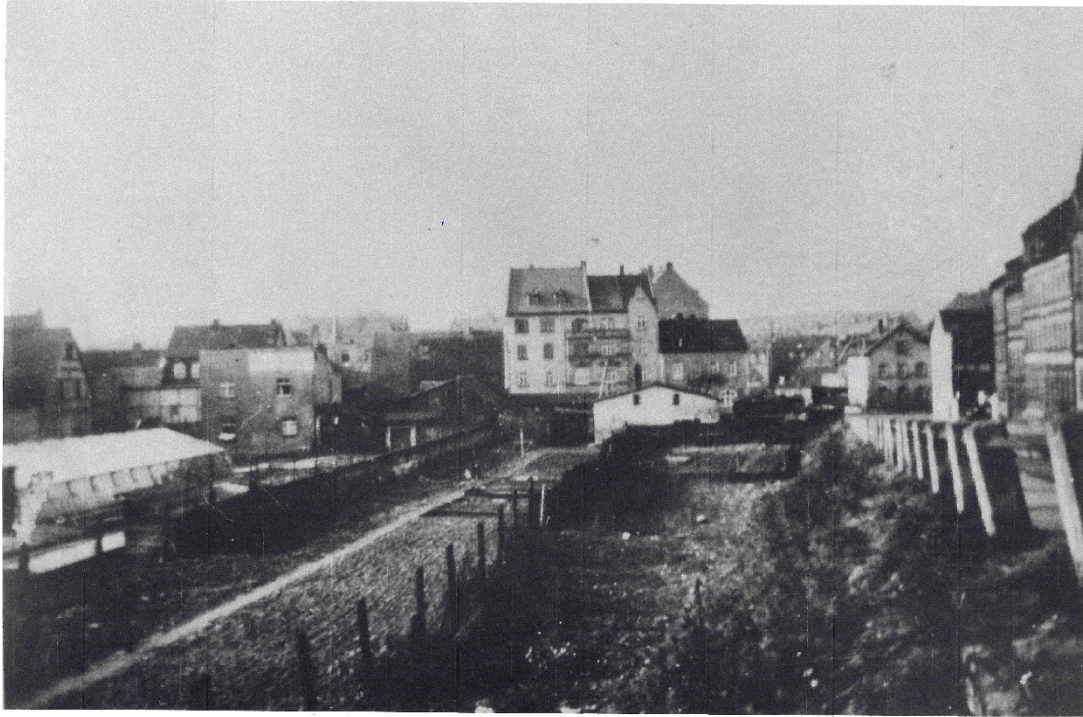


Fig. 4-6 Gardeners' houses and their gardens, which was treated as the horticultural land (1910). Source: Bamberg Archive.

After the 1970s, severe soil sealing (predominantly caused by urban development and infrastructure construction) led to a continuous reduction in the area of vegetable fields. From the 1980s until today, the horticultural areas of the Bamberg gardeners are primarily situated in the Market Gardeners' District. According to the municipal planning documents, the gardeners' area in the Market Gardeners' District consists of two components: the lower nursery in the north and the upper nursery in the south (see Fig. 4-8) (Schäfer & Slanz, 2009). In the 1980s, the sum of the two parts was approximately 75.2 hectares (Table 4-1).



Fig. 4-7 The aerial view of the part of the lower nursery in 1966.

This illustration shows that the composition of land use in the past is quite similar to that of today. The houses and their spatial distribution, as well as the vast majority of the walls dividing the farms, have been preserved.

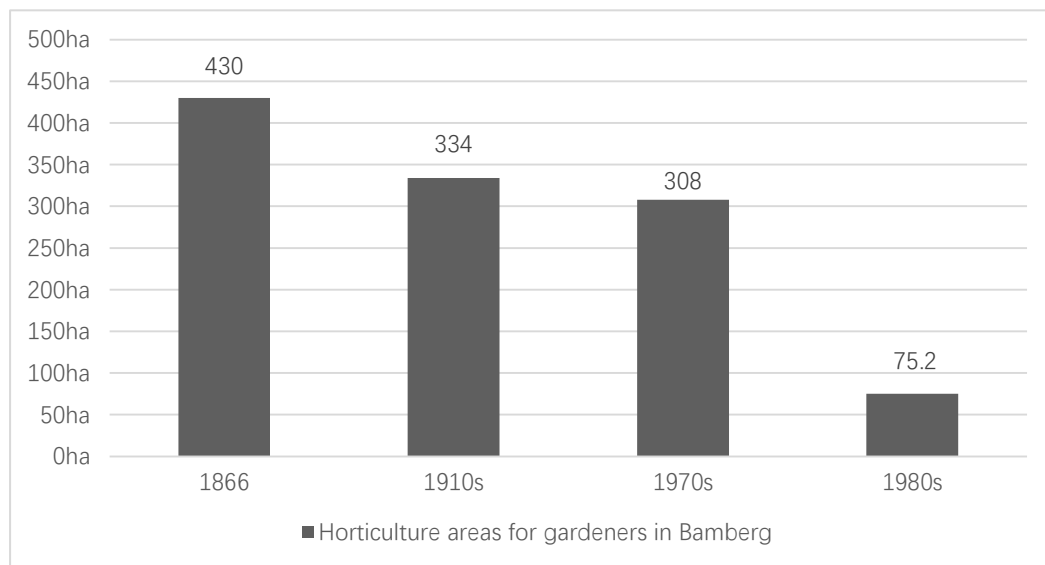
Source: Bamberg Archive.



Fig. 4-8 Location of the lower nursery and the upper nursery.

Source: *Studie Zur Gärtnerstadt*, published in 2009.

Table 4-1 Changes to the distribution area of horticulture activities by gardeners in Bamberg from the 1860s to 1980s<sup>18</sup>



Figs. 4-9, 4-10, and 4-11 show the urban morphology in the range of the Market Gardeners' District in 1602, 1999, and 2009, respectively. In the meantime, they indicate the areas' changes in green spaces from 1602 to 2009. All historical maps were collected from the Bamberg Archive, Stadt Bamberg, including the *Zweidlerplan* of Bamberg in 1602 and the *Urban Planning and Monument Conservation Map of the Market Gardeners' District* in 1999. Furthermore, the *Studie Zur Gärtnerstadt* published by Markus Schäfer and Yvonne Slanz in 2009 can be seen as a useful reference for the summary of changes in land use of the Market Gardeners' District (Schäfer & Slanz, 2009).

As can be seen from these three illustrations, a comparison between the maps from 1999 and 2009 indicates that the distribution of green spaces in the scale of the lower and the upper nursery slightly changed. Furthermore, from 2009 until today, the general spatial pattern of green spaces (including horticultural areas) has not changed significantly. Thus, in this research, the latest land-use map could be omitted. However, since 1999, some exclusive horticultural fields have been transferred to other private green spaces that mainly contained private courtyards and ornamental gardens: this principally occurred in the lower nursery. During the 2010s, only 4.3 hectares of horticulture fields were encircled by gardeners' houses in this region (Bredenbecks, 2014).

<sup>18</sup> The 1910s in the table generally means the period before World War I.



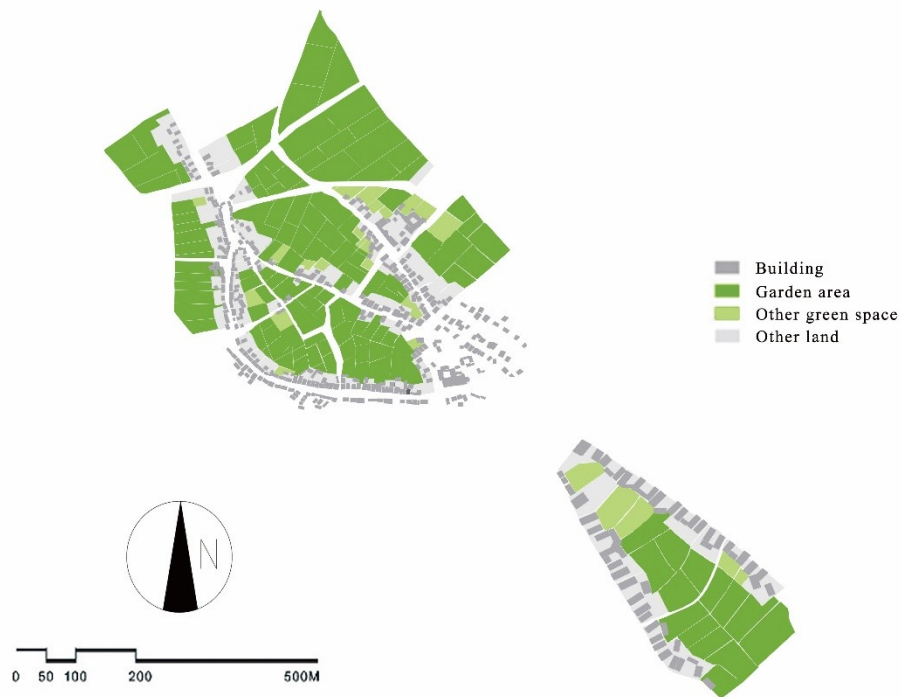


Fig. 4-9 Morphology and the distribution of the green spaces in the Market Gardeners' District in 1602<sup>19</sup>. Sources: the Bamberg Archive, Stadt Bamberg.

<sup>19</sup> As the historical reference is a 17<sup>th</sup> century hand-drawn panorama, there are inevitable inaccuracies in the calculation of building area and green space. Therefore, this figure will differ in part from the two figures below. This is particularly the case with regard to the building area of the individual units. However, according to on-site research, the author found that some houses before the 17<sup>th</sup> century had in fact been preserved. This indicates that the building area has not changed much compared to the present period. It is only due to the different sources of historical information that the drawings are partially deviated.



Fig. 4-10 Morphology and the distribution of the green spaces in the Market Gardeners' District in 1999. Sources: Stadt Bamberg, *Studie Zur Gärtnerstadt* published in 2009; Google Earth.



Fig. 4-11 Morphology and the distribution of the green spaces in the Market Gardeners' District in 2009. Sources: Stadt Bamberg, *Studie Zur Gärtnerstadt* published in 2009, Google Earth.

Concerning tangible heritage components, the typical ‘market gardening’ houses must be mentioned. According to the travelling guide of the Market Gardeners’ District from Klaus Herta<sup>20</sup>, Bamberg gardener’s house can be traced back to the late Middle Ages as a type of unique regional farmhouse. The original form of the gardener’s house could be regarded as the main building with a yard. The majority of gardeners’ dwellings were single-storey houses with half-timbered constructions. At the rear of the house, a barn was often set to store fodder. Additionally, a specific characteristic of gardener’s house in the 15<sup>th</sup> and the 16<sup>th</sup> century was the high, steep roof. The house on Mittelstraße 72 represents a traditional 15<sup>th</sup> century home (see Fig. 4-12).

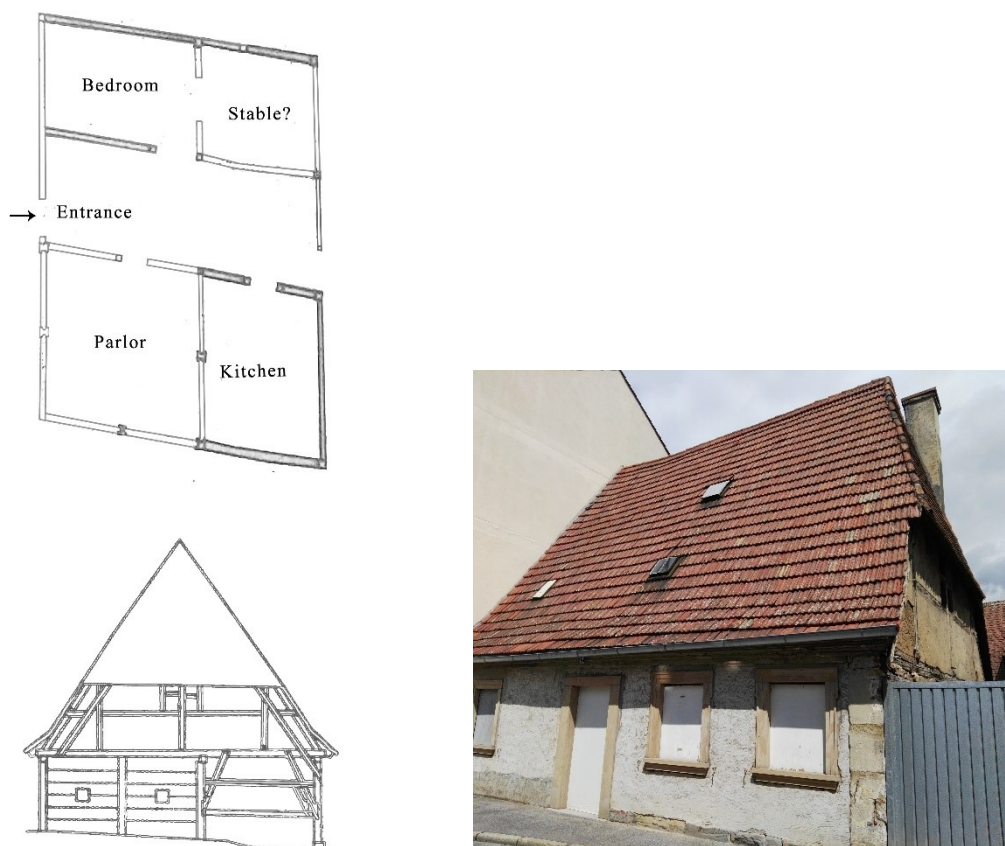


Fig. 4-12 Ground floor plan and elevation drawing of the house on Mittelstraße 72 from the 15<sup>th</sup> century. On the right is the current image of the building.

Source: travelling guide from Klaus Herta. Photographed by the author in 2019.

In the Middle Ages, particularly during the 17<sup>th</sup> and 18<sup>th</sup> centuries, the majority of buildings were built with a slight pitch roof. From the middle of the 18<sup>th</sup> century, the

<sup>20</sup> The source comes from the outdoor billboards based on the ‘Urban Gardening’ project organised by Stadt Bamberg.

typical gardeners' house was built with a broad passage (accessible by vehicles), which led directly to the backyard. Fig. 4-13 shows the ground floor plan and elevation drawing of a house on Mittelstraße 33, which was built during the 18<sup>th</sup> century.

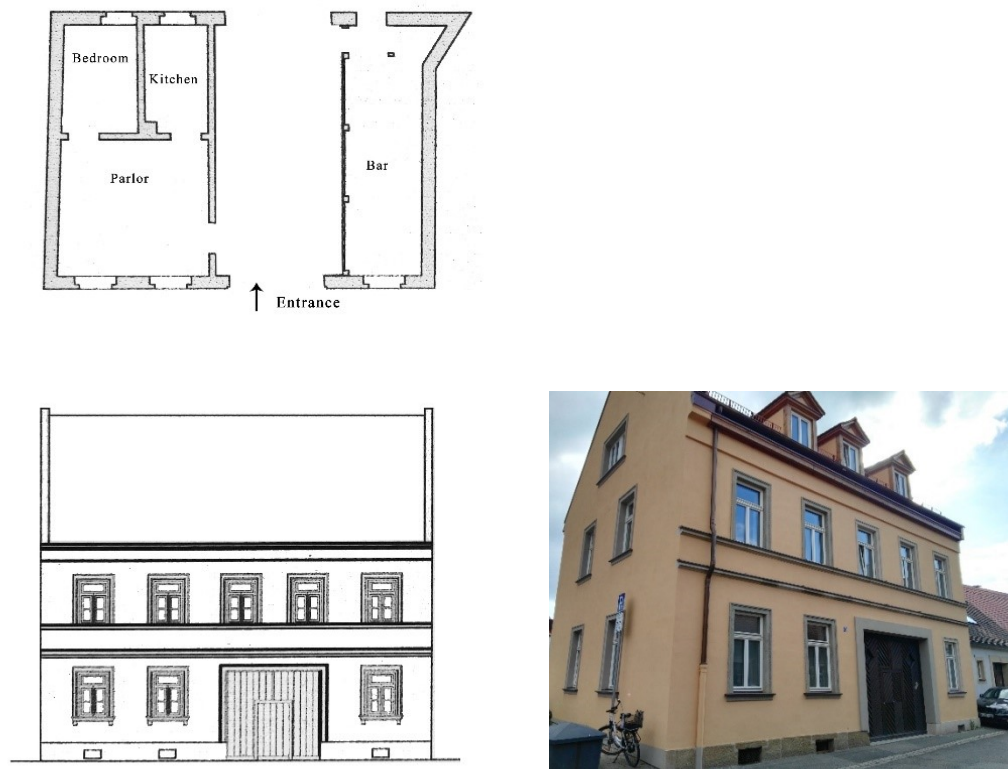


Fig. 4-13 Ground floor plan and elevation drawing of the house on Mittelstraße 33 from the 18<sup>th</sup> century. On the right side is the current image of the building.

Source: travelling guide from Klaus Herta. Photographed by the author in 2019.

When the importance of market gardening decreased in the 20<sup>th</sup> century, the majority of the gardeners' houses had already disappeared. However, there are still some remarkably well-preserved traditional houses, primarily in the Mittel-, Heiliggrab-, Siechen- and Nürnberger Straße.

Concerning the other tangible heritage factors in the Market Gardeners' District, local vegetable species should not be neglected. According to a stipulation issued on March 26, 1670, beetroot, cabbages, savoury cabbage, cauliflower, artichoke, kohlrabi, nasturtium, sage, clove, onion, anise, lettuce, celery, chicory, fenugreek, coriander, black cumin, horseradish and parsnips have been grown in this region (Lessmeister et



al., 2009). In the 1920s, indigenous species in the Market Gardeners' District primarily contained cabbages, cauliflower, Brussels sprouts, savoy cabbage, kohlrabi, celery, parsley, radish, horseradish, swede, water beetroot, red beetroot, salsify, onion and garlic (O. Bender et al., 2001). Furthermore, during the 16<sup>th</sup> and 17<sup>th</sup> centuries, liquorice began to be grown as a medicinal plant and as a sweet; it then became one of the most important crops and primary sources of income for the Bamberg gardeners due to the extensive development of export trade.

Many vegetables used to be cultivated within the Market Gardeners' District. Today, the variety of plants growing in this area increases further, including ornamental flowers, fruits, vegetables, herbaceous perennial plants and herbs. In some backyards, traditional walls were built out of stone. The stones are partly from old churches with high historical value. Stone walls might provide a warm climate for gardeners' seedlings.

Additionally, conventional farm tools have been inherited and used until today (see Fig. 4-14). They are typically hung on the exterior wall of the house and face the yard, so that gardeners can take off the tools while walking past. Gardeners also wore traditional clothes.



Fig. 4-14 Traditional tools are hanging on the exterior wall of a gardener's house. Photographed by the author in 2017.

Regarding intangible heritage factors, vegetables cultivated by gardeners had been sold on the green market (*Grüner Markt*) since approximately the 14<sup>th</sup> century (Fig. 4-15), as well as in farm stores, restaurants and some grocery stores. This type of inner-city commercial vegetable gardening has been recognised as a specific local tradition that has been passed down for generations (German Commission for UNESCO, 2019). The formation and development of inner-city commercial activities were affected by several social elements, including religious and farming corporate

traditions. Today, however, most of the products sold in the green market have been replaced with groceries, snacks, vegetables and flowers cultivated from other regions (Fig. 4-16). According to interviews with Bamberg gardeners, they sell the majority of the products by themselves, or through farm shops.



Fig. 4-15 (left) The Green Market in 1900. Source: Bamberg Archive.

Fig. 4-16 (right) Present scene of the Green Market. Photographed by the author in 2019.

Furthermore, due to the widespread Catholicism confession, all crops in Bamberg were planted in the name of God: gardeners give thanks with processions on the day of Corpus Christi and in the memory of Saint Sebastian, their patron saint. Based on this religious background, a special process has emerged since 1391 (Fig. 4-17): the archbishops carry the Catholic cross and the Blessed Sacrament in a monstrance through Bamberg, and believers can also join the procession (Erzbistum Bamberg, 2019). During the above process, gardeners began in 1891 to wear work clothes with short sleeves, a work-blouse and headscarves for sun protection (German Commission for UNESCO, 2019) (Fig. 4-18).

The history of commercial horticulture activities is influenced by the social, religious, and corporate traditions of the gardeners. The religious procession, work clothes, language (local dialect) in Bamberg are unique and non-copiable; they are typical intangible elements that reflect the development process of urban gardening in Bamberg.



Fig. 4-17 (left) Procession in Bamberg. Source: German Commission for UNESCO. <https://www.unesco.de/en/innercity-horticulture-bamberg>. Accessed 2 October 2019.

Fig. 4-18 (right) Work clothes of gardeners. Source: Photographed by the author in 2017.

#### 4.2.2 Ecological aspect

The aspect of agrobiodiversity is noteworthy. Many vegetables, fruits, herbs, crops and flowers are cultivated in the study area, contributing to the daily food supply and farmers' livelihoods.

#### 4.2.3 Social perception aspect

When compared to Hill Town and the Island City, the Market Gardeners' District is always less appealing, although it was included within the area of the World Heritage site. It was mainly due to the following factors: first, historical buildings and gardens with the specific characteristics of the gardener's culture are not directly accessible to visitors, that is to say, visitors have few opportunities to have close contact with productive landscapes and gardeners' daily lives. Second, the number of farmers who are able to produce food and organise nurseries is now decreasing. To some extent, gardener culture was 'abandoned'.

Nevertheless, action has been taken to protect inner-city commercial behaviour. Gardeners have joined together to form associations, which in turn contributes to their

identity as gardeners. Many associations are working towards collecting and passing on the inherited knowledge of gardeners.

Furthermore, there are positive attitudes towards UA at the Bamberg World Heritage Office, as well as the curator of the Gardeners' and Vintners' Museum. In summary, the dominant attitudes concerning urban gardening in Bamberg in the local community, government, and the public are positive.

#### 4.2.4 Business model aspect

At the end of the 14<sup>th</sup> century, only 30 gardener families were living around the Theuerstadt. By 1450, the number of gardener families was already 70. In the middle of the 19<sup>th</sup> century, the number of gardener families reached 540 (with 400 farmers), and until 1900, the Market Gardeners' District had 700 professional gardeners (Keech & Redepenning, 2017). At present, however, there are only 20–25 family-owned gardeners (some have gardens below one hectare, the majority have three–four hectare plots; the plot maximum was 20 hectare) due to the increasing dominance of the industrial economy (Lessmeisster, Scherle, et al., 2009).

Over the centuries, supported by the monasteries, horticulture used to be the most important branch of the city's economy. Early on, the production and trade of seeds and vegetables were successful. One of the reasons is the production area was nearby the Regnitz River and its canals. Diversified trade routes make it possible for gardeners to not only sold their products to the city's citizens but also sold vegetables and seeds to other countries (Bredenbeck, 2014).

At present, the domestic market relating to high-quality local varieties, as well as the development of horticultural tourism under the influence of UNESCO, has become a leading commercial target for gardeners. Against this background, gardeners began to join agricultural production associations. For instance, *Verein Bamberger Sortengarten* and *Bamberger Süßholzgesellschaft* work toward sustaining unique types of vegetables, as well as collecting and passing on the inherited knowledge of gardeners (German Commission for UNESCO, 2019).

Moreover, the regional network *Gärtnerstadt-Bamberg* has been established with seven different partners. As an advocacy group, it aims to preserve tradition, manage historic cultivated areas in the urban area, and pass on the expertise and experience from generation to generation (Interessengemeinschaft Bamberger Gärtner, 2013).

Nineteen family businesses joined this advocacy group and together managed the historic cultivated areas. Essential information can be gathered from its social media platform: the main crops they cultivate include fruits, ornamental flowers, vegetables, herbaceous perennial plants and herbs.

Although some gardeners have begun to exploit new marketing opportunities (e.g. tourism) for their livelihoods, more than half of the family-owned gardening businesses still regard horticulture and relevant activities as their sole income source.

Two family-owned gardeners were interviewed during the research process. One principally cultivates flowers and herbs, and the other has vegetables and herbs as their main crop: however, they make a living with a similar livelihood. Table 4-2 shows that the primary income of both family-owned gardeners relies on marketing. Tourism development (such as a guided tour) can be seen as a form of income, but it is currently not a significant proportion. The main running costs include labour (which accounts for a large proportion), management of the garden, purchase of seeds and farmhouse maintenance.

Customers primarily come from the locality or the surrounding areas and typically purchase directly from the gardener or farm shops; gardeners either directly sell products, and sometimes souvenirs, to consumers (Fig. 4-19), or through the associations of which they are a member. Gardeners also selling their goods and spread knowledge of their history by organizing guide tours.





Fig. 4-19 A gardener's shop in the Market Gardeners' District.

Source: Photographed by the author in 2017.

Table 4-2 BMC results from two family-owned gardeners in the Market Gardeners' District

|                                                                                                                                   |                                                                          |                                                                       |                                                                                          |                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Key Partners</b><br>- self-employed<br>-cooperatives                                                                           | <b>Key Activities</b><br>- Work as tour guides                           | <b>Value Propositions</b><br><br>- natural<br>- organic<br>- regional | <b>Customer Relationships</b><br>- personal<br>- B2B (sell products to other farm shops) | <b>Customer Segments</b><br>- indigenous inhabitant (people with high incomes)<br>- tourists |
|                                                                                                                                   | <b>Key Resources</b><br>- location (UNESCO site)<br>- idyllic atmosphere |                                                                       | <b>Channels</b><br>- direct selling<br>- cooperation with other sellers                  |                                                                                              |
| <b>Cost Structure</b><br>- labour cost<br>-management of the garden<br>-purchase of seeds, etc.<br>-conservation of the farmhouse |                                                                          |                                                                       | <b>Revenue Streams</b><br>-marketing<br>-tourism                                         |                                                                                              |



### 4.3 Conclusion

Table 4-3 The analysis of results from urban gardening in Bamberg

| Types                   | Analysis                                                                     | Description                                                                                                                                                                                                                                                                       |
|-------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manifestation dimension | Tangible elements                                                            | <ul style="list-style-type: none"> <li>·Territory's pattern of farmland</li> <li>·Old pathways</li> <li>·Local species</li> <li>·Traditional gardeners' houses</li> <li>·Farm tools</li> <li>·Gardeners' crafts</li> <li>·Traditional Market</li> </ul>                           |
|                         | Intangible elements                                                          | <ul style="list-style-type: none"> <li>·Names of roads and places,</li> <li>·Historical work clothes</li> <li>·Festivals</li> <li>·Procession-habit since 1891</li> <li>·Language</li> <li>·Commercial horticulture with a long history</li> <li>·Religious background</li> </ul> |
| Ecological dimension    | Agrobiodiversity                                                             | ·Various sorts of vegetables                                                                                                                                                                                                                                                      |
|                         | Others                                                                       | ·An essential component of the urban green infrastructure                                                                                                                                                                                                                         |
| Social dimension        | Social perception analysis based on the interview results from the residents | <ul style="list-style-type: none"> <li>·Outstanding panoramic view</li> <li>·Plenty of private spaces, poor accessibility</li> <li>·Positive attitudes from Bamberg World Heritage Office, as well as the curator of the Gardeners' and Vintners' Museum.</li> </ul>              |
| Economic dimension      | Business model canvas analysis                                               | <ul style="list-style-type: none"> <li>· Most of the households changed their marketing channel. In the past, they sold their products to the 'Green Market'. But now, vegetables and flowers are sent to the other farm shops.</li> </ul>                                        |

## **5 Case Study: farmsteads in the Metropolitan City of Milan, Italy**

### **5.1 Introduction**

Italy has productive agricultural resources (Van Den Pol-Van Dasselaar, Bastiaansen-Aantjes, Bogue, O'Donovan & Huyghe, 2019). The development of agricultural production is closely related to the national economy: as of 2010, Italy had 12.9 million hectares of available agricultural land resources, which comprised approximately 43% of the total territory area (Eurostat, 2018).

As a rapidly developing metropolis in Italy, Milan has a large number of natural and cultural heritage sites. In Milan, UA heritage is a vital urban component, including both the natural and cultural levels. The administrative divisions are, from the largest area to the smallest: Milan Metropolitan Area (Greater Milan); the Metropolitan City of Milan; the larger urban zone; and the Municipality of Milan (Fig. 5-1). The main research object in this thesis is concentrated on the metropolitan city of Milan, on account of its long agricultural history. The entire area is 1,575 km<sup>2</sup>.

There are several reasons for the formation of abundant agricultural resources. With its water resources and geographical characteristics, Milan and the surrounding area has been a prosperous region with a strong agricultural tradition. Outstanding water systems, including natural sources, fountains, and centuries of navigation canals, gradually turned marshland into productive land. For centuries, people organised their agricultural activities through farmsteads. As a connecting link for the farmers, monasteries, the city lord, and wealthy merchants, the farmstead used to play a role in supplying the sustenance needs of urbanites of nearby cities.

Although the demand for food supply has changed over the centuries, farmsteads in Milan remained in the traditional form and pattern: a threshing floor in the middle, surrounded by agricultural facilities and dwellings. The whole complex consists of a square structure, which is usually closed on each side.

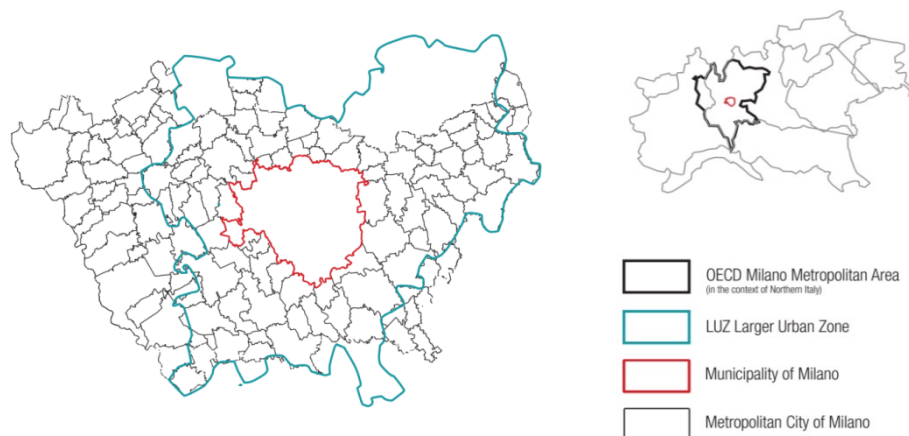


Fig. 5-1 The different administrative scales of Milan. Source: Lohrberg et al. Eds., 2015. PP108-110.

At present, the northern region of the Metropolitan City of Milan is dominated by densely populated and highly urbanised built-up areas, while the south is very different. For instance, the South Milan Agricultural Park (hereinafter referred to as PASM) has become a representative agricultural green belt, aiming to protect forest land and farmland and improve historical and architectural heritage (Migliorini, Corvo & Scaltriti, 2013). The preservation and development of these farmsteads and their corresponding productive landscapes and agricultural systems are of significance to the lives of surrounding residents and the development of ecological protection.

The Metropolitan City of Milan is located on the Po River Plain, which is between the Alps and the Apennines. Since the 13<sup>th</sup> century, there has been fertile land and abundant water resources around Milan (Associazione Parco Delle, 2015). The Po River originates in the ice and snow of the Alps. It is collected by numerous streams and flows down into the Mediterranean. For thousands of years, the Po River Plain has become the most extensive alluvial plain of Italy (Fig. 5-2).

Due to the combined efforts of monastic orders, feudal lords and communes (Wikipedia, 2020e) that began in the Middle Ages, the Po River Plain has been completely converted to agricultural use (it had previously been a vast swamp and wetland). Geomorphic processes have been progressively affected by human activities and are the reason for the expansion of agricultural land.

One of the most important reasons for large-scale land reclamation in the Po River Basin is a suitable climate. In the 19<sup>th</sup> century, the average annual temperature was

12–14°C (Bocchi, Callegarin & Maggiore, 1999): today, the average annual temperature is 8.3–17.7°C. Furthermore, the annual average precipitation has remained approximately the same since 1961 (Wikipedia, 2020d).

According to hydrology research, Milan is located in the ‘areas of resurgence springs’ (Ajassa et al., 1997) of the Po River Plain (Fig. 5-3). As the surface of the lower part of the Po River plain is composed of sand and mud, the impermeable soil composition caused a unique phenomenon: water coming from the northern upper plain becomes trapped in the boundary of the low plain. This type of underground water infiltrates the upper plain and contributes to a vast area of resurgence springs. The whole basin is flat, fertile, temperate, and abundant in rainfall. It is rich in agriculture and cattle husbandry, and the agricultural area is considered the ‘natural granary’ of Italy.



Fig. 5-2 The Po River Basin. Source: Wikipedia.

