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Development of Urban Agriculture, an Inevitable Trend of Agricultural Economy in the World and In Vietnam

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***SUMMARY**: In the process of socio-economic development of our country in particular and the world in general, urbanization is an objective inevitable process. Urbanization in pre-industrial conditions is less associated with internal factors that motivate the urban economy, which has aggravated the major difficulties of urban areas such as: A part of the agricultural labor force loses its land for production, becoming unemployed; a part of the population from rural areas moves to urban areas to work, increasing the demand for food, foodstuffs, and the problem of urban environmental sanitation is also seriously affected; Air pollution, water pollution are inevitable... These are factors that threaten the rapid and sustainable development of today's cities. Among many solutions, developing urban agriculture is considered an optimal direction with high feasibility to solve the related problems in the urbanization process, towards building sustainable ecological cities for the future.*

***Keywords**: Urban agriculture, trend, economy, world, Vietnam*

I. Problem statement

Vietnam is a developing country, so the urbanization process is taking place strongly in large urban areas and suburban rural areas. In fact, centrally-run cities such as Hanoi, Ho Chi Minh City, Da Nang, Hai Phong, Can Tho, and class I cities in the period 2010-2020 tend to expand space from the urban core to the outskirts.

The urbanization rate in Vietnam increased very rapidly from 19.6% with 629 urban areas in 2009 to about 39.3% with 833 urban areas in 2020. Vietnam's urban population density is very high, especially in large cities such as Hanoi with 2,398 people/km2 and Ho Chi Minh City with 4,292 people/km2. The ratio of green trees per capita in Vietnamese cities is from 2 - 3 m2/person, a very low level compared to the minimum requirement set by the United Nations of 10 m2/person. Meanwhile, most cities in the world have reached 20 - 25 m2/person, many modern cities in the region and in the world from 30 - 50 m2/person such as: Singapore 30.3 m2/person, Seoul (Korea) 41 m2/person, Berlin (Germany) 50 m2/person, Moscow (Russia) 44 m2/person, Paris (France) 25 m2/person...

Along with that, the problem of air pollution, noise and urban waste has been and is an urgent problem in Vietnam's urban areas. In large cities such as Hanoi, Ho Chi Minh City, or cities with strong industrial activities such as Viet Tri (Phu Tho), dust pollution is still at a high level, especially in areas near major traffic routes. In these cities, the number of days with AQI at poor, bad (AQI=101-200), and very bad (AQI=201-300) air quality index accounts for a large proportion. Typically, in Hanoi, the number of days in 2014 with AQI at poor level accounted for more than 50% of the total number of monitoring days in the year, and there were even days when air quality declined to very bad and dangerous levels (AQI over 300). Air pollution causes illness, both immediate and long-term, and is a factor that seriously affects the quality of life of the people. According to the World Health Organization (WHO), in 2006, 777,000 people died prematurely worldwide due to exposure to air pollution, of which 531,000 died in Asia, accounting for 68%.

According to the research results of the National Science Program Project No. 23 conducted by the Department of Health, Ministry of Transport in 2011-2012, the rate of people suffering from respiratory diseases in Hanoi is 1.3-1.5 times higher than in Ho Chi Minh City. International data shows that labor productivity increases by about 5% when people work in a good quality, comfortable air environment.

The rapid urbanization process in suburban areas in Vietnam is raising the need for a strategy for developing urban agriculture in the overall national strategy for sustainable development to not only meet people's needs for fresh, safe food and residents' convenience needs, but also meet the urgent requirements of improving a clean living environment, creating a smart, livable urban landscape and architecture for the present and the future.

II. Urban Agriculture

In developed countries, the concept of urban agriculture (UR) has been mentioned for about 20 years along with the theme of sustainable development. UR is understood as the use of small areas, vacant lots, gardens, lawns, balconies, terraces... in big cities to grow trees or raise poultry and small livestock in accordance with land, climate, and hydrological conditions, ensuring ecological balance, ensuring landscape aesthetics, creating production efficiency, economic efficiency, and at the same time contributing to improving environmental quality..., then, all or part of the products are commercialized. Urbanization has narrowed the area of agricultural land, increased the number of city residents; climate change has strongly impacted farming conditions, increased temperatures and erratic rainfall have severely affected crop seasons... have created conditions for urban agriculture to develop in many places around the world.

