

The integration types of agricultural space in urban community scale: The case study of Hamburg, Germany

Qiao HUANG¹

¹ Bauhaus University, Weimar, Germany / Tongji University, Shanghai, China
evelineqq0224@gmail.com

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Faced with agriculture recession, food crisis and a series of environmental problems caused by urbanization, the introduction of urban agriculture and promotion of shifting city-model from a consumer to producer is one effective strategy to achieve sustainable urban development.

Urban community is a certain self-organization and could reflect differences in different social factors. It's a good space for urban agriculture and an appropriate platform to carry out agricultural activities. This paper studied the integration model of agricultural space in urban community scale by choosing a representative city, Hamburg, Germany, as empirical objects. We aimed to explore the integration models of agriculture in urban community, figure out the features of spatial layouts in different models and analyze on participants in corresponding communities.

With literature review and field research to obtain one-hand and second-hand information, firstly we collected the types of agricultural space in communities of Hamburg, then analyzed and compared representatives for each type in terms of agricultural space layout model and participation of people, etc. Descriptive statistics is the key method used for collected materials.

Conclusively, it has found that in the city of Hamburg, community-scale spatial patterns of agriculture include the residential community, enterprise organization, city park and commercial-business community. Different types have their own emphases according to space layout, including horizontal, vertical, green roofs, etc., corresponding with different integration models and specific functions. Meanwhile, demographic structures of the participants, forms of participation and interaction modes vary based on the types of agricultural space.

1. Introduction

The city has experienced a transition from an agricultural society to an industrial society and till today, an information age. Along with the rapid development of industrialization and urbanization, urban area expanded rapidly with a massive rural-to-urban influx. A lot of energy and natural resources were devoured, while agricultural civilization was considered a laggard civilization that hindered urban development, and had been gradually squeezed out. Urban and rural areas became more and more alienated. Their developments showed increasingly imbalance as well, which exacerbated the deterioration of the above crisis, and posed great challenge to sustainable development.

Most recently, information bloom enhanced human being's living standards significantly. Population issue, food security, energy shortages, environmental degradation and other practical issues received more attention. Urban and rural areas relationship and their partnership on development have been reviewed. Urban agriculture is to make agricultural production, supply and consumption concentrated in urban area. It will help improve the self-sufficiency of cities, and to a large extent, ease the food, energy, environment pressure and other issues, promote the change from consumer aptitude to production aptitude which is more flexible and resilient.

1.1 Definition of urban agriculture

Urban agriculture first appeared in developed countries across Europe, America and Japan at the first half of the twentieth century. Then it was spread and developed rapidly in other developed countries and regions. In late 20th century it has been widely introduced to the developing world. Compared with conventional agriculture, urban agriculture is a brand new concept. From the dependency of agriculture and urban development, urban agriculture is not a specific form of agriculture, but a concept which emphasize the synchrony and synergy of agricultural and urban development (Cai, Yang, 2008).

1.1.1 Concept of urban agriculture

The concept of urban agriculture has yet to form a unified conclusion worldwide, but the connotation of urban agriculture has basically reached a consensus. First, the spatial layout of urban agriculture mainly involves inner-city and suburban areas. Second, the carrying out of urban agriculture is to fulfill urban demands, including several aspects of the production, ecological, landscape in essence. I defined herein for urban agriculture: it is a new type of modern agriculture locates in the city center or suburban areas, focusing on integrating production, life and ecology to serve the city in a better way.

1.1.2 Functions of urban agriculture

As a new type of modern agriculture, urban agriculture has a couple of new features. From city demand fulfillment perspective, besides economy function, we're developing more functions of urban agriculture such as ecological function and social function, thus full functionality agriculture.

In conclusion of various definitions of urban agriculture functions, although the expression is different, but the essence is consistent, namely: it has many functions simultaneously, economic, ecological and social cultural. It provides high quality agricultural products for urban residents and meanwhile provides a large number of job opportunities. It helps improve the ecological environment of the city to a large extent. It also fulfills increasing residential spirit demand and reflects educational value.

1.1.3 Types of urban agriculture

According to the layout of spatial location, urban agriculture can be divided into two forms –suburban agriculture and inner-city agriculture (Mougeot, 2000). Suburban areas are less restricted by land. So there is more macro-level large urban farm, such as ecological agriculture garden, allotment garden, leisure farms. Inside-city areas are impacted by the built environment. So it appears in the forms of mid-level residential community, such as small business farm, agriculture theme parks and micro-level presence as roof gardens, squares farm, vertical farms.

