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1 Introduction

Urban population has been rapidly expanding. Between 1950 and 2018, the urban population of the world has increased more than four-fold, from an estimated 0.75 billion to an estimated 4.22 billion (United Nations, 2019: 9). In 1950, the urban population in more developed region (0.45 billion) was higher than that in less developed regions (0.30 billion), but in 2018, the urban population in less developed regions (3.23 billion) is higher than that in more developed regions (0.99 billion) (United Nations, 2019: 9). By 2050, with 5.6 billion urban dwellers, less developed regions are projected to contain 83% of the world's urban population (United Nations, 2019: 12). Rapid urbanization has diverse negative consequences, such as loss of agricultural land (Ayerakwa, 2017), food shortage (Gallaher et al., 2013), higher rate of unemployment (Gupta and Gangopadhyay, 2013; Karanja et al., 2010), deforestation (Gupta and Gangopadhyay, 2013; Pulliat, 2015), and environmental pollution (Chandra and Diehl, 2019) in urban areas. In particular, the reduction of agricultural land due to urban sprawl directly affects food security (Filippini et al., 2014; Diehl et al., 2019), and fragmented agricultural land reduces the sustainability of existing food systems (Filippini et al., 2014). Simultaneously, more than 30% of the world's urban dwellers presently reside in slums (UN-HABITAT, 2006; Okpala et al., 2007), and billions of people around the world remain in poverty (Fernandes, 2008). In this regard, there is a growing demand for subsistence agriculture among urbanites (Filippini et al., 2014; Filippini et al. 2018). The necessity of food security has led to the revitalization of urban agriculture (UA) among city dwellers globally (Rich et al., 2018), and the role of agriculture in food production in urban and peri-urban areas is becoming increasingly important to ensure

food demands are met (Filippini et al., 2014).

Ensuring food security within the urban population, particularly in the poorest households, has become a tremendous challenge in many cities (Oyedele et al., 2017; Korth et al., 2014). Millions of urban poor cannot afford enough food to stay healthy, and this has had adverse effects on their well-being. This situation is not limited to the Global South, but it is also evident in the Global North (Gupta and Gangopadhyay, 2013; Jonas and Wilson, 2018). In addition, as globalization has increased, many countries have been importing much of their food. This incidentally increases their vulnerability to global shocks, such as the coronavirus disease (COVID-19) pandemic. This emphasizes the importance of producing food within cities or regions (Mcdougall et al., 2020; Olsson et al., 2016).

In this context, urban agriculture is regarded as a solution for urban food security. In particular, less developed countries need to pay more attention to urban planning and design to introduce and implement urban agriculture for securing food supply. This research examines policy design for development of urban agriculture in three socialist states; Cuba, Vietnam and the Democratic People's Republic of Korea (DPRK). Urban agriculture conditions from Cuba and Vietnam a representative model of urban agriculture in the developing countries will be analyzed. We try to find some lessons from urban agriculture of Cuba and Vietnam to develop urban agricultural policies in the DPRK.

2 Theoretical Background¹

2.1 Urban Agriculture

According to FAO, urban agriculture and peri-urban agriculture (UPA) is defined as the growing of plants and the raising of animals within and around cities 2018 (FAO, 2019). Since the potential contributions of UA, the concept of UA has captured the imagination of growing number of poverty activists, urban planner, and environmentalist alike (Henn and Henning, 2002). The UA has great capacity to deal with a various number of environmental and social pressures that arise in urban areas, and it has become a worldwide UA movement. UA is comprised with great varieties of forms, both between and within countries, including the ways in which agricultural activities are organized and how they respond to market needs (Sieverts, 2017). Examples of UA abound, existing in many forms including: community and backyard gardens; rooftop and balcony gardening; growing in vacant lots, right-of-ways, and parks; aquaculture; hydroponics; fruit trees and orchard; market farms; raising livestock and beekeeping (Orum and Michelle Glowa, 2019). Importantly, urban agriculture is context specific, meaning that its forms and practices vary according to the conditions of the local environment-social, cultural, economic, physical and political.

Regardless of the development of urban agriculture, the term UA was described in different ways by presenting social, environmental, and economic impacts on the city, and its function are emphasized differently by regions due to each state has distinct targets and motivations of practicing UA. There is an example UA definition, saying “urban

¹ This Chapter of theoretical background is a part of the academic article by authors (Lee et al., 2021).

agriculture is defined as food growing initiatives that include the production of edible plants and livestock in urban areas (Audate et al., 2018).” This definition covers UA practicing areas only in urban areas and includes only the production of ‘edible’ plants and livestock. Unlike this, there are another example of UA definition saying, “urban agriculture is the growing, processing, and distribution of food and nonfood plant and tree crops and the raising of livestock, directly for the urban market, both within and on the fringe of an urban area”. This definition includes the urban agriculture boundary both in and around urban area, and covers urban agriculture products not only edible plants but also nonfood plants. The latter urban agriculture definition is broader than the former. Likewise, the different definition of urban agriculture was used depending on researchers due to the absence of define definition of urban agriculture, and this issue creates confusion for understanding what urban agriculture is.

UA has different objectives such as food security, poverty alleviation, public health, and sustainable resource management, and these are actively associated with the problems of urbanization. The leading forces for farmers to turn into engaged in urban farming are income generation and food security. Apart from these, urban agriculture is crucial for public health and sustainable resource management. Plenty vitamin and protein diet from the agricultural products improve health conditions among urban farmers and urban dweller. In addition, sustainable resource management entails efficient use of resources, by reusing the waste as fertilizers in urban agriculture.

2.2 Enabling and Constraining Conditions

The notion of enabling condition has emerged in several academic fields, including political science, economics, and ecology. The enabling condition has been applied to a variety of subjects and in a range of contexts, and some scholars have even found certain enabling conditions in their study (Dawson and Robinson, 1963). Several researchers have emphasized the significance of enabling conditions as “creating the enabling conditions for policy implementation” and foundational need for “knowledge” (Rands et al., 2010).

The enabling condition is “an imperative concept to increase the likelihood of an intended change in the governance approach, strategy, or management regime” (Huber-Stearns et al., 2017), and diverse terminology is used to refer to the concept of enabling condition. According to the precedent studies, “the presence of enabling conditions can facilitate the emergence of a policy, whereas the absence of key enabling conditions can present a barrier to management or sustained policy action” (Huber-Stearns et al., 2017). For this reason, conducting research on enabling conditions is crucial for facilitating a certain scheme. Furthermore, the study on analyzing conditions that hinder the growth of certain systems is also worth investigation for enhancing the implementation of new strategies such as urban farming. For this reason, it is necessary to examine the enabling conditions for drawing forth successful UA by conducting studies on remarkable stories. In this regard, this study deals with the enabling and constraining conditions influencing the implementation of UA activities in Cuba and Vietnam.

