



PRACTICAL FOUNDATION OF URBAN AGRICULTURE DEVELOPMENT AND LESSONS FOR THAI NGUYEN PROVINCE, VIET NAM

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Abstract

In recent years, the agricultural land area of Thai Nguyen province has been narrowed down to give way to urban development and industrial development. Urban agriculture development is an indispensable direction, creating food safety products with high quality, protecting the ecological environment and increasing income for workers. Urban agriculture in the world has been around since quite early, around the 90s of the twentieth century. In Vietnam, some provinces have also developed urban agriculture, typically Ho Chi Minh City, Hanoi, Da Nang, Hai Phong. Secondary data sources are analyzed and synthesized by descriptive statistical methods, comparative statistics. The research results analyze the practical basis of urban agricultural development in some countries in the world and in Vietnam. On that basis, the study offers lessons for urban agricultural development in the province.

Keywords: Urban agriculture; Practical basic; Cultivation; Livestock; Thai Nguyen province

INTRODUCTION

In many developing countries, urbanization is accompanied by increasing urban poverty and environmental pollution, increasing food insecurity and malnutrition; and the unemployment rate is on the rise. Urban agriculture represents an opportunity to improve food supplies, health conditions, local economy, social inclusion, and environmental sustainability. Urban agriculture

is present around the world with a variety of farming systems. Urban residents 25–30% are involved in the agricultural sector worldwide. Urban agriculture is recognized for its benefits and services because of an increasing urban population and rural-to-urban migration.

In fact, after the rapid urbanization process, the urban population accounts for more than 50% of the world's population. The census in 2019 shows that in the 10 years since 2009, rapid and widespread urbanization in many localities has had an impact on the population increase in urban areas. The population of urban areas in Vietnam in 2019 is more than 33 million people, accounting for 34.4% of the total population of Vietnam, the proportion of the population in urban areas increases by 4.8% compared to 2009. Provincial population Thai Nguyen is 1,286,751 people, ranking third in the provinces in the Northern Midlands and Mountains. After 10 years, the province's population increases by 163,635 people, the average population growth rate is 1.36% / year [2].

The land area is increasingly narrowed for urban development, the labor force in agricultural production also decreases due to the increase of people of working age to work in companies and factories. Labor in the peri-urban areas lost their land without a job, while workers in urban areas still have a living by farming. One of the solutions worthy of attention is urban agricultural development (UA), the direction that has created many products as well as increased income for workers. The article analyzes the practices of UA development in some regions in the world and in Vietnam, analyzing the results achieved by the development of UA in Thai Nguyen province. Then give lessons to the province and propose some solutions in this activity.

RESEARCH METHODS

Methods of investigation and document collection

The article collects secondary and primary documents. Secondary documents include maps, statistical yearbooks, planning projects, research topics, dissertations, books and magazines published at home and abroad. These documents mention the theoretical issues, research methods, aspects of UA development in general.

Methods of analysis, synthesis, comparison

The article analyzes the practical basis of UA development of some countries in the world and of Vietnam based on collected documents. In addition, the article compares data in terms of space and time to see the trend and level of variation in the development of UA in Thai Nguyen province.

RESULTS AND DISCUSSION

Practical basis for urban agricultural development

Practical basis for urban agricultural development of some countries in the world

UA in the world has appeared quite early, when the process of urbanization takes place at a rapid rate, can UA really develop. The book “Urban agriculture: Food, jobs and cities sustainable” showing the history of UA in 1996 only appeared in a few places, the current combination of city farming systems was formed mainly by These eight factors are: Continuity of historical practice; Nature of animal domestication and its relationship with humans; Natural and man-made environmental concept and management; Industrial and agricultural revolution; The global information revolution; Rapid urbanization after the second world war; Contemporary urbanization settlement patterns; Strong expansion of the low-income urban segment. The oasis towns of Iran are the original example of UA. In Mexico there is a system of aqueducts that incorporate multi-crop systems for the cultivation of water and soil. Similar systems were then studied in Ghana and China.