1.2 Research background

From early 20th century to recently, studies of urban agriculture has become a research field addressing economic, social and environmental issues, involving interdisciplinary research in the field of agricultural science, economics, geography, architecture planning, sociology, ecology, and many other disciplines. Based on theoretical research, urban agriculture practice was also carried out adapting to local conditions, and became a hot topic of urban construction and development worldwide. Based on different extend of economic and social development, climate condition, agricultural infrastructure, urban agriculture development pattern differs from countries to adapt to their own characteristics.

There are mainly three patterns: first is the economic function-based model, represented by massive urban agriculture along Atlantic coast in US and highly intensive agriculture in Israel. This model strengthens people's initiative and weakens the natural environment initiative in ecological economic system. Second category is social ecologic function -based model, represented by European cities, such as Germany's garden city, UK's Forest City. This model emphasizes harmony between human and natural environment, requiring government's issuance of laws, regulations and policies to regulate the development of urban agriculture. Last category is economic and social ecological function-mode, represented by Japan. This model emphasizes the use of advanced science and farming techniques. Agriculture resides in urban ecological environment, so as to provide certain amount of agricultural products and perfect public goods (Li, Xu, Wang, 2006).

While developing countries (South America, Asia, and Africa) place urban agriculture to alleviate the country's economic pressure, improve the urban environment and enhance the quality of life, make urban self-sufficiency and promote the steady development of the city.

1.3 Research issue and objectives

1.3.1 Research object and scope

Current research on urban agriculture has penetrated multidisciplinary field. This article is based on architectural planning aspect, covering agriculture and urban spatial integration model research and

discussion, focusing on selected representative on urban agriculture activities in the German city Hamburg as empirical study.

Urban Community is at certain level self-organized and could reflect differences in different social elements and it is also a good platform to create urban agricultural space and carry out agricultural activities (Gao, 2012). Therefore the scope of this article is limited to urban built-up area.

1.3.2 Research objectives and significance

In this paper, the study on community level spatial pattern of agricultural research of Hamburg, is to explore the following three points: 1) What're the integration models of agriculture in urban communities; 2) characteristics in different modes, including integrated form, special layouts and agricultural function; 3) community corresponding analysis, including forms of participation and interaction models vary based on the type of agricultural space. May hope this paper provide a reference value of urban agriculture activities undertaken in the context of urban built-up areas through empirical research on the practical level.

1.4 Methodology

In this paper, the writer used literature review and field research to obtain one-hand and second-hand information about urban community agriculture space. Literature review is mainly used in previous study, with a view of urban agriculture concept, function types, and the development process to get comprehensive understanding. And then analyze and compare representatives for each type in terms of agricultural space layout model and participation of people.

Field research focused on study subjects. Firstly understand the types of hamburger community agriculture space, then for different types trying to select one representative agricultural space to analyze and compare layout mode and participation status. In the field survey, the writer collected data and information through pictures, interviews, follow-up feedbacks. And descriptive statistics is the key method for collected materials.

2. Case study

2.1 Overall introduction of Hamburg

As one of Europe's great ports, Hamburg is located in the northern part of Germany, which is the second-largest city of this country, home to 1.8 million people within its city limits and 4.3 million in the metropolitan region (Braunstein). It is made up of seven boroughs, which are Altona, Bergedorf, Eimsbüttel, Hamburg-Mitte, Hamburg-Nord, Hamburg and Wandsbek, accompany with almost 2500 bridges spanning the canals and waterways (Figure 1).



Figure 1. The location of Hamburg in Germany and the distributions of its boroughs

Source: <http://en.wikipedia.org/wiki/Hamburg>

Hamburg has served as a trading hub for centuries, and in modern times as a major industrial center in Germany. Still, Hamburg is impressively green when compared with most cities of similar size, with over 16.7% of forests, recreation and green spaces in urban area. In 2011, it gained the prestigious European Green Capital mainly for its achievement of high environmental standard, further ambitious goals for environmental improvement and sustainable development.

In those further specific planning, there is one called A Green Network, ‘will connect parks, recreational areas, playgrounds, gardens and cemeteries through green paths’ (European Commission, 2011, p23). The plan aims to form a green link from the outskirts to the city center with two inner loops and several landscaped axes together (Figure 2). It is a great opportunity to combine different types and scales of green lands and public spaces into a greener network in order to make the city more sustainable and resilient. Urban agriculture spaces are also as public greenery lands included in the green network which helps to have a more potential development of its own and better connection with other urban public spaces.