This study defines enabling or constraining conditions for UA as elements that increase or decrease the chance of implementing UA in the governance approach, strategy, or management regime. Diverse terminology is used to refer to the concept of enabling conditions and constraining conditions. Due to the lack of a consistent and concrete

definition for enabling and constraining conditions, this study examines the enabling and constraining conditions based on the terms of conditions, and extracted the activation and inhibitory conditions being addressed in studies through contextual reading. This study seeks to investigate what UA activation and constraints various researchers and practitioners mentioned in the literature by reviewing documents from various perspectives.

2.3 The Compositional Elements of Urban Agriculture

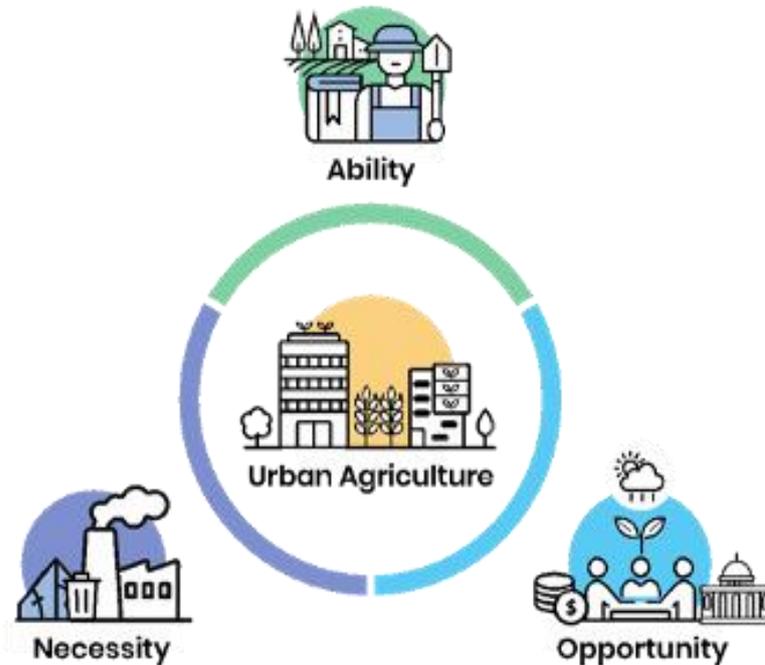
In line with the increasing arguments to preserve or develop appropriate UA systems (Kamoshita, 2007), this study was designed based on the principles of Choguill (1995) to demonstrate the development and conservation of UA enabling or constraining conditions. Choguill (1995) presented the principle of the construction of UA, and three categories correspond to this: necessity, ability, and opportunity. Different studies have used this model (Figure 1) to explain the introduction of UA to secure food and reduce urban poverty (Islam et al., 2019; Hossain, 2013). Furthermore, this model provides reasons for why UA is taken up in urban areas across the world by summarizing the three dimensions of UA drivers (Moglia, 2014). This model, which covers the various aspects of forming UA and explains the introduction of UA with a focus on the role of food supply, is suitable for distinguishing the conditions for the generation, continuation, development, and maintenance of UA.

The three requirements of UA to be implemented within the urban boundaries is explained as follows. Necessity can be defined as a deficient state and the pursuit of such

deficiencies. The necessity conditions corresponding to UA can be poverty and unemployment. Poverty, for example, is known as the primary initiator of UA to reduce expense by cultivating food, especially in developing countries (Masvaure, 2013). The vulnerable households in the city are more likely to implement urban farming, which enables people to continue their living. Not only poverty, but also other different factors also call for urban farming practices. Cities have re-examined the need for UA to preserve urban landscapes and supply a short distribution network for sustainable development. Ability refers to the capacity to perform certain functions (Sen, 1985), in this study, it refers to the capacity to implement UA practices. This is an influential element in the conduct of UA, with respect to the availability of workers, farming knowledge and skills, and cultural factors (Masvaure, 2013). Lastly, opportunity is a set of circumstances that enable urban farming to be performed, for example, climate conditions, political support, watering systems, and land access (Masvaure, 2013).

All three dimensions, necessity, ability, and opportunity are fundamental to UA. It is difficult to carry out UA even if one of them is lacking. For example, without access to land (opportunity), one in need of farming due to poverty (necessity) and has farming skill (ability), it will be impossible to start UA. Moreover, these three areas are interlinked and characterized by their interaction with each other. The government's educational support, for instance, is classified in the dimension of opportunity, which affects the ability of farmers to carry out urban farming practices. Thus, there is no complete separation and distinction between the three dimensions that explain the occurrence of UA. However, this study categorized UA enabling or constraining conditions based on direct statements described in the article by demonstrating what the subject of the condition is.

Figure 1. The Compositional Elements of Urban Agriculture



Source: Choguill (1995)

2.4 Food Security and Food Safety

Food security has been defined by the Food and Agriculture Organization (FAO) of the United Nations (UN). Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996). There are four pillars to food security: food availability, access, utilization, and stability. Food availability means the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid) (FAO, 2006).

In the aspect of food availability, UA associated with dietary diversity and calorie availability. From the research conducted by Zezza and Tasciotti (2010), it is evident that

there is correlation between participation of urban households in agricultural activities and improvement of dietary diversity and calorie consumption (Zezza and Tasciotti, 2010). Food access refers to access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet (FAO, 2006). It means the physical and economic ability to obtain food (Rocha, 2007). It is recognized that over half of food insecurity is induced by obstacles that keep people from acquiring food (Chappell, 2018). When urban households produce food through UA, they have easier access to nutritious food while supporting a more diverse and qualified diet. UA can provide more stable sources of food and reduce the negative impacts of variable food prices. In addition, household food expenditure can also be reduced to ensure costs for food or additional needs (Poulsen et al., 2015). Food utilization means utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met (FAO, 2006). This concept brings out the importance of non-food inputs in food security. Food stability refers to both availability and access dimensions of food security. To be food secure, a population, household or individual must have access to adequate food at all times (FAO, 2006). They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity).

As urban poverty intensifies, food security in urban areas remains an urgent priority. Not only in the Global South, but also in the Global North, millions of urban poor cannot afford nutritious food to stay healthy, which has affected the well-being of the urban poor globally (Jonas and Wilson, 2018). In addition, ensuring food provision for urban citizens will prove to be one of the greatest difficulties facing humanity in the next

century (FAO, 2017). The importance of UA continues to be discussed as an alternative to urban poverty and food insecurity as it can increase the physical supply of fresh and nutritious agricultural products and improve the economic access of urban poor to food (Stewart et al., 2013). Thus, it is an opportune time to investigate the enabling or constraining conditions for adopting, implementing, developing, and sustaining UA in terms of the UA food supply function.