Urban agriculture in English is called Urban agriculture or urban farming or urban gardening. Urban agriculture is understood as an economic sector in and around urban areas, producing, processing and supplying people with food, fresh food, flowers, organisms and ornamental plants; Using organic and high-tech farming methods that do not require much land, do not pollute the environment, use and reuse natural resources and urban waste; increase green space and relaxation opportunities for urban people. Regarding the concept of urban agriculture, many organizations, researchers and planners have mentioned it from many different perspectives, in general, urban agriculture can be understood as the process of producing agricultural products from raw materials, preserving, processing to consuming products suitable to land, climate and hydrological conditions, ensuring ecological balance, creating production efficiency, economic efficiency, and at the same time contributing to improving environmental quality. This process takes place in interspersed or concentrated areas in urban areas including inner cities, border areas and suburbs.

The current trend is that urban agriculture has the ability to develop according to specialized models such as creating urban landscape spaces, providing many services for urban areas such as providing trees, fresh flowers and food for hotels, providing tourism services, nursing services... urban agriculture can also reuse urban waste to make fertilizer, irrigation water..., contributing significantly to reducing environmental pollution. Compared to traditional farming, urban agriculture is more efficient; more sustainable; organic products become more accessible; create small, friendly spaces; allow enjoying fresh products all year round, and simply. urban agriculture has been and is contributing greatly to participating in solving the difficult problems of countries in the process of urbanization. urban agriculture will continue to be the solution and strategic direction for the rapid, sustainable development of ecological cities in the future.

III. The development of urban agriculture in the world

Since the end of the 20th century, urban agriculture has become a trend in the process of urban development in countries. According to the annual report of the Food and Agriculture Organization of the United Nations (FAO), in 2008, "nearly 1/3 of the amount of vegetables, fruits, meat, and eggs supplied to urban areas in the world came from urban agriculture, 25 - 75% of urban households developed according to the urban agricultural model" (FAO Report: Overview of the world food situation 2008.) Many famous cities in the world strongly develop urban agriculture. In Moscow (Russia), 65% of families have urban VAC models, in Dacxalam it is 68%, Maputo 37%,... In Berlin (Germany), there are 80,000 urban vegetable gardens; tens of thousands of residents in New York (USA) have rooftop vegetable gardens. In many large cities in China such as Beijing, Shanghai, Guangzhou..., urban and suburban agriculture provides up to 85% of the demand for green vegetables and 50% of the demand for meat and eggs of the people. According to the US National Gardening Organization,

in 2007, the US people spent about 1.4 billion USD on growing vegetables and fruits at home, an increase of 25% compared to 2006.

Some typical countries in the development of urban agriculture today.

In Cuba, urban agriculture is strongly developed to provide fresh food on the spot for urban residents, thanks to which the capital Lahabana has become self-sufficient in up to 90% of this food. In 2008, more than 200,000 Cuban citizens worked in the urban agriculture sector, using 140 km2 of urban land. Cuba's urban agriculture program is an impressive success. Farms, many of which are small farms, are now the source of most of Cuba's vegetables. The farms also provide about 300,000 well-paying jobs across Cuba and have changed eating habits in a country accustomed to a diet of rice and beans and canned goods from Eastern Europe.

Today, Cubans consume about 3,547 calories a day, according to the FAO, more than the US government recommends for its citizens. “It’s an interesting model, considering that Cuba is a country where nearly 80 percent of the population lives in urban areas,” said Catherine Murphy, a sociologist who has spent decades studying Havana’s farms. “This shows that cities can produce their own food while still ensuring social and environmental benefits.” In Cairo (Egypt) in the early 1990s, a group of agricultural professors from Ain Shams University developed a method of growing vegetables on rooftops in densely populated urban areas, initially on a small scale but then rapidly expanded after receiving official support from the FAO in 2001.

In Mumbai (India), one of the most densely populated cities in the world, with 48,215 people/km2. In the context of land shortage, water scarcity, and a large number of poor people, Dr. Doshi introduced a method of small-scale organic gardening on balconies, even hanging on walls, based on using bagasse mixed with soil stored in plastic bags or in boxes, tubes, and tires, so that households can have vegetables to eat at home and increase their income. According to his method, a household can be self-sufficient in 5kg of vegetables and fruits per day for 300 days of the year.

