Urban Agriculture Development Experiences in the World and its Enlightenments to China

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Abstract. Urban agriculture has now become the trend of the development of modern urban suburban agriculture in the world, which has solved the problems of urbanization and resource allocation in many different developed countries. This paper summarizes and compares the successful experiences of urban agriculture from the United States, the Netherlands and Japan, and then provides some policy suggestions and development ideas to urban agriculture development in China based on the existing problems.

Introduction
Urban agriculture is a cultural phenomenon closely related to the economic, social and cultural development of cities. Its emergence and formation is accompanied by the level of urbanization process, scientific and technological progress and economic development. In many foreign countries, the development of urban agriculture has become increasingly mature during the last century. However, China began to pay attention to urban agriculture since 1990s. At present, urban agricultural in China has not taken place on a large scale, the serious lag of theoretical research obviously restricts the development and exploration of urban agriculture. This article is an analysis of the characteristics and experiences in various developed countries, and explores the mechanism between urban agriculture and economic development. It also provides the enlightenments and implications to the development of China’s urban agriculture and proposes the potential solutions on sustainable urban agriculture.

The Connotation and Main Functions of Urban Agriculture
The concept of urban agriculture originated in Europe at the beginning of the 20th Century and was first generated in Europe, America, Japan and other developed countries or regions. The definition of urban agriculture from Food and Agriculture Organization (FAO) and United Nations Development Program (UNDP) is that: the inner cities and peri-urban areas of agriculture is a kind of integrated economic process of producing, processing, transporting, consuming and then providing agricultural goods and services to the cities, it is also a part of city economy and urban ecosystem [2]. By meanwhile, it depends on the urban technology, talent, capital market, and integrates primary, secondary and tertiary industry with technology, efficiency and ecology in one, provide high quality and pollution-free agricultural products domestically and globally. Also, create a good ecological environment, leisure tourism, promote production, and popularize agricultural knowledge modern agricultural system. This system will spread to the aspects of society, economy, environment and resource allocation.

Urban agriculture mainly has the following three functions. First is economic function: to meet the urban consumers demand on agricultural products, provide safe and healthy agricultural products to citizens. Based on the agriculture production, promotes urban and rural employment opportunities, increase the output of agricultural products and rise farmers’ incomes. Second is ecological function:
agricultural development should be regarded as an important part of ecological construction and incorporated into urban development planning. Agriculture can be used as a green belt between the urban area and the surrounding areas, create green landscaping to ensure the quiet and natural living environment of the cities, also control the further expansion of the cities. Third is social function: provide urban residents with more rural life experience and develop agricultural tourism landscaping, provide leisure vacation living space to the public. In addition, establish more agricultural campus bases with the main purpose of education and training, provide more agriculture-related knowledge to public and professional talents so as to improve the unique connotation of rural areas and promote cultural exchanges between urban and rural areas.

Throughout the development of urban agriculture over the past century around the world, various development models occurred. For example, economic function is the main point of the U.S. model, the main functions of the Dutch model are ecology and export-oriented, Japanese model combines economic, social and ecological functions together. During the next two decades, hundreds of millions of people will migrate to cities and towns in China, many problems such as how to balance and coordinated development of urban and rural areas, how to allocate industrial structure rationally, how to ensure food security and protect the ecological environment are gradually emerging. From the experience of the development of the world's urban agglomeration, it is worth promoting the urbanization mode of urban agriculture in China. Based on the existing literature, this paper will summarize the development experience of foreign urban agriculture with the problems of urban agriculture in China, provides some suggestions and inspirations to China's urban agriculture development.

Table 1. Different Types of Urban Agriculture in the World.

<table>
<thead>
<tr>
<th>Country</th>
<th>Functions of Urban Agriculture</th>
<th>Forms of Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>ecology, landscaping, leisure, education</td>
<td>medium size family farms</td>
</tr>
<tr>
<td>Germany</td>
<td>farming experience, leisure</td>
<td>citizen farms, different forms of cooperatives</td>
</tr>
<tr>
<td>Netherland</td>
<td>export-oriented, landscaping</td>
<td>family farms, internationalization, specialization and high-technology</td>
</tr>
<tr>
<td>United States</td>
<td>export-oriented</td>
<td>family farms, large-scale production</td>
</tr>
<tr>
<td>Japan</td>
<td>economy, society, ecology</td>
<td>small size, industrialization, intensification and modernization</td>
</tr>
</tbody>
</table>

(Source: summarized and adapted from FAO)