Food safety is an umbrella term that encompasses many facets of handling, preparation and storage of food to prevent illness and injury (Hanning et al., 2012). It includes chemical, microphysical and microbiological aspects.

2.5 Cities in Socialist States

There is a variety of criteria used to distinguish urban from rural areas in countries. Among various criteria, administrative designation and population size or density are used as a major criterion in defining urban areas (UN, 2019: 5). Socialist states pay attention to reducing gap between urban and rural areas (Luna, 2014:198-199). In urban planning by socialist states, green space is regarded as an important place to control urban sprawl for keeping balance between urban and rural development and to provide better living conditions for urban dwellers' well-being (Luna, 2014:199). Following this perspective to urban areas in socialist states, we can interpret characteristics of UA in Cuba, Vietnam and DPRK.

3 Contextual Background

3.1 Cuba

3.1.1 Urban Agriculture Conditions in Cuba

More than 90% Cuban population lives in and around cities, and Cuban food system had been heavily relied on import from foreign countries (Koont, 2011). The disintegration of the Soviet Union led Cuba to find new forms of agricultural technology for continuing their society, and Cuban government had faced a challenge to supply the population with adequate nutrition, given the shortage of petroleum for food transportation. In this context, the UA were presented as a possible solution. Growing food near where people live reduce the need to use gasoline and other kinds of natural resources for transportation, and implementing of UA shorten the time lag between harvest and kitchen which can be benefits for preserving the quality deterioration in the foodstuffs. In addition, Cuban government decided to use organic and agroecological agriculture method in their agriculture practices by using organic manures, compost, and worm humus, and little use of machinery. Through these efforts, the soil quality in Cuban urban area has become fertile and restored, which increased agricultural productivity, and this makes Cuban UA more sustainable.

Table 1. Vegetable and Fresh Condiment Production in Urban Agriculture

Year	Production (Millions of Metric Tons)
1994	0.0042
1995	0.0160
1996	0.0580
1997	0.1400
1998	0.4800

1999	0.8760
2000	1.6800
2001	2.3601
2002	3.3450
2003	3.9312
2004	4.1948
2005	4.0745
2006	4.2134

Source: Rodríguez and Companioni Concepción (2006)

Table 2. Types and names of urban agricultural products in Havana

Type of urban agricultural product	Name of urban agricultural product
Vegetable	Beets, Cabbage, Celery, Chard, Chives, Corn, Cucumber, Eggplant, Garlic, Green Bean, Lettuce, Okra, Onion, Peanut, Pepper, Radish, Spinach, Squash
Fruit	Avocado, Banana, Plantain, Chirimoya, Coconut, Grapefruit, Grapes, Guava, Sour orange, Soursop, Lime, Mandarin, Mango, Mamey, Cantaloupe, Orange, Papaya, Pineapple, Passio fruit, Tamarind, Tomato
Tubers / roots	Cassava, Sweet potato, Taro
Legume	Pigeon pea, Black beans, Red beans, Soybeans, Chick peas
Other	Rice, Sugarcane

Source: Novo and Murphy (2000)

3.1.2 Land and Agricultural Policy in Cuba

In Cuba, sugar has been the main agricultural product since colonial times. Agricultural forms were prevalent in Cuba, such as the accumulation of large-scale land (called *latifundios*) that produced sugar, livestock, and fruit by wealthy landlords. Even after the colonial period, foreigners owned considerable land in Cuba, who invested a lot of money in the operation of *latifundios*. By 1958, 73.3% of Cuban arable land was concentrated in the hands of only 9.4% of the landowners, and this situation increased the production of sugarcane for export, but it was difficult for small-scale *campesino* (peasant) farmers cultivating various crops to survive. In response, land reform was the first priority of the

Cuban government, and land reform was carried out for fair distribution and management of land (Land Reform, n.d.).

The First Land Reforms

In May 1959, the Cuban government introduced the 'First Agricultural Reform Law' for the first land reform. The 1st Cuban agricultural reforms were aimed at increasing the overall prosperity and health of the country by equalizing land distribution and providing economic opportunities and acceptable living standards for the Campesino class. The first Agricultural Reform Law got rid of latifundio, nationalized all foreign-owned farmland, and transferred land to Campesinos, who had previously worked without ownership (Land Reform, n.d.).

The Second Land Reforms

Cuba's second agricultural reform took place in 1963. The first farmland reform, enacted by the new government in 1959, limited the maximum size of privately owned farmland to 402 hectares, and the second farmland reform (1963) further reduced the allowance to 63 hectares. All assets held above this limit were accepted with compensation (Sinan, 2011). In the following decades, state-owned land gradually expanded, and by 1988, Cuban government had 82% of the country's land (Land Reform. n.d.).

Cuba's first agricultural reform focused on giving more rights to tenant farmers, while its second agricultural reform focused on land nationalization. At the same time, the Cuban government provided agricultural supplies to each territory and implemented a supply-distribution model between states and cooperative farms, which promoted the use

of high-technology agricultural methods to increase the production of sugar cane and other large crops. However, Cuban agriculture was very vulnerable at the time. Cuba's agriculture was highly dependent on chemicals at the time, which caused a variety of ecological problems, including a decline in land power.

The Special Period (The Third Land Reforms)

Before the collapse of the Eastern Block, rooftop gardens, home garden, and urban gardening were rare in Cuban cities, and food production in the city was perceived as backward (Leitgeb et al., 2016). However, urban food production began to increase in 1989 with the economic and food crisis triggered by the collapse of communist countries (Murphy 1999). Urban agriculture was a logical response to upcoming resource constraints (Hamilton et al., 2014). As agricultural inputs that relied on imports became difficult to secure, agricultural productivity decreased across the country, and there was also a lack of fuel to transport food to cities. Therefore, due to the need to cope with the lack of food supply in the city's population, many city dwellers began to produce vegetables and fruits themselves (Altieri et al., 1999).

Against this backdrop, the Cuban government implemented a third agricultural reform in 1993 to disperse production and support small-scale farming (Land Reform, n.d.). The characteristic of this reform is to give farms to new co-owners of the Basic Units of Cooperative Production (UBPCs) modeled on Cooperatives for Agricultural Production (CPA). The Cuban government has also introduced a new policy on urban agriculture, encouraging citizens to offer unused urban land to develop self-sufficiency in food production. In 2008, Law Decree 259 (updated to Law Decree 300 in 2012) was enacted to

hand over unused land to small farmers. The law guarantees Cuban citizens "usufruct rights" (long-term use rights) to unused farmland of up to 13.42 hectares. This law is enforced by citizens who have no land to farm or farmers who want to expand their farms. In 2017, the authority to use land doubled to 26.84 hectares from the existing authority on farmland (13.42 ha).