Table 1: Selected data on the extent of urban agriculture

Country	Extent of urban agriculture
<i>Africa</i>	
Mali	<i>Bamako</i> is self-sufficient in horticulture products and some products are shipped outside the metropolitan area for consumption.
Uganda	In <i>Kampala</i> , 70 percent of poultry needs (meat and eggs) are produced inside the city.
Zambia	In <i>Lusaka</i> , subsistence food production accounts for 33 percent of the total consumption by squatters.
<i>Asia</i>	
China	In the 1980s, over 90 percent of vegetable demand and over half of meat and poultry demand in China's 18 largest cities was met through produce grown in urban provinces.
Indonesia	In <i>Jakarta</i> , almost 20 percent of the food consumed by squatters is self-produced.
Nepal	In <i>Kathmandu</i> , 37 percent of food producers surveyed met their household plant food needs and 11 percent met animal food needs.
Singapore	Eighty percent of the poultry and 25 percent of the vegetables consumed are produced within the city.
<i>Europe</i>	
Romania	With new government policies and programs, from 1992 to 1998, urban production increased from 14 to 26 percent of all agricultural production.
<i>Americas</i>	
Cuba	From 1992 to 2000, urban food production increased by 300 percent and children are eating four times as many vegetables as they were a decade ago.
USA	Thirty percent of agricultural products in the country are produced within metropolitan areas.

Source: Data compiled by The Urban Agriculture Network from various sources.

Japan:

The urban agriculture in Japan was defined as “a special form of agriculture, allocating in the industrial, commercial and residential districts in urban or peri-urban areas.” (Aoshika; & Kondō, 1935). Moreover, it was also characterized to have high productivity and close attachment to urban economy (J. Yu, et al., 1998).

Despite being a highly industrialized country, the presence of agricultural land use is a common feature on the urban landscape of cities across the nation. Almost one-third of all agricultural output in the country is, in fact, generated by urban agriculture. Likewise, urban farmers account for 25% of farming households in Japan. Japanese urban agriculture is more productive than its rural counterparts. According to 2010 data from the Ministry of Agriculture, Forestry and Fisheries (MAFF), urban fields are the most productive kind of agriculture in terms of economic value of production per area — 3% more productive than the national average. In terms of revenue per farmer, urban agriculture is two times more profitable than inter-mountainous agriculture and around 10% more so than agriculture in rural plain areas. Even in Tokyo, one of the largest and most congested cities in the world, among the intricate networks of railways, roads, buildings and power wires, local agriculture produces enough vegetables to potentially feed almost 700,000 city dwellers. [4]

In just the past decade, agricultural land use has diminished by over 40% because of urbanization-related impacts, even though the population of the country has remained stable. The number of people practising agriculture in urban areas also has decreased dramatically. The other major factors posing a challenge to urban farming are: *Aging of farmers, Tax barriers, Commercialization, Productivity shift.*

Despite the hurdles, opportunities do exist for strengthening the roles of Japanese urban agriculture for sustainability and local well-being, including governance, economic, environmental and social aspects. The opportunities that must be mentioned are: New conceptual approaches; Urban residents are increasingly interested in agriculture. According to a recent study by MAFF, over 85% of Tokyo residents would like their city to have farmland in order to secure access to fresh foods and green space. In some highly industrialized cities, such as Kawasaki and Nagoya, demand for gardens surpassed supply by over 300%[4]. Beside, Innovative finance mechanisms: payment for urban ecosystem services and biodiversity. Cities across the country are developing urban regeneration policies aimed at restoring the urban landscape for improved local environment and well-being.

In a technology country like Japan, urban agriculture offers a fertile ground for green innovation. By linking its technological potential to the principles of sustainable agriculture

rooted on the traditional farming and food cultures, Japan could play a leading role in urban agricultural innovation, inspiring other countries to follow suit.

China:

Urban agriculture is the practice of incorporating farming into city areas through mixed land use and innovative techniques that allow cultivation to occur on much smaller plots of land. In China, it's become popular across the country as a means to promote urban sustainability and resilience by bringing food production closer to consumers and reducing its environmental footprint; encouraging awareness of food safety in response to major health incidences; and promoting environmental stewardship as urban air and water pollution proliferate in new cities. Beijing is one of the early pioneers for integrating urban agriculture into its strategic development plans and acts as a pace-setter in many ways. Beijing's municipal government launched an official programme encouraging multi-function urban agriculture in peri-urban areas by supporting the development of “agro-parks”, which not only produce food but also attract tourism.

The city government has made several moves to help protect this relatively new sector. The government has begun assessing the financial value of urban agriculture, urban agriculture – not just in terms of products but also its contributions to the social and environmental fabric of the city.

Urban farmers are encouraged to establish cooperatives to take advantage of their combined scale and bargaining power in buying farming materials and marketing their products. Through these cooperatives, the government can provide subsidies to encourage growth, including selling less polluting organic fertilizers and pesticides at lower prices. This both reduces costs for farmers and improves food safety.