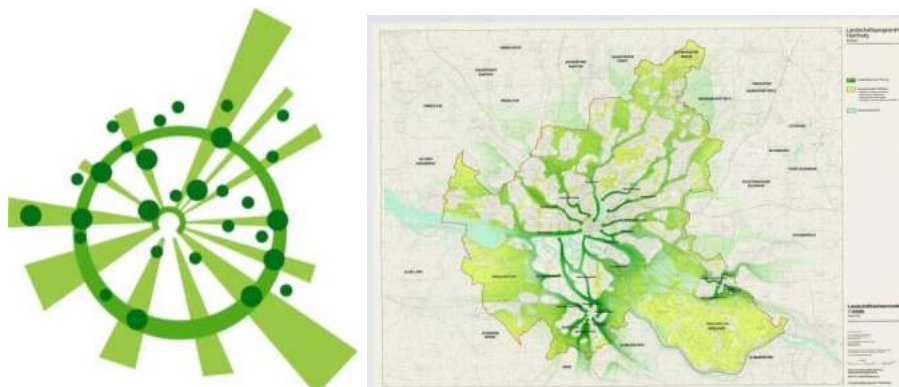


Figure 2. The green network plan of Hamburg

Source: <http://www.hamburg.de/gruenes-netz/>

2.2 Basic information of urban agriculture in Hamburg

Urban agriculture has a long history and successful experience in the development of Germany. In the early 20th century, the first form of urban agriculture, "allotment garden" appeared in Germany, and after 100 years of development and improvement, the current urban agriculture works vigorously with a set of ecological, social and economic functions. Its main purposes are: 1) to enhance the ecological and environmental quality of the city, 2) to create entertainment, farming experience and learning platform for education, 3) to provide healthy and safe green fruits and vegetables.

As Germany's second largest city, the urban agriculture in Hamburg has a relatively long history. Especially in recent years, with emphasis on the ecological environment of the city and the pursuit of sustainable development, the development of urban agriculture is in great esteem by the government and positive response of the public to form a government -NGO- citizens system, including the top-down and bottom-up implemented in two forms.

Among them, the government for the development of agriculture and urban agriculture enacted The Hamburger Agricultural Development Program 2015-2020, which clearly referred that urban agriculture is an important part of the Hamburg economic policy, and will promote the development of urban agriculture through a series of measures to protect its space, function, technology and other aspects (Meinecke, 2015). In addition, several projects are with the government's guidance and assistance.

Furthermore, NGO has played a very important role at the launching of urban agriculture, currently there are several civil society organizations in Hamburg as CSA Hamburg, LGH (Landesbund der Gartenfreunde in Hamburg EV) and so on, who design, build urban agriculture space and organize unregularly activities to attract public members to participate, better play the role of urban agriculture. Meanwhile, the Hamburg public enthusiasm for urban agriculture is also very high that urban agriculture activities carried out by the growing number of people spontaneously, such as moving farm, street gardens, etc.

2.3 Study on agriculture spaces in urban community scale

2.3.1 Urban community and integration of urban agriculture spaces

The word "community" is derived from old Latin, which was firstly applied by Ferdinand Tönnies, Germany's sociologist, in his famous work "Community and Society" (1887). One broad definition which incorporates all the different forms of community is "a group or network of persons who are connected (objectively) to each other by relatively durable social relations that extend beyond immediate genealogical ties, and who mutually define that relationship (subjectively) as important to their social identity and social practice." (Anonymous, n.d.). This shows that there are several characteristics of community, be: 1) in certain geographic region, 2) having a certain number of

population, 3) common interests and consciousness among residents, 4) with relatively intimate social interaction. In this paper, the concept of community keeps the same as previously mentioned.

According to the degree of intervention, agriculture and urban space integrated model is divided into the following four categories: reservation, insertion, substitution and reconstruction. Among them, the reservation refers to keep some existing agricultural space in the city; insertion means, full use of idle space into agricultural space when maintaining the original function of urban space; substitution means partial function replacement in the urban space to convert other space function into agricultural function; while reconstruction refers to building new urban space systems and space unit.