3.1.3 Organizational Structure of Urban Agriculture in Cuba

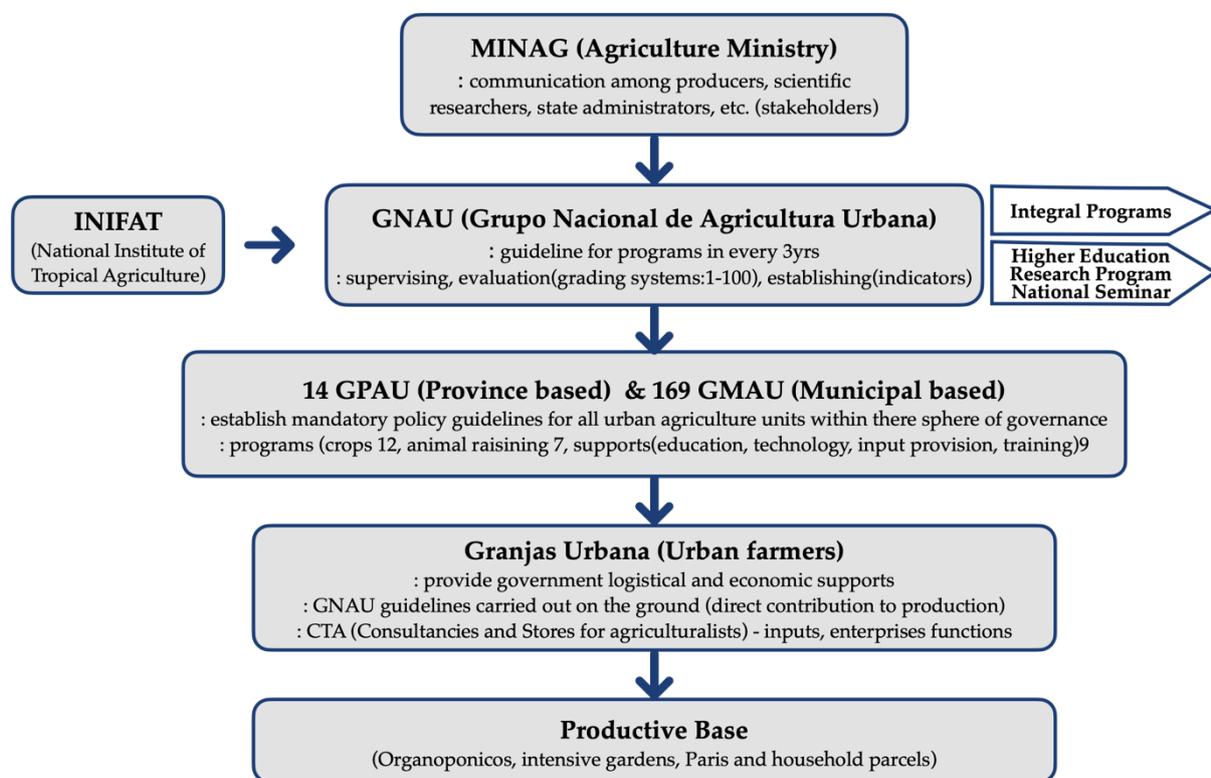
Cuba's urban agricultural movement, based on agricultural ecological principles, has continued to succeed due to the diversity of actors who are deeply involved in different fields and sizes. Departments, institutions, and schools are encouraged to produce food for self-sufficiency, and urban gardens have sprung up throughout the city. In 1994, the Ministry of Agriculture established the world's first Ministry of Urban Agriculture (GNAU) in recognition of its ability to address food and fuel crises (Koont, 2011).

The following Figure 2 shows the organizational structure of urban agriculture in Cuba. The National Urban and Suburban Agricultural Group (GNAUS), the central pillar of the program, is housed by MINAG's National Institute of Tropical Agriculture (INIFAT), which directs the methodology for implementing the activities of 31 sub-programs and strategic planning of the movement. The institution presents guidelines for urban agriculture programs of sub-organizations every three years, evaluates, manages, and supervises urban agriculture implementation of sub-organizations, and develops indicators for them (GNAUS, 2015).

The GPAU/GMAU Urban Agriculture Group, formed based on 14 states and 169, develops various urban agricultural programs, including crop, livestock, and technical

education, within the state and local governments, and introduces policy guidelines for each local government. There is at least one Granjas Urbana under the local government, which provides government guidance and support in the closest position to urban farmers. It also serves as an intermediary support for selling agricultural input elements, marketing and selling harvested crops (Koont, 2011).

Figure 2. Organizational Structure of Urban Agriculture in Cuba



Source: GNAUS (2015), Sinan (2011)

3.2 Vietnam

3.2.1 Urban Agriculture Conditions in Vietnam

Vietnam was under communist rule after the defeat of the French in 1954. From the American War to the 1986 reform, farmers grew government-required crops and

collectively grew crops on government-run farms (Lee et al., 2010). However, after the 1986 reform, Vietnam experienced various changes in agricultural activities, including urban agriculture. In particular, it is said that urban agriculture in Vietnam in the 1980s and 1990s was used as a means of increasing the income of urban residents and supplying food (Le, 2008).

Around 37% population lives in and around cities in Vietnam (Statista, 2020). Urban agriculture emerged. In Hanoi the number of farm increased from 1291 in 2013 to 3166 in 2017 (General Statistics Office of Vietnam, 2017). Hanoi urban dwellers produce various products of UA like Table 3. Not only vegetables and fruits production but also livestock and aquaculture production is conducting. As of 2017, the ratio of livestock farms of total farms in Hanoi is 90% (2847/3166) (General Statistics Office of Vietnam, 2017).

Table 3. Types and Names of Urban Agricultural Products in Hanoi

Type of products	Products
Vegetable	Kangkong, Heading cabbage, Onion and garlic, Pumpkin, Corn, Peanut, Cucumber, Radish, Spinach, and Mustard
Fruit	Lychee, longan, Banana Guava, Orange Mango, Papaya Pineapple, Tamarind, and Tomato
Tuber/root	Carrot, Kohlrabi, Cassava, Potato, Sweet potato, Cassava, Taro and Ginger
Legume	Pea, Black beans, Red beans and Green beans
Livestock	Cow, Buffalo, Pig, Poultry, Bee hives, Fish, and Shrimp
Other	Rice and Flowers (Chrysanthemum, forget me not, madonna lily, rose, tree peony, and wild rose)

Source: Anh et al. (2004)

3.2.2 Land and Agricultural Policy in Vietnam

Land reform in Vietnam was not only central to economic recovery, but also had a significant impact on urban agriculture. Vietnam's land reform policy has produced many notable achievements, including increased land use per household, long-term land use,

increased flexibility in land use, and freedom of transferring land use rights.