USA:

GDP of the US is 14 660 billion USD in 2010, agriculture only accounts for 1.1% of GDP. Employment in agriculture, forestry and fisheries accounts for 0.7% of the total 153.9 million employees in the United States. However, American agriculture is a very typical model of industrialization and modernization. American agriculture is also the most abundant and diverse in the world. About 7% of the farms get an average of 250,000 USD or more. The output of the main agricultural products of the US (2006) is corn - 10.5 billion bushel (1 bushel = about 22-27 kg, depending on the type of agricultural product)

Urban agriculture in the United States is an increasingly popular issue for many, from urban dwellers to policy makers. Urban agriculture offers many potential benefits to urban

areas, such as green space and access to fresh food for urban consumers. For these reasons, urban agriculture has captured the attention of city residents and policymakers. Food policy councils and city governments around the country, in cities including New York, Baltimore, and Chicago, have explicitly incorporated suggestions for their local food environments intended to facilitate the expansion of urban agriculture (Goldstein et al., 2011; Hodgson, 2012).

Urban agriculture refers to growing plants and raising animals within and around cities. Farming in the city presents many challenges, some of which are common to all types of farming, and others unique to the urban setting. Urban farmers face significant knowledge gaps and institutional barriers (Pearson et al., 2010). Time restrictions and funding for technical assistance staff are also challenges (Surls et al., 2014).

Practical basis for urban agricultural development in Viet Nam

Since the end of the 20th century, UA has become a trend in the process of urban development in many countries. In the world, nearly one third of vegetables, fruits, meat and eggs supplied for urban areas come from urban agriculture, 25-75% of urban households develop according to urban agriculture model.

In Viet Nam, urban development, service industry and agricultural land fund are increasingly narrowed; This fact requires local leaders, the agricultural sector as well as farming households to change their thinking in agricultural production, implement a strong transformation of the structure of crops - animals, thereby opening up the direction development for UA.

Hanoi:

Hanoi is the capital of Vietnam. Hanoi has the highest urbanization rate. Many old peri-urban areas are in the planning of new urban areas, economic and political centers of the capital in the near future. Urbanization has brought many positive factors for the development of this area such as upgraded technical infrastructure systems, people's access to social facilities such as culture, health and education have been improved, and people's incomes have improved. However, the high speed and spontaneous urbanization has also brought negative impacts on the peri-urban area of Hanoi.

Hanoi has been giving priority to agricultural development both in urban and peri-urban areas. In urban areas, agriculture exists in urban areas and peri-urban areas in our country for a long time. Hanoi has vegetables: Lang basil, Tay Tuu vegetables, Ngoc Ha flowers, Nhat Tan peach, Dam Set anabas, West Lake fish and shrimp, water spinach in ponds, canals.

The capital is an area that both produces and associates with a large consumer market and has many central research units on agriculture. Therefore, it has advantages over other provinces in applying new science and technology. Hanoi also has large enterprises in the animal husbandry sector, many food processing factories, and seed production establishments to handle agricultural output.

In order to have clean vegetables, many households planted vegetables in ornamental pots, foam boxes, even renovated the rooftop into a vegetable garden, some households started growing vegetables by the hydroponic method on balconies and terraces.

Currently, Hanoi has supplemented and completed the planning for agricultural development and rural construction of the capital; building a stable consumption market for agricultural products with a system of commercial establishments throughout the regions; to encourage organizations and individuals to cooperate directly with farmers and production cooperatives. High quality agricultural products gradually replace imported products and serve for export; promote land consolidation and exchange; improve production level for farmers.

Ho Chi Minh City:

Ho Chi Minh City is the place with the fastest urbanization rate in the country. UA development is very suitable with land conditions, climate, hydrology, science and technology, especially people and large consumption markets. The city has many incentive and supportive policies to develop urban agriculture. The initial results of accelerating the restructuring of urban agricultural production are creating jobs for many local workers, increasing income, contributing to poverty reduction, environmental improvement, and contribute to the growth of city agriculture.

Currently, the city has high-tech agricultural centers such as: High-tech Agriculture Park (Cu Chi), Biotechnology Center (District 12), Fisheries Center (Can Gio), Cow Experimental Farm High-tech milk - Israeli cooperation (Cu Chi). The goal is to create high-quality crops and animals, specialties, fertilizers and techniques to provide for local and market demand.

In addition, in the context of inefficient rice cultivation due to low economic value and frequent natural disasters, households turn to safe vegetable production because of a small investment capital and production time. However, due to individual production, it is difficult to consume products. When vegetables have high prices, traders can buy them, when the market drops, traders do not. Therefore, many farming households have linked together, from which many cooperatives and cooperative groups were formed. These forms of association have brought about high efficiency from production to consumption.