In China, urban agriculture plays an important role in improving the resilience of cities, effectively solving the problems caused by rapid urbanization in cities, especially in densely populated cities such as Beijing and Shanghai. Many Singaporean households have received government grants to expand food production and aquaculture. In 2019, Singapore had 220 agricultural farms, of which 122 were marine and land-based fish farms, and the majority of offshore fish farms were located in the Straits of Johor in the north of the island. Land-based vertical aquaculture is also being considered as an alternative to increase fish production. In addition, Singapore has also partnered with Brunei to build high-tech vertical fish farms, which are multi-storey farms that can save space but still bring high efficiency (Jose Ma. Luis Montesclaros et al., 2018). With limited land conditions, with only 1% of land for agricultural production, the Singaporean government encourages people to use technology to achieve high production output. And technology has really played an important role in ensuring food security in this country. In the production of leafy vegetables, Singaporeans have come up with creative ways to arrange vegetable farms in different areas of the city. Urban farms are strongly developed and agricultural production is deployed everywhere, taking advantage of the space on rooftops, on terraces and in unused spaces such as under bridges for cultivation. These vegetable farms receive a grant from the Government under the “30x30” program of up to S$30 million (about US$22 million) (Anne Pinto Rodrigues, 2021). In Singapore, most apartment blocks are public housing and the government allows the use of rooftops as spaces for agricultural production for the benefit of the community.

Urban agriculture development in Malaysia is carried out through the establishment of urban farming communities. Urban residents take advantage of the empty spaces around their homes to grow crops. As of 2021, Malaysia has 11,000 urban farming communities and the Government aims to create 20,000 urban farming communities by 2030 (Rozhan Abu Dardak, 2021). When implementing urban agriculture development, the Malaysian Government recognizes that farming in urban areas will need to change, it cannot be the same as traditional farming methods in rural areas. Agricultural production in urban areas will have to face problems such as: environmental pollution, use of fertilizers, chemicals... which are the causes affecting the health and living environment of people in urban areas, which are already cramped. Therefore, agricultural cultivation in urban areas needs appropriate techniques to solve these problems.

Experience from many countries shows that urban and peri-urban areas can contribute to ensuring fresh food for people, helping poor consumers access cheap food from producers and from nearby markets. Small-scale producers can also provide their own products and sell surpluses to the market to increase their income.

It is estimated that there are currently about 800 million people in the world who make a living from producing food and food from urban areas. In times of disaster, self-sufficiency in clean food is very important and open spaces in urban areas such as agricultural land can be used as emergency shelters or temporary settlements.

IV. The inevitable trend of urban agricultural development in Vietnam

- *Urban agriculture contributes to the supply of food and fresh food on the spot for urban areas.*

Food security and food safety are issues that have been and are of great concern in urban areas, especially for low-income people in urban areas of developing countries like ours. It seems paradoxical to make this statement, but in fact it is very objective. The urban population is constantly increasing during the urbanization process, this process also pushes poor households in the suburbs into a situation of losing their main means of production and the problem of increasing poor households and low-income households in urban areas is increasingly difficult to control. The supply of high-quality food at expensive prices is only aimed at high-income households, so the risk of a shortage of basic food sources to meet the needs of poor households is becoming more and more present. Therefore, developing urban agriculture is the only solution to this problem. Rural people can produce their own food and foodstuffs to meet their daily needs, while poor urban people cannot buy food without money. Therefore, the risk of food and nutrition shortages in urban people is greater than in rural areas, especially in the current conditions of sharp increases in prices of essential goods. In the current conditions, the concept of poverty is not only for mountainous areas, remote areas but also exists in suburban areas, and this is a common, objective problem in the urbanization process. To ensure sustainable development, reduce the gap in essential nutritional needs of urban people, developing urban agriculture is really an important solution today. If production is well organized and planned, urban agriculture can create a source of fresh and safe food, on the spot, contributing greatly to meeting the consumption needs of urban residents.

- *Urban agriculture creates jobs and income for a part of the urban population.*

In the process of urbanization, for the common goals of urban areas, the problem of shrinking agricultural land area of suburban farmers is common. People lose their means of production, are forced to change their careers in conditions of no qualifications, limited capital, and very low experience in adapting to the lifestyle and industrial style, so the problem of employment for workers, especially suburban families, becomes more urgent. Men can do temporary jobs to make a living, but what can women, the elderly and children do in the family? In addition, the wave of population migration from rural to urban areas in search of jobs is also increasing rapidly. In this issue with Urban Agriculture, if there is attention and planning, there is a suitable strategy to take advantage of urban land funds and surplus labor to contribute significantly to solving the problem of employment and income in the urbanization process.