Land reform before Doi Moi (1975-1985)

After Vietnam's reunification in 1975, the movement for agricultural collectivization were planned by Vietnamese government. However, the Vietnamese economy, especially the agricultural sector, was severely affected by central planning model-based policies and agricultural collectivization. Agricultural production was reduced by the lack of incentives for individual farmers to contribute to production. In 1981, reforms in the agricultural sector began with Central Party Secretary's Instruction no. 100 (Contract 100). The policy linked farmers to land use. Resulting in a high level of food production. Under this policy, the Agricultural Cooperatives (AC) allocated farmland to agricultural organizations and individual farmers, but the land was still owned by the government and managed by AC. Instruction no. 35 issued on 18 January 1984 mad land resources not used by AC available to individual farmers for food production. However, as agricultural growth declined from 1985 to 1987, Vietnam suffered a food crisis, leaving 2 million people starving (Linh, 2014).

Doi Moi reforms and land use (1986)

Vietnam had an economic model that did not officially recognize private property. However, the emergence of the urban land market for the first time through the reform of Doimoi in 1986 triggered the shift to a socialist-oriented market economy. Doi Moi reforms change the nature of urban agriculture in Vietnam. The most notable effect of the Doi Moi reform on the agricultural sector was that farmers were given the right to decide on individually farmable land and what to grow, allowing farmers to grow their own crops

and sell them where they chose (Lee et al., 2010).

Land policy after Doi Moi²

The Land Law of Vietnam, enacted in 1993, recognized land rights to individuals under the premise that "land belongs to the entire nation" in the 1992 Constitution. The law enacted at that time gave ownership of land to the people and recognized individual land use rights, but the state's role in the land sector remained dominant. Vietnam amended the National Land Law every 10 years after the First National Land Law of 1993. Through this, the rights of land users are defined and the requirements of the land use plan and the mechanisms for land allocation, lease and withdrawal are prescribed. The Land Law of 2003 further opened the land market and guaranteed and embodied land use rights through the BOLUCs (Building Ownership and Land Use Certificates) and LURCs (Land Use Rights Certifications) systems and the farmland was allocated to farmers within 20 years. The Land Act of 2013 further clarified the mechanisms of the land market through regulations on the rights and responsibilities of governments and individuals, allocation of land, acquisition and compensation, and market access. In addition, land use rights were extended from 20 years to 50 years (OECD, 2018).

3.3 DPRK

3.3.1 Urban Agriculture Conditions in DPRK

The proportion of urban population in the Democratic People's Republic of Korea (DPRK),

² This content was summarized with the review of OECD (2018)

considered one of the less developed countries, increased from 40.20% in 1960 to 61.90% in 2018 (World Bank, 2019). The rural population of the DPRK is projected to decline approximately by 29% between 2018 and 2050 (United Nations, 2019: 46). In view of the increasing urbanization, political approach to improve the living conditions of urban people emerged in the DPRK.

According to the United Nations food security assessment, 10.1 million of people suffer from severe food shortages in the DPRK (WFP, 2019). North Korea's food security assessment report, which was jointly investigated by the UN Food and Agriculture Organization (FAO) and the World Food Program (WFP), says the North's food situation in 2019 is the worst in the past decade, and 1.36 million tons of food aid is needed from outside (WFP and FAO, 2019). DPRK's food production per ha is only 37 percent of Republic of Korea (ROK), meaning land and labor productivity are far behind in DPRK (Cha, 2019). Moreover, many studies and data have mentioned that the biggest obstacle to improving agricultural production in North Korea is the lack of fertilizer supply (Cha, 2019; Kim, 1999).

What is worse, DPRK's farmland is believed to have been devastated by the large amount of chemical fertilizer, and the total food production has been reduced due to poor soil condition (Jeon and Lafent, 2019). Many researchers insisted that fundamental soil improvement should be preceded for increasing food production in DPRK. To solve this, the DPRK government is making great efforts to supplement the insufficient supply of chemical fertilizer with organic fertilizer (Kim, 2019; Cha, 2019).

The considerations have long been made to secure food for urban residents of DPRK. According to *Rodong Shinmun* in 1955, the DPRK's government ordered the city's residents to secure food to stabilize the city's lives (*Rodong Shinmun*, March 7, 1955). A

dedicated vegetable production base was established around important cities and districts to ensure the normal production of vegetables, resulting that 130 official vegetable production bases were established around important cities and districts (*Rodong Shinmun*, February 22, 1959). In addition, according to the *Rodong Shinmun* on January 29, 1961, efforts and considerations have long been made to ensure the food supply and various foods of urban residents by encouraging urban residents to actively support farming projects in peri-urban area (*Rodong Shinmun*, January 29, 1961). In the recent 2010s, articles on various global urban agriculture were frequently reported in the *Rodong Shinmun* (*Rodong Shinmun* July 4, 2014; May 14, 2018; June 20, 2018). It was confirmed that urban agriculture was actively treated as an example of overcoming the food crisis especially targeting urban dweller in DPRK.

3.3.2 Land and Agriculture Policy in DPRK

DPRK's land system has changed in four stages: the timing of land reform, agricultural cooperation, the establishment of a land ownership system, and the opening of the foreign economy (Table 4). However, it can be seen that land use and ownership under the North's land system are still limited to the state and cooperative farms.

Table 4. Land System Changes in DPRK

Land Reform Initiative (1945~1953)	Land reform (free confiscation, free distribution) Nationalize all means of production
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Agricultural Cooperation Period (1954~1971)	Reorganization of production method based on agricultural cooperative farms The establishment of a fully socialist cooperative farm Extinction of private ownership other than consumer goods Revision of individual laws according to the changed ownership style
The Establishment of the Socialist Land Ownership System (1972~1991)	The enactment of a socialist constitution System improvement in accordance with the establishment of a socialist ownership system Systematization and comprehensivization of various system by the enactment of the Land Act
Period of Opening the Foreign Economy (1992~Present)	Constitutional revision of “our style socialism” following the fall of socialism Strengthening state-owned systems and opening policy

Source: Cha (2019)

DPRK's land ownership is largely divided into state ownership, cooperative farm ownership, and individual ownership. Although there exists an individual owned land type, the right to use the land is not permitted to individuals. In addition, the land use classification and use subject under the North Korean Land Act is limited to cooperative farms, institutions, businesses, and organizations, and land for means of production cannot be subject to individual ownership (Cha, 2019).