Binh Duong:

Binh Duong is also one of the provinces with high urbanization rate. Therefore, urban agriculture was soon paid attention, the value of agricultural production continued to increase. Thu Dau Mot city can be taken as a typical example for the strong development of urban agriculture.

Due to the urbanization process, the agricultural land area of the city is only about 2,655 ha, accounting for 22% of the natural land area and only 4,118 laborers are left to serve agriculture.

However, the value of the agriculture, forestry and fishery sector reached 50.6 billion VND, the average output value per 1 hectare cultivated a year reached 69.4 million VND. This is an effort to shift from trees of low economic value to high economic value trees suitable for urban agriculture such as growing vegetables, orchids, flowers and fruit trees. Small-scale breeders have also switched to concentrated breeding with larger models in households and farms.

However, the formation of UA in the province is not clear; Although people have paid attention to building agricultural models to suit the increasingly rapid urbanization process such as growing sprouts, growing mushrooms, growing hydroponic vegetables, models of growing orchids, and cultivating orchids, ornamental plants, breeding special animals with high economic value. Cause: The new models require farmers to be quick in acquiring and applying scientific and technical advances and grasping the needs of the market; High investment capital is also difficult, on average investment for these models is from 30-40 million VND; Especially the investment capital for orchid growing models is usually very large. These UA models have an income of 8-10 times higher than traditional farming models.

Da Nang:

Da Nang is one of the localities with quite unique urban agricultural models. In recent years, there are regulations on prohibiting raising cattle and poultry in urban areas, and the transformation of crop-livestock structure has been quite active.

The most remarkable achievement is the profession of making ornamental organisms, growing sprouts, and mushrooms, which have created valuable products. Since then, many farmers have the opportunity to access the profession of growing flowers and ornamental plants. The Da Nang Fisheries-Agriculture-Forestry Extension Center and Hai Chau District Economic Office have opened many technical training courses for farmers. As a result, the model of growing flowers and ornamental plants in Da Nang develops very quickly. Currently, every district has an Ornamental Biology Association and a product display area. Some households grow up to 10,000 pots of chrysanthemum / crop, more than 5,000 ornamental

plants, earning 300-400 billion VND / year. In addition to growing flowers and ornamental plants, the production of green vegetables serving the city is also prioritized for development and brings high efficiency.

Hai Phong:

Although the cultivated area decreased, the value of agricultural production and the yield of crops increased. The city has developed many areas specializing in the production of cashew agricultural products that meet the needs of urban consumption and export. Increase the production value of many fields and gardens to about 100 million VND / ha. It has developed industrial-oriented livestock and poultry breeding facilities. The city has 9 concentrated breeding areas, a total area of 147.5 hectares with 142 farms, including 35 pig farms, 107 chicken farms with a scale of 5,000-8,000 heads / farm. Livestock farms focus on effective production, disease rarely occurs, ensure food safety, environmental protection.

However, the city's agriculture faced many difficulties and challenges. Rapid urbanization has negatively affected agricultural sustainable development. Every year, more than 1,000 hectares of agricultural land is devoted to urban development and projects; Farmers lose farmland along with lack of jobs, widening the rich-poor gap; environmental pollution arises. In that context, the development of sustainable urban agriculture is an important orientation.

In 2019, Hai Phong has 2 agricultural zones with high technology application with an area of 222.35 hectares; 3 high-tech flower production areas: 5ha; concentrated breeding area: 20 ha; 1 region of soybean production for export: 120ha. In 2020, Hai Phong has 2 enterprises that have applied for investment policy in 2 hi-tech agricultural areas with the scale of 203 ha.

General assessment of UA development in Thai Nguyen province

Result

Thai Nguyen is a mountainous province located in the Northern Midlands and Mountains, agricultural land accounts for 31.77% of the total land area, so agricultural production remains the main industry (93- ninety four%). This is a high proportion in the provincial cities.

In the period 2015-2019, the value of agricultural production has a growth rate of 3.47%. The value of agricultural production is increasing and larger than the value of forestry and fishery production. The production value of the crop, livestock and agricultural services sectors increases over the years from 2015 to 2019.