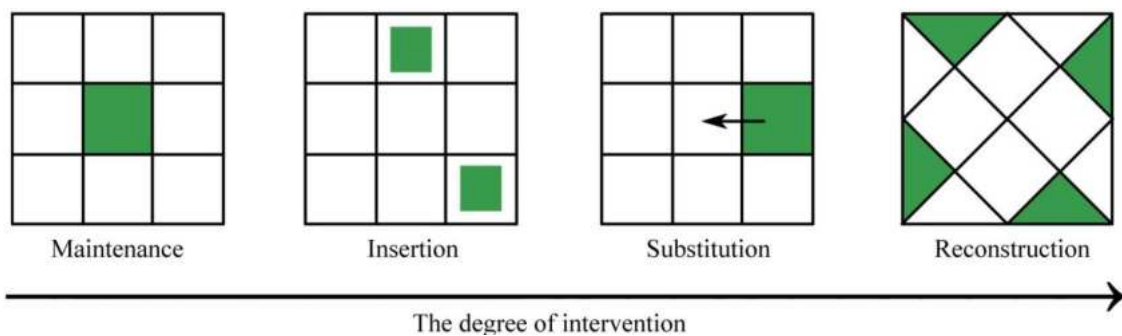


Figure 3. The integration modes of urban agriculture

Source: writer's own drawing

From the reservation to the reconstruction, the degree of intervention in the agricultural space to the city enhances gradually. Wherein the reconstruction as a subversive space construction, will form a new city structure, so it is more in the planning and construction of a new city but has greater difficulty in the city has been built. The other three modes are easier to integrate in the space within the city and suburbs, with a strong operational.

2.3.2 Types of urban community agriculture

According to the relationship with the land, the space for urban agriculture may include urban green space, city squares, buildings, etc. Taking into account the compatibility of urban agricultural production and urban construction land as well as the community connotation, the paper divides the basic unit of urban agriculture in the community level into four types: residential areas, parks, enterprise organizations (schools, hospitals, units, etc.) and commercial business districts.

With the Collection of information from literatures as well as field research, the current agricultural space in the city of Hamburg includes the following four types:

A. Allotment Garden (Kleingarten)

Allotment garden originated from Germany in nineteenth-century. It means the farmer or a specific organization offer the land and help the plant management, then urban residents rent and participate in

farming, harvesting their products which owned to them. Currently in Hamburg inner city, allotment gardens are mainly by certain NGOs planning and organization, to provide the public different locations in the city for the planting and harvesting of crops. One representative NGO is the LGH (Landesbund der Gartenfreunde in Hamburg E.V.). Now it has already have almost 1400 hectare lands, 33000 allotment gardens in 9 districts all over the city, managed by the club members (LGH, n.d.).

B. Community Garden (Gemeinschaftsgarten)

Community gardens is a very famous type of urban agriculture in Hamburg in nowadays that there are some different forms, like stationary farmland, moving garden, roof agriculture and so on, which provide fresh produce and plants as well as satisfying labor, neighborhood improvement, sense of community and connection to the environment (Hannah, Oh, 2000). To some extent the community garden is related to the allotment garden, but the existing forms of it are more flexible and abundant.

C. Intercultural Garden (Interkulturelle Gärten)

Intercultural garden is a characteristic type of urban agriculture in Germany. It firstly grew up as a project of the German Association of Intercultural Gardens (Interkulturelle Gärten e. V.), and the goal is a further intercultural competence and racial integration among refugees, immigrants and natives. The intercultural garden consists of planting vegetables and fruits as well as public space for community events and activities.

D. Professional Garden

Compared with the types of urban agriculture above, professional garden is a comprehensive concept. It includes the gardens especially for culture and education, the gardens owned by certain organizations, such as school agriculture, company agriculture etc. Now in Hamburg this type of urban agriculture is having a rapid development that it offers the agricultural experience to wider range and more citizens.

Corresponding to urban community, the urban agriculture space mainly includes community-scale in meso-level and scale of buildings and spaces in micro-level. It should be noted that, in the paper, private gardens and other private space are not included. When matching the four types of community agriculture basic unit and the types of urban agriculture in different scales, there is a table to show the proper agriculture forms in different communities (Table 1).