However, according to recent DPRK's information, it is officially allowing individuals to use small arable land as a land area named 'back yard' and 'part-time field'. In particular, 'back yard' gardens are used as agricultural activities by utilizing empty spaces around detached houses in the city, and the productivity of agricultural products on the land is reported to be much higher than that of national land or collective farms (Cha, 2019).

This is very similar to the situation in Vietnam and Cuba, when the land system was

transformed, before it secured food production by providing land to ordinary citizens or farmers within the socialist system. However, the use of small arable land allowed by ordinary citizens in North Korea is somewhat limited, suggesting that the use of land by ordinary citizens will be expanded little by little, and that the land use method will be diversified and institutionalized to increase food production in North Korea. In other words, land use rights or ownership promote citizens' sense of ownership, which leads to increased productivity. As an appropriate alternative to solving food shortages, including developing countries, it is believed that land use and expansion of authority will be appropriate for ordinary citizens through land reform.

Table 5. Forms of Land Ownership in DPRK

	Public ownership	Collective farm ownership	Private ownership
Targets and Features	<ul style="list-style-type: none"> - National possession - No restriction on target - Natural resources (ground resources, forest resources, fishery resources, etc.) - Heavy and light industries (major factories, ports, banks, transportation, broadcasting institutions, schools, important cultural facilities, health facilities, etc.) - No limit on acquisition prescription 	<ul style="list-style-type: none"> - Collective ownership of workers - Cooperative organizations can own land, livestock, agricultural equipment, fishing boat, buildings, small and medium-sized factories, cultural/health facilities, and other management activities - No limit on acquisition prescription. 	<ul style="list-style-type: none"> - Only available for consumables items. - Available for Land, housing, etc. (different from the right to use). - Not recognized to use real rights such as right of occupancy, surface rights, lien, right of pledge, mortgage rights, etc.

Source: Cha (2019)

3.3.3 Organizational Structure of Agriculture in DPRK

The DPRK's agricultural management system appears as Figure 3. The agricultural commission was established in the upper institution, and the following structures were formed from the provincial government, the county, and the branch. The existing DPRK's

agricultural industry does not have any specific institutions in particular that govern urban agriculture.

Establishing an urban agricultural bureau under the jurisdiction of the city or county-level farm management committee to revitalize DPRK's urban agriculture could be considered, as Cuba developed agricultural technology close to urban residents and improved agricultural production by providing various educational programs for urban farmers. In addition, it would be desirable to establish an institution separately in charge of agricultural technology and agricultural education to maximize food production tailored to the urban environment of North Korea (Cha, 2019).

In addition to the establishment of a direct institution to manage and guide urban agriculture, it will be possible to promote urban agriculture by including agricultural activities and management policies in North Korea, such as Vietnam's attempts to ensure urban agriculture-related policies and urban planning. In other words, the government could seek ways to revitalize urban agriculture through an integrated approach to North Korea's urban agricultural policy and urban policy.

Figure 3. Agricultural Guidance System in DPRK



Source: Cha (2019)

4 Research Design and Method

This study identified enabling and constraining conditions for UA in Cuba and Vietnam. As an integrative review is widely considered an appropriate way to summarize the current conceptual thinking (Broome, 2000), this study applied non-experimental research for a comprehensive understanding of the phenomenon of UA and includes case studies. According to Berg et al. (2004), the case study analysis is “a method in which researchers systematically gather sufficient information about a particular social environment, event, or group so that researchers can effectively understand how the subject works or functions” (Berg et al., 2004). Furthermore, a collective case study is a method for gathering several cases to improve ability theorizing about a broader context (Berg et al., 2004). Thus, this method has the potential to capture various perspectives and the complexity of evolving phenomena (Whittemore and Knafl, 2005) by sampling various integrative reviews in conjunction with the multiplicity of purposes. In this regard, the integrative review of collective case study is considered suitable for this research as it has the strength to systematically search, rigorously review, critically analyze, and comprehensively synthesize empirical and theoretical literature (Whittemore and Knafl, 2005).

For our literature selection, we searched Scopus journal databases in 2020 to aggregate academic journal literature on enabling and constraining conditions with a primary focus on UA in Cuba and Vietnam. Literature on UA were included by using key terminology of urban agriculture. A total of 68 documents were extracted using the search string (Table 6), and 42 documents are accessible. Through the screening process of title

and abstract reading, finally 10 articles about UA in Cuba and 7 articles about UA in Vietnam were selected, according to the criteria for inclusion of literature established by the researcher; 1) Publication, or academic journal, 2) Written in English, 3) Used “Urban and peri-urban agriculture” terminology in title, and 4) Study areas identifiable by reading the title and abstract to distinguish case study.

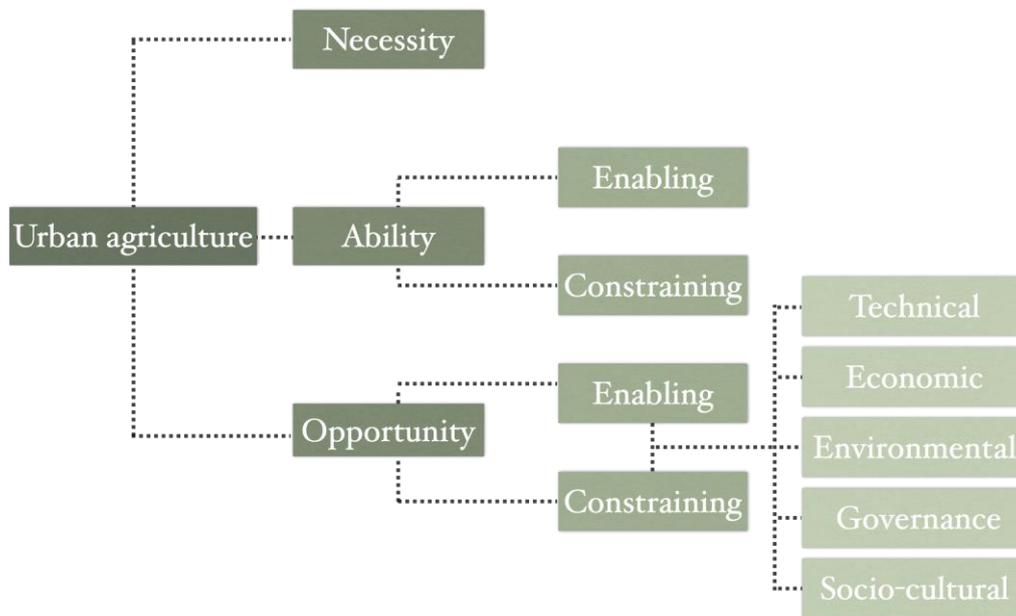
Table 6. Search Query for Searching Documents on Urban Agriculture in Cuba and Vietnam