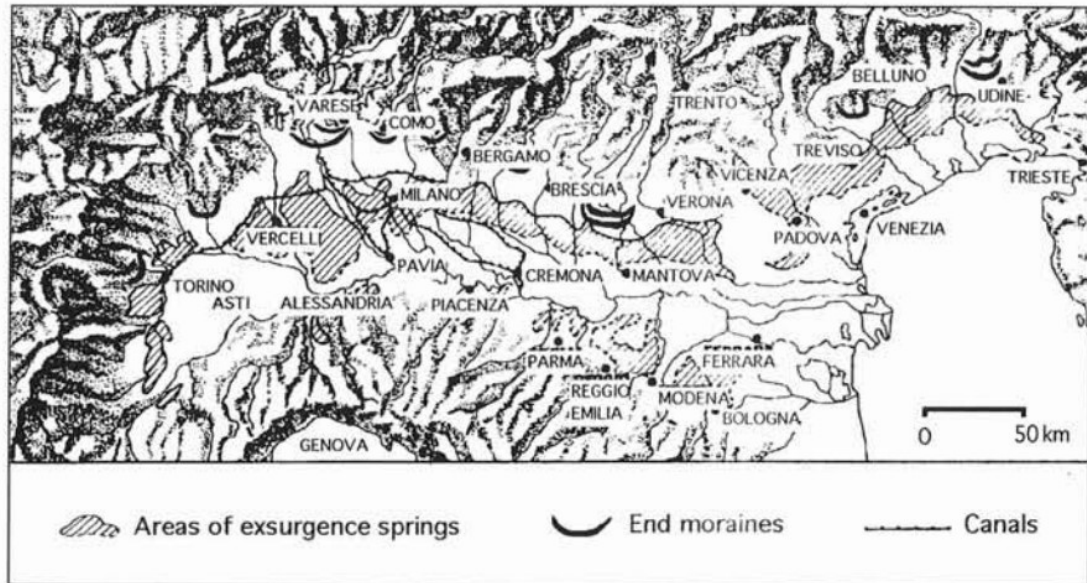


Fig. 5-3 Resurgence springs (*Fontanili*) and settlement. Source: Ajassa et al., 1997. (original image from Bonaparte, 1977), P55.

The water system plays a vital role in the Metropolitan City of Milan, not only through two natural rivers but also in several canals distributed within the city. The construction of a complex network of basins and canals can be traced back to the 12<sup>th</sup> century. The oldest canal, Naviglio Grande, has a total length of 49.9 km, which contributed to the development of agriculture, transportation, and business: it mainly transported materials (construction materials, coal, foodstuffs) and was used for irrigating the dry plain (Navigli Lombardi, n.d.). Due to the Industrial Revolution, the increasing need for moving goods led to the construction of more canals (Ajassa et al., 1997). Several nobiliary villas were built in the suburbs in the 19<sup>th</sup> century and canals were constructed to connect them (Walks of Italy, 2013).

Urban morphology and land-use have changed considerably over time. Since 49 BC, three different systems of defence walls have been considered as the boundary of the urban-rural distinction. The oldest city wall of Milan is the Roman Wall. From the Roman Empire to the Middle Ages, with the gradual establishment of the Medieval Wall, the boundary between the built-up urbanised area and the suburbs were well-defined. During this period, there was a large amount of agricultural land in the area outside the medieval wall. The land, which mainly provided agricultural produce for the city's residents, could be found in the area around the Medieval Wall (outside). The construction land was then gradually extended to the Spanish Wall (built during the Spanish colonial period), which was then dismantled in 1884 due to the urban planning and renovation policy of the time. During this time, the boundary between urban and rural areas gradually blurred and staggered. The agricultural land was

reduced, but the overall distribution pattern did not change dramatically.

Since the 20<sup>th</sup> century, rapid urbanisation has resulted in the dramatic expansion of artificial land, and the pattern of farmlands in the suburbs has gradually changed. A portion of agricultural land has been transformed into forests and other green spaces (Sanesi et al., 2016). During this transitional period, rapid urban expansion left the city with a large number of agricultural heritage sites: within the Metropolitan City of Milan, most have been preserved and have become essential resources to improve the local ecological environment and protect regional culture.

## 5.2 Analysis Results<sup>21</sup>

Due to the diversity of the types of farmsteads distributed within the study area, the authors have selected a number of them to be interpreted. In order to obtain a truly systematic understanding of the type of UA heritage in the Metropolitan City of Milan, there are some differences between the four analytical objects (Fig. 5-4).

To undertake a targeted analysis and interpretation of Milan's UA heritage, the author has decided to select a number of paradigmatic farmsteads for close-up study. After consulting with experts at Politecnico di Milano, three typical farmsteads have been taken into consideration: *Cascina Linterno*, *Cascina Cuccagna*, and *Cascina Biblioteca*, all of which are arranged by different business models.

This chapter focuses first on the Metropolitan City of Milan. However, when discussing the historical development and change in detail, it takes a typical farmstead, *Cascina Linterno*, as an example. Subsequently, through an economic analysis, three farmsteads of different types are discussed together, which could reflect the current situation of the regional overall business models.

In general, from manifestation and ecological dimensions, *Cascina Linterno* can be regarded as the research object. From the social dimension, the public perception could be collected from the whole city. Finally, three different types of farmsteads have been selected for discussion (Fig. 5-5). This research procedure has been endorsed by experts at Politecnico di Milano.

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<sup>21</sup> The contents of this chapter have been summarised in a journal paper. It has been published as Jiang, Y., & Lu, H. (2020). The Conservation and Revitalisation Strategies for the Agricultural Heritage in Italy: the Metropolitan City of Milan as an Example. *Chinese Landscape Architecture*, 36(12), 117–122. (in Chinese).(Jiang & Lu, 2020)



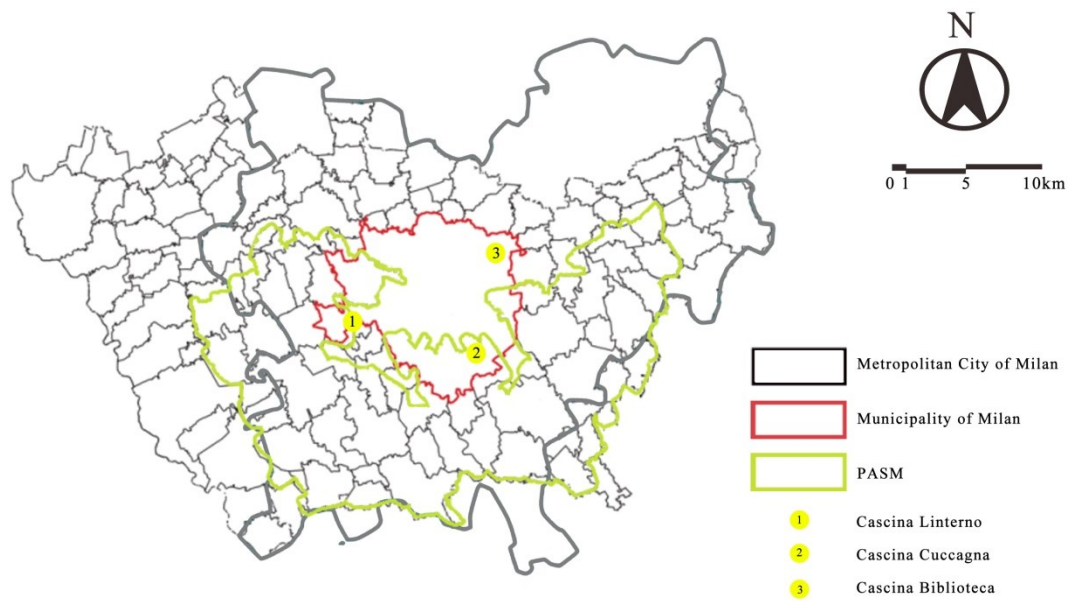


Fig. 5-4 Map of the location of specific research subjects

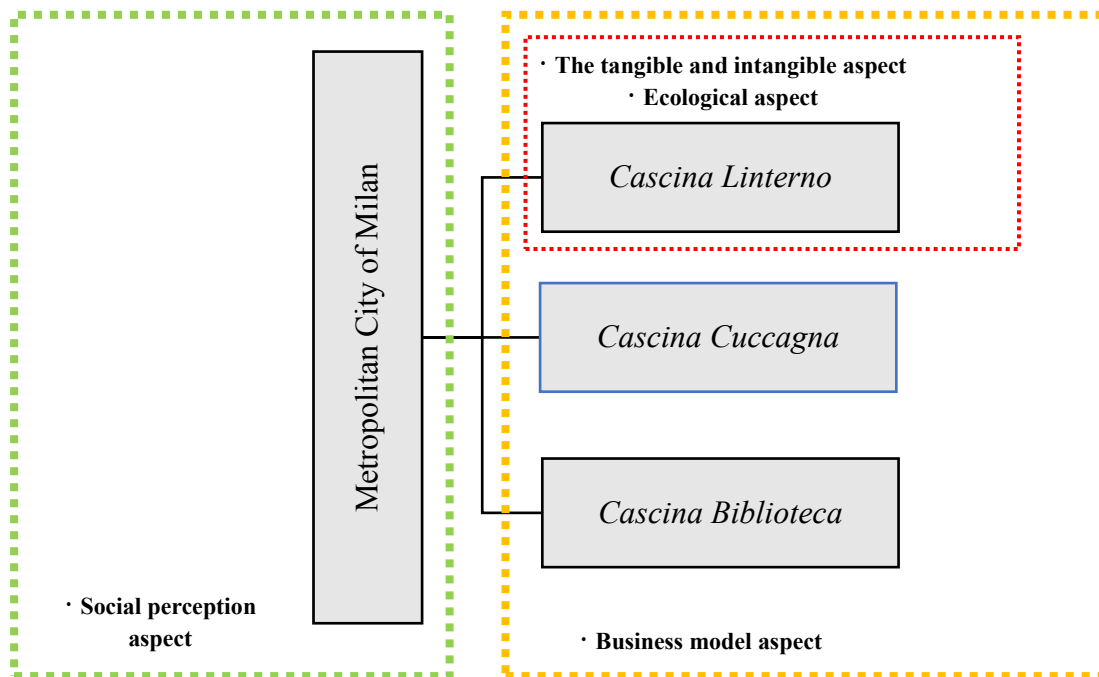


Fig. 5-5 The research subjects corresponding to the four dimensions of analysis

### 5.2.1 The tangible and intangible aspect

Milan has a rich agricultural history. For example, in the 1930s, the *Naviglio Grande* was used for agricultural transportation and irrigation (Lohrberg et al. Eds., 2015), and in the 19<sup>th</sup> century, the Milanese would buy milk and fresh products from outside the bastions of Milan, close to the *Duomo*. Additionally, rice has a long history of cultivation in this region: at present, mainly rice, soybean, barley, corn, wheat, and pasture are cultivated in this area (Ranghetti et al., 2016).

In sum, UA heritage has been preserved for centuries. The land use pattern and the structure of agricultural land in this area have been maintained since the 17<sup>th</sup> century (Shi & Ning, 2005). During the 20<sup>th</sup> century, cultivated fields in this region were extremely abundant, and some were protected as preservation areas.

Several historical maps have been collected and analysed. Fig. 5-6 shows that in 1600, the medieval wall divided the whole region into two parts: the ancient municipality of Milan and the nearby farmlands. The construction land existed in the centre: farmsteads were established surrounding the construction land and were mainly for agricultural production (e.g. rice and other crops). Additionally, the southwest and eastern regions contained forests. Urban agriculture (UA) activities can be traced back to this period: Fig. 5-7 shows that there was still some farmland within the Medieval wall (outside the Roman Wall) and that farming activities took place in this zone.

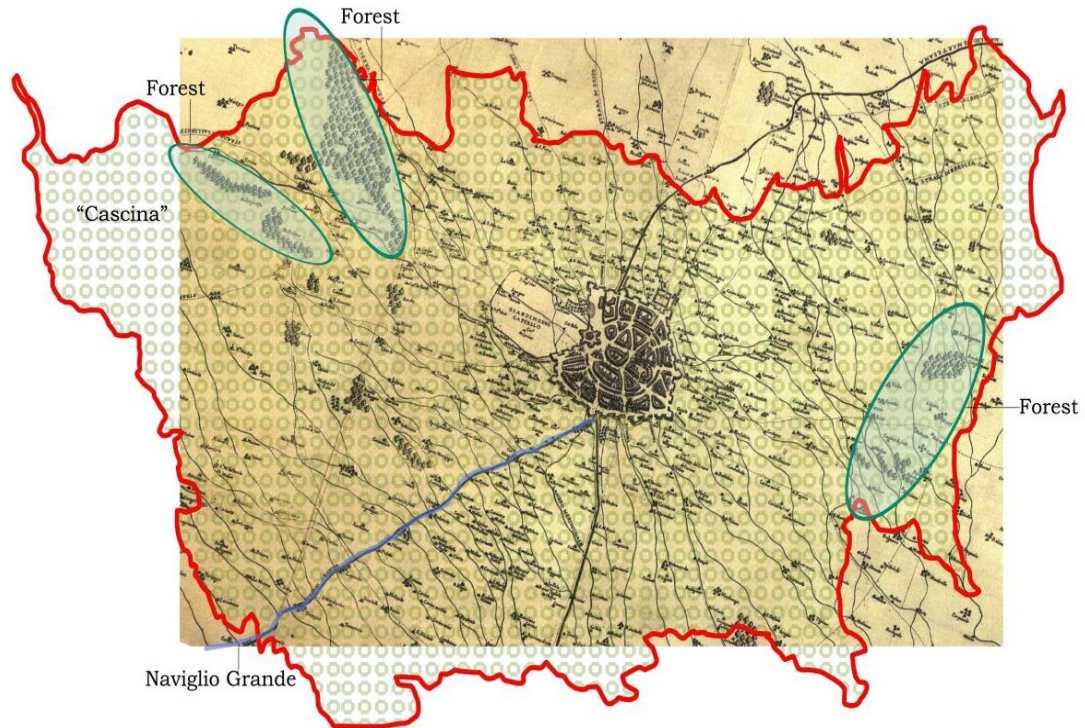


Fig. 5-6 Carta de' dintorni di Milano. Source: Giovanni Battista Clarici, 1600. From the International Landscape Research and Documentation Centre (PaRID) at Politecnico di Milano. The red line represents the area of the Municipality City of Milan as it exists today.

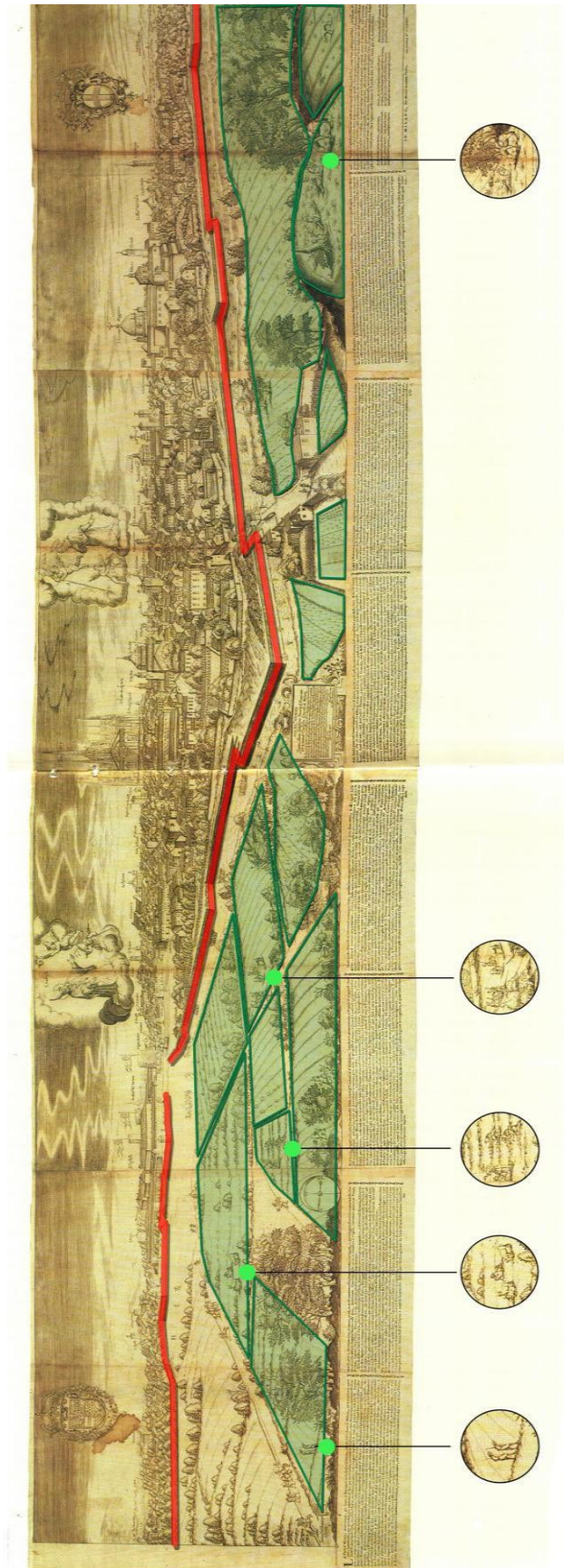


Fig. 5-7 Veduta prospettica di Milano.

Source: Giovanni Francesco Lampugnani, 1640. From the International Landscape Research and Documentation Centre (PaRID) at Politecnico di Milano.

The red line indicates the Roman Wall and the green spaces represent the agricultural patches (outside the Roman Wall but inside the Medieval Wall) . The view of the whole scene is between the Roman Wall and the Medieval Wall.



From 1868, construction land began to expand and radiate outwards gradually (Fig. 5-8): this eventually led to the Medieval Wall being dismantled as the expansion continued into the inner city.

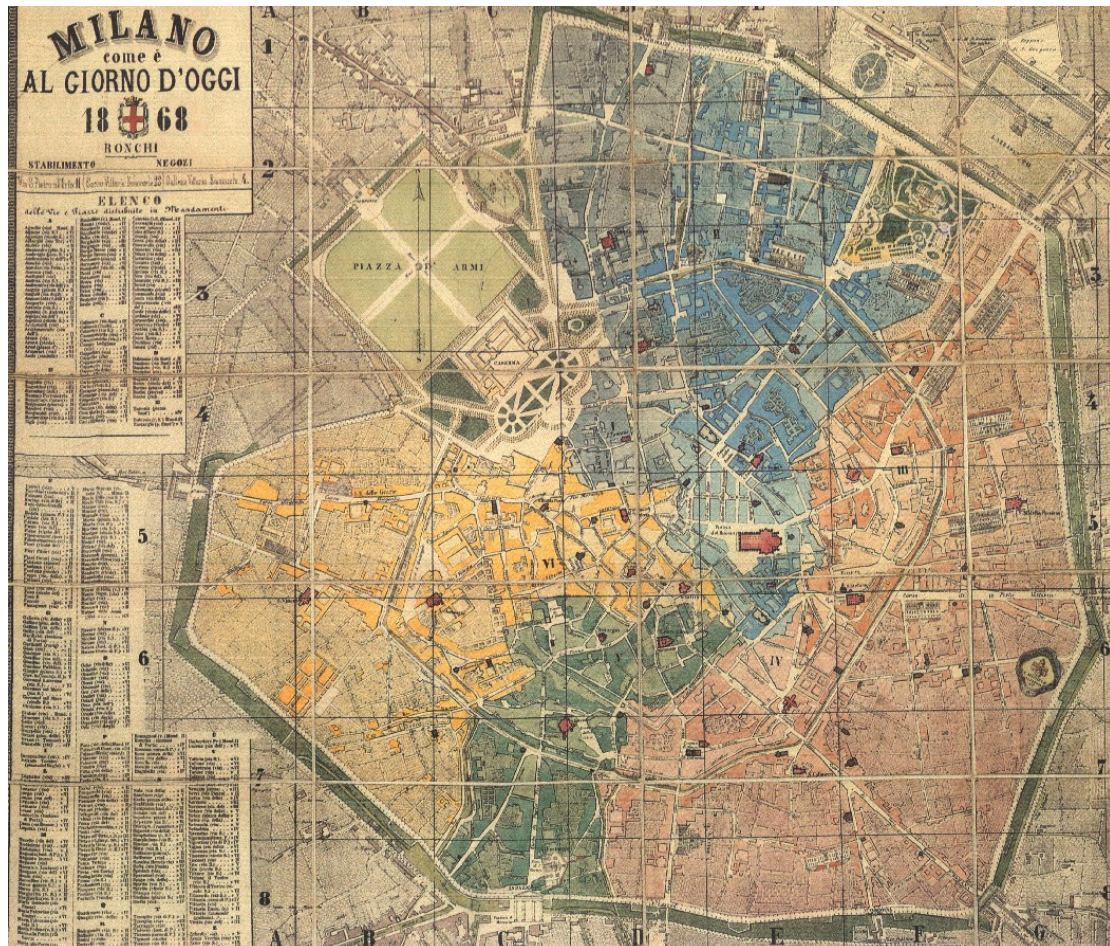


Fig. 5-8 Milano come è al giorno D'oggi. The map in 1868. Part of the Medieval Wall was demolished (the green ringed area). Construction land appeared outside the walls. Source: International Landscape Research and Documentation Centre (PaRID) at Politecnico di Milano.

From the 20<sup>th</sup> century, city wall systems successively disappeared due to urbanisation. In the city centre, construction land accounted for the majority of land, and the division between the city centre and farmland started to blur. Urban sprawl resulted in rural transformation, which caused farmlands to be converted for urban land use and to become an essential component of the Metropolitan City of Milan. However, the farmland structure gradually changed too. Two maps from 1945 and 2015 (Fig. 5-9 and Fig. 5-10, respectively) show that some of the farmlands were transformed into forests or other green spaces over time. The construction land use was limited in

downtown areas, although today, the proportion is growing annually. Based on the results from Giovanni Sanesi's research, as well as a map from 1600, the trend of agricultural area decline was self-explanatory for centuries (Sanesi et al., 2016). In 1600, the study area was almost entirely agricultural land and forests (exclusively built-up areas occupied fewer spaces). By 1954, approximately 80% of the total surface was agricultural, and by 2012, only roughly 49% of the whole region was agricultural land (Table 5-1).

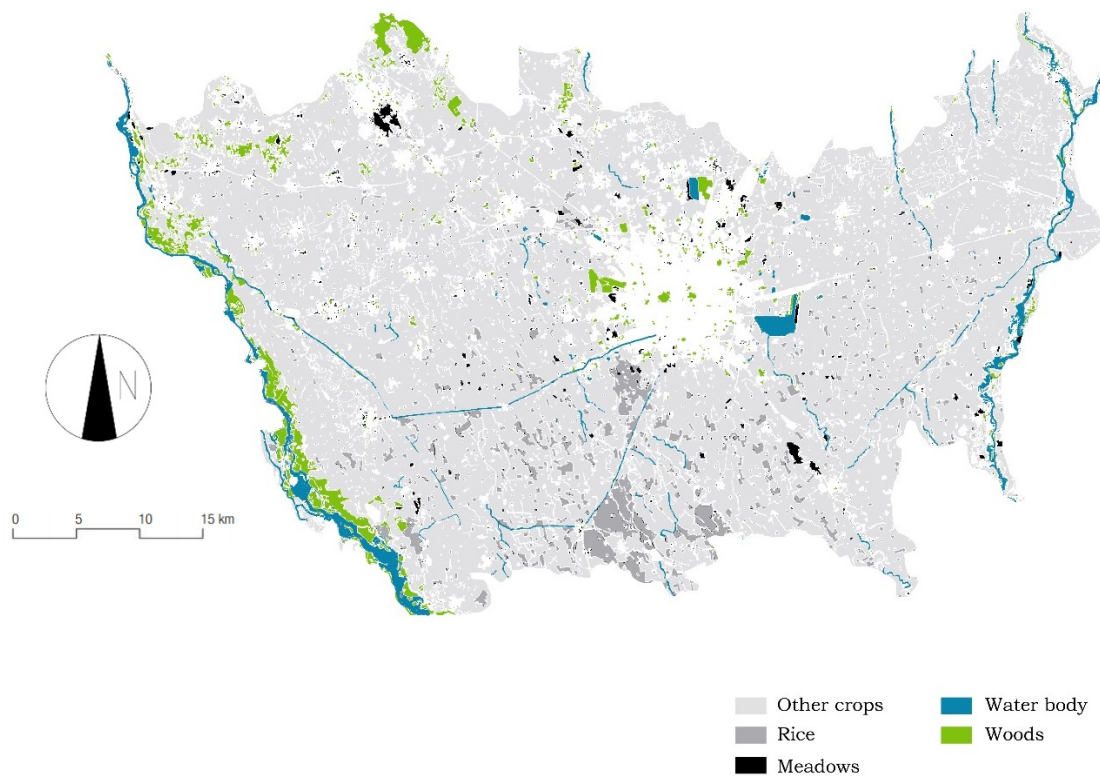


Fig. 5-9 Agricultural land use in the Metropolitan City of Milan in 1954.

Source: Geoportale Della Lombardia, Uso del suolo, 1954. Data was accessed in August 2018.



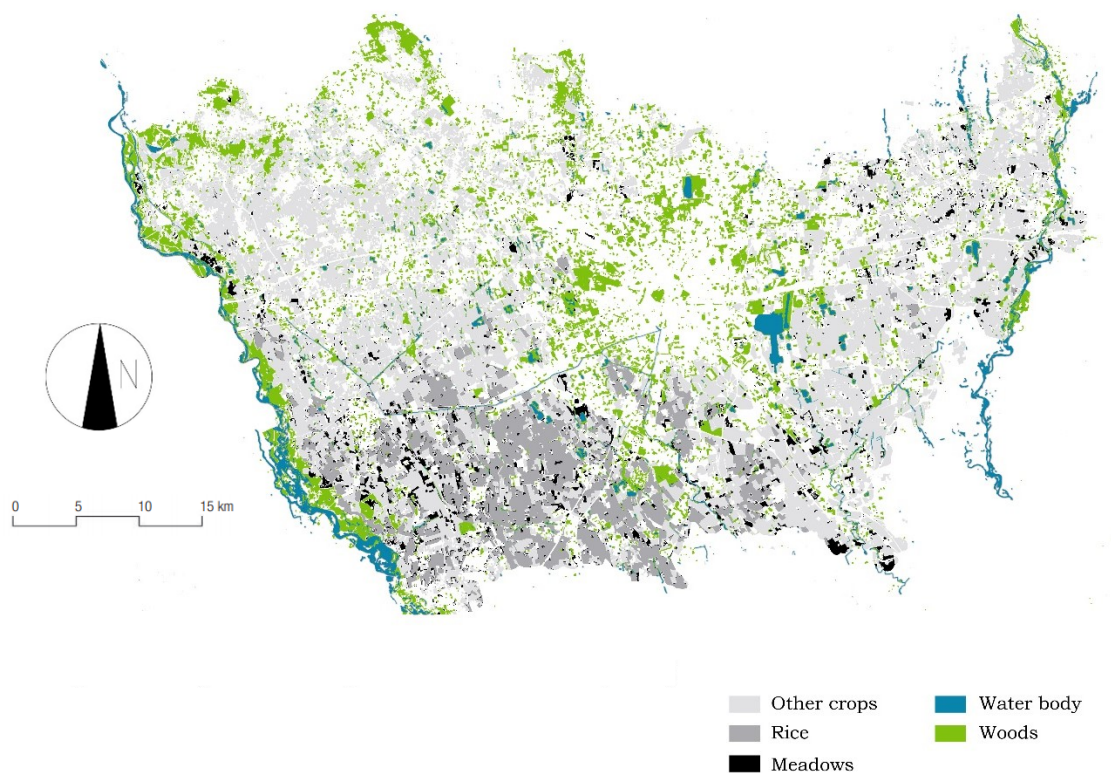
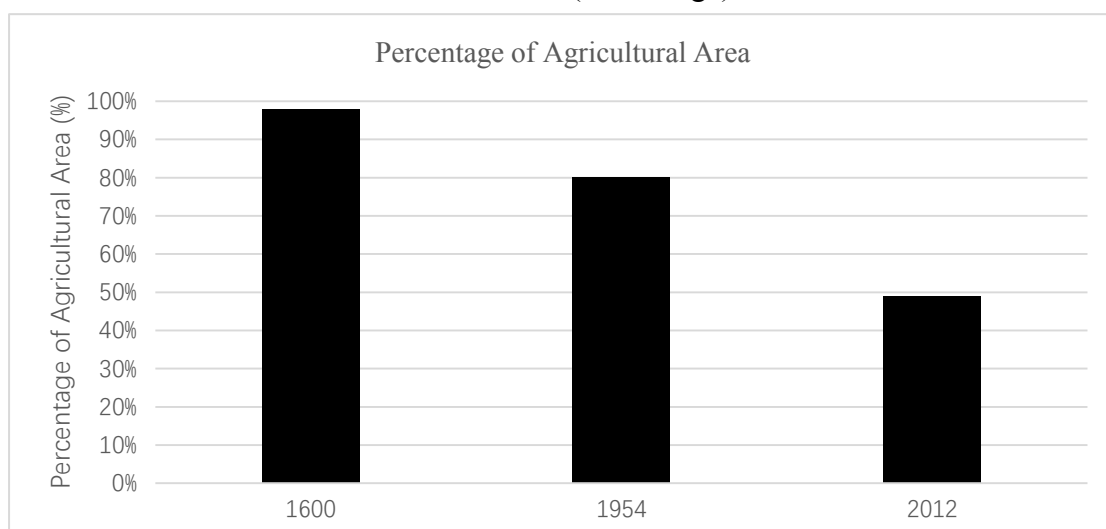


Fig. 5-10 Agricultural land use in the Metropolitan City of Milan in 2015.

Source: Geoportale Della Lombardia, Uso del suolo, 2015. Data was accessed in August 2018.

Table 5-1 Changes in the agricultural area of the Metropolitan City of Milan from 1600 to 2012 (Percentage)



With regard to the intangible agricultural heritage elements in the study area, a variety of historical documents or images of UA activities from ancient to modern times are evidence to demonstrate the history of UA development. Images of irrigation technology, market activities, and festivals have been collected. For instance, the painting *Mercato* reappears the urban market in 1735 (Fig. 5-11). *Via Verziere* is now a crossroad near the Duomo (Fig. 5-12): it has been used as an ancient vegetable and fruit market since 1911 (Vecchia Milano, 2011). Based on the scholars at Politecnico di Milano, this market used to focus on the sale of local vegetables and food items. The painting *Naviglio di san gerolamo tra il ponte di san vittore e quello di porta vercellina* (Fig. 5-13) was painted in the 18<sup>th</sup> century. It shows hay transported via a canal and a private food garden<sup>22</sup> behind the Spanish wall.

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<sup>22</sup> Based on experts' opinions on the interpretation of the painting at Politecnico di Milano.



Fig. 5-11 (left) Painting of *Mercato*.

By Alessandro Magnasco, 1735.

Source: International Landscape Research and Documentation Centre (PaRID) at Politecnico di Milano.

Fig. 5-12 (right) The old image of *Via Verziere*.

Source: <https://vecchiamilano.wordpress.com/2011/01/13/il-verziere-itinerante/>.

Accessed 20 August 2018.



Fig. 5-13 Painting of *Naviglio di san gerolamo tra il ponte di san vittore e quello di porta vercellina* in the 18<sup>th</sup> century, by Anonimo.

Source: International Landscape Research and Documentation Centre (PaRID) at Politecnico di Milano.

This chapter focuses on one traditional farmstead, *Cascina Linterno*, as an example to illuminate the current status of UA heritage factors. *Cascina Linterno* was once situated in the peri-urban area of the Municipality of Milan; however, with the

progress of urbanisation, it has already become an integrated component of the metropolis (PASM). It can be traced back to the 18<sup>th</sup> century (Fig. 5-14): in that era, farmsteads were generally comprised of farmhouses, barns, stalls, vegetable gardens, and meadows. Frequently, farmers produced vegetables (for self-sufficiency) and raised livestock (especially, cows). Meadows provided the cows with areas to forage, and the milk was directly sold to markets or Milan's residents (Mezzadri, 2014b; Politecnico di Milano, 2018b). Today, many farmsteads, like *Cascina Linterno*, have already changed and expanded to include new functions. Citizens come here not only with the aim to buy products: they are also eager to gain more knowledge of agricultural heritage elements, such as traditional agricultural techniques, typical farmhouses and traditional activities.

On the one hand, with regard to tangible heritage elements, by 1722, *Cascina Linterno* was surrounded by cereals and vineyards. Only two farmhouses were built during this period. In the 19<sup>th</sup> century, there were more meadows and pastures on the property to support animal husbandry (primarily cows). Rows of trees and several bushes were planted, which transformed the whole farmstead into an enclosed compound, and vegetable gardens began to appear in farmsteads. Additionally, the homestead became larger and well-organised. By the 20<sup>th</sup> century, professional horticultural fields and permanent meadows had been established (Toso & Gelmo, 2010).