Table 1. The characteristics of different community agriculture

	Residential community	enterprise organizations	City parks	commercial and business area
Allotment garden	√	—	√	—
Community garden	√	√	√	o
Intercultural garden	√	o	—	—
Professional garden	√	√	o	—

Roof farm	√	√	—	√
Vertical farm	—	o	—	√
Street garden	—	—	—	√
Square farm	√	—	—	√

2.3.3 Research on different types of community agriculture in spatial layouts

According to the basic four types of urban community agriculture, the writer has selected several representative cases of urban agriculture in Hamburg that own to different types in order to study on and compare the characteristics of integration models, spatial layouts and the space functions in different community agriculture types.

A. Urban agriculture in residential community

The residential community is the most common form for urban agriculture in the city. Closely related to people's daily life, residential agriculture offers a public space which is attractive to the residents for participating and experiencing.

- **Gartendeck**

The Gartendeck is an urban agriculture project in Hamburg St. Pauli, working as a temporary roof garden on a parking deck. The roof area offers 1000 sqm for flexible agricultural spaces, like around 650 baker boxes and a container. This garden offers green vegetables planting, herbs growing, and also there are three beehives and a worm box.

This residential community garden is a moving farm that every week it has regular opening time to welcome all the residents in neighborhoods coming by and participating in. As the self-organized community center, it offers a rent-free and use-free space for neighborhood meetings, sociocultural facilities, collective gardens etc. to improve the integration and communication among residents and help shape new forms of urban community with locally food production. The integration model of it is insertion, which means to turn the fallow land into productive green (Figure 4).



Figure 4. The location and image of Gartendeck

Source: <http://www.gartendeck.de/>

- **Keimzelle**

The Keimzelle is located in Hamburg as a small social garden since May 2011. In the garden, variety of vegetables and herbs are grown as well as fruits to offer the residents a natural environment with plants and insects that not as likely to find in a big city. Everyone can use the site jointly, whether for gardening, a meeting or just a short break.

This site lies in the road turning as a green plaza before, then turned its function to the urban agricultural space. The integration model of this form is substitution that actually the garden is still a greenery in the city but add the social and economic functions in accompany with the environmental one. The cultivation forms in the garden include the stationary land and mobile boxes, which offer the participants more chances to join in the urban agriculture activities to take over the design of their living and working environment and especially a part of the food production back into their own hands (Figure 5).



Figure 5. The location and image of Keimzelle

Source: <http://keimzelle.rindermarkthalle.de/>

The above urban gardens are two typical examples in residential community in Hamburg, and with the information the writer has searched and the field research in the city, there are some more types of community agriculture in residential areas, such as the allotment garden, cultural and educational garden, etc. The main integration models are insertion and substitution with both stationary and flexible spatial layouts in relatively small sites.

B. Urban agriculture in school

As one of the representative types of enterprise organizations, the school is a proper subject to implement the urban agriculture that offer the students knowledge and practical experience about the agriculture. Hamburg is paying attention to the school garden in different education levels, from kindergarten to the university, there're many agricultural activities happened.

- **Ganztagsgrundschule**

This school is located in Hamburg Bernstorffstraße 147, including a primary school accompany with a nursery. It has a big campus with a school garden on the south side of the main building. The school consists of seven parcels, each of which is assigned to a class.

The reason for creating a school garden next to play and sports facilities is to bring the city kids to nature. A school garden provides the opportunity to see plants from seed to harvest for the students to design the ground, experience in the agriculture space and finally eat the vegetables and fruits of their own work. Not only for the spare time, there are also some relevant classes taking place in the garden, which contributes to health education as well as the social experience (Figure 6).



Figure 6. The garden and agricultural activities in Ganztagsgrundschule

Source: <http://www.schule-bernstorffstrasse.hamburg.de/index.php/article/detail/1037>

The Hamburger Bildungsserver accounts and shows some basic information of the school garden in Hamburg. To collect the information together can find the main characteristics of current school agriculture. Firstly, the gardens extend among all the school levels with the main functions of education and social experience. The types of farmland mainly include the public ground and roof gardens, and in some schools, the agriculture spaces also exist in the buildings like gym and lab. What's more, both inside and very nearby the school of the garden exist at the same time.

C. Urban agriculture in city park

The parks work as attractive public greenery spaces in the city's green system. Traditionally, parks offer ecological environment and places for social communication, while in nowadays, urban agriculture has emerged in some city parks in Hamburg, creating more abundant greenery forms as well as functions of the park.

- **Hammer Park**

The Hammer Park was belonging to the family Sieveking in 1826 and less than a hundred years later, it transformed the originally landscape of English style garden as a public park in Hamburg. With at

least 16 hectares, it offers plenty of space for communication, play and fun.