Urban Agricultural Experiences in Foreign Countries

United States

From 1950s to 1970s, the world's earliest agricultural production system was occurred in the United States. Based on the abundance of land resources, government allocated the specialized large-scale family farms (or citizen farms) among big cities, in the form of mutual assistance between farms and communities, make the connection between consumers and farmers closer. It is not only increasing food supply regionally, but also promoting the local agricultural development and realizing the mutual reciprocity and mutual benefit. New York City currently has more than 600 community-supported farms, whose primary function is to provide citizens with high-quality, safe
agricultural products with lower prices. Most of these family farms were operated by urban low-income groups and communities, bring more jobs and incomes for them. At the same time, the community also provides a stable sales channel for farmers so that ensure the quality of agricultural products and achieve a win-win situation.

In meanwhile, the United States has established the thorough and advanced logistics system (e.g. land, sea, air transportation modes) and sales system that covers urban and rural areas to ensure the logistics and transportation of agricultural products. Relying on the information release system in agricultural market, farmers can easily to obtain the information of price fluctuations, market incentive policies and other useful agricultural policies at home. In addition, a variety of integrated agricultural production and sales organizations becomes more and more. The first type is various companies which providing production factors to farmers, such as pesticide manufacturing companies. Second type is alliance organizations or the various technical and information associations which were spontaneously organized and voluntarily joined by farmers. The next is joint enterprises which were built by signing cooperative contracts among industrial, commercial enterprises and farmers, such as trade enterprises and processing enterprises. Fourth, different types of cooperatives come from farmers’ joint investment for providing production factors and distributing goods were established in the market.

In addition, the United States has established a relatively perfect legal system for agricultural development, especially in the areas of agricultural subsidies and price control. All these have maintained the stability of the agricultural product market and ensured the trading in agricultural products, thus protecting the interests of domestic farmers.

Netherlands

The Dutch urban agriculture mode pays more attention to the coordination and sustainable development of agriculture and natural environment. Netherland is a country with relatively few agricultural resources and land, but with relatively high level of population. However, since the 1960s, it became the third largest agricultural exporter in the world, especially in the export volume of some agricultural products, such as flowers, vegetables and potatoes, ranking the first position in the world and making the exporting incomes per capita rank top in the world. The processing bases of those agricultural products are located in the suburbs of the city, so it can be seen that urban agriculture plays a major role in the development of the Dutch economy.

Amsterdam is a major representative of urban agriculture based on export-oriented. It mainly develops animal husbandry and horticultural export-oriented agriculture. Amsterdam combines cultivation technology, biotechnology and automatic management technology to develop flower and vegetable planting industry, especially in export-oriented horticulture industry, so that the flower exporting from the Netherlands accounts for nearly 60% of the total global trade. Because the greenhouse industry in urban agriculture gets rid of the constraints of land and climate, the planting process can be arranged according to a specific time, and the process production can also be achieved in the later stages of packaging and sales.

From the successful experience of urban agriculture in the Netherlands, it can be seen that urban agriculture not only meets the daily food needs of local urban people, such as meat, eggs, dairy products, vegetables, etc., but also sell the surplus products to overseas market to earn incomes. Rely on Rotterdam, which is one of the world's busiest ports, Dutch advanced communication systems also promote the development of agriculture, nearly 58% of exported agricultural goods were transported from this port and Schiphol airport to the rest of world. In order to develop agricultural advantage, the Netherlands also carried out land reclamation, which push agriculture to the high level of industrialization and yield. Also, Dutch agriculture was integrated into the urban environmental management system and establishes a sound waste treatment program. The recycling of organic waste also greatly reduces the cost of environmental protection for the government and relevant departments. Therefore, the urban agriculture in Netherlands also shows the functions of environmental protection, ecology and landscaping.
Japan

Japan has less resources and limited lands but with large size of population. In order to maintain the ecological balance, the forms of green island agriculture and high-tech agriculture has been built. At present, it is mainly located in the Tokyo circle, the Tokyo-Kyoto circle and the Osaka circle. With the aid of high technology and government support, high-rise agriculture and underground agriculture were developed to improve land productivity and create a modernized, intensive and high value added urban agriculture. For example, according to the urban layout scheme, Japan has reserved the farmlands which are less than 5 hectares and larger area of farmland (bigger than 5 hectares) in the urban area with dotted and sheet distribution. Residents in the city can grow vegetables and flowers by using the idle land, and carry out "flower arranging" agriculture. Planting green potatoes and sweet potatoes in the high-rise buildings and basements of Japan Telecom in the city of Tokyo not only provides sun-shading function but also improves the space utilization within the city. Subsequently, the connotation of urban agriculture in Japan also keeps expanding. Urban agriculture not only provides local residents with green and high-quality agricultural products, but also changes the original extensive style of production to mechanization and specialization, and solves the problems of low level of production profits and small land area. On the other hand, farmers provide agricultural products to citizens through stable sales channels also promote the mass production of green agricultural products and innovate networked management pattern. Such green agriculture simultaneously promoted the local leisure, tourism, experience agriculture and other functions of urban agricultural.