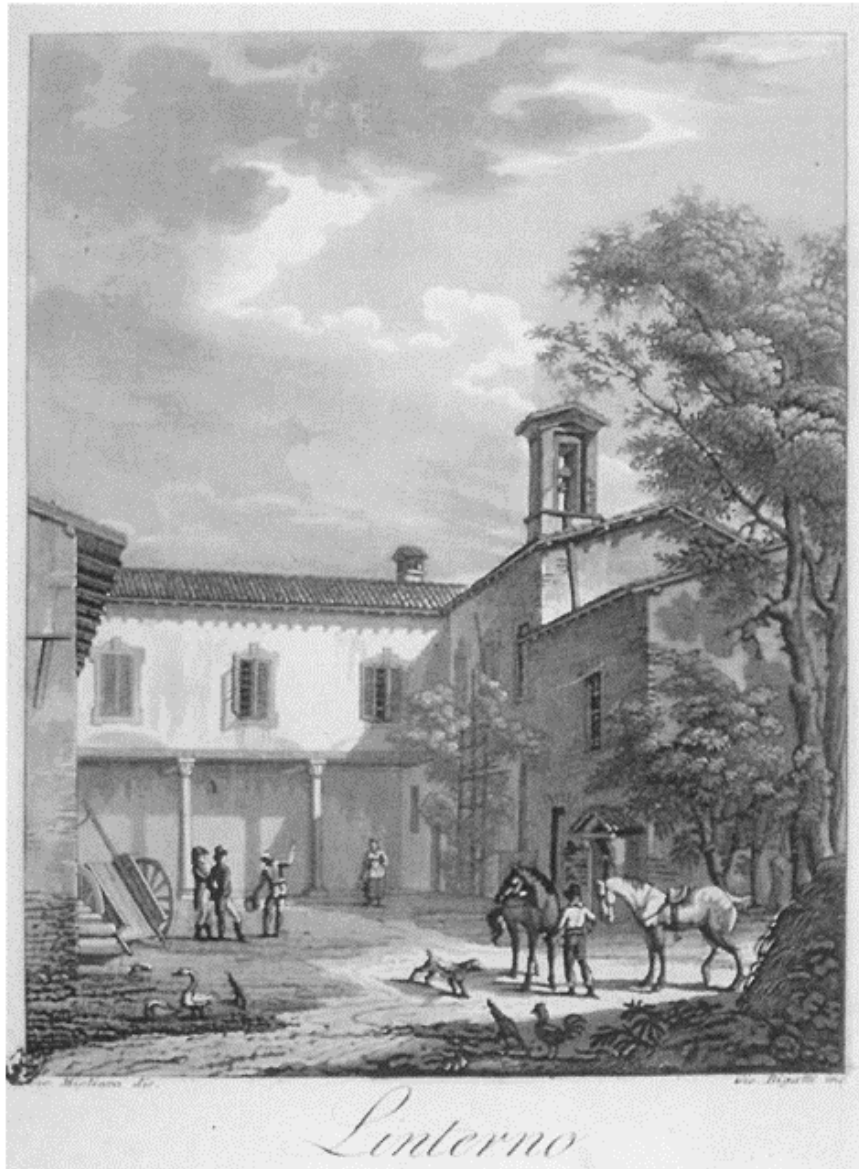


Fig. 5-14 Painting of *Cascina Linterno* in 1819.

Source: Toso & Gelmo, 2010. P157.

The spatial pattern of *Cascina Linterno* has essentially kept its original shape. According to the historical map, many tangible heritage elements can still be explored: farmland patterns and sections of farmhouses documented since the 18<sup>th</sup> century have not significantly changed. Old roads, tree rows, and hydraulic canals are well-maintained (Fig. 5-15). For farmhouses, old structures and materials were retained and carefully restored. The specific functions of the building groups are shown in Fig. 5-16 (Branduini, 2018).



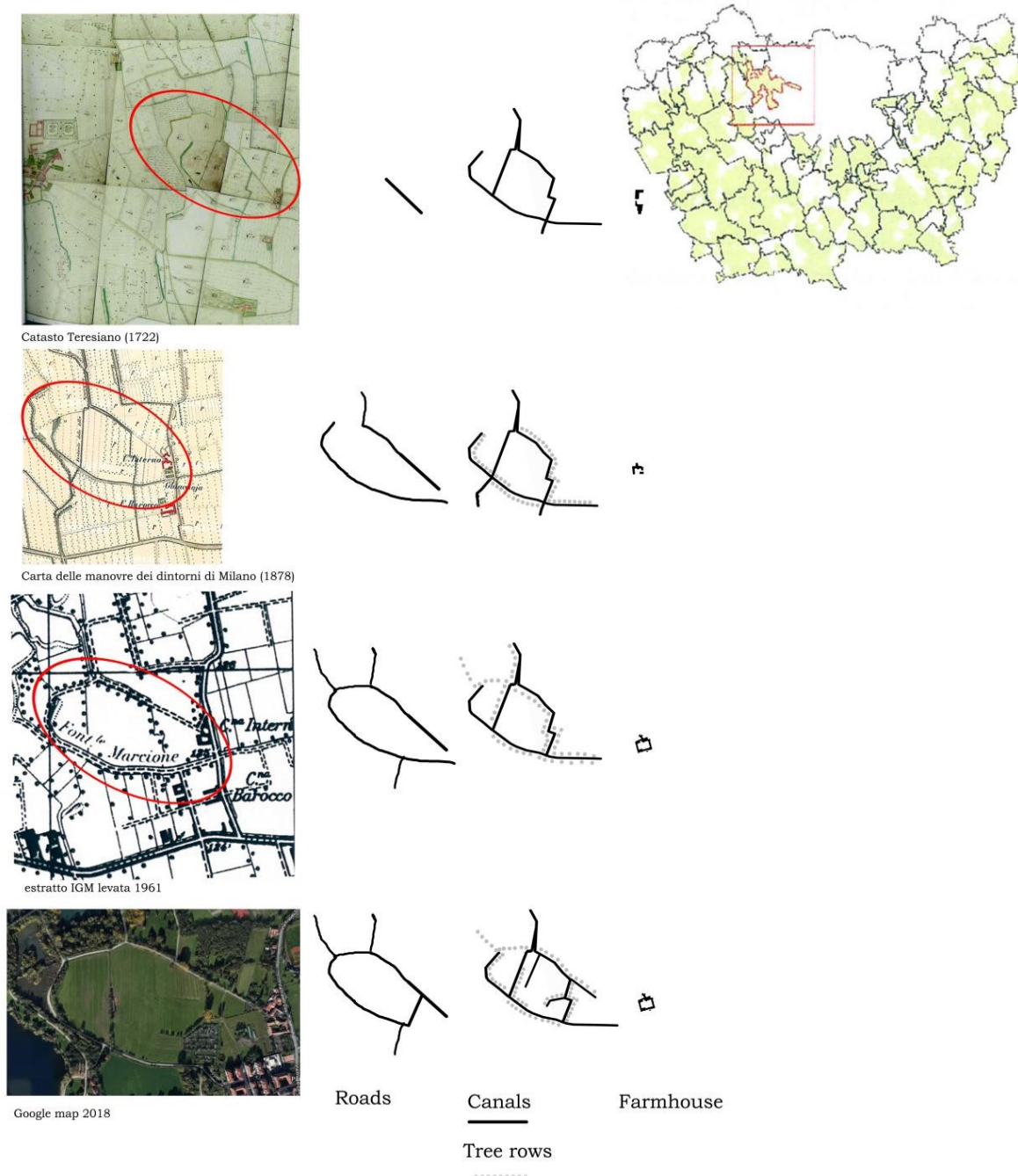


Fig. 5-15 Historical maps of *Cascina Linterno* and its spatial patterns of recent years. This figure shows that the old roads, canals, tree rows, as well as farmhouses, have been well-preserved in almost complete condition.

Source: Toso & Gelmo, 2010; International Landscape Research and Documentation Centre (PaRID) at Politecnico di Milano.



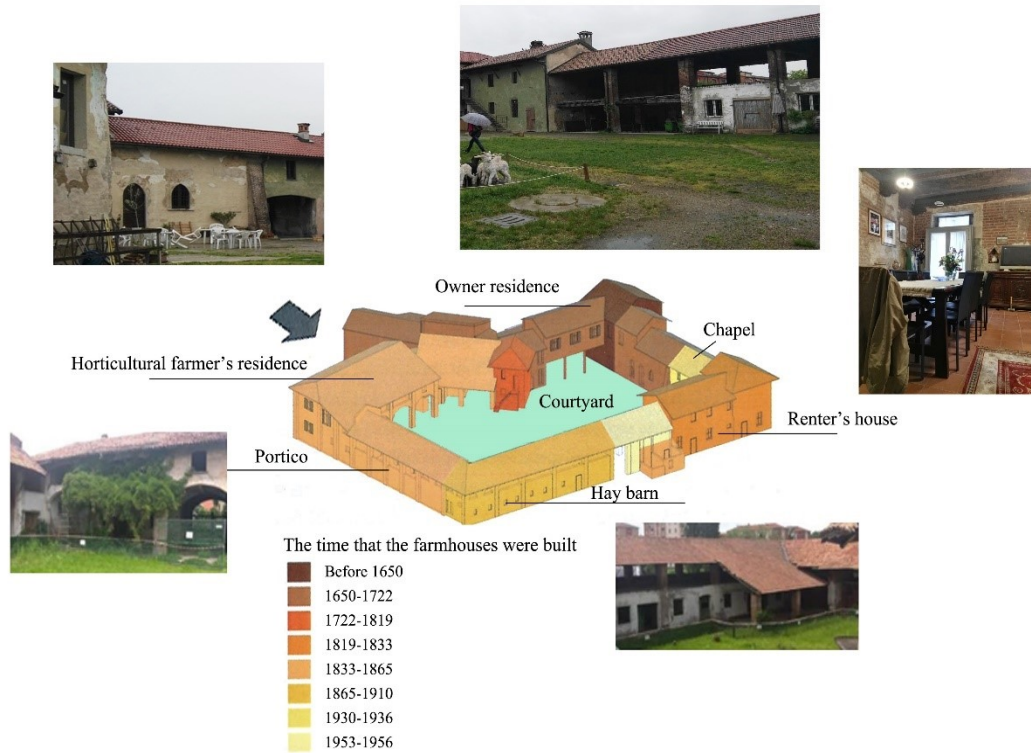


Fig. 5-16 Analysis of farmhouses. Source: Branduini, 2018; Photographed by the author in 2018.

Besides, intangible elements should be noted: *Marcita* cultivation<sup>23</sup> technique and the traditional bonfire festival (Fig. 5-17). The *Marcita* meadow is a living witness of ancient agriculture born in the Middle Ages and is still working today due to its efficiency and genius (Mezzadri, 2014a). The working model of this traditional irrigation system is illustrated in Fig. 5-18. According to the interview with Professor Branduini from Politecnico di Milano, the project ‘The Conservation of the *Marcita* Meadows’, which is aiming for the Globally Important Agricultural Heritage Systems (GIAHS) nomination, is in progress.

On the surface of the *Marcita* meadow, there is a veil of water flowing from spring to late autumn. Due to the resurgence spring as the waterhead, irrigation water has a constant temperature that never drops between 9 °C and 14°C (Parco Agricolo Sud Milano, 2015). This system maintains continuous movement due to the gently declining ground (depending on the slope and wings), which prevents the field from freezing and keeps the grass continuously growing. Sluice gates and wooden

<sup>23</sup> Although *Marcita* meadows are widespread in PASM, it is really a recent addition to the *Linterno* farmstead. The *Marcita* meadow in the farmstead has been created in recent years. Therefore, in analysing the tangible and intangible aspect, the author only classifies the *Marcita* cultivation technique in the farmstead as intangible cultural heritage.

board dams can control the water flow (Fig. 5-18). Today, many *Marcita* meadows exist in the study area and continue to work as they always have (Parco Agricolo Ticinello, n.d.).

The bonfire festival can be traced back to the 1990s (Branduini, 2018). Currently, the permanent meadow is still regarded as the gathering place for holding the ceremony of the blessing of animals. Visitors can gather here and celebrate together, accompanied by music and dancing.

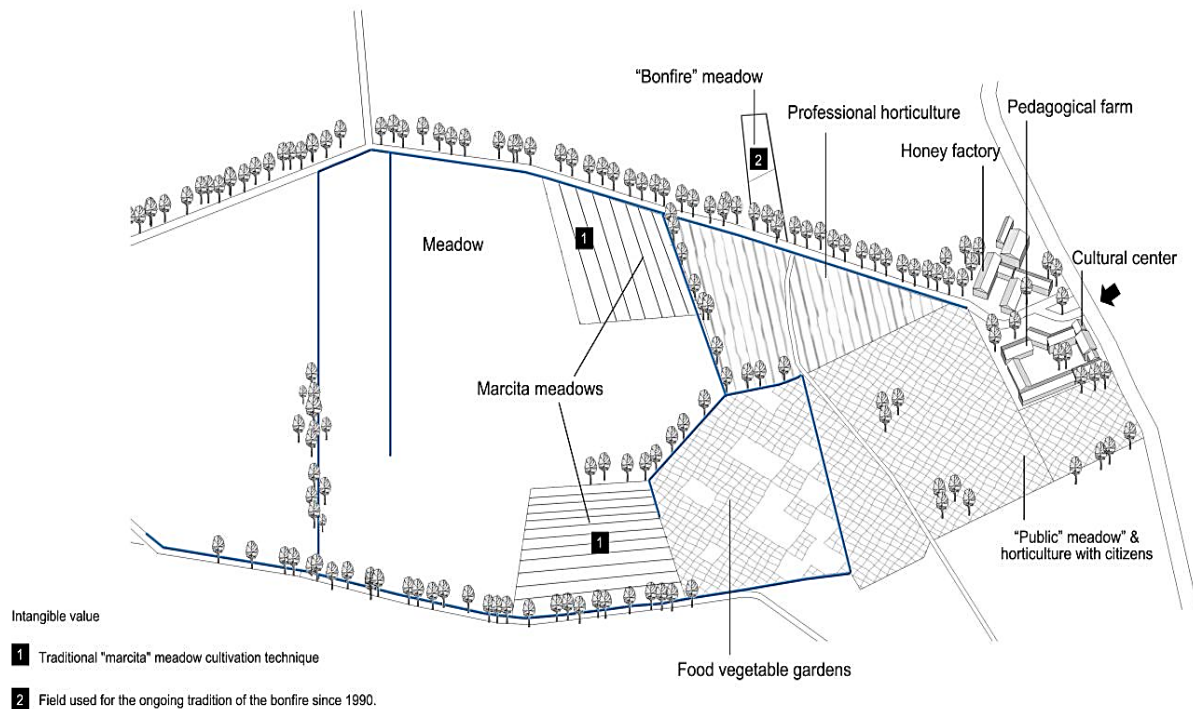


Fig. 5-17 Functional zoning map of *Cascina Linterno*

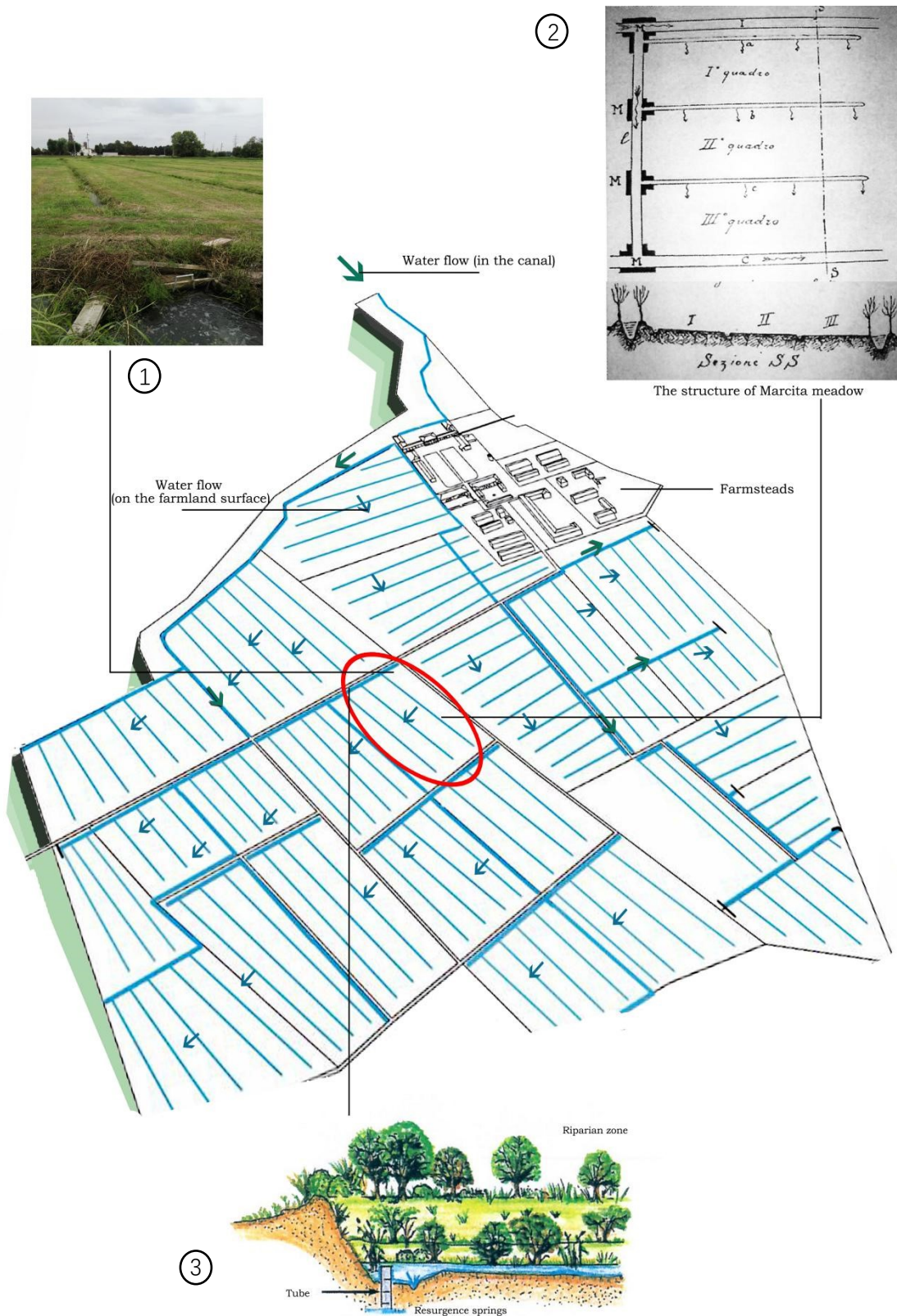


Fig. 5-18 Analysis of a typical *Marcita* meadow.

No.1 shows the photo from the field of the *Marcita* meadow.

No.2 shows the structure of the *Marcita* meadow. There is also a simple section that reflects the drop between the slopes of the meadow.

No.3 shows a section of the extra area (stream) of the *Marcita* meadow. It illustrates

that the resurgence springs come out through a pipe, and irrigate the riparian zone between the stream.

Source: Toso & Gelmo, 2010, PP 60-62; Mezzadri, 2014a.

### 5.2.2 Ecological aspect

Here, this chapter primarily focuses on the traditional irrigation system. The *Marcita* meadow technique in *Cascina Linterno* is an essential component that has outstanding value: it is a permanent grassland irrigated year-round and can thus produce green grass throughout the year. Pastures can survive the winter because the irrigation water comes from underground. Furthermore, the milk produced by cattle after feeding in the *Marcita* meadow is healthier and full of nutrients (Politecnico di Milano, 2018a).

In the cold season, spring water is warmer than surface water. Thus, spring water could be used for watering pastures in all seasons, and birds could spend the winter there. In addition, some rare species of hydrophilous plants were found in the meadow (Politecnico di Milano, 2018a). In the meadows, herbs, pasture, insects and birds coexist in harmony, thus forming a relatively stable ecosystem.

### 5.2.3 Social perception aspect

The productive landscape in the Metropolitan City of Milan has been naturally preserved. For example, to enhance regional UA heritage and maintain agricultural resources and activities, in 1990, PASM was established by the Lombardy region. In the study area (including Ticino Park and PASM), there are many farmsteads with a long history. In the municipality of Milan, by 2019, 62 farmsteads have been maintained and restored (Agricity, n.d.). However, the primary activities in PASM focus on leisure, agritourism and local food. Fewer tours emphasise the specialised education of heritage protection.

Additionally, after staging the 2015 World Expo in 2015, the municipal government has begun to pay more attention to the development of urban agriculture. The 2015 World Expo made citizens aware of the vital role of food, water and agriculture in their daily lives (Pulighe & Lupia, 2019). One of the Expo's demonstrations, The Old Milano Food Tour, reflected that historical research on the relationship between urban development and food had been undertaken (Milanostyle, 2017). An increasing number of citizens participate in this activity and promote the conservation of UA heritage.

As for the *Marcita* meadow, different groups have different attitudes. For experts who major in agronomy, landscape architecture, urban planning, the *Marcita* meadow is worth being preserved for several reasons. For example, they would like to highlight that this antique technique has a long history and only exists in Milan. Moreover, the fascinating historical landscape formed by the *Marcita* meadows gives the Milanese a place to relax, and further, has substantial value with regards to improving the landscape. Conversely, some agricultural economists believe that the *Marcita* meadows are too expensive and require a large amount of artificial maintenance (including the cost of the technical training programme).

In general, the dominant attitudes in official spheres and social media regarding the *Marcita* meadow are negative<sup>24</sup>. The *Marcita* meadows now in PASM are still used but are not in good condition, as both farmers and citizens do not pay attention to them.

The municipality of Milan and several parks issued regulations to contribute to the *Marcita* meadow system's restoration, preservation and innovation, with an aim to improve the quantity of such meadows and to promote this technique. Furthermore, Politecnico students, experts, and farmers cooperate as volunteers to participate in the related activities or projects for the *Marcita* meadows.

For farmhouses, conservation and functional recovery projects were designed and organised by the municipality of Milan and Politecnico di Milano. The project team maintains the original structure and materials; on this basis, it reinforces and restores the building.

#### 5.2.4 Business model aspect

First, regarding *Cascina Linterno*, the municipality, a non-profit association, Politecnico di Milano and several farmer groups are in charge of the farm: the vegetable gardens belong to the Municipality; meadows (including the *Marcita* meadow) are managed by the *Paolo Campi* farmer group; and the *Veca* farmer group takes care of professional horticulture, the honey factory and the pedagogical farm. The conservation project of farmhouses was designed by Politecnico di Milano and

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<sup>24</sup> This opinion is derived from: 1. the general opinion of scholars in the relevant field at Politecnico di Milano. 2. the results of the author's research while in Milan (April-September 2018). The author conducted interviews with a number of Milanese citizens (e.g. students, caterers, service workers, architects, etc.) at that time.



funded by the municipality. Furthermore, several cultural activities, such as the exhibitions and conferences, are held in the farmstead by Politecnico di Milano and aims to spread knowledge of the farming history of the farmstead.

The primary income source for the whole farm is honey production and sale. The products are sold directly to visitors or markets. Citizens, gardeners and farmers from PASM, as well as other social consumer groups, constitute the main clients (Table 5-2).

Table 5-2 BMC results from *Cascina Linterno*

|                                                                                                      |                                                                                     |                                                                                                           |                                                                                         |                                                                                                         |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Key Partners</b><br>- University<br>- PASM<br>-Municipality of Milan<br>- non-profit organisation | <b>Key Activities</b><br>- agritourism<br>- selling stories                         | <b>Value Propositions</b><br>- memorable, authentic experiences<br>-landscape<br>- educational activities | <b>Customer Relationships</b><br>- personal<br>- association<br>-social network         | <b>Customer Segments</b><br>- citizens<br>- gardeners<br>- farmers from PASM<br>- social consumer group |
|                                                                                                      | <b>Key Resources</b><br>- traditional irrigation system<br>-old farmhouses and yard |                                                                                                           | <b>Channels</b><br>- direct selling<br>- farmer market                                  |                                                                                                         |
| <b>Cost Structure</b><br>- labour cost<br>- maintenance of heritage                                  |                                                                                     |                                                                                                           | <b>Revenue Streams</b><br>-beekeeping (the sale of honey)<br>-donations from volunteers |                                                                                                         |

The second example is *Cascina Cuccagna*, which is situated in downtown Milan (Fig. 5-19). It aims to restore and protect 17<sup>th</sup> Century farmhouses (Cascina Cuccagna, 2020) for public use. After years of oblivion, the farmhouses began to be transformed into a place for meeting and socialisation (Un Posto a Milano, 2018). Furthermore, parts of the farmhouses have been innovated into bars and guesthouse, which aim to attract tourists who want to enjoy an idyllic lifestyle.

A corner of the yard contains a community garden. It is a shared plot of land where people gather to grow fresh vegetables and flowers. Additionally, many social and commercial activities can be held in *Cascina Cuccagna*, including catering, travel consulting, and cooking skill training services. The places can be booked and rented for organising events such as public lectures and art salons. The cost for *Cascina Cuccagna* primarily contains the restoration fee for the old farmhouses and the labour



cost. In general, a variety of clients exist because of the multi-functionality of the farmsteads (Table 5-3).



Fig. 5-19 Picture of *Cascina Cuccagna*. Photographed by the author in 2018.

Table 5-3 BMC results from *Cascina Cuccagna*

|                                                                                                                                                                                                           |                                                                                                                                                 |                                                           |                                                                                                                         |                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Key Partners</b><br>- non-profit organisation<br>-bank as a sponsor<br>- restaurant, bar, cooking school<br>- flower shop, bicycle workshop, travel agency, etc.<br>- artists (designer, photographer) | <b>Key Activities</b><br>- community garden<br>- visitor centre<br>- variety of activities                                                      | <b>Value Propositions</b><br>- landscape<br>- traditional | <b>Customer Relationships</b><br>- heterogeneous, variety of clients exists, depending on the different business scopes | <b>Customer Segments</b><br>- diverse clients and groups. For instance, people who want to feel the idyllic atmosphere or are eager to have a sustainable lifestyle. |
|                                                                                                                                                                                                           | <b>Key Resources</b><br>- business is conveniently located in the best place to attract customers<br>- the original appearance of the farmstead |                                                           | <b>Channels</b><br>- depending on the different business scopes                                                         |                                                                                                                                                                      |
| <b>Cost Structure</b><br>- labour cost<br>- restoration fee                                                                                                                                               |                                                                                                                                                 |                                                           | <b>Revenue Streams</b><br>-venue rental<br>-financial support for management the farmstead by the sponsor               |                                                                                                                                                                      |

Finally, *Cascina Biblioteca* (Fig. 5-20) is located in the peri-urban area in the northeast of the study area. The origin of the farmstead can be traced back to the

middle of the 14<sup>th</sup> century, although the manor was purchased by the Ambrose Library (*Biblioteca Ambrosiana di Milano*) in the 1500s (Cascina Biblioteca, 2018). The farmstead provides various services under the operation of local cooperatives and focuses on social services, especially for groups that work with disabled people.



Fig. 5- 20 Picture of Cascina Biblioteca (in the farmhouse).

Source: <http://cascinedavivere.altervista.org/cascina-biblioteca/>. Accessed 17 March 2020.

Traditional farmhouses have been restored and renovated as nursing homes for disabled persons: the municipality and the non-profit organisation are responsible for persons with disabilities. Disabled persons can improve their quality of life through farming activities in the therapeutic garden (primarily vegetable gardens), live in close contact with horses (managers raise horses in the farmstead) and receive skills training through specific vocational training courses.

In addition, crops and vegetables are cultivated on the farmland. Managers provide a food supply for Milanese citizens, such as opening community vegetable gardens, operating agricultural product stores, providing equestrian training and supplying ingredients to some specific farm shops and restaurants. However, due to the high quality of agricultural products, the cost is relatively high (Table 5-4).

Table 5-4 BMC results from *Cascina Biblioteca*

|                                                                                                |                                                                                                 |                                                                                                                |                                                                                                                                                                                                        |                                                                                                                           |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Key Partners</b><br>-Municipality of Milan<br>- non-profit organisation                     | <b>Key Activities</b><br>- community garden<br>- educational activities<br>- therapeutic garden | <b>Value Propositions</b><br>- organic<br>-fresh<br>- seasonal<br>-equestrian activities<br>-product diversity | <b>Customer Relationships</b><br>- personal<br>-social network                                                                                                                                         | <b>Customer Segments</b><br>- customer groups that demand high quality and safe food<br>- disabled persons<br>- gardeners |
|                                                                                                | <b>Key Resources</b><br>-old farmhouses and yards                                               |                                                                                                                | <b>Channels</b><br>- direct selling (restaurant and farm shop)                                                                                                                                         |                                                                                                                           |
| <b>Cost Structure</b><br>- labour cost<br>- costs for agricultural production are usually high |                                                                                                 |                                                                                                                | <b>Revenue Streams</b><br>-premium prices due to the high quality<br>-funding by the cooperative project with the municipality, which is primarily focused on the support actions for disabled persons |                                                                                                                           |

In summary, the three different business models of the farmsteads selected in this chapter are essentially typical of urban farms as a whole in the Metropolitan City of Milan. The overall business model of the farmstead is divided into two types: the non-profit and the profit approach. However, in most farmsteads, both phenomena are present.

On the one hand, the non-revenue model is primarily managed by non-profit organisations. Its main purpose is to promote the historical background and cultural characteristics of the farmstead. The main activities' manager organised including exhibitions, lectures, and agritourism activities to help the public understand the UA heritage. Meanwhile, a small part of the therapeutic garden has also been created on the basis of the original old farmhouse, mainly for the elderly and disabled.

On the other hand, the profit-oriented business model involves the restoration and reuse of the original farm heritage elements to attract visitors to engage in consumer behaviour. Managers always open restaurants and hotels, host venue rentals, and so on.

### 5.3 Conclusion

Table 5-5 The analysis results of the farmsteads

| Dimensions              | Analysis                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manifestation dimension | Tangible elements                                                            | <ul style="list-style-type: none"> <li>· Territory's pattern of farmland</li> <li>· Old pathways</li> <li>· Farmhouses</li> <li>· Canals</li> <li>· Old <i>Marcita</i> meadows</li> </ul>                                                                                                                                                                                                                                     |
|                         | Intangible elements                                                          | <ul style="list-style-type: none"> <li>· Names of roads and places</li> <li>· Festivals</li> <li>· Agricultural technique</li> <li>· Story</li> </ul>                                                                                                                                                                                                                                                                         |
| Ecological dimension    | Agrobiodiversity                                                             | <ul style="list-style-type: none"> <li>· A variety of species</li> </ul>                                                                                                                                                                                                                                                                                                                                                      |
|                         | Others                                                                       | <ul style="list-style-type: none"> <li>· An essential component of the urban green infrastructure</li> <li>· Relatively integral eco-system</li> </ul>                                                                                                                                                                                                                                                                        |
| Social dimension        | Social perception analysis based on the interview results from the residents | <ul style="list-style-type: none"> <li>· Good natural environment</li> <li>· Outstanding productive landscape</li> <li>· Positive attitudes from managers of farmsteads</li> <li>· Volunteers from university</li> <li>· Supported via several non-profit organisations</li> <li>· Most citizens have an awareness of the preservation of heritage buildings. However, agricultural elements are usually neglected</li> </ul> |
| Economic dimension      | Business model canvas (BMC)                                                  | <ul style="list-style-type: none"> <li>· A variety of business models exist in the study area. There is a big difference between them. However, the diversification of management pattern contributes to the prosperity of the agricultural economy.</li> </ul>                                                                                                                                                               |

## 6 Summary of existing preservation and development approaches in the three cases

### 6.1 Comparison of the three cases

There are apparent differences among the three cases, especially as regards location. After drawing the spatial pattern of the three regions, it is evident that in Xuanhua, grape gardens have been distributed in the city centre from ancient times (inside the old city wall), which is exceptionally close to the everyday life of residents (Fig. 6-1). When focussing on Bamberg, although the Market Gardeners' District can now be seen as a part of the urban area, in the past, it was a food and garden plot production base that was situated in a peri-urban area outside the old city wall (Fig. 6-2). As for Milan, in the process of urban sprawl, three walls were built: in ancient Rome, in the Middle Ages, and during Spanish rule (Wikipedia, 2018). In the past, the three selected farmsteads were outside the city or in the urban fringe. Today, however, due to rapid urbanisation, they have become one of the components of the metropolis; most of the markets for their products depend on city dwellers (Fig. 6-3).

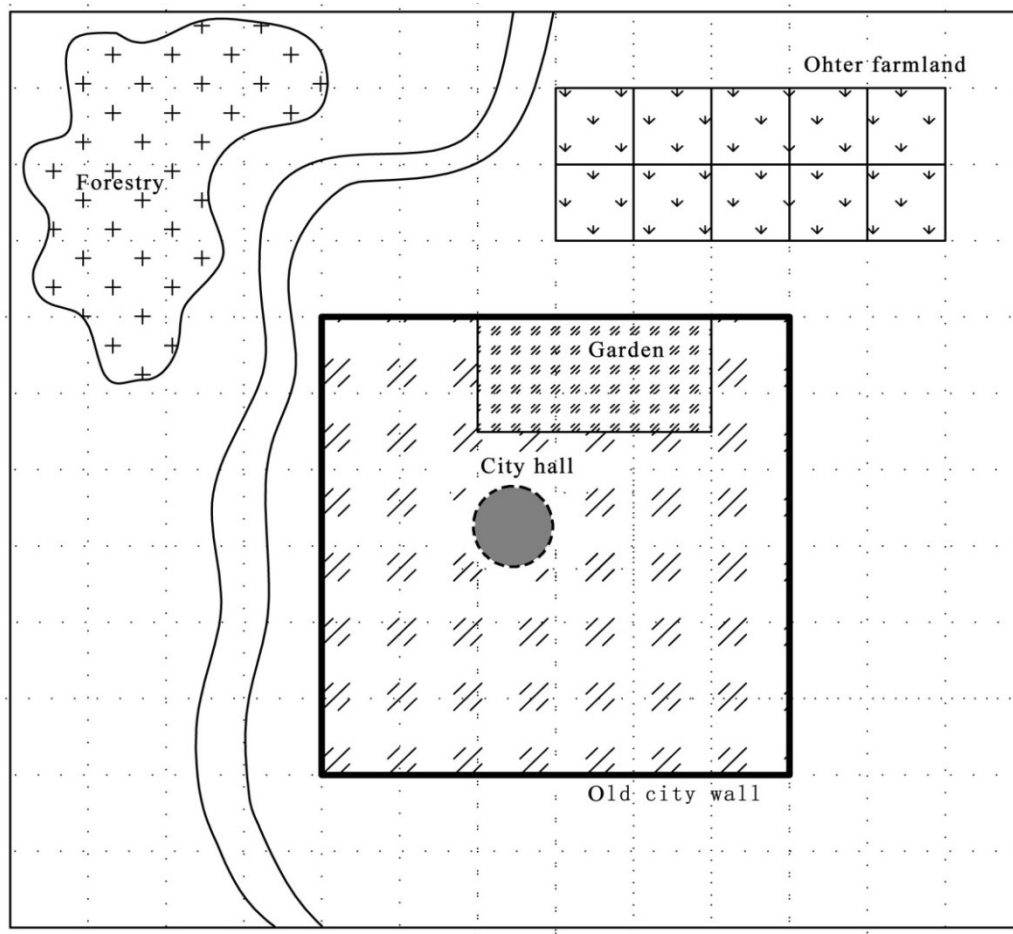


Fig. 6-1 Sketch map of Xuanhua. The reason for the dashed outline of the city hall is that the former building has now been demolished.