Table 2: Output value and structure of agricultural production of Thai Nguyen in 2015-2019 (constant 2010 prices)

Chỉ tiêu	2015	2016	2017	2018	2019
Output value (bill. dong)	10.565,1	11.284,0	11.718,6	12.164,8	12.529,6
- Cultivation	5.090,0	5.121,0	5.228,5	5.322,5	5.508,1
- Livestock	4.661,6	5.257,9	5.494,5	5.787,1	5.875,1
- Service	813,5	905,1	995,6	1.055,2	1.146,3
Structure (%)	100,0	100,0	100,0	100,0	100,0
- Cultivation	48,2	45,4	44,6	43,8	44,0
- Livestock	44,1	46,6	46,9	47,6	46,9
- Service	7,7	8,0	8,5	8,7	9,1

Source: Thai Nguyen Statistical Yearbook 2019

- The agricultural growth rate of the province is quite good. The agricultural structure has had positive changes. The proportion of the livestock industry increases from 2015 to 2018 and is one of the provinces with a high proportion of livestock production in the country. The province's agriculture is shifting from traditional production to cultivating high-value products suitable to the needs of urban residents.

- Cultivation industry: the production value has increased and the area of trees has high economic value. Food crops with seeds have the highest scale of production value and proportion, exceeding those of other annual crops. Thereby, it shows that solving the food problem is still very important to the province. However, in 2015-2019, the value of the grain food group has gradually decreased. The second most valuable crop group is vegetables, beans and flowers. Thereby, we can see the strength in vegetable production in Thai Nguyen as well as the task that UA has to provide green vegetables to the people in the city. The second most valuable crop group is the perennial industrial crop, which has grown relatively rapidly in recent years, with the strength that has been promoted, which is the value of tea products.

- Animal husbandry: In 2015, the proportion of the livestock industry (accounting for 44.1%) ranked second after the farming industry (accounting for 48.2%), by 2019 the proportion of the livestock industry ranked first (accounting for 46.9%). The industry has grown both in herd size and output. Livestock are focused on vigorously developing are poultry and pigs. In 2019, the production value of poultry accounts for 60.03% and that of pigs accounts for 33.08%.

- A number of production-consuming chains have been formed. Since then, building quality products and basically meeting market requirements such as high quality rice, safe vegetables, safe tea according to Viet gap standards.

- Some agricultural tourism models have been formed and developed. With the purpose of serving the needs of entertainment for the community; improve income for farmers. For example, the model welcoming tourists to experience tea hills and processing tea, learn about the history and origin of tea trees: Thai Hai eco-tourism area; Yasmi farm ecotourism area in Cao Ngan, Vo Nhai district.

Exist

- The growth of agricultural production value is not stable, it is not commensurate with the current potential. Demand for association is not high because production is still small and fragmented.
- The application of high technology in production is still slow. There are few high-tech agricultural products. The area of high quality rice and safe vegetables still accounts for a low rate.
- The production value of the service is still low. Service activities are simple, not commensurate with the role, position and requirements of UA development in Thai Nguyen province.

Lessons learned for urban agricultural development in Thai Nguyen province

- It is necessary to focus on developing specific products and products of UA's strengths (safe vegetables, special flowers, fruit trees). In particular, it is advisable to choose a number of crops and animals that can be produced intensively in conditions of little land and high economic value to focus on development. Improve urban living environment; Agricultural development for rest and relaxation.
- It is necessary to accelerate the application of technology to quickly increase productivity, quality, added value, and ensure food hygiene and safety; branding for each type of agricultural product.
- Provincial agencies should review to have a set of policies to support infrastructure, farming techniques, high technology application, financial policy. This encourages the economic development of the cooperative; ensure social security and health safety for consumers.
- There should be policies to encourage businesses to invest directly or associate with cooperatives to organize production and supply of urban green agricultural products.
- The province has an equal policy to encourage cooperatives, organizations and farmers to participate in the market in many different forms. Create sales clusters for these manufacturers, help them build brands. This will create a unique character for each urban area.
- Building a model of UA combined with ecotourism services.

CONCLUSION

UA has become an economic sector with an important role in the world. For Vietnam and Thai Nguyen province, urban agriculture is gradually contributing a role in socio-economic development. Research on the practical basis of urban agriculture in some countries in the world and in Vietnam, it can be seen that UA in Thai Nguyen has the advantages of geographical location, consumption market, human resources and scientific potential. These are favorable conditions for the development of UA in the direction of concentrated, high-quality production of goods. The agricultural growth rate of the province increased by 3.48%, contributing 0.36 percentage points to the general growth rate. The agricultural structure has had positive changes. The proportion of livestock has increased over the years. The province's agriculture is shifting from traditional production to the cultivation of high-value crops and animals that suit the market demand. However, the province's UA also faces many challenges such as agricultural labor, degraded infrastructure system, technical facilities and decreased agricultural land area. To promote UA in Thai Nguyen developed the authors have given the province experience in this activity.

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