Country	Search query
Cuba	TITLE ("Cuba" OR "Havana") AND TITLE (("CIT*" OR "METROPOL*" OR "PERIURBAN" OR "PERI-URBAN" OR "TOWN" OR "URBAN" OR "Suburban") AND ("GARDEN*" OR "FARM*" OR "CROP" OR "LIVESTOCK" OR "FOOD PRODUCTION" OR "FOOD PROCESSING" OR "AGRICULTUR*" OR "Community garden*" OR "Allotment*" OR "Horticultur*" OR "Rooftop" OR "School garden*" OR "Home garden*"))
Vietnam	TITLE ("Vietnam" OR "Hanoi") AND TITLE (("CIT*" OR "METROPOL*" OR "PERIURBAN" OR "PERI-URBAN" OR "TOWN" OR "URBAN" OR "Suburban") AND ("GARDEN*" OR "FARM*" OR "CROP" OR "LIVESTOCK" OR "FOOD PRODUCTION" OR "FOOD PROCESSING" OR "AGRICULTUR*" OR "Community garden*" OR "Allotment*" OR "Horticultur*" OR "Rooftop" OR "School garden*" OR "Home garden*"))

Using literature inclusion criteria, 17 case studies (Appendix) from 42 publications were finally included in this study, followed by a full screening reading process. Enabling/constraining conditions were broadly identified by reading papers, and identified conditions were extracted based on the following criteria. Sentences and paragraphs in a research paper are the unit of condition analysis, and information that is directly stated in sentences or paragraphs, containing expressions that have positive or negative effects on UA were obtained. The extracted information was then used as a basis for the analysis and

were grouped based on three categories of requirements for the construction of UA presented by Choguill in 1995 (Masvaure, 2013; Choguill, 1995). The three descriptive categories are necessity, ability, and opportunity (Figure 1) (Choguill, 1995). The classified conditions were grouped again into detailed items depending on their characteristics and types. Conditions corresponding to necessity were classified according to their similar characteristics to the condition for UA due to a certain deficiency. Conditions corresponding to ability were grouped as enabling/constraining conditions for UA depending on the existence of a certain condition. Finally, the conditions corresponding to opportunity were described as external influences, which were further classified into six sub-categories based on the factors affecting the success of UA projects mentioned in the preceding study: technical, economic and socio-cultural factors (Dehnavi and Süß, 2019), and two more categories, environmental and governance factors, added by the researcher (Figure 4).

Figure 4. Structure of Urban Agriculture Condition Category



5 Conditions of Urban Agriculture in Cuba and Vietnam

5.1 Necessity Conditions

As a result of the analysis of the unfulfilled conditions leading to the occurrence of UA, the following conditions were identified: increase in income contribution, food price and demand, food safety or quality, economic and food crisis or war, food stability and security, environmental concerns, and social concerns (Table 7).

In Cuba, food price and demand, economic and food crisis and food stability and security have become driving forces behind the introduction of urban agriculture. Above all, with the collapse of communist countries in 1989, the economic and food crisis triggered Cuba to adopt urban agriculture. In addition, in 1990, Cuba was dependent on imports of agricultural resources and chemical fertilizers from the Soviet Union, which led to a crisis in food security in Cuba. The Cuban government, therefore, has sought to reduce dependence on external resources and increase the self-sufficiency of urban residents through urban agriculture (Leitgeb et al., 2016). Because of the need to cope with the

shortage, many city dwellers are starting to produce vegetables and fruits on their own. Cuba has been part of the integrated urban agricultural and food system since the 1990s (Górna and Górný, 2020; Leitget et al., 2016). The immediate main challenge for Cuban government is to provide a more equitable approach to local availability resources and low-input technologies needed for production as well as food (Altieri et al., 1999). In response the country experienced a dramatic and unprecedented reorganization of its agricultural system, turning to the agroecological production of food in or near cities and to a focus on growing food for local consumption rather than crops for export (Koont, 2011).

In Vietnam, multiple conditions of necessity were found; increase in income contribution, food safety or quality, food stability and security, environmental concerns, and social concerns. UA can offer an additional means to mitigate the adverse effects of fluctuation and imbalance in income and expenditures on food situation (Pulliat, 2015), and people living in the suburbs of Hanoi still recognize the important role of agriculture (Nguyen et al., 2020). Not only food security but food safety issues are also major drivers of emerging UA practices in Vietnam. The most ongoing motivation for urban agriculture is to grow comfortable and safe vegetable for their families rather than basic food needs in Vietnam (Pham and Turner, 2020). Vietnam's two largest cities, Hanoi and Ho Chi Minh City, revealed that people are willing to pay 60 percent more for residue-free vegetables (Mergenthaler et al., 2009). In particular, a study on urban agriculture in Vietnam found that urban agriculture also helps strengthen social and kinship relations. In an interview with an urban farmer, he expressed that urban agriculture helps eradicate crime or social evil (Pham and Turner, 2020). According to another interview, abandoned urban spaces

will not only create a filthy environment, but also create many social evil conditions such as 'drug users'. Furthermore, gardeners mentioned that their urban agricultural activities have a broad positive impact on the urban environment (Pham and Turner, 2020)

Table 7. Necessity Conditions of Urban Agriculture in Cuba and Vietnam

Category	Cuba	Vietnam
Income contribution	Not recognizable	Perceived important role of agriculture in income contribution
Increase of food price and demand	Due to the necessity to respond to the supply shortfall countless city dwellers began to produce vegetables and fruits on their own It is unsurprising that in post-1990s Cuba, urban agriculture became established as part of an integrated food system.	Restore a fragile food situation that has been aggravated by food inflation
Economic/ Food crisis	The economic and food crisis triggered by the collapse of the communist countries in 1989 urban food production began to increase Cuba's introduction of urban agriculture after the collapse of its economy.	Not recognizable
Food safety/quality	Not recognizable	The most important motivation to begin gardening was to provide clean and safe vegetables for their families
Social concern	Not recognizable	Reinforce social relations and kinship ties, and eradicate crimes or social evils
Environmental concern	Not recognizable	Using vacant land improved the environment with such land not going to waste