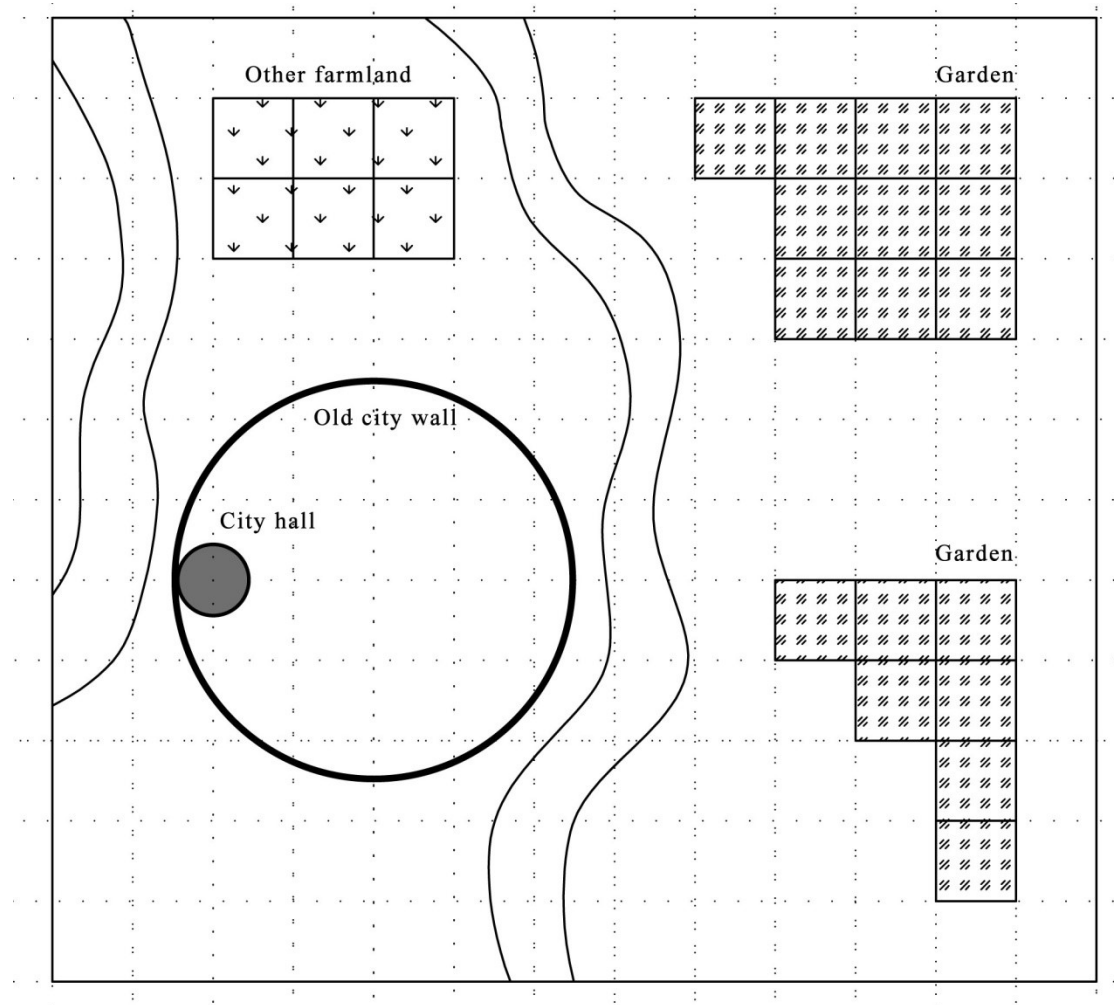


Fig. 6-2 Sketch map of Bamberg



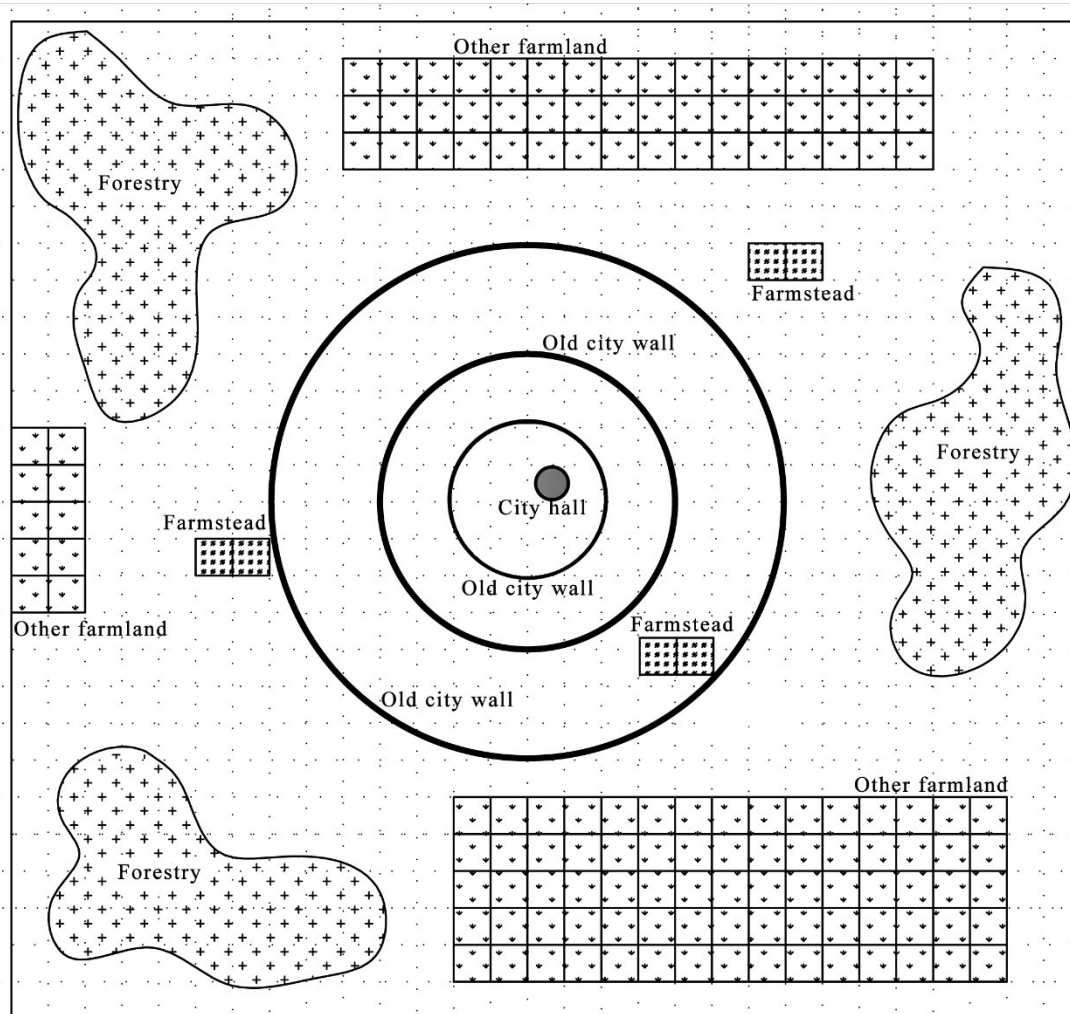


Fig. 6-3 Sketch map of the Metropolitan City of Milan

Different geographical locations result in distinct functional positioning. Three cases existed in a different form in the past. Xuanhua traditional vineyards existed in the form of the backyard gardens of temples or dwellings with ornamental functions. The Market Gardeners' District in Bamberg used to exist as a residential area for gardeners. Backyards were mainly operated for profit as vegetable gardens or nurseries. The decentralized farmsteads in the Metropolitan City of Milan always had the function of agricultural products selling for the urbanites.

According to the research, the current preservation status of each of the three cities also varies, which merits further attention. The three cases are discussed as follows.

In the case of Xuanhua, the tangible heritage (e.g. grape species and old grapevines) is in good condition. Besides, intangible heritage factors in the Xuanhua grape garden have been preserved. The urban fabric of courtyards containing grape funnels has not changed. Both panoramic and courtyard landscapes are worth promoting as potential

assets for the development of the tourism industry.

In the case of Bamberg, the tangible heritage, such as a variety of indigenous species and traditional gardeners' houses, is in good condition. As for intangible heritage factors, traditional work clothes and documents written in the dialect have been collected and preserved by the local museum. Procession habits are held regularly as before. Although the number of gardeners has decreased, commercial horticulture is still in operation and managed at various scales. Furthermore, the urban fabric of the Market Gardeners' District has not changed dramatically. The productive landscape in this area is still outstanding.

In the case of the Metropolitan City of Milan, although there is a clear trend towards a decline in agricultural land throughout the region, plenty of the urban agricultural (UA) heritage sites are still retained in the southern part of Milan. In this area, agricultural species are in abundance and the ecological environment is well-established. The commercial model of UA sites, in general, is diversified. Traditional agricultural celebrations have been inherited.

Taking farmstead *Cascina Linterno* as an example, the spatial pattern of farmland, old pathways, farmhouses, and canals in the farmstead have been protected and remain in good condition. Intangible heritage factors such as festivals and irrigation techniques have also been preserved.

Comparing these UA heritage sites (Fig. 6-4), it is obvious to see that in the economic dimension, the Milan case has significant advantages. The reason for this depends on the large number of farmsteads located in the rural-urban area of the Metropolitan City of Milan, with multiple existent formats and diversified business models. While plenty of different business practices exist in Milan, the business models that exist in Xuanhua and Bamberg are very homogeneous.

Concerning the social dimension, in Xuanhua, there are an independent research institute and specific regulations for the protection and research of traditional vineyards. In Milan, the diversity of farms gives the population a diverse display of rich agricultural heritage features. Comparing to these two cities, although dominant attitudes concerning urban gardening in Bamberg are positive, it is not of particular interest nationally. Also, the small number of gardens and the enclosed backyards of farmhouses are not very friendly for some foreigners (particularly tourists) to perceive the charm of the local heritage.

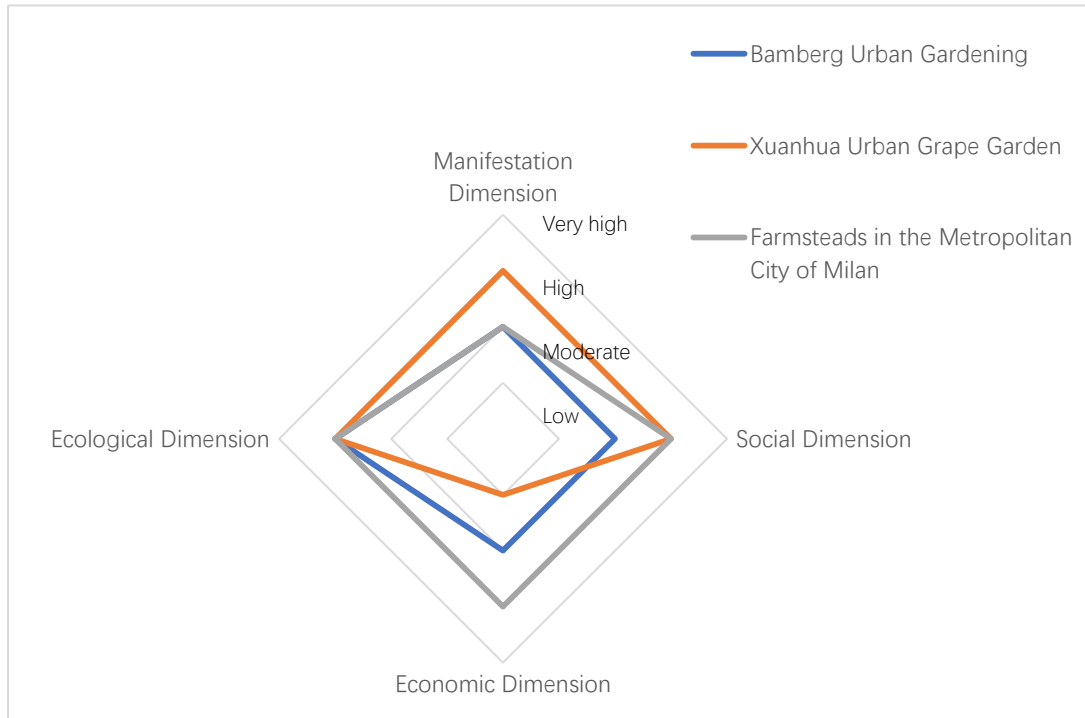


Fig. 6-4 Comparison of UA heritage in three cases

At the same time, however, they all currently present a number of development challenges and opportunities. They are described separately below.

#### 6.1.1 Xuanhua urban grape garden

The outstanding historical value of the Xuanhua vineyard and the branding benefits of the Globally Important Agricultural Heritage System (GIAHS) Programme have created an opportunity for the development of tourism in the old city of Xuanhua. As of 2019, several open spaces (as well as a comprehensive park) have been established in the village for attracting visitors.

In recent years in China, the rapid development of the logistics industry has, to some extent, broadened sales channels for grapes, thus boosting household incomes. In addition, the diversification of agricultural activities has been enhanced. Besides visiting the gardens and participating in ‘pick-your-own’ schemes, visitors and vendors can purchase Xuanhua grapes online as well as through social media platforms.

However, some problems remain for Xuanhua grape garden operators. First, Zhangjiakou is located in a semi-arid region of northern China whose land is relatively barren due to a lack of water (Koohafkan & Altieri, 2016). Increasing water

shortages due to the overuse of water resources have become a threat to the grape garden, which will directly affect agronomic production and farmers' lives in the future. Second, households are relying primarily on one sole source of income for their livelihood and there is a lack of economic benefits.

#### 6.1.2 Urban gardening in Bamberg, Germany

As most operations are small family-owned businesses, most gardeners work and live in enclosed courtyard spaces. Visitors or tourists are not allowed to enter without permission. Besides, family culture and family succession have a far-reaching influence on the development of commercial horticulture in Bamberg. To some extent, this deep-rooted perception restricts the growth of commercial horticulture and has directly led to a decrease in the number of people working as gardeners.

In 2012, the model project 'Urban Gardening' was initiated by the Bamberg World Heritage Office. It is intended to maintain the typical Bamberg gardeners' culture and preserve inner-city gardening lands as part of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage. Several regulations, for instance, land tax remissions and financial support, were issued by the local government to encourage residents to become gardeners.

The Gardeners' and Vintners' (*Gärtner- und Häcker*) Museum, with its cultivated garden, shows the recreated world of a comparatively well-off market-gardening family around 1900. The museum is an old renovated farmhouse that was originally built around 1767. In 2012, the museum was redesigned and refitted in connection with the 'Urban Gardening' project (Fig. 6-5, 6-6). Behind the museum in the historic domestic garden, vegetables and herbs are cultivated, as well as liquorice, which together with onions was historically one of the leading products of Bamberg's gardeners (Fig. 6-7).

However, nowadays, the Market Gardeners' District is still short of markets, and investment and energy costs are still rising. In the meantime, the absence of financial support is an urgent issue that needs to be resolved.

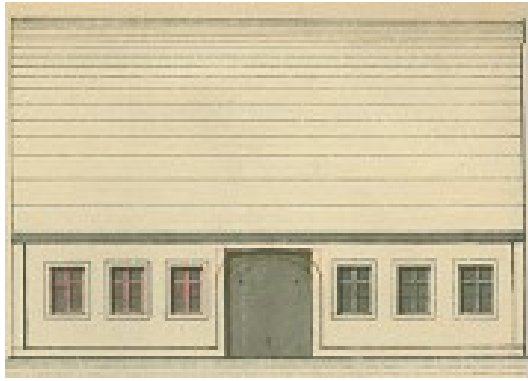


Fig. 6-5 Plan of alterations to the facade in 1895 (left).

Source: The Gardeners' and Vintners' Museum.

<https://gaertner-und-haecker-museum.byseum.de/de/das-museum/das-gaertnerhaus>

Fig. 6-6 Present look of the museum (right). Photographed by the author in 2017.

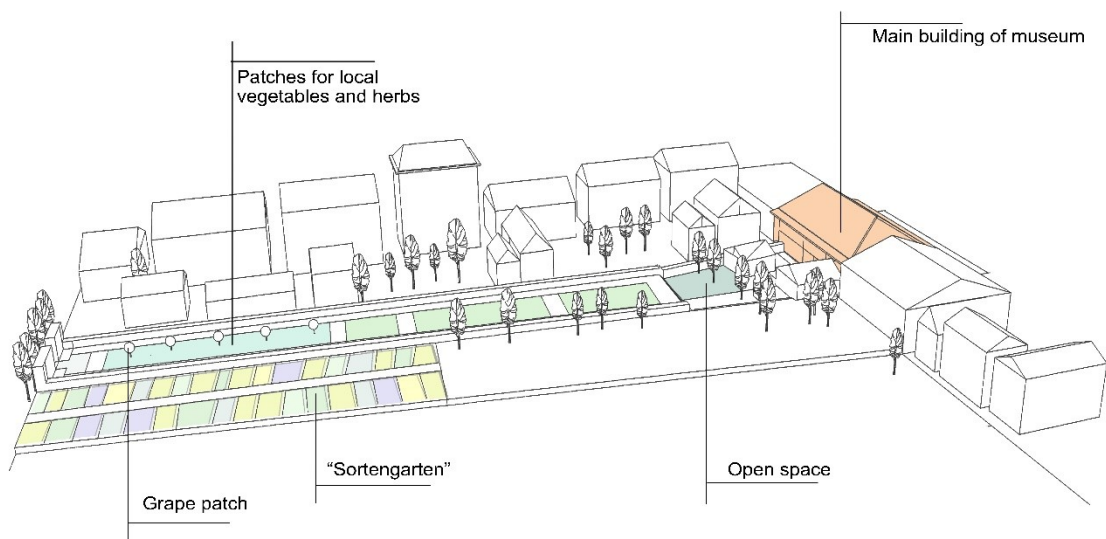


Fig. 6-7 The Gardeners' and Vintners' Museum and the historic domestic garden

### 6.1.3 Farmsteads in the Metropolitan City of Milan

Taking farmstead *Cascina Linterno* as an example, first, Politecnico di Milano is responsible for the renovation and restoration project of the farmstead *Cascina Linterno*. Under the premise of preserving the original structure and most of the

materials, the architects made a conservation design and restored the farmhouses in order to ensure that their original historical appearance is presented to the greatest extent to tourists. For instance, instead of removing aged materials, architects reinforced the roof of the farmhouse with steel to create a safe open space for the public (Fig. 6-8).

Second, for the entire city, several regulations for *Marcita* meadow preservation have been established. The protection and promotion of the *Marcita* is being carried out by various actors, including Politecnico di Milano, South Milan Agricultural Park (PASM), and Ticino Park. For instance, when focussing on a farmstead project, *Mulino Maglio in Ozzero* (Regione Lombardia, 2016), the experts at Politecnico di Milano and Ticino Park authorities collaborated to clean up the *Marcita* meadow, repair artefacts, collect waste, and cut the grass along the canals (Fig. 6-9).

Spreading knowledge of the *Marcita* technique is critical. Thanks to the Globally Important Agricultural Heritage System (GIAHS) Programme, responsible personnel now are devoting themselves to the project proposal application. Some professional training courses have been organised to educate local farmers and propagate knowledge of the *Marcita* meadow system. For the public, travel tours, exhibitions (Figs. 6-10, 6-11) and activities have been organised by Politecnico di Milano, PASM and Ticino Park.

However, when taking a broad view of the whole metropolis, the specific agricultural heritage still lacks social attention, even though heritage preservation is of great significance for a large number of Milanese.





Fig. 6-8 (left) Wooden roof is reinforced with steel to maintain the original structure. Photographed by the author in 2018.

Fig. 6-9 (Right) Farmers, experts, and Ticino Park authorities work together to clean up the *Marcita* canal. Photographed by the author in 2018.



Fig. 6-10, Fig. 6-11 '*Paesaggi di Marcita*' Exhibition in *Cascina Linterno*, on May 25, 2018. Photographed by Hang LU in 2018.

All three of the above cases share some commonalities. They have already been identified as UA heritage sites by various organisations. Therefore, their analysis sheds light on the characteristics of UA heritage, which is crucial for the exploration of UA heritage in the future.

## **6.2 Existing preservation and development approaches in the three cases**

### **6.2.1 Overall preservation and development goals**

As mentioned in Chapter 2, UA heritage can be analysed in four dimensions, as each UA heritage site has specific characteristics. (For instance, a UA heritage site has a unique agricultural ecosystem, for which planning could mainly concentrate on its ecological function instead of other dimensions.) The general planning goal should be adjusted, relying on a variety of existing models of UA heritage sites. Hence, solutions to the preservation and development goals and strategies of UA heritage sites might be multifarious.

According to the current summary results, there are three different development goals for UA heritage sites, as described in the following.

#### **Ecological habitats**

Ecological habitat is an aggregation of various species; a natural environment in which animals, plants and other organisms live and grow. Traditional UA heritage sites may exist as local species and the original ecological system, which cannot be ignored. Based on this phenomenon, the primary goal is to protect the existing habitat for animals and plants, restore the natural environment, or create a new biological environment where species can thrive.

Generally, this kind of UA heritage site is distributed in peri-urban areas or the rural-urban fringe, which has a large area of cultivatable land without too much human disturbance.

#### **Historical and cultural reserves**

In addition to ecological functions, some UA heritage sites are mainly characterised by historical relics that can reflect specific scenes from ancient times. These sites may exist with a complete collection of buildings from one or more stages of history, or with distinctive features of landscape environments. Furthermore, intangible heritage elements should not be neglected. For instance, regional characteristics or ethnic customs, local lifestyles, and folklore can be considered beneficial elements during the process of reviving urban cultural identity. Regarding these kinds of UA heritage sites as urban historical and cultural reserves can contribute to the improvement of the cultural impact and significance of urban development.

It is worth mentioning that in most cases this type of UA heritage site has weak

ecological effects, sometimes not even requiring any materials, agricultural features such as farmland, or plants and animals. Instead, their social and historical functions play a significant role. These sites may have a high impact on society and contribute to the spread of culture and are usually distributed in built-up areas or inner-cities.

Therefore, when we protect and develop such sites, we should aim to protect culture instead of re-establishing or creating an ecological agricultural planting area based on ecological effects.

### **Mixed UA heritage sites**

Mixed UA heritage sites have the potential to develop both types. With regard to the fundamental features of the aforementioned sites, mixed UA heritage sites have the potential to be developed and explored from four dimensions, as mentioned in Chapter 2. In fact, according to fieldwork and the literature review, many UA heritage sites around the world are complex and diverse. Hence, there should be myriad approaches to conserving and developing UA heritage.

#### **6.2.2 Current management approaches of UA heritage**

Analysis results of the three case studies showed different management approaches to the conservation of heritage. There are two primary schemes when concentrating on the management of UA heritage sites.

The former is related to the regulations formulated and promulgated by international organisations such as UNESCO and/or national governments. This shows that only authorities are responsible for the entire process of heritage supervision and management. However, it is debatable whether this management system primarily concentrates on the physical elements instead of intangible aspects of heritage (Aylwin, 2016).

The latter is the bottom-up management approach for heritage conservation, which focuses on carefully studying the actions of those affected by and involved in policy implementation. This approach can contribute significantly to local communities by means of the production of heritage.

Some researchers believe that it is difficult to maintain a balance between top-down and bottom-up approach forces (Theerapappisit, 2012). Indeed, only a reasonable and

practical combination of these can be the key to solving problems (Fig. 6-12).

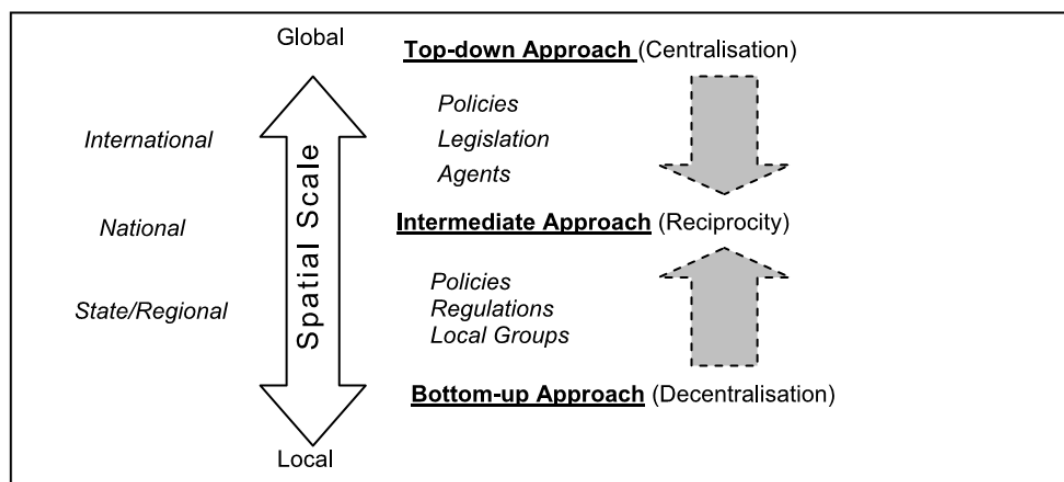


Fig. 6-12 Conceptual diagram of policy approaches.

Source: Theerapappisit, 2012.

For the Xuanhua urban grape garden, the development strategy and management model are mainly decided via the top-down management scheme. First, from the national level, in 2005, the Ministry of Agriculture of the People's Republic of China (MOA) put forward the proposal of *The Measures for Administration of Important Agricultural Heritage*, which proposed management requirements of the China's National-Global Important Agricultural Systems (China-NIAHS) Programme (MOA, 2015). The rules are as follows:

The Department of Agricultural Administration of the People's Government at the county or prefecture-level should:

- consider the expenditures of heritage protection as part of the financial budget;
- incorporate heritage conservation and development in the national economic and social development plan of the corresponding level;
- through subsidies, compensation and other methods, ensure that local farmers can obtain reasonable economic benefits; and
- adopt any other necessary protective measures.

MOA encourages and supports the GIAHS and China-NIAHS Programme that have already been nominated, which in turn highlights the great significance of the local ecological environment and agricultural resources. In the meantime, the development of ecological and cultural products, leisure agriculture, and other commercial

activities are recognised as potential opportunities to revive the regional economy. MOA also mentioned the importance of supporting organic food, the promotion of international exchanges and co-operation as well as ensuring the farmers' opinions are heard and their participation.

Next, from the perspective of People's Government of Xuanhua District (GXD), *The Measures for the Protection and Management of Traditional Grape Garden in Xuanhua* were formulated in 2013, which clearly stipulated the core protection areas of ancient vineyards. From 2018, GXD compiled *The General Plan for the Protection and Development of the Xuanhua Grape Garden Agricultural Heritage*, which, as a whole, aimed to evolve traditional vineyards from several developing aspects: sightseeing, agritourism, scientific education and product exhibition.

GXD provides a subsidy of 2,000 RMB per *mu* ( $1\text{ mu} = 666.6667\text{ m}^2$ ) to the householders who plant new grape vineyards. Furthermore, it provides an annual financial appropriation of 400,000 RMB to support the growth of grapes, primarily with the traditional funnel-shaped structure. In addition, GXD takes charge of the supply of outer packing boxes when framers sell grapes (S. Wang, Ma, & Zhong, 2018).

For the Metropolitan City of Milan, both top-down and bottom-up approaches have been considered. For the former, at the regional level, for example, the promulgation of *The Regional Territorial Plan (2010–2014)*, and *The Regional Law 23 January 2007*, established by the Lombardy Region, have proposed the establishment of agricultural districts in the metropolis (Lohrberg et al. Eds., 2015). On 3 May 2012, the *Milan Rural Development Strategy* was promulgated and implemented in the Lombardy region, emphasising the planning objectives of protecting the cultivated land area, encouraging direct selling of agricultural products, enriching agricultural landscapes, and renovating the ecological environment. It also mentioned that attention should be paid to the restoration and reuse of traditional farmsteads (Agricity, n.d.).

As for the latter, the bottom-up management scheme is reflected in the following activities. Ticino Park, a green belt on the western boundary of the Metropolitan City of Milan, has substantial autonomy. The committee on the landscape of the Lombardy Park in the Ticino Valley aims to administer landscape protection and management of the park independently (Della Parco Lombardo Valle Del Ticino, 2018). According to an interview with Mr. Lu, an employee at Politecnico di Milano, the committee's

activities are beyond the limits of the administration's regulation. The agricultural landscape is one of the underlying landscape types in Ticino Park. Agricultural land in the park accounts for more than half of the total area. Situated on this land are abundant agricultural heritage resources such as historical farmsteads, traditional irrigation channels, and agricultural systems. Elements of the agricultural landscape within the park are strictly protected as cultural heritage sites. These can only be changed after a thorough review and evaluation by the landscape committee, including the appearance (colour, shape, etc.) of farmhouses, the shape and size of farmlands, and the addition or removal of irrigation channels.

The UA heritage management approach in Bamberg is another excellent example characterised by both top-down and bottom-up approaches. The Bamberg World Heritage Office was established in 2005. However, its original protection targets did not include urban gardening activities. After the new management plan was launched by the World Heritage Office, the historical value of urban gardening in Bamberg was mentioned. The conservation of the Market Gardeners' District was considered part of the *Bamberg New World Heritage Management Plan* in 2015 (Fig. 6-13). According to the new management plan, in 2016, the municipal government agreed to grant a financial budget of 900,000 euros for the installation of a new World Heritage Visitor Centre (Organization of World Heritage Cities, 2016). Vast exhibits dedicated to the gardeners' history and the Market Gardeners' District, in particular, were retained in the visitor centre (Fig. 6-14).

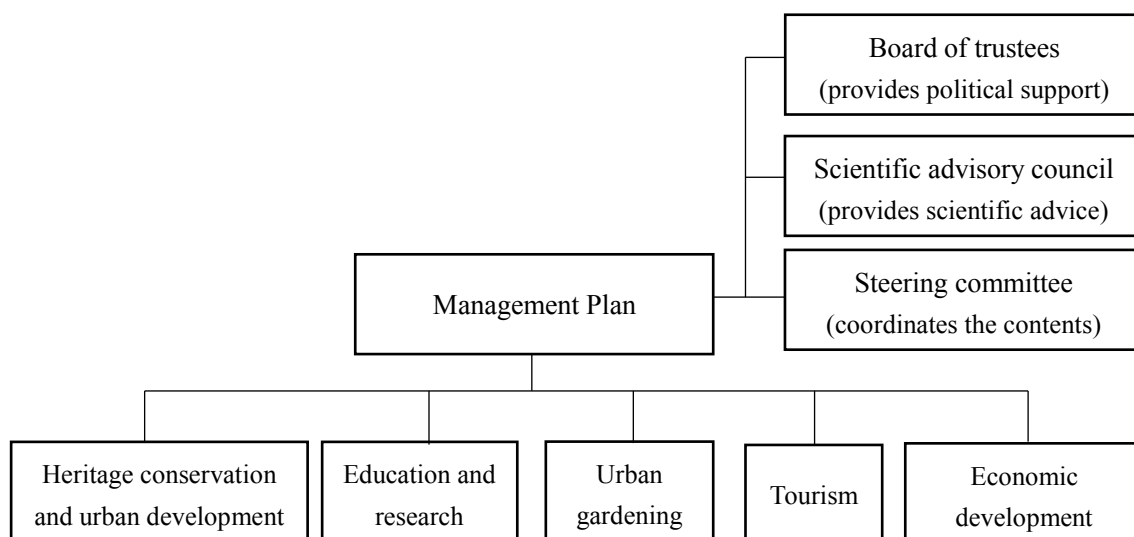


Fig. 6-13 Organisational framework of Bamberg World Heritage management plan in 2018. Source: Kloos & Alberth, 2018.





Fig. 6-14 New World Heritage Visitor Centre in Bamberg.

Source: Bamberg Tourismus,

[https://en.bamberg.info/veranstaltungen/world\\_heritage\\_in\\_a\\_nutshell-320484-11943684/](https://en.bamberg.info/veranstaltungen/world_heritage_in_a_nutshell-320484-11943684/). Accessed 1 August 2020.

Furthermore, the Bamberg World Heritage Office had a strong desire to involve civic society in the decision process of heritage conservation and management. Thus, several stakeholders from different fields were invited to public working meetings to contribute external points of view for heritage management (Fig. 6-15). The working process resulted in a wide range of ideas generated by various members in Bamberg.

Based on the research by Kloos and Alberth, it is obvious that the lesson from Bamberg's participation process is essential for guiding other UA heritage preservation efforts in the future (Kloos & Alberth, 2018).