Since 1982, there is a herb garden in the Hammer Park. The herbs can be cultivated as well as harvested by the citizens. The herb garden was formerly used well, but later became oblivion over some years that the variety of herbs decreased and the herb signs and information board turned empty. Trying to make the garden more attractive, the organizer has dealt with this issue to search for effective solutions. So far, several effects have been achieved, such as more herb diversity, better management with the support of certain club, regular events and herb festival, etc. (Glöckner, n.d.). In 2013, the garden has received the support of North German Foundation for Environment Development to offer a herbal workshop for seniors. With those efforts, now the agriculture activities in Hammer Park work well, making a creative agricultural space opening to all the citizens (Figure 7).

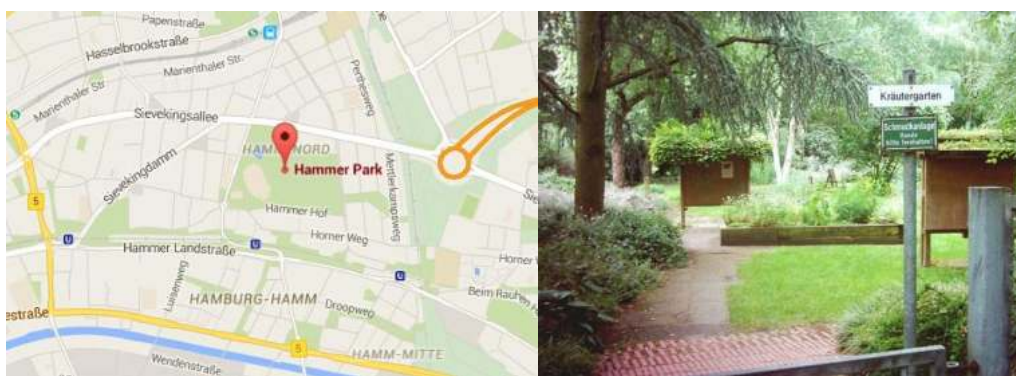


Figure 7. The location and image of Hammer Park

Source: <http://www.google.com/maps> & http://de.wikipedia.org/wiki/Hammer_Park

Compared with other urban community agriculture spaces, the advantage of city park is that it offers bigger green and public space to create agriculture production and activities. The common practice is to divide a certain area in the park as agriculture space, with unified management and unlimited participation. The integration models are mainly reservation and insertion, and the stationary land is the prior form for cultivation.

D. Urban agriculture in commercial and business community

The commercial and business area is generally located in the central and sub-central parts of a city. In comparison with other areas, the commercial and business community seems with higher density, more complex context and less functional public spaces for agriculture. So trying to find more fallow land for urban agriculture is the key point.

- **Kallersche Gärten**

This project was aroused by Keller, a 79-year-old grandpa in 2003, on the traffic islands at Barcastraße/Ecke Ackermannstraße. It is located in the center of Hamburg old city as a typical example to make full use of fallow space in commercial and business area.

In the first few years, the garden was the responsibility of the old man dealing with the planting and reservation, but after his death in 2011, more and more citizens around this area even from other parts of the city joined in the urban agricultural activity, opening up more land on the traffic islands and the street green belt. The green plants and flowers not only beautify the environment, but also supply the green agricultural products for the citizens (Figure 8).



Figure 8. The location and image of Hammer Park

Source: <http://www.google.com/maps> & <http://www.kallersche-gaerten.de/>

E. Summary of urban agriculture characteristics in different communities

After the analysis on typical cases of different community agriculture and some further related information from internet and literatures, the writer summarizes the characteristics of different communities in the aspects of integration model, spatial layout and main function (Table 2).

Table 2. The characteristics of different community agriculture

Type	Integration model	Spatial layout	Main function
Residential community	Insertion / Substitution	Fixed / Mobile Ground / Roof	Improve the communication and locally food production
Enterprise organization	Insertion / Reservation	Fixed / Mobile Ground / Roof	Educational and social functions for specific groups
City park	Insertion / Substitution / Reservation	Fixed Ground	Visit and experience the agriculture landscape and activities
Commercial and business area	Insertion	Fixed / Mobile Ground / Roof	Full use of fallow space to create agriculture landscape

2.3.4 Participants involved in agricultural activities

Relying on certain involving people, the community agriculture space has different target groups

according to the types, layouts and functions of it. In this paper, the urban community agriculture is defined in four different types: residential area, enterprise organization, city park and commercial-business area. The demographic structures of the participants, forms of participation and interaction modes vary based on the types of agricultural space.