- *Urban agriculture has easy access to urban services.*

In the context of limited urban and suburban land funds, the application of new technology to agricultural production to increase crop and livestock output is an inevitable and urgent issue. While a large number of farmers in rural areas do not have access to scientific and technological services and still organize agricultural production in an extensive and traditional way, urban agriculture has many advantages in applying scientific and technological services to production. In addition, urban agriculture also has the ability to develop according to specialized models to provide many services for urban areas such as providing trees, fresh flowers and food for hotels, providing tourism services, nursing services, etc.

- *Urban agriculture contributes to the sustainable management of natural resources and reduces environmental pollution.*

Urban agriculture can reuse urban waste to make fertilizer, irrigation water, etc. for agricultural production, contributing significantly to reducing environmental pollution. Urban waste is really creating increasing

pressure along with the increase in urban population. With appropriate treatment technology, it is possible to utilize a part of urban waste sources to serve agricultural production in the direction of clean, safe and effective production. This is really meaningful in improving the environment and improving the quality of life. Agriculture is a production industry that requires a large amount of water, but with urban agriculture, by reusing wastewater, it can improve water resource management towards the goal of sustainable development for urban areas. In urban areas, the situation of soil contamination, degradation, and lack of fertility is also of no less concern than pollution and lack of water resources. Most of the land is infertile, contaminated by industrial chemicals, affected by construction activities... One of the important tasks of urban agriculture is to regenerate nutrients for the soil through the reuse of organic waste from urban activities. This not only contributes to reducing environmental pollution for urban areas, but also reduces chemicals when applying chemical fertilizers to the soil, which can easily cause further pollution, and reduces the cost of buying fertilizers. Urban agriculture is produced on the outskirts of urban areas, so after harvest, the costs of packaging, transportation and cold storage are eliminated, thereby contributing to reducing costs to the maximum extent. The quality of the products is guaranteed to be safe while contributing to reducing the number of heavy vehicles entering and exiting urban areas, significantly reducing accidents and pollution in urban areas.

- *Urban agriculture contributes to creating urban landscapes and improving public health.*

Developing “ecological cities” or “green cities” are phrases that are becoming popular in urban development forums today. The goal is to plan and build cities with a natural environment and landscape, ensuring good standards for public health. For this goal in the process of urbanization and development of cities, developing urban agriculture is truly the most effective solution. In addition to the above meanings, urban agriculture will create a landscape system, green belts that are very meaningful for cities (Trees, parks, green areas on balconies, or green belts surrounding the suburbs... are forms and products of urban agriculture). Urban agricultural production not only ensures nutritional needs, but also is a form of labor and entertainment that contributes to improving the physical and mental strength of urban residents.

V. Conclusion

“Urbanization is an inevitable process, it cannot be avoided, whether we like it or not, the future of the world still lies in cities”. That is the conclusion of the world urban summit organized by the United Nations in Istanbul (Türkiye). In fact, the urbanization speed of our country in general is happening faster and faster in both scale and quantity. Rapid urbanization in the current conditions of our country really gives rise to many problems. Developing urban agriculture is considered the optimal solution to solve these problems. Although it has only developed strongly since the 70s of the 20th century, urban agriculture has contributed greatly to the sustainable development strategy of cities around the world. Urban agriculture also has the potential to develop according to specialized models to provide many services for urban areas such as providing trees, fresh flowers and food for hotels, providing tourism services, nursing services... Urban agriculture can also reuse urban waste to make fertilizer, irrigation water..., contributing significantly to reducing environmental pollution. Compared to traditional farming, urban agriculture is more efficient; more sustainable; organic products become more accessible; create small, friendly spaces; allow enjoying fresh products all year round, and simply. Urban agriculture has been and is contributing greatly to participating in solving the difficult problems of countries in the urbanization process. Urban agriculture will continue to be the solution and strategic direction for the rapid, sustainable development of ecological cities in the future. In our country, in general, urban agriculture is present but still in a fragmented form, mostly due to the creativity of the people. Although the scope of activities is not wide, the level of development is not high, not comprehensive, but the economic - social - environmental efficiency of urban agriculture has been proven in many cities of many developed and developing countries in the world. Hopefully, urban agriculture will be the solution and strategic direction for the rapid and sustainable development of cities in the current urbanization process of our country.

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