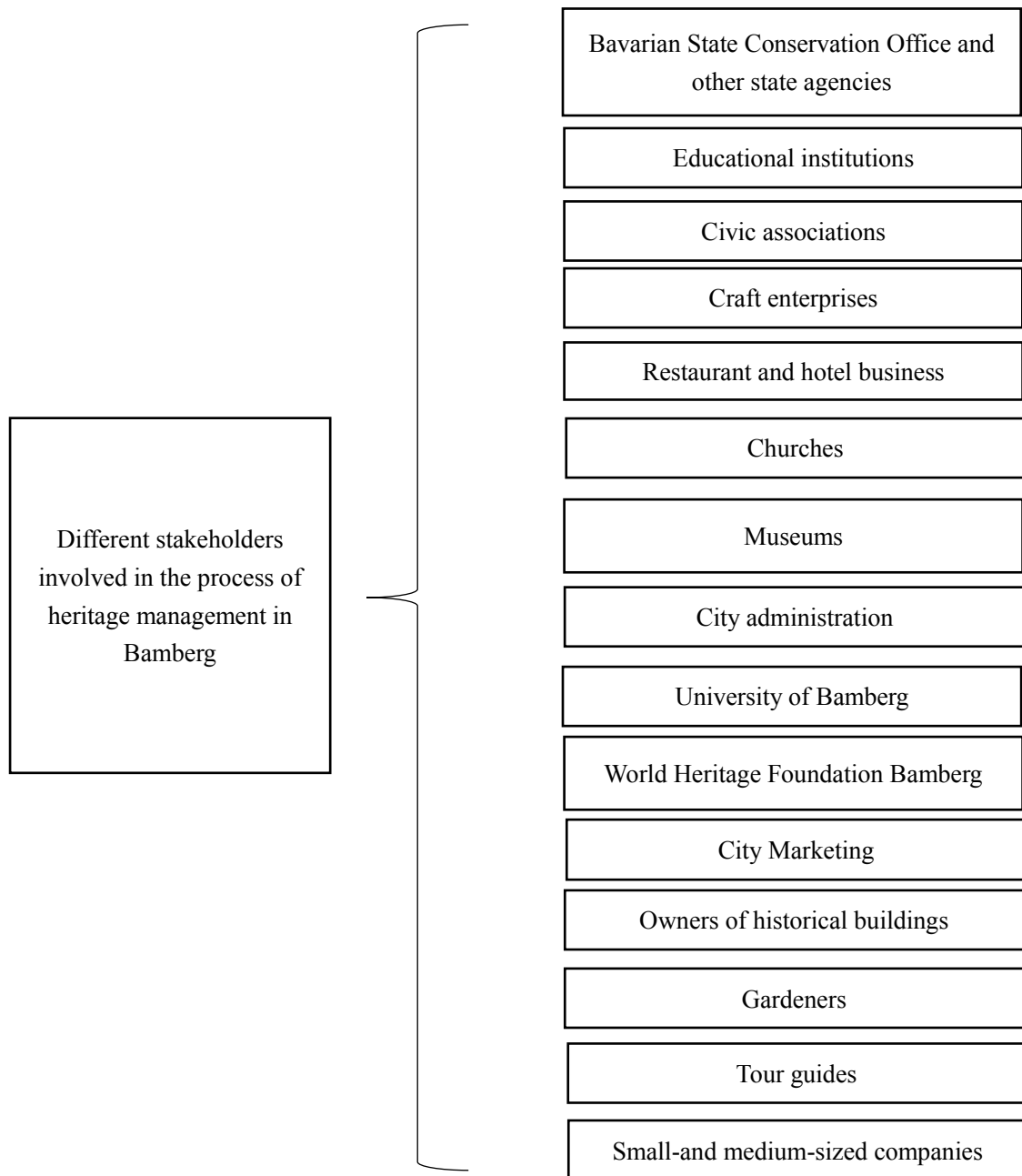


Fig. 6-15 Different stakeholders involved in the process of heritage management in Bamberg. Source: Kloos & Alberth, 2018.

### 6.2.3 Preservation types in three cities

#### **T1: Living museum**

As mentioned in Section 6.1.2, in Bamberg, the Gardeners' and Vintners' Museums were established in the Market Gardeners' District. Although this museum has made significant contributions to the promotion of regional culture, several issues still exist. For instance, the decline in tourist flows proves that the agricultural landscape or historical background of the Market Gardeners' District might not be sufficiently attractive on a national scale. Based on this situation, it is clear that there is the potential to develop a living museum there, which could bring many benefits to both inhabitants and the government.

The living museum can be thought of as a place where visitors can visit and participate in indigenous life and daily activities. Unlike ordinary museums, a living museum can be contextualised in a real-life scenario, rather than a set of static displays (Ciolfi & McLoughlin, 2012).

Together with others who took part in the *Herrenhausen Conference on Urban Agricultural Heritage and the Shaping of the Future Cities* in 2019, participants proposed a new updated form of the Gardeners' and Vintners' Museum. It was considered as a result of the conference's pre-workshop in Bamberg. In the meantime, the concept of a living museum can be spread as a paradigm. It could be applied to other regions for the development of UA heritage sites. The detailed conceptual explanation is as follows:

Throughout the region, community residents should be encouraged to manage their own culture and create opportunities for community development. Based on this situation, the living museum can be considered an appropriate tool for cementing the relationship between the natural environment and human beings.

Based on public participation, the living museum can realise interactive functions during the process of heritage conservation. It is a dynamic, sustainable utilisation and development of museums without boundaries which emphasises the preservation of both natural and cultural heritage. The synthetic protection target includes a variety of inhabitants' everyday lifestyles, their production, and a variety of agricultural activities. Farmers' living and farming areas are treated as the museum space, including farmhouses, patches, and the surrounding environment. Visitors have the chance to interact with productive landscapes without disturbing the daily lives of

local residents.

Taking the design idea of the museum in Bamberg as an example, a tour route is designed to pass through the farmlands (Fig. 6-16). Tourists can enjoy the pastoral scenery with little environmental disturbance. It is also a suitable way to gain an authentic sense of the gardeners' everyday lives. Visitors can purchase vegetables and flowers, taste local food in the nearby restaurant, and learn about the agricultural history of the region when visiting the exhibition hall in the farmhouse.

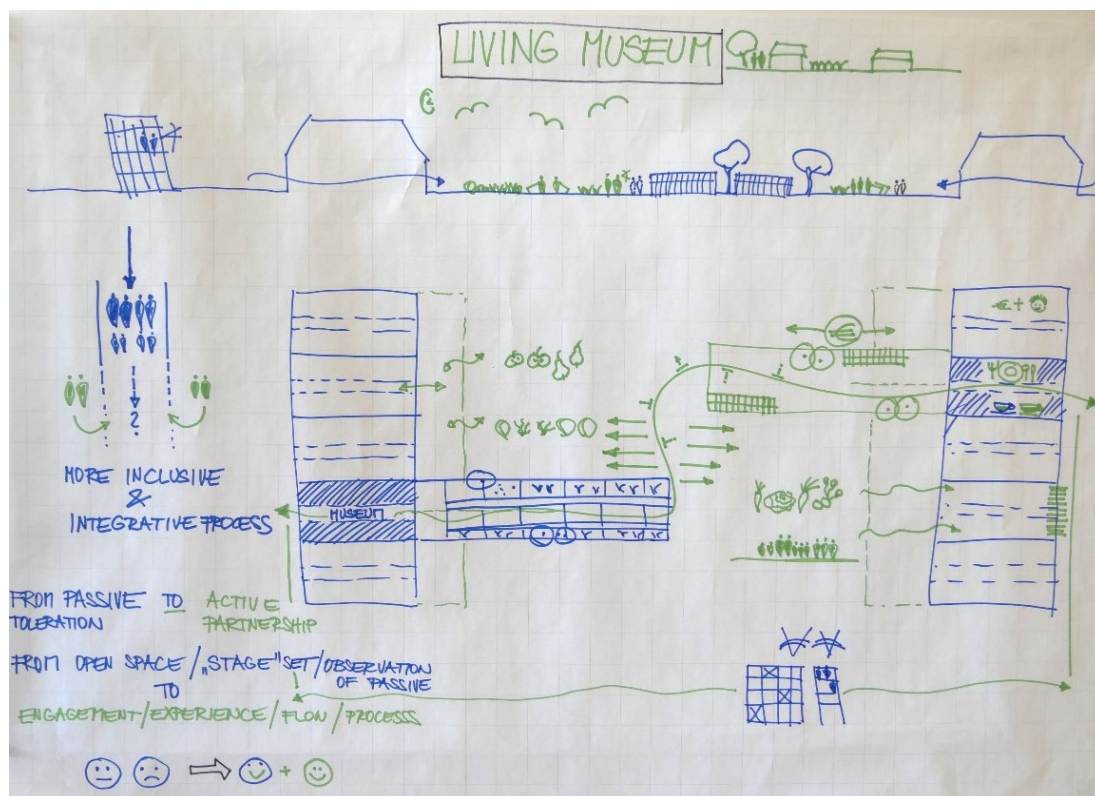


Fig. 6-16 Workshop results proposed by Tóth, Attila, Miriam C.Dobson, Yichen Jiang, Gwan Solange Akhere during the *Herrenhausen Conference on Urban Agricultural Heritage and the Shaping of the Future Cities*, in 2019, Bamberg.

## T2: Farmstead (innovation type)

When analysing the summary results from the Milan experience in Section 6.1.3, it is evident that a multi-functional farmstead is another suitable type for UA heritage preservation.

For instance, all three farmsteads in the Metropolitan City of Milan focus on a

heritage preservation-oriented development procedure. The general operational structure of farmsteads in Milan should be briefly described initially. The farmers own farmhouses, barns, stalls, vegetable gardens, and meadows. Typically, farmers produce vegetables (self-sufficiency) and raise livestock, especially cattle. Meadows provide them with the necessary forage. After the cows are milked, the milk is sold to urban residents (Fig. 6-17). Nowadays, the primary function of the farmstead is to offer an education space—citizens come here and gain more knowledge of the rural landscape, for example, traditional agricultural techniques and old buildings. The farmhouse preserves the character of old buildings and their connection to the agricultural landscape.

Currently, the three farmsteads (See Chapter 5) have evolved into various innovative forms and have specific target groups (Table 6-1). Although the traditional form of the farm still exists, the original functions have undergone some changes and innovations. The modern farmstead has not only adapted to modernisation but also preserves the heritage in a more dynamic form. Overall, farms are all developed to realise the multiple values of UA heritage. In addition to the renovation and protection of historic buildings and the surrounding agricultural land, the implementation of educational activities and sales of high-quality agricultural products reflect the educational and economic value of UA heritage, respectively.

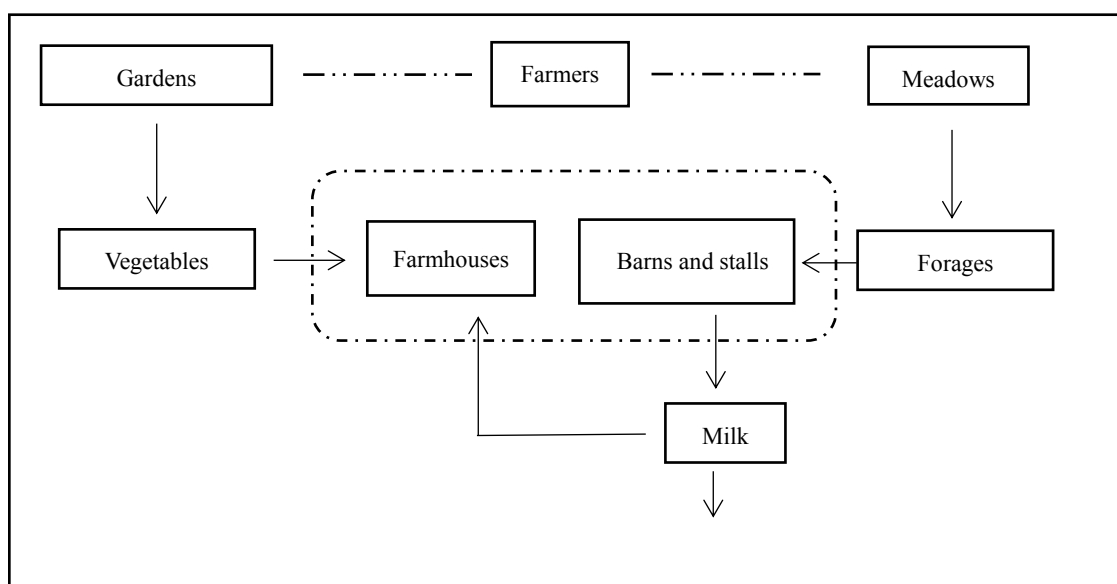


Fig. 6-17 General function of farmsteads in Milan in the past.

Source: Mezzadri, 2014b.

Table 6-1 Three farmsteads in the Metropolitan City of Milan with different methods of UA heritage preservation and their primary target groups

| Name                      | Method of UA heritage preservation                                                                                                                                                                                                              | Primary target groups                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Cascina Linterno</i>   | Building restoration and renovation<br>Restoration and reuse of traditional water meadows and landscapes<br>Popularisation of agricultural technology<br>Agricultural culture exhibition<br>Holding an agricultural history conference or forum | Residents of Milan for agritourism<br>Agricultural practitioners, especially in PASM<br>Consumer organisations/groups that have special requirements for food quality               |
| <i>Cascina Cuccagna</i>   | Building restoration and renovation<br>Educational activities in agricultural history<br>Community garden                                                                                                                                       | Residents of Milan for agritourism<br>Tourists pursuing traditional pastoral style dining and accommodation<br>Urbanites pursuing sustainable lifestyles<br>Urban vegetable farmers |
| <i>Cascina Biblioteca</i> | Building restoration and renovation<br>Social service<br>Community garden<br>Training in traditional horticulture and agricultural techniques                                                                                                   | Residents of Milan with physical and mental disabilities<br>Urban vegetable farmers<br>Gardeners                                                                                    |

In summary, farmsteads with innovation type might be an appropriate development model for the preservation of UA heritage, especially for sites situated in the suburban area.

### T3: Innovative commercial activities

Through a variety of commercial activities, UA heritage can be inherited and promoted. Farm-to-table, farm-to-school, this win-win co-operation promotes the provision of indigenous food and speciality in restaurants and school canteens, preferably through direct acquisition from producers. This co-operation can be achieved through direct marketing relationships, community-supported agricultural arrangements, and farmers' markets. On the one hand, farm-to-table or farm-to-school can involve some form of food traceability, allowing the consumer to identify the original source of the food. This phenomenon could spark customers interest in regional characteristics. In addition, local dishes can be treated as signature dishes to



attract more customers.

#### **T4: Agricultural landscape**

The Greek researchers Kizos and Vlahos regard the agricultural landscape as a 'palimpsest' of the interaction process between the environment and farmers' activities (Kizos & Vlahos, 2012). Based on their opinions, the primary forms of agricultural landscapes include farmlands, orchards, herds of livestock in green meadows, semi-natural habitats, human infrastructure, and parts of ecological habitats. Several benefits and amenities are derived from the evolution of the agricultural landscape, i.e. protection of natural resources, beautiful scenery, idyllic settings, and cultural conservation (Aliza & Tsur, 2000; Marshall, 2004).

Furthermore, as a result of the research by Janet Stephenson et al. in 2004, a brief concept of heritage landscape was introduced as '...a landscape, or network of sites, which has heritage significance to communities, and/or the nation' (Stephenson, Bauchop, & Petchey, 2004).

UA heritage possesses the characteristics of both aforementioned types of landscapes. UA heritage sites have the potential to be developed as a specific agricultural landscape connected with heritage preservation. Unlike the typical agricultural landscape, particular emphasis is placed on cultural perceptions and agricultural activities. It consists not only of physical factors such as historic sites and the unspoilt natural environment but also cultural practices and traditions. These practices include farming, fishing, and spiritual and religious activities. Traditions include historical stories, folklore, and myths.

#### **T5: Social service centre**

Most papers agree that agriculture has multiple functions. For instance, it can provide farmers with working opportunities or additional income, which contributes to the conservation of indigenous cultural heritage (Fodor, 2007). UA has a social function for supporting the development of livelihoods, especially for the poor and disadvantaged segments, or socially marginalised groups (Cunk, Straus, & Zamfira, 2017). Many social service centres around the world consider UA to be a useful tool for social relief. For example, the Nationalities Service Centre (NSC) in Philadelphia aims to create a connection between refugees and their communities. It helps refugees integrate into the new community, learn new skills, find jobs related to urban

agriculture, and offset their food budgets by developing agricultural activities to grow their own food (Nationalities Service Center, 2017).

Another way to contribute to society is the establishment of a therapeutic garden. With a relatively large outdoor space, the therapeutic garden is specifically designed to assist people with chronic illnesses or disabilities in a variety of settings. According to one study, as a type of UA, the therapeutic garden is considered to have mental health benefits, namely its ability to reduce mental illness, slow the process of dementia, or promote cardiac recovery (Orsini et al., 2014).

In short, there is no doubt that the priority of UA heritage conservation is preserving and revitalising historical sites, relics, and immaterial factors. However, through the evolution of social relief and welfare programs, old buildings and courtyards can also be reused and updated and traditional farming techniques have the chance to be promoted. UA efforts like *Cascina Biblioteca* in Milan offer a wide range of social services with a specific focus on health care and education for disabled groups.

A range of public services provides the general public with an opportunity to access the knowledge of local agriculture. As a ‘win-win’ situation, developing UA heritage includes the function of social services not only supports the heritage conservation but also promotes the structural transition of urban or peri-urban areas. These public service centres can be organised by the government, private, and profit or non-profit organisations and may include job training, health care, education, and food subsidies.

## **T6: Agricultural heritage tourism**

Agricultural tourism is not a new topic. The development of agricultural tourism can encourage agro-producers to participate in local tourism industry, contributing to the improvement of regional economic benefits. The combination of heritage preservation and agricultural tourism is both feasible and reasonable. With farm marketing efforts, heritage elements have become more accessible to the public and tourists, who feel closer to the landscape with historical factors when visiting farm settings (Lapan & Barbieri, 2014).

Furthermore, in 2015, Yulong Li and Caroline Hunter defined heritage tourism as ‘visits by persons from outside the host community motivated wholly or in part by interest in historical, artistic, scientific, lifestyle, or cultural offerings of a community, region, group, or institution’ (Y. Li & Hunter, 2015).

Compared to the five preservation types mentioned above, the development of agricultural heritage tourism is a form of macroscopic protection at the regional level. Agricultural heritage tourism can be developed in many ways, including heritage tourist routes, theme parks with heritage elements, museums, and cultural/visitor centres. As a regional strategy implemented both in Milan and Bamberg, it plays a significant role in preserving UA heritage.

For example, in Bamberg, scenic route planning in the Market Gardeners' District has been established (Fig. 6-18), which contributes to conveying the functional, cultural, and historical characteristics of 'urban gardening'. Eighteen scenic spots and nine nurseries are included in the route, and small green signposts have been erected which provide information about the history of urban gardening and local gardeners.

An observation platform has been established to support the tourism industry. It is derived from classical greenhouse construction (Fig. 6-19). Through the translucent glass, the platform serves as an overlook allowing tourists to observe the vast inner-city areas.



#### Themenstationen entlang des Rundweges

1. Willkommen in der Gärtnerstadt
2. Bamberg's Brauereien
3. Mäng'sche Wachsbleiche
4. Gärtner- und Häckermuseum
5. Aussichtsplattform Gärtnerstadt
6. Kloster zum Heiligen Grab
7. Bamberger Bahnhof
8. Großstadt Bamberg
9. Theaterstadt, St. Gangolf
10. „Mohrenpeter“
11. Gemüsesamen als Globalisierungsbeitrag
12. Bamberger Gärtnerhaus-Typen
13. Religiöse Male
14. Wunderburg, Maria-Hilf-Kirche
15. Majoran und Wunderburgschule
16. Koppenhofkaserne
17. Süßholz
18. Katharinenhof

#### Gärtnereien entlang des Rundweges

- A. Gärtnerei Niedermaier, Mittelstraße 44
- B. Hofstadt-Gärtnerei Carmen Dechant, Heiliggrabstraße 37a
- C. Gärtnerei Neubauer, Heiliggrabstraße 32
- D. Gärtnerei Böhmerwiese, Heiliggrabstraße 57
- E. Gärtnerei Schumm, Spiegelgraben 10
- F. Gärtnerei Demuth, Mittelstraße 18
- G. Gärtnerei Hans-Jürgen Eichfelder, Egelseestraße 81
- H. Musairol Bamberger Kräutergärtnerei, Nürnberger Straße 86
- I. Gärtnerei Blumen Hohe, Nürnberger Straße 32

#### Rastmöglichkeiten entlang des Rundweges

- Station 2: Zwei Brauereien (Fäsla und Spezial)
- Station 5: Wiesen-Café auf der Böhmerwiese
- Station 14: Zwei Brauereien (Keesmann und Mahrs Bräu)

Fig. 6-18 The main scenic route in *Gärtnerstadt*.

Source: Stadt Bamberg, (Promotional brochure). Accessed 15 April 2017.





Fig. 6-19 The side view and surrounding environment of the observation platform in Bamberg.

Source: Photographed by the author in 2017.

## 7 Exploring the preservation and development method of urban agricultural heritage

The entire procedure contains four main parts, and the details of which are shown in Fig. 7-1 below.

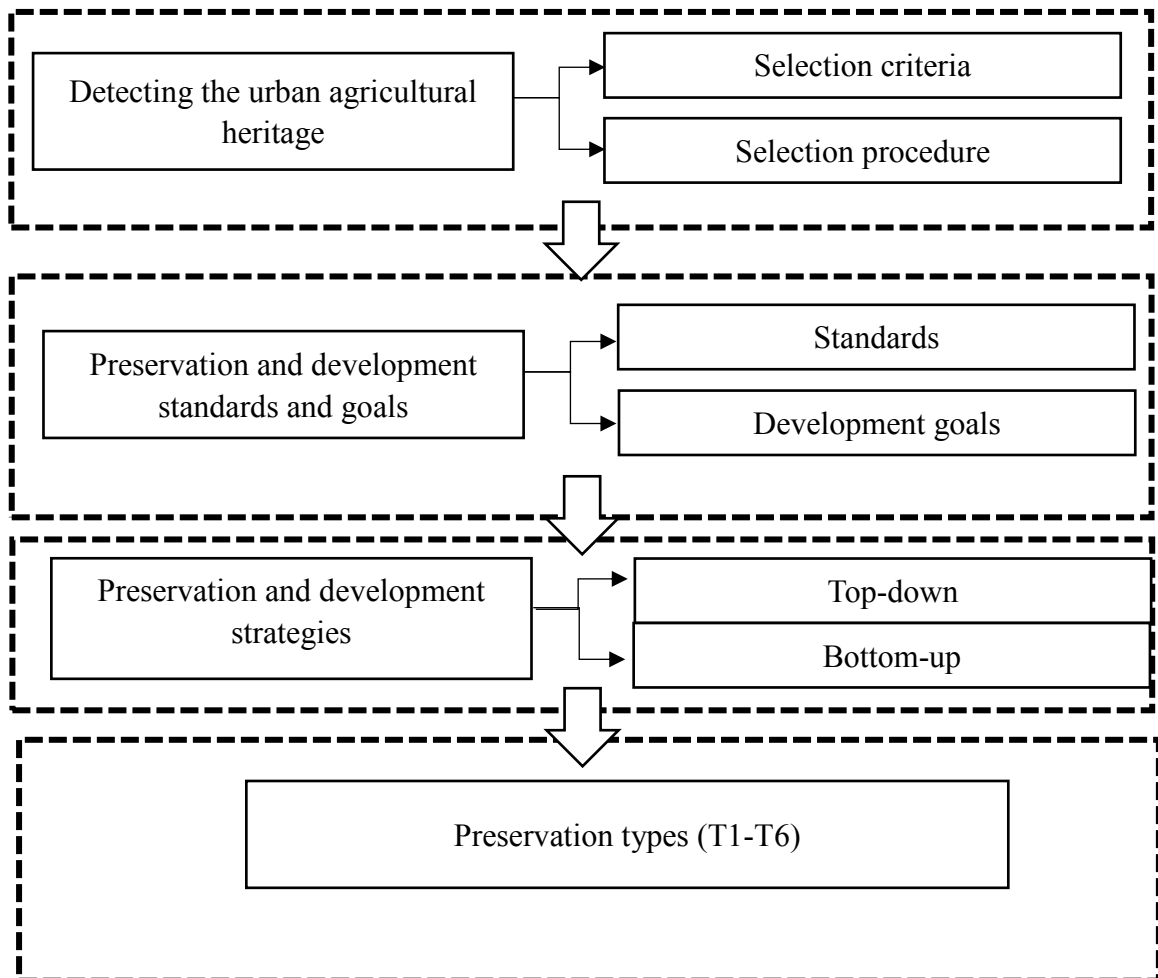


Fig. 7-1 Overall outline of preservation and development work



## 7.1 Detecting the urban agricultural heritage

### 7.1.1 The top-down approach

Several charters and international documents proposed by international authoritative organisations and experts have been considered as follows:

- The improvement process of the Outstanding Universal Value (OUV) was proposed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and the guidelines for the implementation of the World Heritage Convention.
- An International Council on Monuments and Sites (ICOMOS) international document named ‘ICOMOS-IFLA Principles: Concerning Rural Landscapes as Heritage’.
- ICOMOS International Day for Monuments and Sites held by ICOMOS with the topic of ‘The Heritage of Agriculture’ in 2010.
- Five criteria from the FAO, which focus on the selection of the Globally Important Agricultural Heritage System (GIAHS) Programme.
- The relationship between heritage and sustainability is emphasised in Goal 11, Target 4, of the Sustainable Development Goals (SDGs) in the 2030 agenda.
- The joint ICOMOS-IUCN<sup>25</sup> initiative ‘Connecting Practice—Nature and Culture’ ‘the importance of people interacting with their environment in ways that sustain bio-cultural diversity (including agrobiodiversity and cultural and spiritual values)’.
- Viewpoints from the book *Urban Agriculture Europe*, published in 2015, which discuss the historical function of Urban Agriculture (UA).
- The *Herrenhausen Conference on Urban Agricultural Heritage and the Shaping of Future Cities* held in Hanover with the topic of UA heritage.

Moreover, numerous case studies across the world have been collected (see Section 1.3). Chapters 3–5 can be seen as the dominant analysis results for exploring the characteristics of urban agricultural heritage.

Based on the above, the author suggests the following detecting criteria to promote the understanding, adequate protection, and sustainable innovation of UA heritage as a significant resource across the world.

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<sup>25</sup> IUCN means the International Union for Conservation of Nature and Natural Resources.

**Criteria and procedure of detecting UA heritage are as below:**

### **1. Cultural identity**

The sites should have the function of spreading the agricultural traditions or regional living expressions from ancestors to descendants, which can contribute to the inheritance of local traditional knowledge and practices, ingenious adaptive technology, and management models. In sum, local and traditional knowledge represents the conventional wisdom of the management and utilisation of natural resources. Cultural identity and sense of place are embedded in and belong to specific agricultural sites.

### **2. Agrobiodiversity and ecological function**

These sites have the potential to access sustainable development and biocultural diversity, including agrobiodiversity and ecosystem management. The ecological function of agricultural heritage sites is of great significance. The original ecological system, a variety of indigenous plants, livestock, and even micro-organisms are used for food and agriculture, either directly or indirectly. Among them, endemic and rare species of crops and animals, as well as endangered varieties, are of considerable importance and need more attention. Besides, some migrated species are also an influential component of UA biodiversity. Specific examples are the peaches of Paris and the Liquorice of Bamberg mentioned in the above chapters.

### **3. Detection range: urban and peri-urban**

The priority is to define the location. The UA heritage comprises actors, communities, activities, places, and economies that focus on both cultural identity and biological production in urban and peri-urban areas. Additionally, from the public's view, if agricultural heritage sites are strictly related to urban development or are essential for the future of the city, they need to be selected, protected, and managed.

### **4. Heterogeneity: existence in multiple forms**

The quality of urban agricultural heritage sites is diverse. UA heritage is available in a variety of formats, including ecosystems that represent the original agricultural systems and still exist in modern times. Besides, monuments, groups of buildings and sites, as well as diverse cultural landscapes related to agricultural activities, are

components of UA heritage, which belong to the result of human management. They can contribute to recreational values, collective, or valuable non-commercial uses (aesthetic, artistic, educational, spiritual, and/or scientific values of ecosystems). Furthermore, a variety of enterprises exist due to the commercial behaviour of agricultural production. Thus, different business models of UA heritage sites should be taken into account.

Focus then shifts from criteria to procedures and tools. How are we to find them? What is the specific procedure? This is an essential issue that needs to be addressed urgently.

The priority is to set a definite scale for seeking UA heritage. Detecting scopes can be considered not only in the wide-spread agricultural land in the peri-urban area but also in the fragmented croplands distributed in the built-up areas.

On the one hand, from the top-down view, first, the range of the search for UA heritage sites should focus on the fields that remain and are still being farmed. This is because these areas are massively more likely to have local agricultural practices and distinct eco-systems. These regions are conducive to the detection of UA heritage footprints so that these pristine places may be found in time and evaluated with priority.

Second, the trails of heritage sites inside the city, even in downtown areas, cannot be neglected. Although some regions have been demolished, some historical accounts of agriculture still exist.

The next step is to clarify how many information channels exist, which can then be utilised to collect and integrate resources in connection with the UA heritage. These channels mainly contain two parts: the official channel and the non-government channel.

The official channel embodies such aspects as local chronicles and official documents. The non-government channel includes newspapers and news articles published on social media platforms. Via these channels, not only heritage sites with widely accepted protection significance but also vernacular agricultural factors can be identified.

Finally, an initial UA heritage assessment should be arranged. Several detection criteria are mentioned above. According to these standards, the assessment form is

listed in Tables 7-1 and 7-2. After being detected via various channels, potential UA heritage sites can be evaluated through this list in terms of their cultural heritage value and ecological function, and current existing forms will be emphasised.

Table 7-1 Detection procedure of UA heritage sites (DP1)

| Procedure                        | Sources <sup>26</sup>                          | Contents                                                                                                          | Comments | Notes |
|----------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------|-------|
| Step 1<br>Regional<br>assignment | Urban and<br>peri-urban                        | Peri-urban area                                                                                                   | ○        |       |
|                                  |                                                | Urban area                                                                                                        | ○        |       |
| Step 2 Access to information     | Official channel                               | Recognised by authorities                                                                                         | ○        |       |
|                                  |                                                | Local chronicles or the other official documents                                                                  | ○        |       |
|                                  | Non-government<br>Channel                      | Newspapers                                                                                                        | ○        |       |
|                                  |                                                | Internet news media                                                                                               | ○        |       |
|                                  |                                                | Families' legacy or farming methods                                                                               | ○        |       |
|                                  |                                                | Folkloric stories and legends                                                                                     | ○        |       |
|                                  |                                                | Other channels                                                                                                    | ○        |       |
| Step 3 initial evaluation        | Cultural identity                              | Tangible elements (e.g. ancient buildings and fields)                                                             | ○        |       |
|                                  |                                                | Intangible elements (e.g. a long history of commercial marketing, cultural background)                            | ○        |       |
|                                  |                                                | Others                                                                                                            | ○        |       |
|                                  | Agrobiodiversity<br>and ecological<br>function | Tangible elements (e.g. species)                                                                                  | ○        |       |
|                                  |                                                | Intangible elements (e.g. the traditional method for the regenerative cycle and utilization of natural resources) | ○        |       |
|                                  |                                                | Others                                                                                                            | ○        |       |
|                                  | Existing form                                  | Landscape                                                                                                         | ○        |       |
|                                  |                                                | Farmstead                                                                                                         | ○        |       |
|                                  |                                                | Family-centred enterprise                                                                                         | ○        |       |
|                                  |                                                | Large-scale enterprise                                                                                            | ○        |       |
|                                  |                                                | Agritourism                                                                                                       | ○        |       |
|                                  |                                                | Ecological reserve                                                                                                | ○        |       |
|                                  |                                                | Museum                                                                                                            |          |       |
|                                  |                                                | Others                                                                                                            |          |       |

Here it takes the Xuanhua grape garden as an example. Table 7-2 shows the detecting procedure list of the Xuanhua grape garden.

<sup>26</sup> The criteria for developing these indicators are largely derived from the results of the authors' overall analysis of UA heritage cases over the period 2016-2020, and in particular from the summary of the three cases in the above chapters.