Japan's successful experience is mainly attributed to the government's policy support and the improvement of the quality of the agricultural labor force. Combination of economic, ecological and leisure agriculture functions can reduce the cost of government expenditure on environmental protection. Additionally, farmers in Japan are easily to improve the productivity and quality of agricultural products based on various forms of organizations and high level of technologies, therefore ensure the supply on agricultural products and raise farmers' incomes.

Enlightenment for the Development of Urban Agriculture in China

Uphold Multi-functional Urban Agriculture

In the process of urban agriculture development in China, we usually attach importance to economic function but ignore ecological and social functions. Due to the shortage of agricultural talents in China and the imperfect laws and regulations, many places blindly develop tourism, sightseeing or experiential agriculture in order to generate incomes but bring serious damage to the ecological environment. Therefore, China must focus on the national conditions of overpopulation and insufficient ecological environment capacity, promote the production function of urban agriculture mainly and with the considerations on ecological and service functions so that distribute agricultural land rationally. In such a way, we can not only ensure the safe supply of agricultural products, but also increase the rate of employment and promote the unique culture of rural areas. Through the combination of the primary, secondary and tertiary industries, personal and industry incomes could be raised dramatically.

Strengthen Government Intervention and Supporting

The government should give preferential policies to urban agriculture. In the process of developing agriculture, some parts of the land should be reserved as the basic resources for leisure agriculture, sightseeing and experience agriculture. Urban agriculture should be incorporated in urban development planning, introduce relevant agricultural regulations and legislations to regulate and solve various problems so that ensure farmers' interests. Establish a secure and stable supply chain of agricultural products, combine urban agriculture with major projects such as the environment, education and leisure to build a sustainable development urban management system. On the other
hand, government should actively encourage financial institutions, enterprises and individuals to invest in urban agricultural sector, accelerating financial supporting and realizing high rate of return.

Create New Forms of Marketing and Logistics System with Science and Technology

At present, China's agricultural production technology and productivity still stays at a lower level. In the future, government should provide more technical trainings to farmers, so that they can understand the knowledge of technology and management. Also, professional personnel trainings must be offered by agricultural colleges and universities to promote the transformation of agriculture from traditional type to high-technology farming industry. In particular, agricultural sector should provide more high-technology related products and services, combine agricultural production, green technology, new technology and information technology to upgrade the quality of products, expand the market and realize the development of high technology and high level of output. In addition, advanced and necessary storage and logistics supporting for agricultural products is also useful to develop urban agriculture. According to the characteristics and timeliness of agricultural products, new forms of marketing operation must be created, such as market intermediary organizations and brokers. Explore the new ways of sales, for example, producing direct sales, on-line sales, store direct sales, etc., to provide sound urban agricultural logistics system.

Develop Featured and Branding Urban Agriculture

China is a vast country with varied agricultural resources, urban agriculture should make full use of local absolute advantages and resources. In some areas, such as large cities along the east coast of China, export-oriented urban agriculture can be developed to satisfy the functions of leisure agriculture, experience agriculture and ecological protection. In some traditional grain-producing areas, such as the central and northeastern of China, the implication of development of urban agriculture can be learned from the mode of United States: develop industry sector and apply new species and modern technologies to develop high-tech and high-quality agriculture. For the western region where the ecological environment is relatively weak, China can utilize local cultural heritage and natural resources to develop tourism agriculture, ecological agriculture, etc., and create a featured and branding urban agriculture.

Conclusion

To sum up, the successful experience from the United States, the Netherlands and Japan gives a lot of references and inspirations to the development of urban agriculture in China. But that doesn't mean China can copy their model of success in developing urban agriculture directly. Since different political, economic and social environments exist in different countries, a set of urban agriculture system and related policies must be made in line with China's own national conditions and characteristics in order to realize the rapid and healthy development of urban agriculture in China.

References