A. Demographic structures of participants

In the residential community, the agriculture garden is mainly focusing on the residents in this area as their target group because of the proper service radius and the functions of residential agriculture, offering a public space to improve the communication and integration among residents and create a locally production environment. All the ages are invited.

The enterprise organization like school is the specific area for fixed service groups. So the related participants are mainly the people in the organizations. For example, the agriculture space in school is for the students and teachers only on educational and social functions.

For the city park, the urban agriculture is more open to all the citizens in the city for visiting and experiencing, while the commercial-business area is relatively flexible in demographic structure of participants according to the agriculture forms.

B. Forms of participation and interaction modes

Generally speaking, in spite that the enterprise organization is owned to specific groups, participation and interaction modes of other three types of community agriculture include two main forms, unlimited participation and membership participation. The membership form usually exists in the allotment garden, which mainly in the residential community and in some professional parks, while the unlimited participation distribute in all the three types. What's more, no matter of which types, the citizens can experience the entire process from sowing to harvest.

3. Conclusions

Firstly, the paper studied the research background, content and development process of urban agriculture, then defined the study range in the urban community level and selected German city of Hamburg as the research object. Based on the types of agriculture inner the city and the divided basic units of community agricultural types, the writer analyzed a few representative cases, focusing on the integration types, spatial layouts, functions and participants in different community agriculture types.

Conclusively, urban agriculture in Hamburg shows good momentum that urban agriculture works in all the types of residential communities, enterprise organizations, parks and commercial business district, both the forms of variety agriculture gardens in meso-level and small farms in micro-level attached to the buildings and sites.

Due to the low replacement rate of public lands, the integration model in commercial-business area is relatively simple, mainly the insertion; while the city park is most abundant, including the forms of reservation, insertion and substitution. Each community has a variety of agricultural space forms, including ground, roof, fixed and mobile, etc. The main functions of different types have own emphasis, but the core lies the social, environmental, economic integration, which pays more attention to the effectiveness of the social and environmental aspects.

Because of the target groups varying from different community types, the demographic structure, participation forms and interaction patterns are not the same. But all the communities offer participants personally involving in the whole process of production, which makes urban agriculture more practical significance through the communication and interaction with the participants.

4. Reference:

- Cai J., & Yang Z., 2008. International experiences and reference in development of urban agriculture. *Geographical Research*, 27 (2), pp. 362-374.
- Meugeot, L., 2000. Urban agriculture: Concept and definition. *Urban Agriculture Magazine*, 1, pp. 5-7.
- Li, N., Xu, M., & Wang, L., 2006. A Comparison of Urban Agriculture between Countries and its Development in China. *Journal of Jiangxi Agricultural University*, 5(1), pp. 69-72.
- Gao, N., 2012. A Study of the Planning Thoughts and Spatial Mode Based on the Theory of Agrarian Urbanism. Zhejiang University, Zhejiang, China.
- Braunstein, L., 2011. Lessons from the European Green Capital—Hamburg? [online] Available at: < <http://urbanland.uli.org/capital-markets/lessons-from-the-european-green-capital-hamburg/>> [Accessed 18 March 2015].
- European Commission, 2011. Hamburg, European Green Capital 2011. European Commission, Luxembourg, Belgium.
- Meinecke, S., 2015. The Hamburg agricultural support program 2015-2020. [online] Available at: < <http://www.hamburg.de/pressearchiv-fhh/4445196/2015-02-03-bwvi-agrarfoerderprogramm/>> [Accessed 18 March 2015].
- Anonymous, n.d. Community from Wikipedia. [online] Available at: < <http://en.wikipedia.org/wiki/Community>> [Accessed 7 April 2015].
- LGH, n.d. The allotment garden in Hamburg. [online] Available at: < https://www.gartenfreunde-hh.de/ueberuns/zahlen_fakten/> [Accessed 10 April 2015].
- Hannah, A., & Oh, P. (2000). Rethinking Urban Poverty: A look at Community Gardens. *Bulletin of Science, Technology and & Society*. 20(3), pp. 207–216.
- Glöckner, G., n.d. Herbs Garden in Hammer Park. [online] Available at: < <http://www.krautwerke.de/index.php/kraeutergarten.html>> [Accessed 18 April 2015].