Table 7-2 Detection procedure of the Xuanhua urban grape garden

| Procedure                        | Sources                                  | Contents                                                                                                           | Comments | Notes                                                                                               |
|----------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------|
| Step 1<br>Regional<br>assignment | Urban and<br>peri-urban                  | Peri-urban area                                                                                                    | ○        |                                                                                                     |
|                                  |                                          | Urban area                                                                                                         | ●        |                                                                                                     |
| Step 2 Access to information     | Official channel                         | Recognised by authorities                                                                                          | ●        | GIAHS, China-NIAHS                                                                                  |
|                                  |                                          | Local chronicles or the other official documents                                                                   | ●        |                                                                                                     |
|                                  | Non-government<br>Channel                | Newspapers                                                                                                         | ●        |                                                                                                     |
|                                  |                                          | Internet news media                                                                                                | ●        |                                                                                                     |
|                                  |                                          | Families' legacy or farming methods                                                                                | ○        |                                                                                                     |
|                                  |                                          | Folkloric stories and legends                                                                                      | ○        |                                                                                                     |
|                                  |                                          | Other channels                                                                                                     | ○        |                                                                                                     |
| Step3 evaluation                 | Cultural identity                        | Tangible elements (e.g., ancient buildings and fields)                                                             | ●        | Spatial pattern<br>farmlands                                                                        |
|                                  |                                          | Intangible elements (e.g., a long history of commercial marketing, cultural background)                            | ●        | Buddhist legends<br>Folklores & stories<br>Artistic creation                                        |
|                                  |                                          | Others                                                                                                             | ○        |                                                                                                     |
|                                  | Agrobiodiversity and ecological function | Tangible elements (e.g., species)                                                                                  | ●        | Species<br>Old grapevines                                                                           |
|                                  |                                          | Intangible elements (e.g., the traditional method for the regenerative cycle and utilization of natural resources) | ●        | Cultivation techniques                                                                              |
|                                  |                                          | Others                                                                                                             | ○        |                                                                                                     |
|                                  | Existing form                            | Landscape                                                                                                          | ●        | Courtyard and panorama for the whole Guanhou village                                                |
|                                  |                                          | Farmstead                                                                                                          | ●        |                                                                                                     |
|                                  |                                          | Family-centred enterprise                                                                                          | ●        | Most of the households manage their business in the form of individual enterprise and self-employed |
|                                  |                                          | Large-scale enterprise                                                                                             | ○        |                                                                                                     |
|                                  |                                          | Agritourism                                                                                                        | ●        |                                                                                                     |
|                                  |                                          | Ecological reserve                                                                                                 | ○        |                                                                                                     |
|                                  |                                          | Museum                                                                                                             | ○        |                                                                                                     |
|                                  |                                          | Others                                                                                                             | ○        |                                                                                                     |



### 7.1.2 The bottom-up approach

On the other hand, local heritage value, which displays historical, economic, or social themes that are of importance to the local area, cannot be neglected. There should be scope for negotiating UA heritage within groups of local stakeholders. After acquiring community feedback, further assessments can be arranged.

Participatory research of local community should be taken into account. There are many survey methods that researchers can use in the course of this study, including questionnaire distribution, workshop organisation, stakeholder analysis, participatory mapping, as well as observation and interviewing (Fig. 7-2). The distribution of questionnaires is twofold, i.e. in the field and through online platforms (such as newspapers and social media platforms).

The workshops are conducted in two formats. The first form is the community consultation sessions with influential members of the community. Like religious leaders and senior citizen activists, their opinions are usually respected by other community members. They can express the point of view of residents and have some influence over community opinion (Berkowitz & Schultz, 2014). Conducting small meetings with them helps researchers gain a quick understanding of the attitudes and demands of residents. The second is the thematic panel discussion. This form is inclusive of a large number of participants and therefore supports researchers in conducting associative, in-depth qualitative research on the topic.

Stakeholders have a positive or negative impact on UA heritage preservation. The stakeholder analysis aims to investigate the roles, interests, relative power, and desire to participate in the major stakeholders (individuals, organisations, and institutions). In this way, different interest groups will be divided, and the cooperation or conflict in the relationships among them will be identified. Furthermore, particular attention will be paid to vulnerable groups (e.g. older people, people with disabilities, children).

The form of participatory mapping can promote researchers to work together with the community to map out relevant objects of investigation (e.g. distribution of natural or cultural heritage sites). It is also possible to mark the daily travel route and activity list of residents, which can effectively reflect the traditional everyday lifestyle. Participatory mapping also allows for a direct representation of residents' conceptions and ideas for the future of the community.

Finally, the form of observation and interviewing is a fundamental way of gathering

first-hand information. The interviewee will give the researcher direct feedbacks.

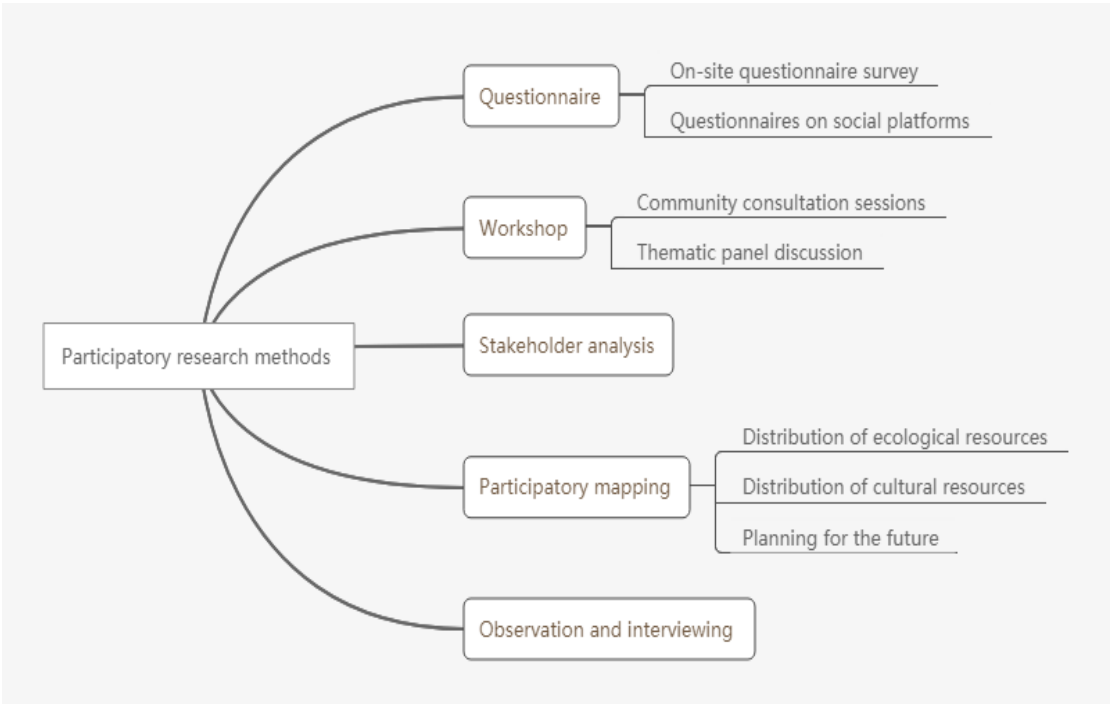


Fig. 7-2 Summary of participatory research methods

The next step is to identify the critical content that needs to be investigated. Table 7-3 shows some sample questions when exploring the wishes of community residents to participate in UA heritage preservation. Furthermore, regardless of the organisational form, critical questions need to be asked. Some examples can be found in Fig. 7-3.

Table 7-3 Wishes to participate in UA heritage preservation of community residents

| Wishes of Participation                                                                  | Very high | High | Moderate | Low | Very low |
|------------------------------------------------------------------------------------------|-----------|------|----------|-----|----------|
| wants to participate in the management of UA heritage conservation                       | ○         | ○    | ○        | ○   | ○        |
| wants to participate in the regulation-making procedure of UA heritage conservation      | ○         | ○    | ○        | ○   | ○        |
| wants to operate profitable projects (e.g., tourism) related to UA heritage preservation | ○         | ○    | ○        | ○   | ○        |
| wants to participate in relevant educational training activities                         | ○         | ○    | ○        | ○   | ○        |
| wants to be a volunteer during the preservation and development process                  | ○         | ○    | ○        | ○   | ○        |
| Others                                                                                   |           |      |          |     |          |

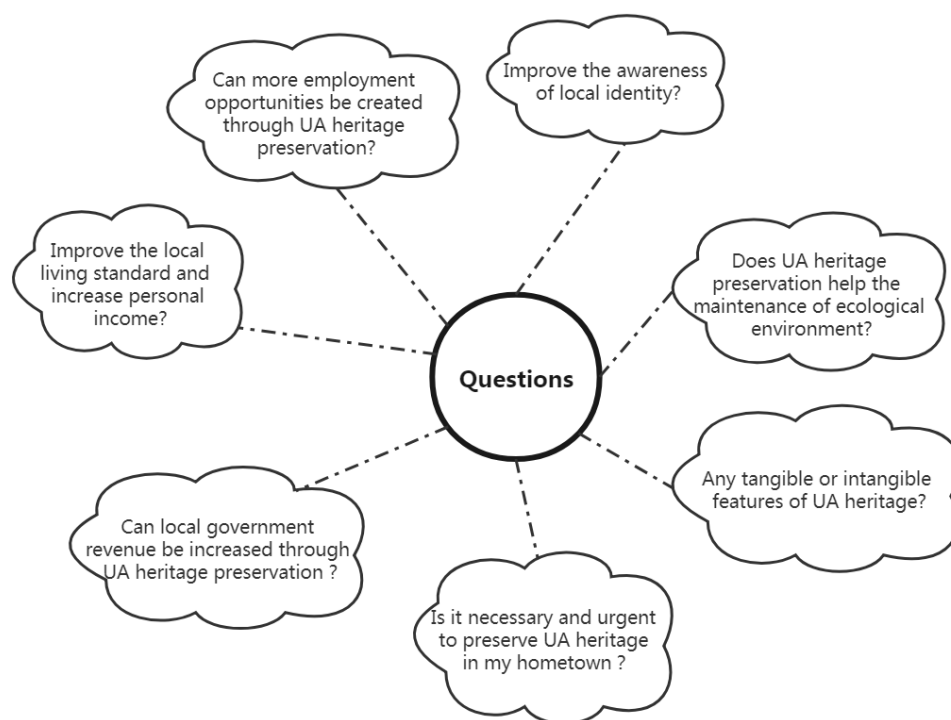


Fig. 7-3 Examples of questions that can be asked during the community research process.

According to the above two perspectives, the entire detection procedure is as follows. There are two channels for guiding people to explore UA heritage. If people can find clues about ‘hidden’ UA heritage from the public—for example, the site has already been mentioned by the municipality as a specific ecosystem with indigenous species but there is still a lack of social concern and ecological maintenance—a top-down channel for selecting and assessing UA heritage should be taken into account (DP1). Even if the site has not been mentioned by the public so far, local stakeholders may have a strong feeling of their hometown and sincerely believe that their local UA heritage is of significance. Perhaps they are eager to be involved in the conservation efforts of heritage. For this phenomenon, the bottom-up channel for detecting UA heritage may be considered (DP2) (Fig. 7-4).

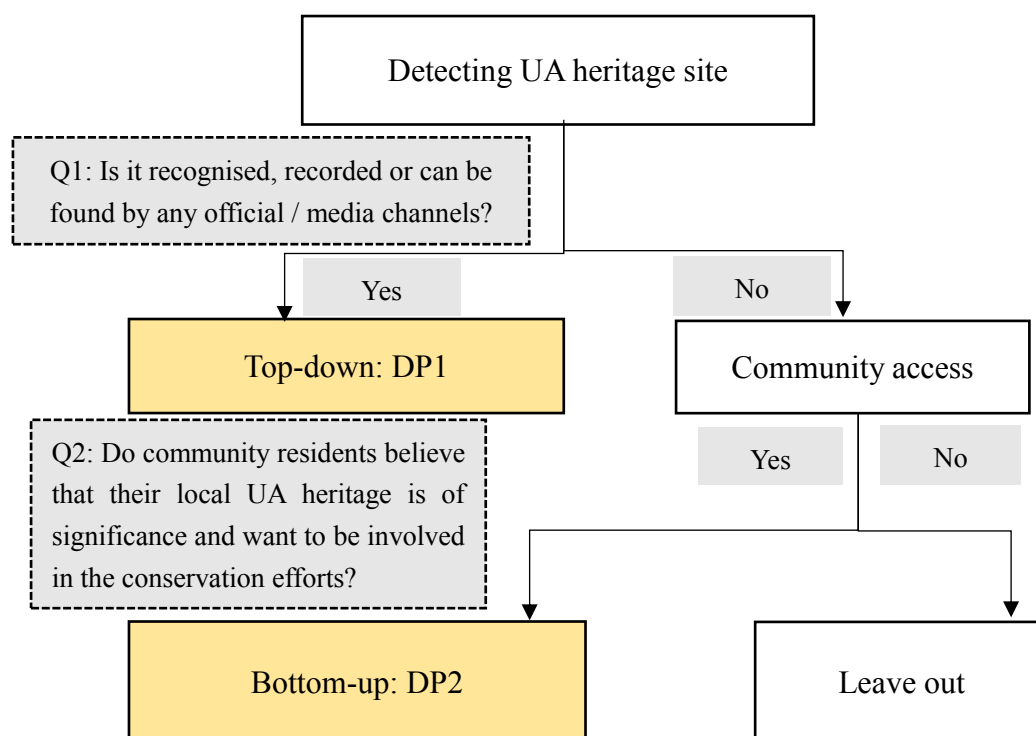


Fig. 7-4 Two different detection procedures (DP1 & DP2)

## 7.2 General preservation and development standards and goals

With regard to the results from Chapters to 3–5, three standards must be highlighted initially: **authenticity**, **integrity**, and **sustainability**.

Authenticity and integrity are crucial and priority standards when focussing on the protection of UA heritage types. They have been enshrined in the evaluation criteria of the World Heritage (WH) sites.

On the one hand, authenticity is the quality of being genuine or real. In the heritage context, since 1977, design, material, workmanship, and settings have been considered as the four parameters for testing the authenticity of heritage. Indeed, material fabric or other physical objects always directly reflect the history and significance of a site over time, which can be recognised as essential factors during the identification process of authenticity. On the other hand, in November 1994, UNESCO's promulgation of *The Nara Document on Authenticity* emphasises the cultural values of the WH properties. Traditions, techniques, languages and other intangible heritage are also conditions of authenticity when evaluating properties (Boccardi, 2019; C. Zhang, 2010). In 1996, *The Declaration of San Antonio*, published by ICOMOS, denoted that it is vital to refine the concept of authenticity in relation to cultural heritage. It is worth mentioning that this doctrinal text highlighted that the original communal life (e.g. settlement patterns, land-use practices, and religious beliefs) had become components of the authenticity of heritage (ICOMOS, 1996).

In this research, for UA heritage, authenticity would need to be verified, not only in the constructed buildings and land but also in the continuity of tradition, culture, technique, as well as communal life, that is, the more intangible qualities of the place.

Integrity is another crucial issue when identifying and defining heritage resources. UNESCO mentioned it as '*... a measure of wholeness and intactness of the natural and/or cultural heritage and its attributes*'. It is fundamental for the nomination of WH sites (Jokilehto, 2006). During the process of heritage conservation, attention should be paid to not only the physical objects but also the surrounding environment.

Finally, sustainability denotes the sustainable development of UA heritage. A spacious concept of sustainable development contains environmental, social, cultural, and economic aspects. The vital role of UA heritage lies in its struggle for sustainable development in relation to economic growth (Gražulevičiūtė, 2006).

More importantly, with regard to Sustainable Development Goals (SDGs), the 2030 Agenda for Sustainable Development is a universal plan of action to transform the world by 2030. According to the Goal 11, target 4, in the framework of the 2030

Agenda (UNESCO, 2018), heritage (both natural and cultural, material and immaterial) plays a vital role in the development of sustainable cities and communities. As an essential component of heritage, UA heritage could be conserved and updated in the context of sustainability. This illustrates that multiple factors need to be considered in the conservation process, that is, rational utilisation of resources, improvement of the ecological environment, recognition of cultural integrity, maintenance of ecosystem and biodiversity, and community engagement. Sustainable development of UA heritage can address a wide range of public needs, such as economic, social, as well as aesthetic demands.

After detecting and assessing UA heritage sites, the next step for a city is to carry out specific conservation and development work. According to the explanation in Section 6.2.1, three preservation and development goals of UA heritage can be followed, as shown in Fig. 7-5.

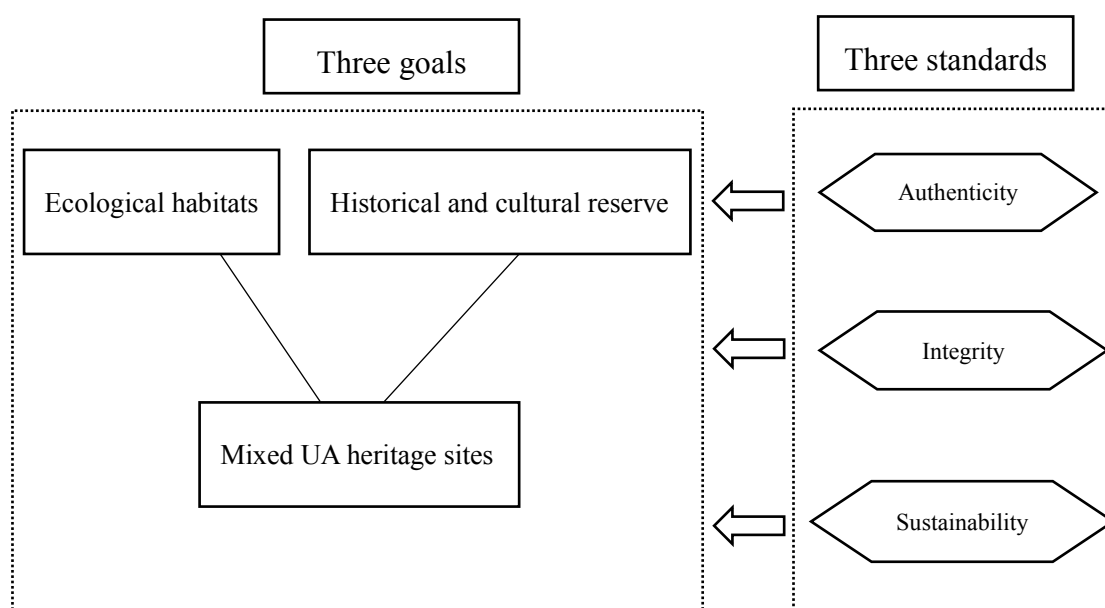


Fig. 7-5 Preservation and development standards and goals

Theory combined with practice can better explain and reflect the central idea of the research. The starting point of this research is to address some of the issues that have arisen in China. Thus, Chapter 8 provides an example in Hangzhou, China, which can clarify the steps taken in preserving UA heritage, from selection to the strategic planning.

In-depth strategies from four dimensions of UA heritage are proposed in Chapter 8. In the meantime, both top-down and bottom-up approaches need to be considered.



## 8 Practice: urban agricultural preservation strategies in Hangzhou

### 8.1 Introduction

The city of Hangzhou (N30°16, E120°12) is situated in the northeast of Zhejiang Province in southern China along the southeast coast among the lower reaches of the Qiantang River. It lies 176.3 kilometres to the west of Shanghai. The whole area is 16,853.57 km<sup>2</sup> (8,292.31 km<sup>2</sup> excluding the counties). Throughout its territory, hills and mountains account for 65.6% of the city's total area, while the plains account for 26.4%. A large number of rivers, lakes, and reservoirs are distributed in the city. Surface water bodies account for 8% of the total area (People's Government of Hangzhou, 2020).

Based on field research results and data collection, it is clear that rapid urbanisation has resulted in the expansion of the city. The surrounding several large districts are part of the metropolis within the administrative boundaries, but with distinctly rural characteristics. Therefore, this chapter chooses the Hangzhou metropolitan area as the study site. It contains eight districts within a planned main centre and three planned subcentres of the urban area: the Shangcheng, Xiacheng, Gongshu, Binjian, Xihu, Yuhang, Jianggan, and Xiaoshan Districts (Fig. 8-1). The entire area is 3352.51 km<sup>2</sup>.

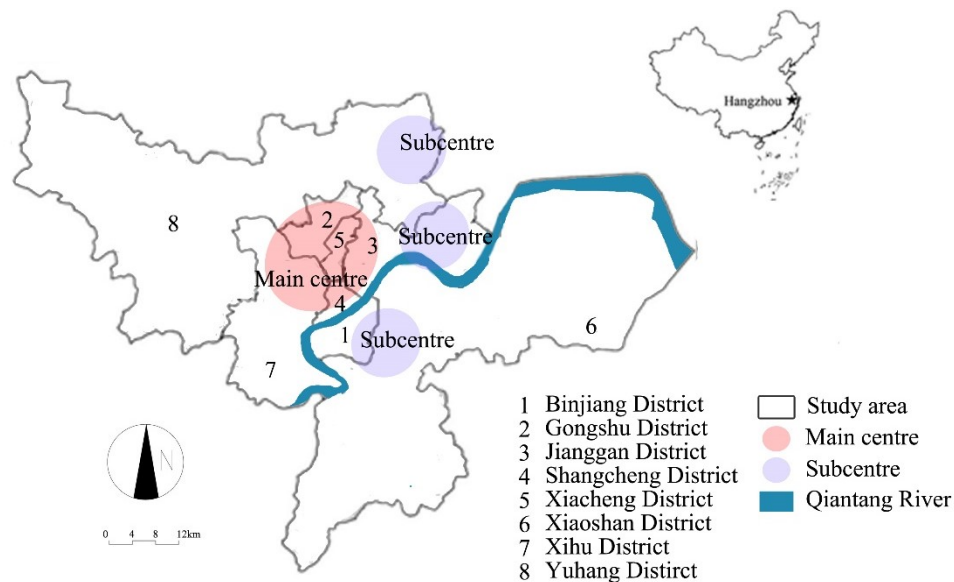


Fig. 8-1 Location of the main centre and sub-centres of the Hangzhou metropolitan area. The eight districts are considered the study area.

Source: Yue, Qiu, Xu, Xu, & Zhang, 2019.

Hangzhou has been rich in products and water resources since ancient times. It has a subtropical monsoon climate, characterised by hot and rainy summers and mild and rainy winters. Rainfall and sunshine are abundant in this region. Besides, laterite and paddy soil in this region are suitable for growing tea, rice, rape, cotton, and vegetables (Wikipedia, 2020a). Conditions for agricultural production are excellent. The main crops harvested are rice, tea, and mulberries. In addition, there is a wide variety of forestry and livestock cultivation.

#### 8.1.1 The tangible and intangible aspects

As one of the earliest manual canals in the world, the Grand (Jing-Hang) Canal was dug at the end of 486 BC, more than 2,480 years ago (X. Shi, Liu, Liu, Sun, & Xu, 2012) (Fig. 8-2). It stretches from Hangzhou in the south to Beijing in the north. Initially, the primary function of the canal was to transport grain from the southern agricultural region to the capitals. (In ancient China, agricultural cultivation areas were mostly located in the southern provinces, while capital cities were concentrated in the northern regions.) The canal runs through the Hangzhou metropolitan area, along which on both sides numerous farmlands, vendors, markets and warehouses used to exist (Fig. 8-3).

Both inner-city Hangzhou and the surrounding areas have a long cultivation history. For example, the historical map in 1784 indicates that during the Qing Dynasty (1644–1911), large areas of agriculture and forest used to surround the ancient city of Hangzhou (Fig. 8-4).

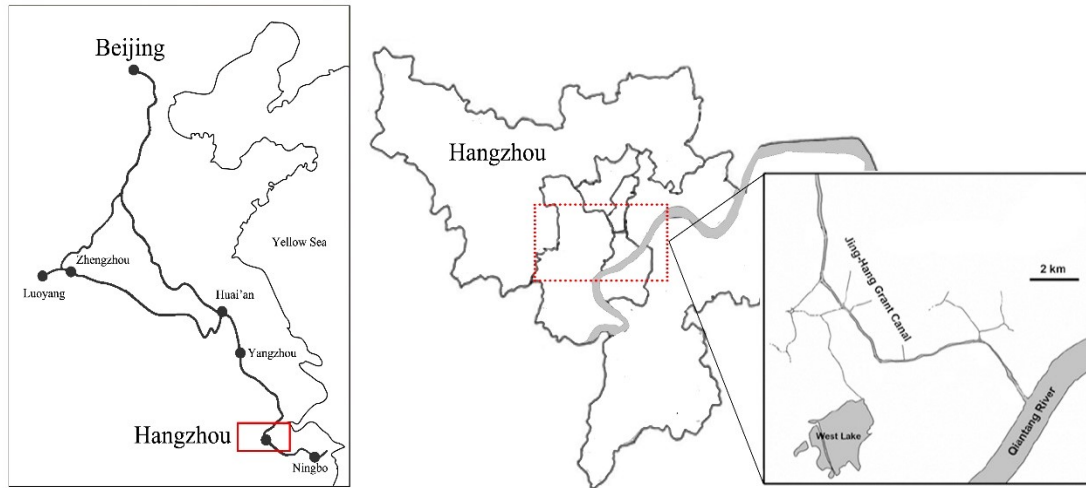


Fig. 8-2 The Great Canal in the main centre of the Hangzhou metropolitan area.

Source: X. Shi, Liu, Liu, Sun, & Xu, 2012.

1. The drawing on the left reflects the overall appearance of the Great Canal that linked Beijing and Hangzhou in the past.
2. In the middle drawing, the red square box indicates the stretch of the Grand Canal that currently exists within Hangzhou.
3. The drawing on the right is able to show the location of the Grand Canal in relation to the West Lake and the Qiantang River.

Since agricultural land within a metropolitan area has the most significant potential to be cleared for construction, it is vital to protect arable land within the metropolitan area. How to preserve arable land in metropolitan areas has become the popular focus of current research in China (Dong, Kong, Tan, Zhang, & Liu, 2010).

When considering the agricultural land use variation of the Hangzhou metropolitan area, Wu and Zhu's research can provide excellent references (Qian, 2015; K. Wu, Ye, Qi, & Zhang, 2013; K. Wu & Zhang, 2012). The spatial pattern of the Hangzhou metropolitan area was relatively stable from the Yuan Dynasty (1271–1368) to the liberation of 1949.

From the late 1980s, the city began to expand rapidly. From 1978 to 2008, Hangzhou's built-up area increased from 31,900 ha to 86,300 ha. Concerning agricultural land, in 1978, cropland, forests, and other green spaces accounted for 73.5% of the entire region. In 2008, the scope of agricultural lands (crop and fallow lands) decreased by 9,450 ha. In contrast, the area of built-up land had increased dramatically, growing by 54,250 ha.

By 2019, the total area of agricultural land was 104,680 ha (Hangzhou Municipal

Bureau of Planning and Natural Resources, 2020). Agricultural land located in the main centre had almost disappeared, while that in the surrounding areas remained in good condition. Especially in the Xiaoshan District, the arable land is widely distributed (Fig. 8-5).

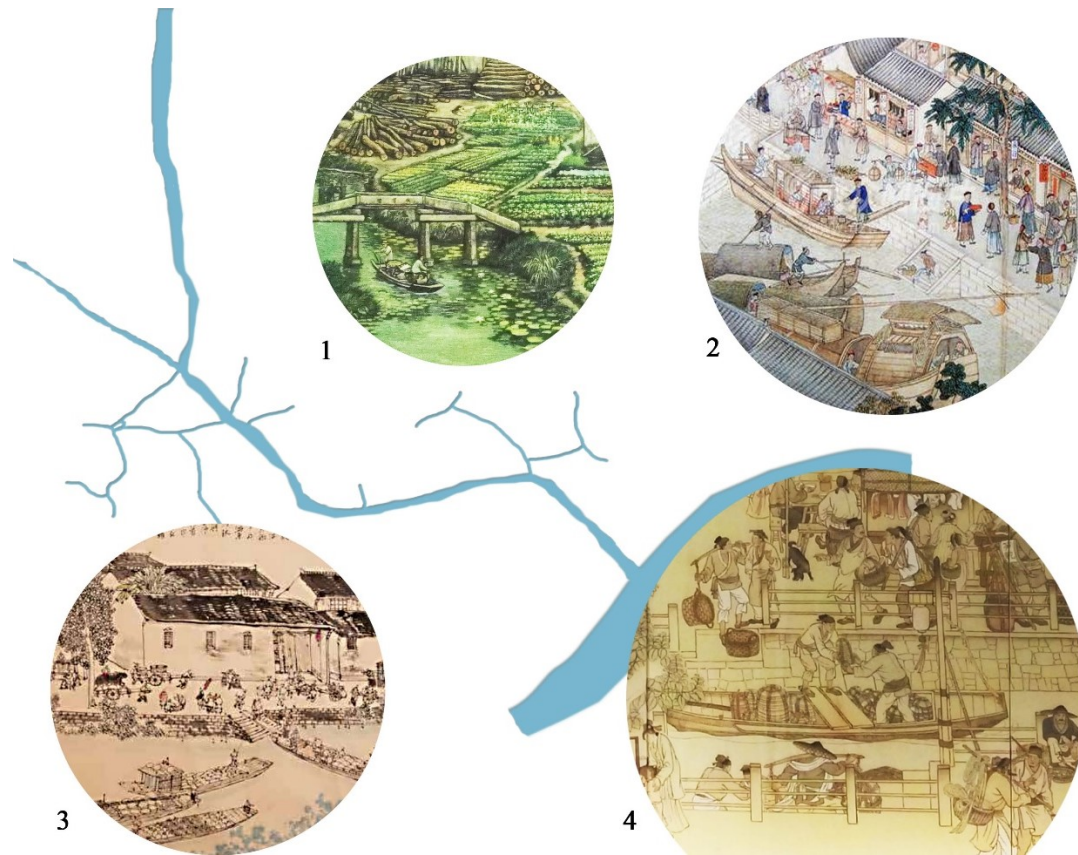


Fig. 8-3 Traditional market and farmlands in Hangzhou during the Song Dynasty (1127-1279).

1: Painting of farmlands along the Grand Canal during the Song Dynasty.

Source: from the public display area of the Grand Jing-Hang Canal Museum.

2 & 3: Painting of ships carrying goods on the Grand Canal during the Song Dynasty.

Source: Zhejiang Internet-Radio & TV, 2019; L. Wu, 2014.

4: Painting of water market on the Grand Canal during the Song Dynasty.

Source: from the public display area of the Hangzhou Cuisine Museum.

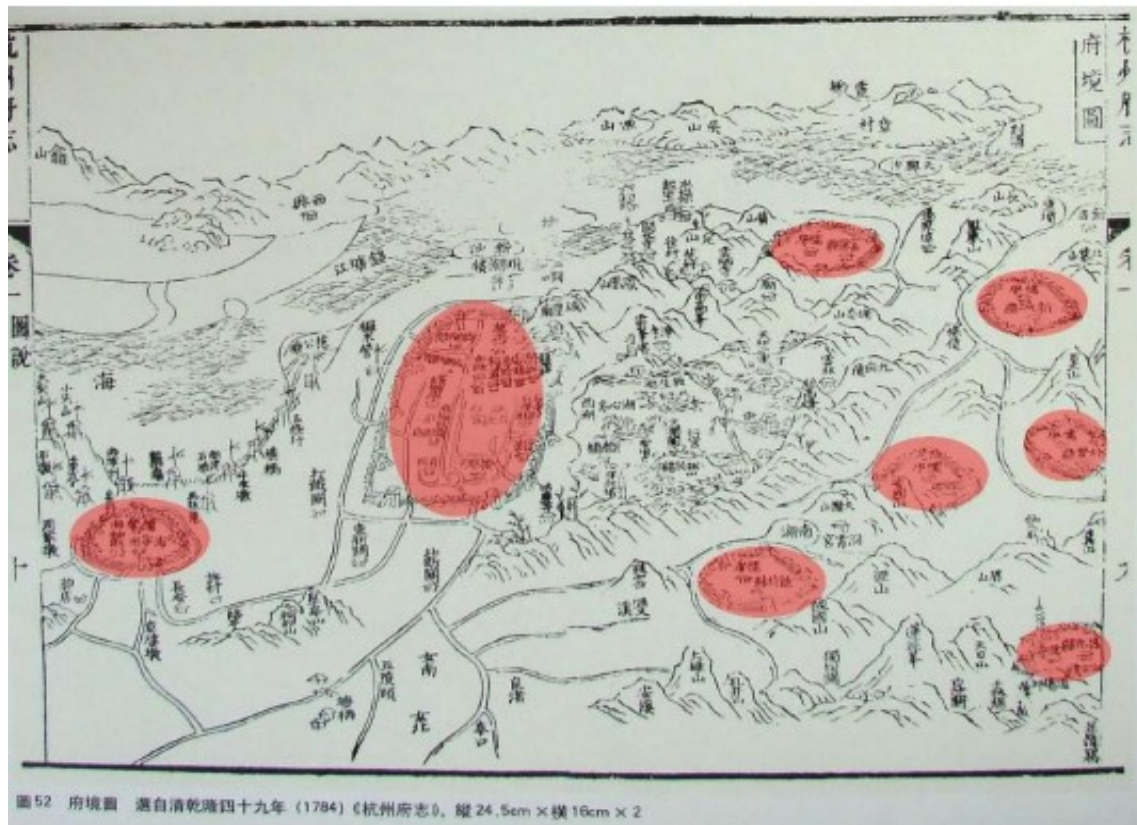


Fig. 8-4 Historical map in 1784. The red circles represent the ancient residential clusters. This map reflects that less built-up land existed during that era, with numerous forests and agricultural areas. (Unfortunately, this map does not reflect the exact location of the Grand Canal.)

Source: *Hangzhou Ancient Atlas*, Hangzhou Archive, 2006. Fig. 52.

On the one hand, with regard to tangible heritage elements, most are located in the suburban area. Examples are the agricultural land reserve (tea plantations), land-use patterns, numerous indigenous species, as well as traditional farmhouses. On the other hand, intangible heritage features can be found everywhere throughout the city. In addition to historical accounts and folk music, stories related to the Great Canals seem to be popular among not only the locals but also tourists. The names of roads and places, culinary culture, and folklore are inherited and dispersed. There are also various literary and artistic works, such as poems and paintings praising the Great Canals.





Fig. 8-5 Agricultural land of the Hangzhou metropolitan area in 2019.

Source: Hangzhou Municipal Bureau of Planning and Natural Resources, 2020

### 8.1.2 Ecological aspects

Agro-ecosystems can play an essential ecological function in soil and water conservation and the protection of biodiversity. The protection of agricultural land is vital for achieving sustainable development (Y. Wu, Qian, & Guo, 2020). According to one study (Tu, 2014), agricultural products in Hangzhou primarily consist of tea (Xihu and Yuhang District), flowers and nursery stock (Xiaoshan District), aquatic products, livestock, poultry, and vegetables (Xiaoshan and Yuhang District), and bamboo, fruits, and sericulture (Yuhang District). Agricultural activities, such as beekeeping and herb cultivation, are also carried out in adjacent areas of Hangzhou. The aspect of agrobiodiversity is noteworthy. Many crops and flowers are cultivated in the study area, contributing to the daily food supply and farmers' livelihoods.

### 8.1.3 Social perception aspect

The fact that the specific term 'Hangzhou Agriculture' is not searchable on China's



mainstream trending website 'Baidu Index'<sup>27</sup> (a data-sharing platform based on behaviour data of Internet users), which reflects the general neglect of social attention. However, when searching for the keyword 'Hangzhou', it can be found that search volume related to 'Hangzhou Tourism', 'Hangzhou Food', 'Hangzhou Cuisine' and 'Hangzhou Tea' are particularly high.

These results indicate that the attitude of mainstream media towards heritage related to agriculture in Hangzhou is comparatively negative. As Hangzhou is a city with a long history, many heritage sites and historical landscapes exist. Such as the famous West Lake, which was recognised by UNESCO as a World Heritage (WH) site (R. Zhang & Taylor, 2020). People tend to pay more attention to these kinds of heritage sites and neglect the role of agriculture in urban development to some extent.

However, traditional culinary and local species in Hangzhou have been widely known, which manifests that Hangzhou's agricultural heritage is of great value for further exploitation, especially from the perspective of tourism development.

During conversations with local people in Hangzhou, the researcher discovered that few people were aware of the importance of the agricultural heritage and its potential for future development. Furthermore, in order to obtain the academic trend towards Hangzhou's urban agricultural (UA) heritage, this chapter paid attention to social indicators for particular terms from different network platforms in China. Through comparison, as a dominant survey social platform, the China Knowledge Resource Integrated Database (KNS)<sup>28</sup>, was chosen. When selecting 'Urban Agriculture in Hangzhou' as a search term in the KNS platform, the results show that from 1998 to 2019, 72.73% of academic research was related to the research field of the agricultural economy, accounting for the vast majority of all relevant research results (Fig. 8-6). When selecting 'Hangzhou Heritage' as a search query, 38.05% of the academic research was related to the research field of culture. Of this, 23.89% focussed on the areas of building science and engineering (Fig. 8-7). It is obvious that through a cross-search, there is almost no intersection between these two current research terms, which indicates that the UA heritage in Hangzhou is still not a significant matter of public concern.

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<sup>27</sup> Searching via the platform of Baidu Index.

Source: <http://zhishu.baidu.com/v2/index.html#/>. Accessed 30 August 2020.

<sup>28</sup> Searching via the platform of China Knowledge Resource Integrated Database.

Source: [https://kns.cnki.net/kns/brief/default\\_result.aspx](https://kns.cnki.net/kns/brief/default_result.aspx). Accessed 1 August 2020.

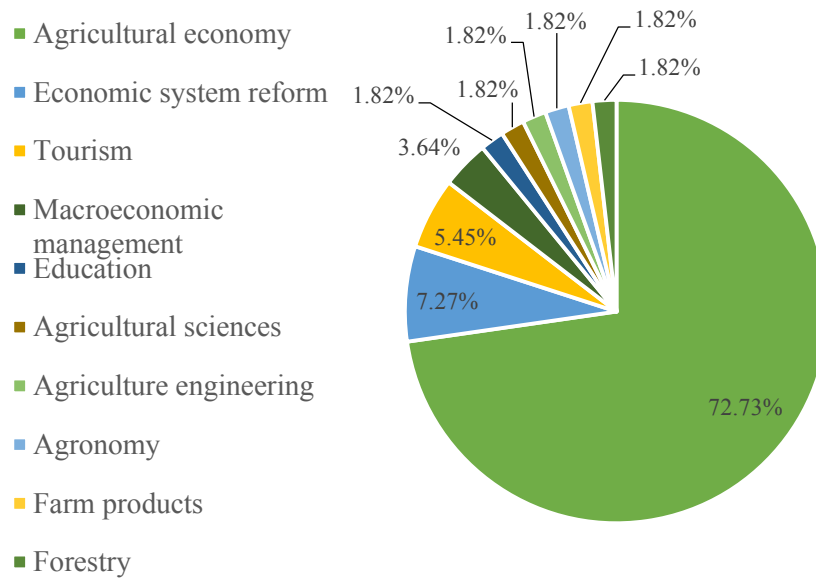


Fig. 8-6 the result of 'Urban Agriculture in Hangzhou' as a search term in the KNS platform.

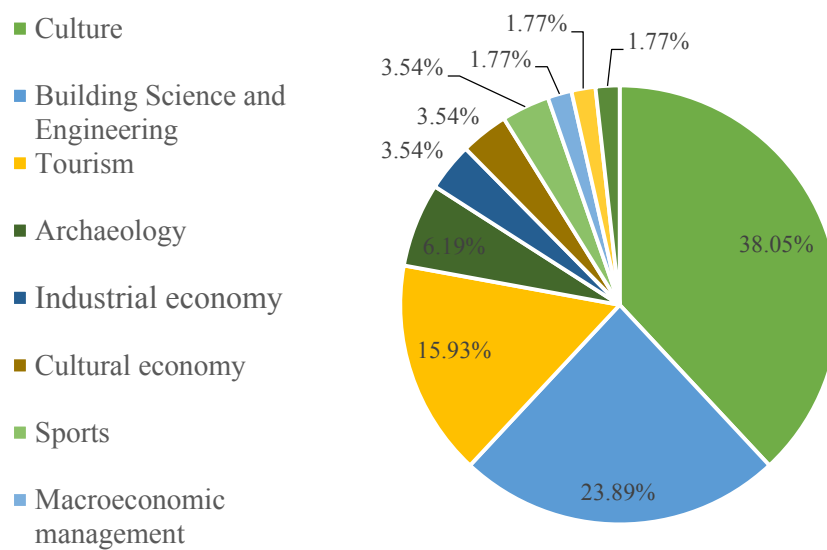


Fig. 8-7 the result of 'Hangzhou Heritage' as a search term in the KNS platform.

#### 8.1.4 Business model aspect

Multiple business models exist simultaneously in Hangzhou. As for the UA heritage sites, however, after the field survey, it appears that except for the tea industry, small family-owned businesses now make up the vast majority of the overall business categories.

On the one hand, Hangzhou has been site of tea cultivation since ancient times. Many varieties of tea produced in Hangzhou are famous and known for their long histories. For instance, Meijiayu Village is well-known site of a tea production in Hangzhou, with more than 130 teahouses (converted from farmhouses) in 2011 (China Tea Auction & Trading Services Ltd., 2011). Most inhabitants' livelihoods rely on tea planting in Meijiawu Village. Guests will drink tea, have a farmhouse meal and bring back the local specialities sold in the teahouse. The combination of speciality restaurants and farmhouse tea houses allows tea farmers to transform their business from agriculture to the service industry, thus developing new economic growth points and increasing farmers' income.

On the other hand, many businesses are now catering to foreign tourists. For instance, as a part of the Xixi National Wetland Park, the traditional persimmon plantation supplies urbanites and tourists with local fruit species (People's Government of Zhejiang Province, 2014). The primary source of income has become entirely dependent on tourism development. This business model is based on the organisation of harvest festivals and the creation of 'pick your own' schemes. Tourists visit the comprehensive park during the festival and other customers usually pick persimmons in the park, which they then purchase directly.

## 8.2 Detecting UA heritage sites in Hangzhou metropolitan area

### 8.2.1 Division of the three regions in the Hangzhou metropolitan area

Chapter 7 introduces how to discover Hangzhou's agricultural heritage from two dimensions respectively. Firstly, on a large scale, Hangzhou is divided into three major regions based on the historical changes in agricultural land and its current type. Secondly, the study focuses on the cultivation site of Xiaolin ginger, describes in detail its heritage characteristics and current status, and finally proposes strategies for its preservation and development in the future (Fig. 8-8).

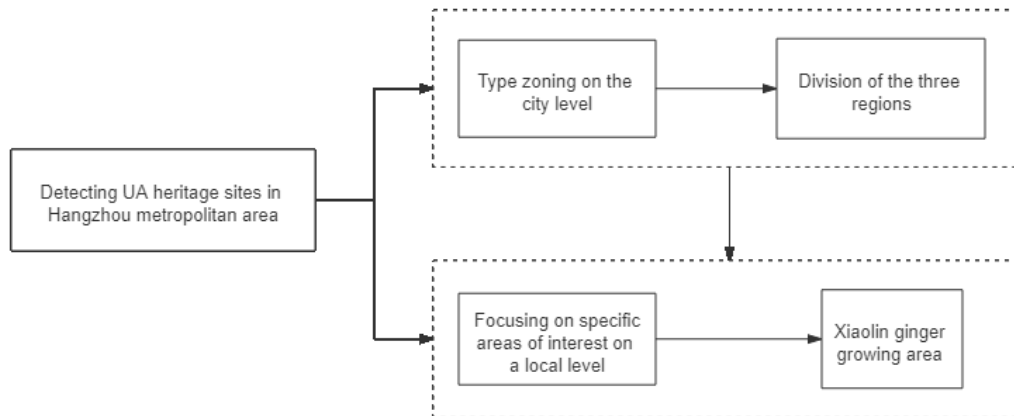


Fig. 8-8 Two-step procedure for detecting UA heritage sites in the Hangzhou metropolitan area.

Based on the four criteria for detecting UA heritage sites mentioned in Chapter 7 (cultural identity, agrobiodiversity and ecological function, urban and peri-urban range, existence in multiple forms), Based on the author's field works from 2018 to 2020, Hangzhou metropolitan city can be divided into three zones (Fig. 8-9). Three zones contain different types of UA heritage sites (Table 8-1).

Table 8-1 Different zones and characteristics of their UA heritage sites

|          | Cultural identity | Agrobiodiversity and ecological function | Urban or peri-urban range                            | The form in which UA heritage exists                   |
|----------|-------------------|------------------------------------------|------------------------------------------------------|--------------------------------------------------------|
| Zone I   | +                 | +                                        | border zone between city centre and peri-urban areas | Landscape,<br>Family-centred enterprise<br>Agritourism |
| Zone II  | ++                |                                          | city centre                                          | Museum<br>Landscape<br>Agritourism                     |
| Zone III | +                 | ++                                       | peri-urban range                                     | Farmstead<br>Large-scale enterprise<br>Agritourism     |

\* + indicates the strength of relevance to the corresponding item.

### Zone I

In the northwest of the city, Zone I used to be forests and agricultural lands, making it widely recognised as the border between the city centre and the peri-urban area. In this zone, the Yuhang and Xihu Districts have been an abundant resource of a variety of vegetables and teas since ancient times. In the Xihu District, several potential UA heritage sites can be identified using the criteria proposed in Chapter 7. As mentioned

above, the Meijiawu Village and a traditional persimmon plantation in the Xixi National Wetland Park can be considered as two representative sites. In addition, the Xiaolin ginger growing area in the Yuhang District could be another example.

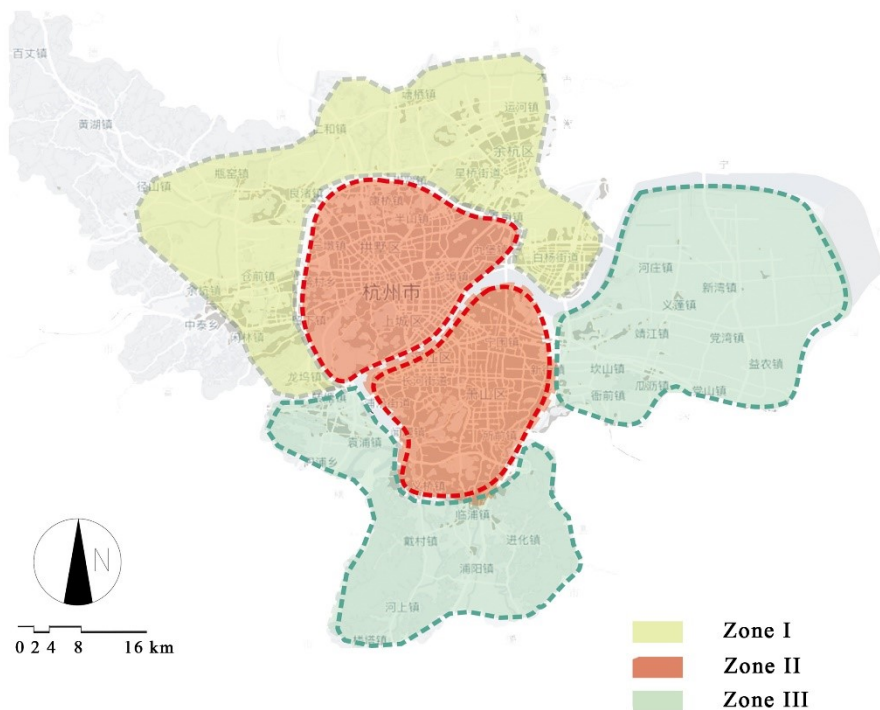


Fig. 8-9 Three zones of Hangzhou metropolitan city, based on the UA heritage characteristics.

Meijiawu Village has an extensive history of more than 600 years, with a tea planting area of about 0.67 km<sup>2</sup>, which is one of the main production areas of the well-known Longjing tea (Wikipedia, 2020c) (Tu, 2014). The tea plantation in there is an outstanding agricultural landscape with a traditional cultivation method and techniques for processing tea leaves.

In 988 AD, Xixi Town was established. During the Ming and Qing Dynasties, the socio-economic and cultural aspects of Xixi were further developed. Fish, bamboo, fruits and vegetables and other agricultural products were widely grown and planted in this region. However, after the early Republic of China (ROC) period, the original wetland in Xixi Town gradually shrank. Nowadays, the establishment of Xixi National Wetland Park aims to protect the ecological environment, and at the same time restore the historical natural and cultural landscape (China Wetland Conservation Association, n.d.).

As one of the scenic areas in the park, the persimmon plantation (H. Shi, 2015) can also be traced back to the ancient era. The traditional processing technique of persimmon (primarily the method of removing the astringent taste from persimmon) has been nominated as an intangible cultural heritage of Zhejiang Province (Hangzhou Folklore Culture, 2018).

In the Yuhang District, Xiaolin ginger is recorded to have been produced during the Northern Song Dynasty (1040 AD). Ginger is native to East India and China. China has a long history of cultivating ginger that dates back 2,000 years. At that time, Xiaolin ginger was famous for its large pieces of ginger with yellow flesh, a thick spicy juice, and fresh taste (Hangzhou Archive, 2007).

## **Zone II**

Zone II primarily contains the main city centre and two sub-centres of Hangzhou. It is difficult to find a wide range of agricultural lands in the downtown areas; hence, fewer UA heritage sites are currently being explored. Further investigations need to be supported by future research.

However, after arial photos, web-mining and arial photo detection, the author found that two particular heritage sites are conspicuous. One of them is the Fuyi Warehouses, which are situated in the main centre on one side of the Grand Canal. It covers an area of 8,000 square meters with a total construction area of 3,000 square metres, comprising three rows of warehouses and courtyards. The warehouses were built in 1880, mainly for grain reserves during the Qing Dynasty (People's Government of Gongshu District, 2020).

The other is the Octagonal Diagram Relic Park. Many researchers believe that it was once a specific relic site with the function of holding national ceremonies and festivals. In the Southern Song Dynasty (1127–1279), the emperor himself cultivated crops in order to show the concentration on farming activation and agricultural industry (Tu, 2014). Since the Ming Dynasty, this park has been cultivated by nearby residents (Fig. 8-10). By 2007, the Hangzhou Municipal Government, in an effort to protect the site, had built a relic park (Guo, 2018). Nowadays, it is an agricultural park offering scientific education and sightseeing experiences. According to the field interview, some patches in the octagonal field could be rent for cultivation. The rentals are usually for school staff (for primary school children's agronomy teaching activities) and individual citizens.





Fig. 8-10 *Painting of Octagonal field* by Erzeng Yang (upper left corner) in 1609<sup>29</sup>. Source: Guo, 2018.

In ancient times, different parts of the Octagonal Diagram Field housed various kinds of crops such as soybeans, rice, and corn (Jiang, 2017; Tu, 2014). Since then, this park has been redesigned and became a landmark in the urban area of Hangzhou. It is also considered an ideal place for learning about Chinese agricultural history and environmental issues.

In addition, a museum with the topic of culinary skills featuring a cuisine exhibition was built in this region. This Hangzhou Cuisine Museum lies to the east by the Octagonal Diagrams Field, beside the West Lake. It consists of three parts: an exhibition area, an experience area, and a business area. The business area also features an exhibition hall, a public lecture hall, and several casual restaurants. Citizens and visitors alike are offered the opportunity to participate in the preparation

<sup>29</sup> The map shows that the field is a circular shape. But according to multiple ancient documents, it is indeed an octagonal terrain.

of local dishes. The museum has played a significant role in promoting the popularity of Hangzhou cuisine (Hangzhou Cuisine Museum, 2012).

### Zone III

Agricultural resources are well-developed within Zone III. In recent years, the extent of construction has been well controlled. It is positioned as a peri-urban zone and has a strong rural character. Many agricultural lands and woodlands have existed in this region over the years. Zone III mainly encompasses the Xiaoshan District and the southern part of the Xihu District. Many potential sites could be detected, and most of them possess high ecological values. Preservation of them can contribute to the conservation of agrobiodiversity and the maintenance of local ecosystems.

As a typical UA heritage site, Tongjian Lake is situated in the Xihu District (Fig. 8-11). The lake has an area of 1.35km<sup>2</sup>, and it is the origin of the local aquatic plant species, water shield (*Brasenia schreberi*) (Wikipedia, 2020f). In 2019, a new planning scheme for the lake and its surrounding green space was proposed which included design ideas for farming areas and aquatic plant conservation. If successful, visitors will be able to experience various farming activities as well as taste local water shield and other specialities (J. Gao & Li, 2019; Zhao, 2019).



Fig. 8-11: Recent general planning of Tongjian Lake. Source: Zhao, 2019.  
Source: J. Gao & Li, 2019.



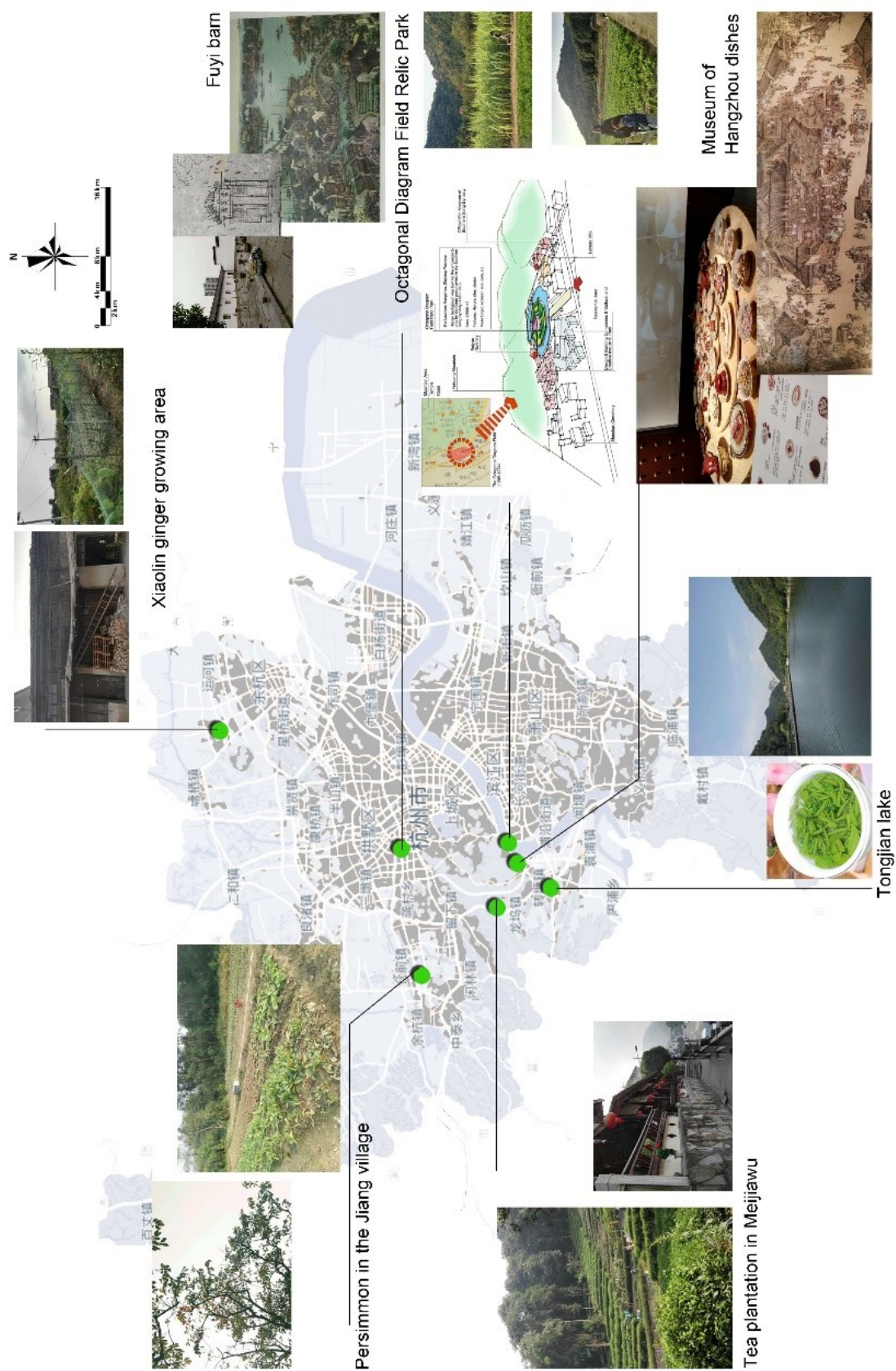


Fig. 8-12 All UA heritage sites described above in the three zones.

### 8.2.2 Description at the micro-level—the Xiaolin ginger growing area as an example

The Xiaolin ginger plantation is located in the eastern part of Zone I (Fig. 8-13). It can be detected through the UA Heritage detection process as mentioned in Section 7.1.1. It was chosen to be analysed as a detailed case study for several reasons.

Xiaolin ginger was regarded as an imperial tribute during the Qing Dynasty (Zhu, Pang, & Zhu, 2011) (Fig. 8-14). Nowadays, it has been considered as a rare germplasm resource at the provincial level (Zhu et al., 2011). The conservation of Xiaolin ginger seems urgently. Unfortunately, since the late 1990s, the area used to cultivate ginger has decreased dramatically. Through field surveys, it is obvious that cultivated areas of Xiaolin ginger have almost disappeared. Farmers' income source singular and increases in farmers' income progresses at a slow pace.

In this chapter, due to the farmland fragmentation as a result of the urbanisation process, most of the Xiaolin ginger fields are scattered, small-scale operations. Hence, as a typical plot, here, a small farmland with the surrounding environment has been chosen, which reflects the connection between the ginger cultivation and everyday lifestyles of inhabitants.



Fig. 8-13 Location of the Xiaolin ginger growing area. Source: Google Map.



Fig. 8-14 The difference between Xiaolin ginger (lower) and regular ginger (upper) and the documentation of Xiaolin ginger in the Qing Dynasty.  
Source: Cong HU, 2013; Zheng, Local Chronicle of Hangzhou (1735–1796), Ch. 53.  
The illustration on the right means ‘Ginger: the original growing area is located in Xiaolin of Yuhang (District) in Hangzhou’.

According to the four criteria for detecting UA heritage sites, Table 8-2 reflects the detection process of the Xiaolin ginger field from the top-down view. Information has been collected from various channels, such as local chronicles, official documents and newspapers.

After being detected by various channels, cultural heritage value and ecological function, and current existing forms of the Xiaolin ginger growing area have been emphasised.



Table 8-2 Detecting procedure of the Xiaolin ginger growing area

| Procedure                    | Standards                                | Contents                                                                                                           | Comments | Notes                                                                                        |
|------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------|
| Step 1 regional assignment   | Urban and peri-urban                     | Peri-urban area                                                                                                    | ●        |                                                                                              |
|                              |                                          | Urban area                                                                                                         | ○        |                                                                                              |
| Step 2 Access to information | Official channel                         | Recognised by authorities                                                                                          | ●        | Rare germplasm resources at the provincial level                                             |
|                              |                                          | Local chronicles or the other official documents                                                                   | ●        | Can be traced back to the 10 <sup>th</sup> century                                           |
|                              | Non-government channel                   | Newspapers                                                                                                         | ●        |                                                                                              |
|                              |                                          | Internet news media                                                                                                | ●        |                                                                                              |
|                              |                                          | Families' legacy or farming methods                                                                                | ○        |                                                                                              |
|                              |                                          | Folkloric stories and legends                                                                                      | ○        |                                                                                              |
|                              |                                          | Other channels                                                                                                     | ○        |                                                                                              |
| Step3 evaluation             | Cultural identity                        | Tangible elements (e.g., ancient buildings and fields)                                                             | ●        | Traditional dwellings farmlands                                                              |
|                              |                                          | Intangible elements (e.g., a long history of commercial marketing, cultural background)                            | ●        | Food culture                                                                                 |
|                              |                                          | Others                                                                                                             | ○        |                                                                                              |
|                              | Agrobiodiversity and ecological function | Tangible elements (e.g., species)                                                                                  | ●        | Species                                                                                      |
|                              |                                          | Intangible elements (e.g., the traditional method for the regenerative cycle and utilization of natural resources) | ●        | Storage method (by cellar hole with the right temperature)                                   |
|                              |                                          | Others                                                                                                             | ○        |                                                                                              |
|                              | Existing form                            | Landscape                                                                                                          | ○        |                                                                                              |
|                              |                                          | Farmstead                                                                                                          | ●        |                                                                                              |
|                              |                                          | Family-centred enterprise                                                                                          | ●        | Most households manage their business in the form of individual enterprise and self-employed |
|                              |                                          | Large-scale enterprise                                                                                             | ○        |                                                                                              |
|                              |                                          | Agritourism                                                                                                        | ○        |                                                                                              |



| Procedure | Standards | Contents           | Comments | Notes                        |
|-----------|-----------|--------------------|----------|------------------------------|
|           |           | Ecological reserve | ○        |                              |
|           |           | Museum             | ○        |                              |
|           |           | Others             | ○        | Almost abandoned by the city |

From tangible and intangible aspects, such growing areas can be traced back to the 10<sup>th</sup> century. According to Yinghua Pang from the Agricultural Extension Centre in Yuhang District, during the 1870s and 1880s, almost all households living in the Xiaolin area planted ginger. ‘Although the planting places of per household are small, the total area has reached tens of thousands of *mu*<sup>30</sup>’ (China News, 2013). However, based on the map in 1942, it is clear that agricultural land has mostly disappeared in the Xiaolin area (Fig. 8-15). By the end of 2000, the cultivated area had been reduced to less than 1.33 ha. Thus, Xiaolin ginger is endangered (Zhu et al., 2011).

Few heritage elements can be explored. Species are well kept, and for some dwellings that date back to the Qing Dynasty, old structures and materials have been retained and restored by the local council. However, some of the buildings are no longer functional. Although they have not been demolished, they are no longer inhabited.

As for intangible heritage features, the storage method of Xiaolin ginger (in a cellar hole at a particular temperature), which has been passed down through the generations, is at risk of disappearing. As described above, Xiaolin ginger has many advantages. It has good quality and is suitable for long-keeping. Hence, most locals choose to store and preserve ginger in cellars during the winter months.

The form and exact size of the cellar vary throughout China. In Hangzhou, Xiaolin ginger usually is stored in a cellar situated in a one-storey brick house. This house is normally a part of the household’s house compounds. The storage period usually started in September (CN103858616B, 2014).

Local cellars have specific design sizes based on local wisdom and long experience in agriculture. According to Xuyan Zhu’s research, the cellar in the Xiaolin area is generally 1.3-1.5m wide, 1.0-1.5m deep, with a flat bottom, and the length can be adjusted according to the quantity of ginger expected to be stored. It is generally 2.5m

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<sup>30</sup> 1 *mu* is equal to 0.667 ha.

long, 1.5m wide and 0.8m deep, and the weight of ginger that can be stored in a cellar of this size is approximately 1250kg. In addition, each cellar must contain more than 1000kg of ginger to maintain and stabilize the temperature of the ginger in the cellar (CN103858616B, 2014) (Fig. 8-16).



Fig. 8-15 Historical map in 1942. The yellow circle means the location of the Xiaolin area (In the yellow square is Xiaolin's Chinese name). The green circle represents vegetation. It does not have much vegetative cover in Xiaolin. It can be assumed that the area of built-up land increased significantly during this phase.

Source: *Hangzhou Ancient Atlas*, Hangzhou Archive, 2006. Fig. 118.

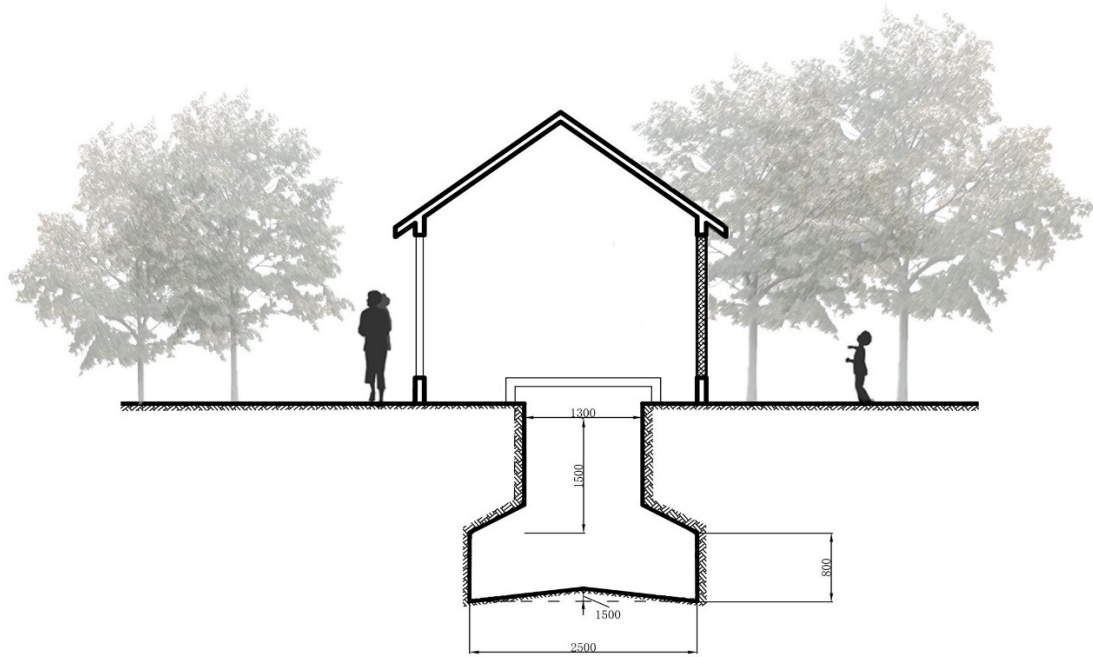


Fig. 8-16 Typical cellar in Hangzhou for Xiaolin ginger storage.

Source: Xuyan Zhu, et al. 2014. Farmers usually descend into the cellar via a removable escalator.

Since the 20<sup>th</sup> century brought about the urbanisation, only small-scale vegetables, fruits, and crops have been cultivated in the Xiaolin area. When standing in the ginger field and looking around, visitors will notice that the surrounding environment is poor. Noise from the surrounding area (e.g. traffic) and household garbage have a negative influence. A few dumps were observable in the study area. Additionally, a waterscape exists in the study area. However, it currently does not have a certain ornamental value

Information from the *China News* Report shows that ‘the reporter has visited several farmers’ markets in Hangzhou and found that the vast majority of ginger (species) in Hangzhou is from outside the province. Only a small number of local ginger varieties are sold. Local ginger traders and street vendors also do not know if their suppliers grow Xiaolin ginger or other species...’ (China News, 2013)

As for the business model in the study area, most households manage their business in the form of small individual enterprises and are self-employed. There is a farmers’ market in the study area, and customers are primarily local and nearby residents. Xiaolin ginger can be bought from this market as well as some surrounding street vendors (Table 8-3).

Contrary to the opinion of local and the public, researchers and district government have indeed expressed their expectations for the conservation of germplasm resources and traditional dwellings in the Xiaolin area. However, through field surveys, only a few specific measures have been taken. Therefore, the preservation and development strategies of the Xiaolin ginger growing area are urgently needed (Fig. 8-17, Fig. 8-18).



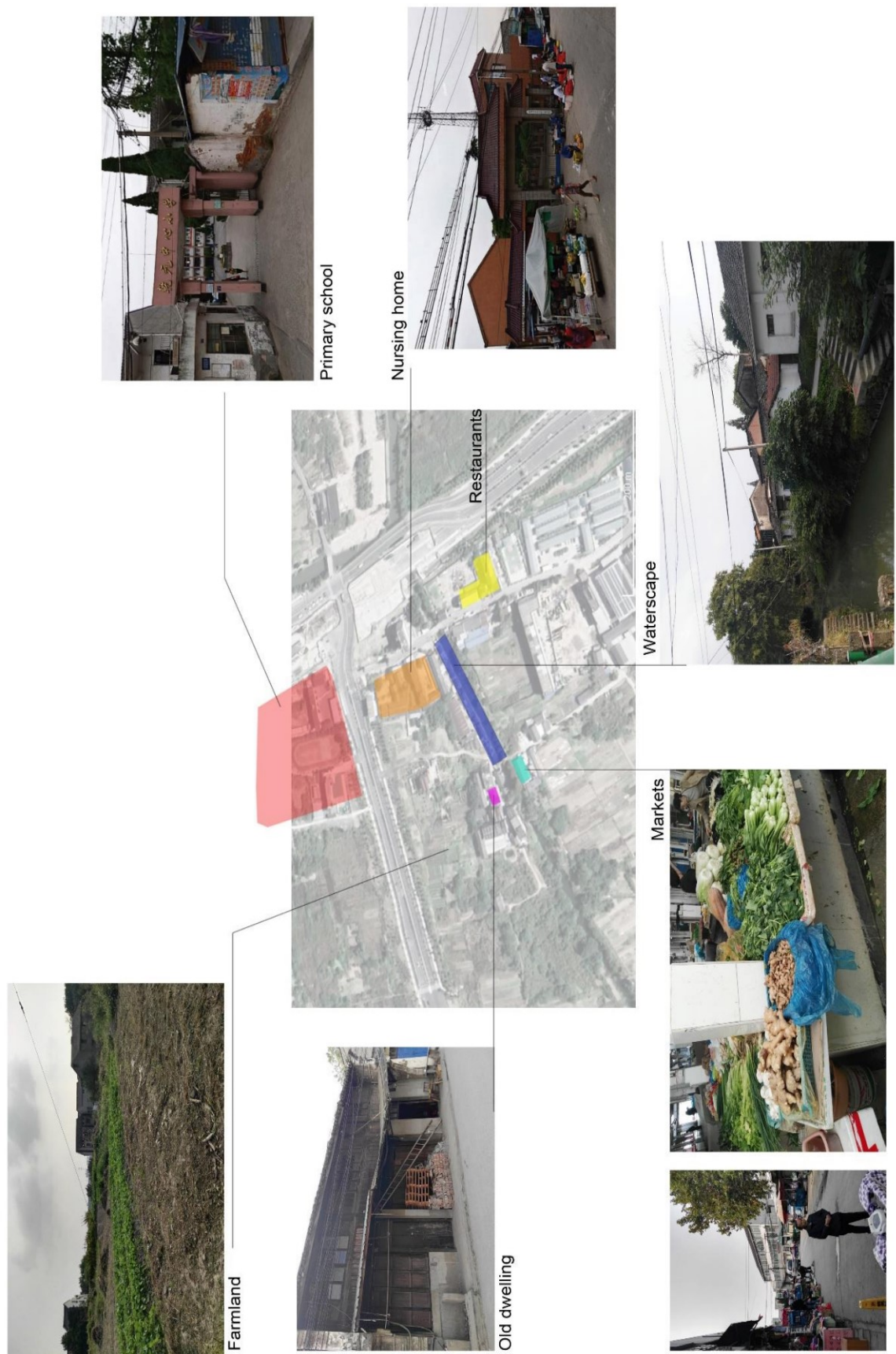


Fig. 8-17 Current status analysis diagram of the Xiaolin growing area

Table 8-3 The analysis results of the Xiaolin ginger growing area

| Dimensions              | Analysis                                                                     | Description                                                                                                                                                                                                                       |
|-------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manifestation dimension | Tangible elements                                                            | <ul style="list-style-type: none"> <li>·Old dwellings</li> <li>·Ginger species</li> <li>·Some farmlands</li> <li>·Cellar hole</li> </ul>                                                                                          |
|                         | Intangible elements                                                          | <ul style="list-style-type: none"> <li>·Traditional storage method with cellar</li> <li>·Names of places</li> <li>·Neighbourhood relationship</li> <li>·Local cuisines with Xiaolin ginger</li> </ul>                             |
| Ecological dimension    | Agrobiodiversity                                                             | · Other species of vegetables                                                                                                                                                                                                     |
|                         | Others                                                                       | /                                                                                                                                                                                                                                 |
| Social dimension        | Social perception analysis based on the interview results from the residents | <ul style="list-style-type: none"> <li>·Noise from neighbourhoods</li> <li>·Household garbage and poor accessibility</li> <li>·Negative perspectives from households, migrant labours, as well as the young generation</li> </ul> |
| Economic dimension      | Business model canvas (BMC)                                                  | · With a full-time cultivation livelihood, the increasing income process is moving slowly                                                                                                                                         |

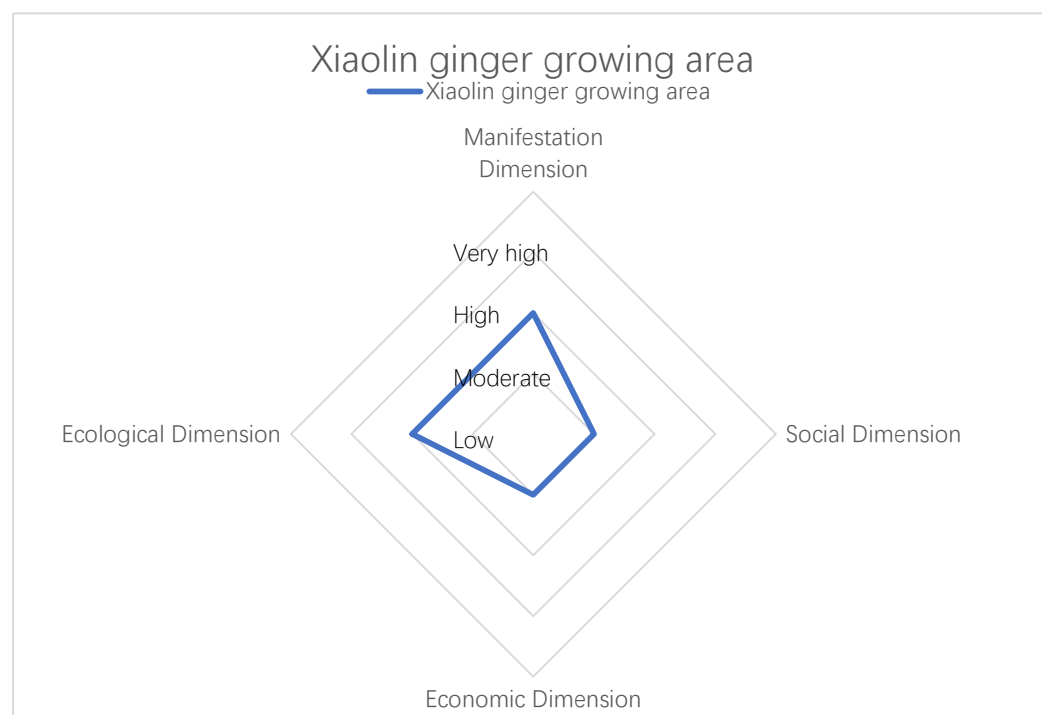


Fig. 8-18 Summary of UA heritage of the Xiaolin ginger area



### 8.3 Strategies

Overall workflow for proposing strategies can be found in Fig. 8-19.

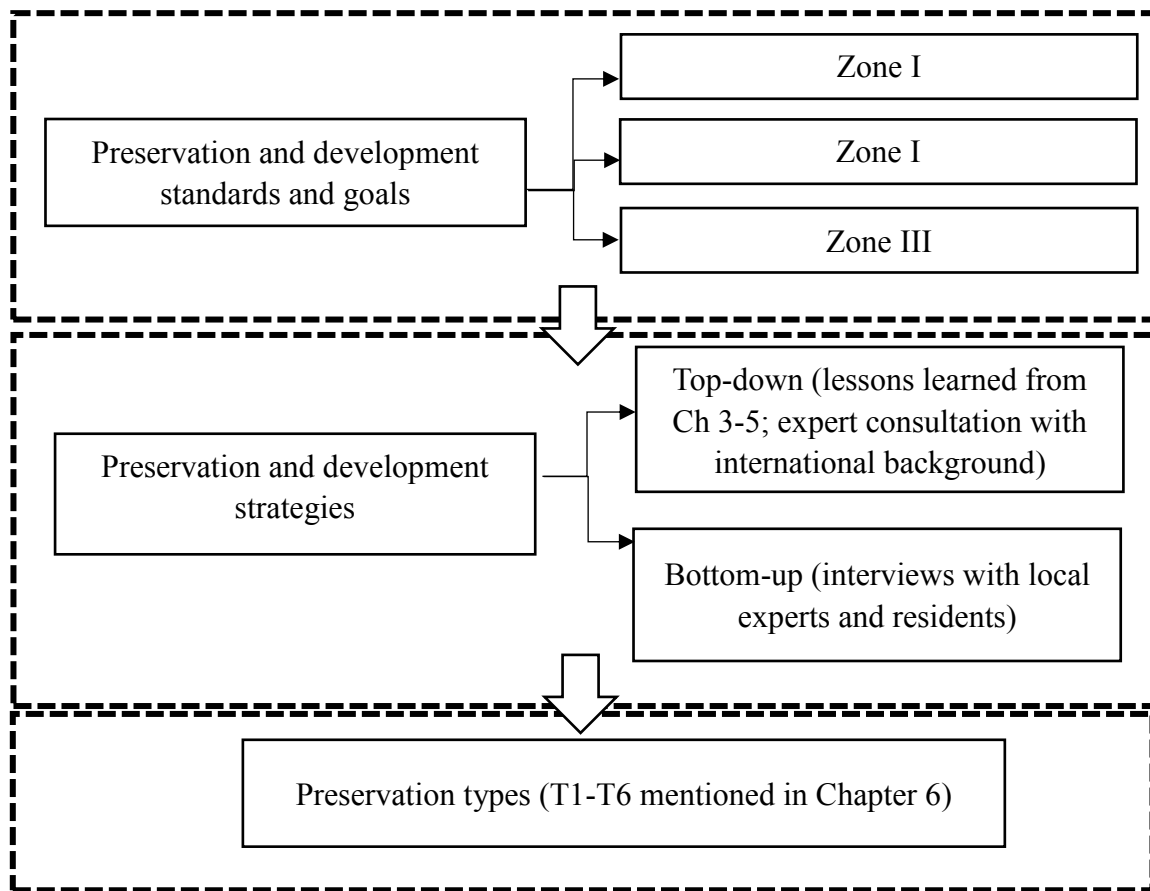


Fig. 8-19 Workflow for proposing strategies

#### 8.3.1 General preservation and development goals of Hangzhou metropolitan area

When focusing on the Hangzhou metropolitan area, the overall strategies are shown below.

##### **From a historical perspective:**

Both historical and cultural resources associated with agriculture should be valued, even some historical accounts and folklore, such as historic sites, stories and habits related to the Grand Canal, especially the old floating markets, productive landscapes, and the culinary heritage along the river.

##### **From an ecological perspective:**

Some UA heritage elements can form an essential part of the urban food chain,

thereby indirectly reducing carbon emissions and contributing to the urban green infrastructure.

Hence, existing agricultural land should be protected significantly, especially in Yuhang and Xiaoshan Districts, and species components in agrobiodiversity should be enriched.

**From a social perspective:**

Farming activities should be linked to leisure and education functions. It is suitable to regard some UA heritage sites as places supporting public services. Furthermore, it is urgent to popularise the idea that ‘UA heritage preservation is of great importance’ to citizens.

**From an economic perspective:**

A variety of business models must be promoted. Diversification of management patterns contributes to the prosperity of the agricultural economy. Additionally, promoting branded products and their processed products might be an excellent way to develop agritourism.

Turning to the preservation and development goals of the three zones separately, the following should be noted.

Since the area of construction land is increasing in Zone I, UA heritage sites within the range are suitable for both of the two key development goals: the establishment of an ecological conservation area and a cultural reserve.

As for Zone II, a focus on the cultural landscape and historical and cultural reserves might be an appropriate strategy for the preservation of UA heritage sites in this region (although not in all cases).

In Zone III, it is reasonable to say that the key development goal of UA heritage within this range is the establishment of environmental protection zones with a well-preserved ecosystem and biodiversity.

### 8.3.2 Strategies for the Xiaolin ginger growing area based on a top-down approach

**S1: From a top-down approach: international background**

Many lessons can be learned from Chapters 3–5, as well as through expert

consultation in both RWTH Aachen University and Politecnico di Milano and the *Herrenhausen Conference on Urban Agricultural Heritage and the Shaping of Future Cities* held in 2019 (Volkswagen Stiftung, 2019). From an international perspective, combined with other current nearby locations (nursing home, primary school, and restaurants), the study area could become a multi-functional community that meets the demands of heritage preservation.

Furthermore, the Agricultural Technology Extension Centre in the Yuhang District has put forth protection measures that highlight the importance of community development and the promotion of cultivation techniques among local residents (Zhu et al., 2011).

The primary strategy is to consider the entire region as UA heritage. In this view, the everyday lifestyle of the inhabitants should be preserved in the study area. It aims to reduce the disruption of communities by external factors. The cases of Xuanhua, Bamberg, and Milan all emphasise this point.

The main idea is primarily to promote historical and social functions (Fig. 8-20), concentrating on economic revival. As mentioned in Chapter 6, T2 (multi-functional farmsteads), T3 (co-operation between farmers and surrounding shops), and T5 (a social service centre) might be viable specific ways to preserve and develop the Xiaolin ginger growing area.

In this approach, the focus is on highlighting the historical value of Xiaolin ginger. Strategies are proposed in an attempt to motivate the whole community and the surrounding environment to participate in heritage preservation actions, in order to enhance the vitality of the Xiaolin ginger growing area. Through the design of various social activities, more people will become involved in heritage conservation activities.

Old dwellings will be preserved and renewed as the centre of the community for various forms of education, recreation, and entertainment. The residents of Hangzhou can also enrol in courses and lectures to acquire knowledge of traditional ginger cultivation and storage techniques.

Waterscapes should be well maintained. An educational farming patch will be designated, allowing primary school students the opportunity to be responsible for a small plot of land on which they can grow ginger or other crops. A therapeutic garden can be established in a nursing home to positively contribute to the physical and

mental health of the elderly. Residents can purchase ginger and other indigenous foods from the community centre as well as other farmsteads or markets directly. Co-operation between households and restaurants should be built-up. Local specialities can be tasted directly in nearby restaurants (Figs. 8-21, 8-22).

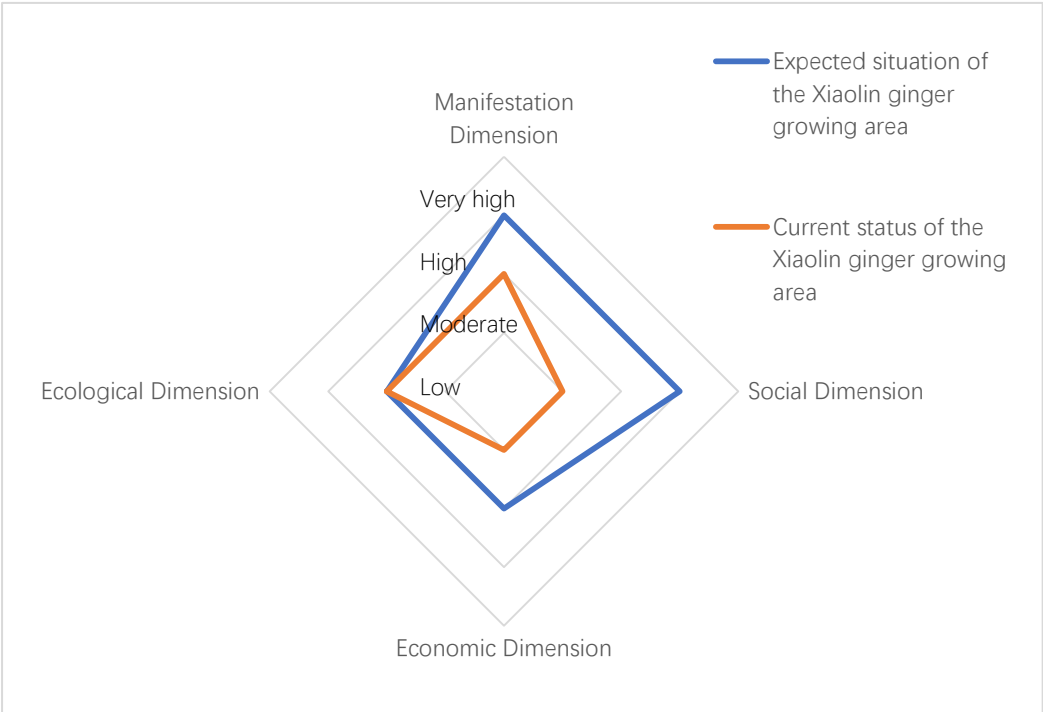


Fig. 8-20 S1 designed result of UA heritage in the Xiaolin ginger growing area



Fig. 8-21 S1 Function zone of the Xiaolin ginger growing area



Fig. 8-22 S1 Planning Diagram of the Xiaolin ginger growing area



### 8.3.3 Strategies for the Xiaolin ginger growing area based on a bottom-up approach

#### **S2: From a bottom-up approach: interviews with local experts and residents**

A process of participation has been outlined. The survey format was based on observation and interviews. After designing the survey questions, the next step is to collect the feedback on the items. The final step is synthesising, which involves combining ideas to present common arguments.

For example, questions contain the following elements:

‘Do you think it is urgent to preserve the Xiaolin ginger and the plantation?  
What do you think is the goal of the preservation and development of this place?  
What are your thoughts and suggestions for the future development of the Xiaolin area?’

Six citizens, three farmers, four street vendors, two vegetable traders, and three foreign visitors were interviewed (Table 8-4). All of the vegetable traders and street vendors around and within the Xiaolin area have been aware of Xiaolin ginger’s heritage value. They expressed their wishes that the growing area of Xiaolin ginger should be further expanded, and the indigenous species needs to be continuously planted. Unfortunately, half of the local citizens interviewed are not aware of the heritage value of Xiaolin ginger. All the foreign visitors never heard of this variety of ginger. In particular, the younger generations pay little attention to it.

Table 8-4 Demographic characteristics of respondents

| Sample size | Category          | Number |
|-------------|-------------------|--------|
| Occupations | citizens          | 6      |
|             | farmers           | 3      |
|             | street vendors    | 4      |
|             | vegetable traders | 2      |
|             | foreign visitors  | 3      |
| Gender      | Female            | 7      |
|             | Male              | 11     |

Two farmers and one street vendor in the Xiaolin area also expressed their thoughts on future planning. They hope to contribute to the construction of an area for intensive cultivation of Xiaolin ginger, the establishment of a ‘pick your own’ fruit and vegetable garden for tourists, and the development of the agricultural primary processing industry.

Furthermore, as an expert from the Chinese Academy of Sciences with experience in several urban agriculture projects, Prof. Jianming Cai also stated that it is crucial to develop the economy to promote the development of the local agricultural industry in China. Agriculture-based tourism can achieve this goal.

Combining the two views above, the strategy is to consider how best to develop tourism of UA heritage. The main idea is primarily to promote social and economic functions (Fig. 8-23), with a concentration on economic revival. As mentioned in Chapter 6, T2 (living museum), T3 (co-operation between farmers and surrounding shops), T4 (agricultural landscape) and T6 (tourism) might be viable specific ways to preserve and develop the Xiaolin ginger growing area.

This strategy focuses on highlighting the economic value of Xiaolin ginger. Under the premise of preserving the original structure and most of the materials, it aims to make a conservation design and restore old dwellings in order to present their original historical appearance to the greatest extent for tourists. One old dwelling will be reconstructed as a museum with the function of preserving and spreading knowledge of the local culture. Through this museum, visitors will learn about the history of Xiaolin ginger. In the meantime, several indoor or outdoor activities relevant to heritage conservation could be organised. In addition, a new observation platform will be established in the area. Through this tall architectural structure, visitors can enjoy panoramic views of the entire landscape.

The next stage is to rethink the design of the waterscape. Optimising and upgrading the quality of waterscape should be taken into account. The original riparian vegetation (willows, etc.) can be retained and, on this basis, the variety and number of plants can be increased, e.g. with some foliage trees (such as red maples, purple-leaved plums) or aquatic flowers (lotus, for example).

Furthermore, on the basis of water body conservation, new ideas have been proposed. The aquaponic container is a type of micro-farm (Triboli, 2014) that can be parked anywhere in the city as an appropriate part of the urban environment. Waterscapes embedded with aquaponic containers in Xiaolin have an educational function. They provide valuable opportunities for introducing and disseminating agricultural techniques and knowledge to visitors.

The existing farmers' market will be expanded from its original location. Xiaolin ginger and other-products derived from it could be sold here or in farm shops as

specialities or souvenirs. Furthermore, some farm plots will also be available for public rental. The co-operation between households and restaurants should be built-up. Local specialities can be tasted directly in nearby restaurants.

Specialised cooperatives could be established, contributing to the joint procurement of ginger seeds and training techniques among farmers so as to attract more farmers to plant Xiaolin ginger and promote income growth (Figs. 8-24, 8-25).

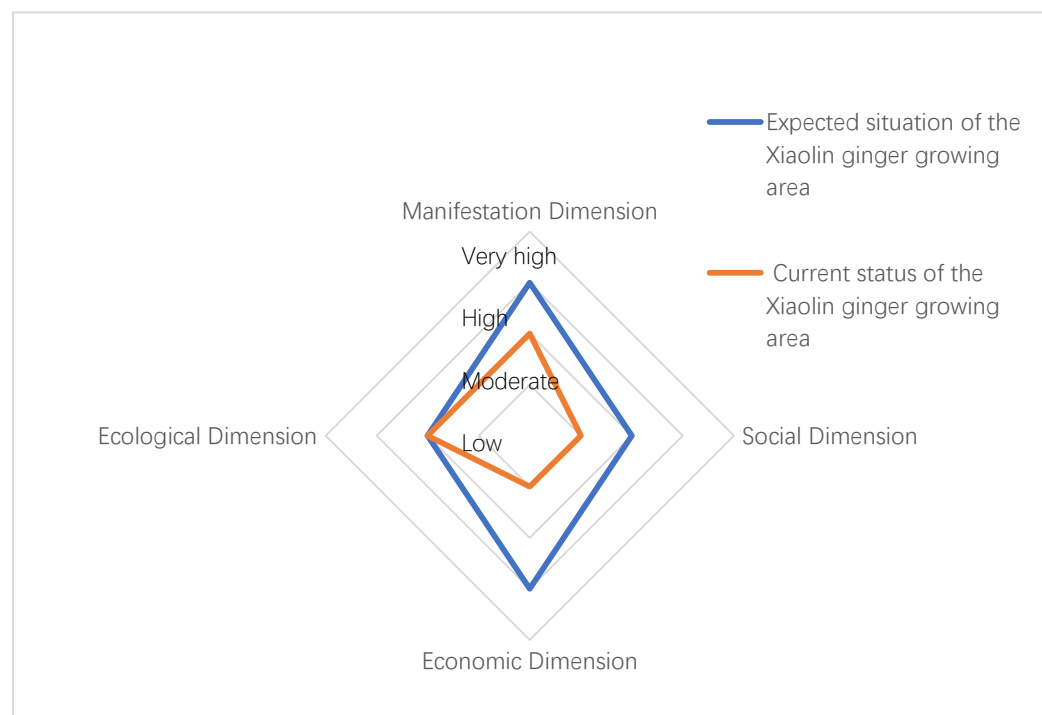


Fig. 8-23 S2 designed result of UA heritage in the Xiaolin ginger growing area



Fig. 8-24 S2 Function zones of the Xiaolin ginger growing area



Fig. 8-25 S2 Planning diagram of the Xiaolin ginger growing area

## **8.4 Conclusion and discussion**

### **8.4.1 Conclusion**

This thesis has concentrated on the following topics.

1. The characteristics of UA heritage have been interpreted from manifestation, ecological, social, as well as economic dimensions.
2. Case study: in-depth analyses of three valuable cases in Germany, Italy, and China.
3. Various reservation and development measures in different countries were collected. Action strategies correspond to different types of UA heritage. In this chapter, the standards and detection procedure of UA heritage, preservation and development standards and goals, management approaches, and specific preservation and development types have been set up and proposed.
4. Analysis of practices in one city and suggestions for potential agricultural value in Hangzhou, China. Two preservation and development strategies of the Xiaolin ginger area in the Yuhang District have been proposed based on top-down and bottom-up approaches, respectively.

As a vital component of urban history, UA heritage deserves the attention of society, government, as well as scholars and researchers. Currently, developing a systematic framework for bridging the gap between theory and practice for a better understanding of UA heritage is of extreme significance. This research tries to present the scientific data on the evolution of urban agriculture from the past to the present, in order to provide transferable knowledge and appropriate tools for the future research and work on heritage conservation, maintenance, and renewal.

Based on the concept of UA heritage summarised from the four dimensions, this paper draws six preservation types of UA heritage through case studies. They contain living museum, farmstead (innovation type), innovative commercial activities, agricultural landscape, social service centre, as well as agricultural heritage tourism.

At the same time, this research has explored how to detect UA heritage sites. Both top-down and bottom-up approaches have been considered simultaneously. Immediately afterwards, it has proposed three standards (authenticity, integrity, and



sustainability) and three overall goals (ecological habitats, historical and cultural reserves, and the mixed model of the afore mentioned) for the preservation and development of UA heritage.

Finally, in this chapter, the general study of the Hangzhou metropolitan area and the in-depth excavation of the Xiaolin ginger plantation tested the validity of the proposed heritage detection method. The author then proposes strategies to give an overall perspective on the UA heritage of the Hangzhou metropolitan area from the four dimensions. Afterwards, through both top-down (expert opinions) and bottom-up (field interviews) channels, this research proposes a corresponding strategy for the Xiaolin ginger growing area from two perspectives.

#### 8.4.2 Shortcomings and the prospects of future work

At present, there are relatively few studies of the UA heritage, and there is a lack of in-depth discussion on this topic. This study is the first attempt to explore UA from a historical perspective. The fundamental part of UA heritage has been completed in this thesis. However, due to the constraints of knowledge, time, financial resources, and energy, many elements related to UA heritage remain worth exploring, and more in-depth research is still needed.

In response to the points raised above as shortcomings, the author believes that the direction of research on UA heritage can be expanded. On a global scale, based on the distinctive regional background of cities, a comparative analysis of multiple examples of UA heritage should be conducted, and the differentiation between the different samples needs to be generalised.

It is hoped that the concept of UA heritage proposed in this research can gain widespread public attention, especially in China. In this way, it can be combined with relevant projects in reality and widely used in the actual processes for detecting UA heritage potential sites, so as to truly realise its research significance and value.

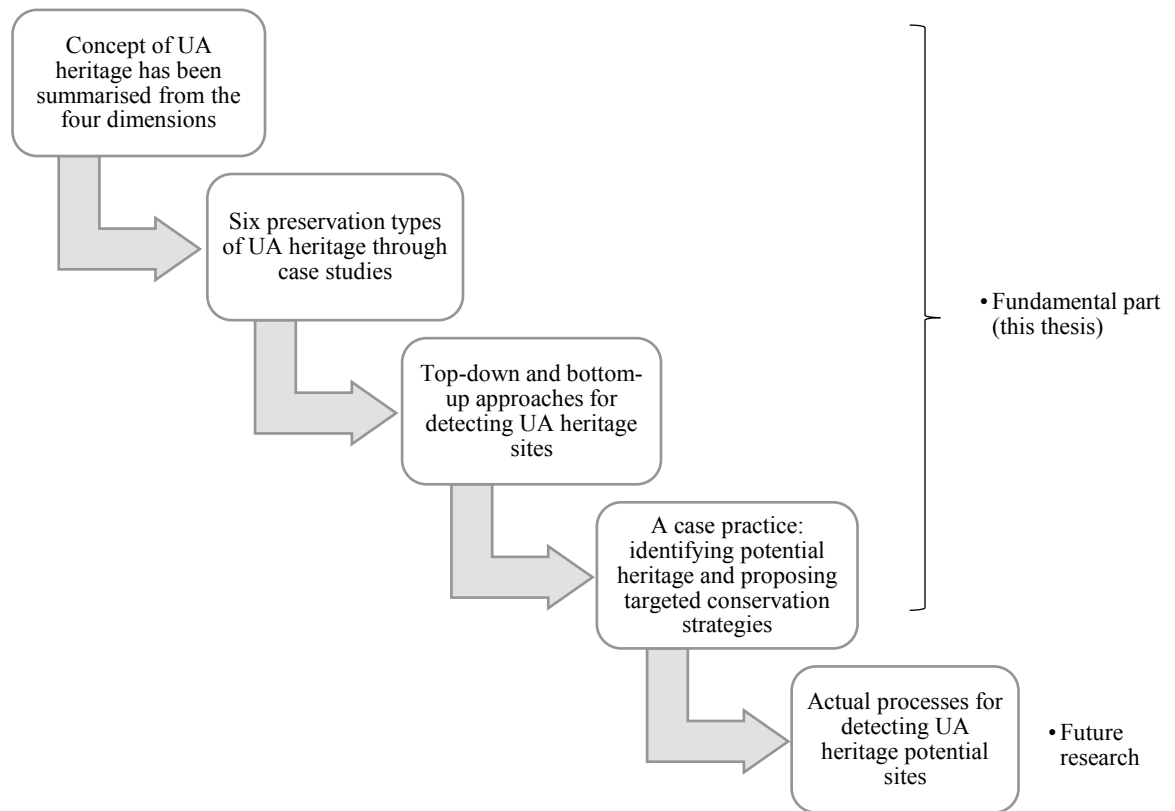


Fig. 8-26 The research level of this thesis and future research outlook

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## Appendix

### Appendix 1:

#### **Questionnaire for analysing urban gardening/ agriculture activities in Italy/China/Germany<sup>31</sup>**

Name of responsible person:

E-mail / Tel:

Name of enterprise / project:

Post address:

1. Short description of the activity

Enterprise ☐      Association ☐      Project ☐

Year of foundation (if have):

Years of activity:

Production area (ha or square metre):

Employed persons:

Volunteers (if have):

Family member (if have):

Kind of crops and livestock:

---

<sup>31</sup> Only the English version is shown here. The Chinese, Italian and German versions have all been translated from this version. Their contents are identical.

2. Production system (e.g., integrated, organic, permaculture, conventional.....):

3. Main services (e.g., business events, educational activities, agritourism.....)

4. What is/are the purpose(s) of your activities? How important the proposes are from your point of view:

| Level                                     | High Importance | Certain Importance |   | Little Importance |   | No Importance  |
|-------------------------------------------|-----------------|--------------------|---|-------------------|---|----------------|
| Score                                     | 1               | 2                  |   | 3                 |   | 4              |
| Activity                                  | Score           | 1                  | 2 | 3                 | 4 | I have no idea |
| Commercial                                |                 |                    |   |                   |   |                |
| Self-consumption                          |                 |                    |   |                   |   |                |
| Production for food security              |                 |                    |   |                   |   |                |
| Educational                               |                 |                    |   |                   |   |                |
| Environment protection or area management |                 |                    |   |                   |   |                |
| Social                                    |                 |                    |   |                   |   |                |
| Leisure or well-being                     |                 |                    |   |                   |   |                |
| Tradition, expression of culture          |                 |                    |   |                   |   |                |
| Research                                  |                 |                    |   |                   |   |                |
| Others                                    |                 |                    |   |                   |   |                |

5. Who are your clients? (past and present)



- Past

- Present

6. What kind of specific expectations do the clients of your enterprises / project have? (past and present)

- Past

-Present

7. What is the value you can provide to your clients? (past and present)

- Past

- Present

8. Which marketing channels are used to hand out products and services to the clients? (past and present)

- Past

- Present

9. What makes your products or services unique compared to alternative providers?

10. How does the public support /limit your enterprise?

11. Which partnership are you involved in (professional organizations, marketing alliances.....)

12. What are the revenue streams of your enterprises / project? What about the profit?

13. What costs the most during the whole management process:

| Level                                                                           | High Cost | Certain Cost |   | Little Cost |                | Free |
|---------------------------------------------------------------------------------|-----------|--------------|---|-------------|----------------|------|
| Score                                                                           | 1         | 2            |   | 3           |                | 4    |
| Item \ Score                                                                    | 1         | 2            | 3 | 4           | I have no idea |      |
| Jobs with salary                                                                |           |              |   |             |                |      |
| Educational activities                                                          |           |              |   |             |                |      |
| Social activities                                                               |           |              |   |             |                |      |
| Preservation of historical building                                             |           |              |   |             |                |      |
| Management of green open space<br>(fields, orchards, gardens,<br>bushland.....) |           |              |   |             |                |      |
| Seeds (seedings), farm tools and other<br>facilities                            |           |              |   |             |                |      |
| Others                                                                          |           |              |   |             |                |      |

14. Which are the problems that your activities are facing?

15. Which expectations do you have towards public support for your activities and towards your clients?

16. What are the heritages (elements) in your place, both tangible and intangible?

- Tangible

-Intangible

**Thank you very much for your cooperation!**

## Appendix 2:

### List of contributors

| Country/City |             | Name                             | Affiliation                                                                                                |
|--------------|-------------|----------------------------------|------------------------------------------------------------------------------------------------------------|
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