Urban Agriculture in Cuba, Vietnam and Democratic People's Republic of Korea

<p>Food stability and security</p>	<p>The need to contribute to food security for the population in harmony with nature and society. The major challenge facing Cuban agriculture is to provide for a more equitable access not only to food but to the locally-available resources and low-input technologies required for its production.</p>	<p>Strengthening the food supplies from urban and peri-urban agriculture production and home gardens contribute to food security for the low-income group</p>
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5.2 Ability and Opportunity Conditions

5.2.1 Ability Conditions

Ability, one of the components of UA, is described as internal and potential to the performance of UA, its innate nature, or its given things. The UA enabling condition of ability were found in labor or human resources in Vietnam and awareness and motivation of UA stakeholders in Cuba (Table 8). Enhancing human capacity by providing farming knowledge or information to urban farmers is necessary to achieve success in multifunctional agriculture (Leitgeb et al., 2016). The presence of human resources such as farmers, agricultural scientists, and urban planners can respond to the implementation of UA as basic conditions that enabled UA (Altieri et al., 1999). In Vietnam, for example, farmers with abundant agricultural experience shifted their crop choices strategically to efficiently utilize the amount of resources available, and tended to withstand the difficulties of the urban environment with poor access to land (Nguyen and Kim, 2019). Not only human resources but also motivation or awareness of UA is found as ability condition. There are various "moral" incentives for urban farmers. At the individual level, these incentives provide ample opportunities for further formal training and a healthy, supportive, and decent work environment. At the social level, there are efforts to "honorize" urban agricultural workers and workers. The provision of not only honor but also moral incentives enable the introduction and dissemination of new technologies among urban farmers (Koont, 2009). The condition that disables UA classified as ability conditions has been shown as farmers' vulnerability in Vietnam. Because of gender discrimination in low- and middle-income households, it is more difficult for women to

access agricultural resources, services for agricultural activities (Pham-Thanh, 2020).

5.2.2 Opportunity Conditions

The opportunity UA conditions represent a series of situations that enable or obstruct UA. These conditions were classified into technical, economic, environmental, social and governmental or political subcategories.

Technical conditions

Technical enabling conditions for UA included the research and technological development of UA, the agricultural education and training of urban farmers, and the use of suitable farming methods, systems, and equipment (Table 8). Instructions on farming skills and technical advice should be provided to farmers to enhance their farming capacity (Le, 2019). Moreover, place-based research and development in the agricultural sector is fundamental for the successful implementation of UA, and this is one of the ways to stimulate interest among local people and encourage them to participate in UA practices (Manzano, 2007). Not only agricultural research and technical development, but the development of platforms governing agricultural education and training to empower urban farmers' capabilities also have positive effects on cultivating crops successfully in urban areas. In the early days of the introduction of urban agriculture, Cuba had a highly educated urban population, but had little knowledge of ecological-based agriculture. This was overcome through serious, organized, and concerted participatory efforts by research institutes, universities, and organizations. Cuba's motto in urban agriculture is "production

during learning, teaching during production, and learning during teaching," and teaching and preparing next-generation urban agricultural engineers are important in the curriculum, even in elementary and secondary schools (Koont, 2009). Likewise, enhancing the accessibility of farming workshops and technical training services has been confirmed to enable the implementation of UA by increasing the chance of success. In addition, UA is being promoted by appropriate farming methods, systems, and tools (Altieri et al., 1999; Gónna and Górnny, 2020; Pham-Thanh et al., 2020), and these are considered as key ingredients for gardening to succeed. In Cuba Organoponicos (Cederlöf, 2016) are actively used as urban crop-growing agricultural systems that consider urban land issues, which play a role in alleviating urban food insecurity.

However, inappropriate technical conditions of agriculture disabled the development of UA, and the conditions corresponding to this are lack of irrigation system that are fundamental for destruction of agricultural products (Nguyen and Kim, 2019), and lack of UA technology innovations (Pham-Thanh et al., 2020) and reliable data for UA policy making (Aubry and Kebir, 2013).

Economic conditions

Economic conditions for improving UA practices were observed in suitable distribution channels and markets, and incentives. The existence of a distribution network of agricultural products or a market for agricultural products directly affects the income of farmers performing UA, and further contributes directly to the revitalization of UA (Le, 2019). Furthermore, incentive payments is given to farmers, and it revealed that financial incentive provide farmers various opportunities in their work environment in Cuba (Koont,

2009).

Constraining condition observed in implementing UA includes low production volumes and wages. The low agricultural production volumes do not guarantee sufficient wages for urban farmers, resulting in the slow implementation of UA by people (Leitgeb et al., 2016), and its low quality products in the city bring pressures which can lead to narrowing of UA production (Le, 2019).

Table 8. Enabling and Constraining Conditions of Urban Agriculture in Cuba and Vietnam

Element of Urban Agriculture		Enabling		Constraining	
		Cuba	Vietnam	Cuba	Vietnam
Ability		Motivation/ Awareness	Labor/ Human resource		Farmers' vulnerability
Opportunity	Technical	Agricultural education and training			Poor technology
		Agricultural research technical development			
		Farming method/system/tool			
	Economic	Incentives	Distribution channel/market		Low production volumes/income
	Environmental	Arable land	Climatic condition	Limited arable/fertile land	
				Scarcity/Contamination of resources	
		Resources		Disease/Weed/Pest	
					Harsh climatic condition
	Social	Social capital		Limited accessibility	
		Promotion or publicity		Crime	
Governance	Strong governmental will/talented leader				

		Governmental Institution			
		Policy			
		Non-governmental institution			
		Participatory UA policy-making			
		Collaborative partnership among stakeholders			

Environmental conditions

The environmental conditions in developing UA including the existence of arable land, available resources, and suitable climatic conditions for crops were observed (Table 8). The key condition that makes UA possible is the land for food production in Cuba (Premat, 2009). Securing the site of the event in urban areas is an essential aspect of supporting UA, and a great deal of effort is being made to provide land ownership to urban dwellers who wish to grow food in cities. In Cuba and Vietnam, for example, land reform has been implemented to secure land for urban farmers (Pulliat, 2015 Leitgeb et al., 2016). Another important consideration of UA is “suitable” and “arable” land. The poor soil quality in urban areas can be improved by adding organic manure and compost to the soil (Leitgeb et al., 2016). Material resources such as quality seeds, water, and fertilizer (compost or manure) are important elements to ensure the success of UA. Obtaining adequate resources for cultivation, such as seeds or fertilizers, is also important aspects for implementing UA (Koont, 2009). Finally, climatic conditions are environmental factors that affect agricultural production. Adequate climatic conditions according to cultivated crops

fostered sustainable urban farming conditions in Vietnam (Pham and Turner, 2020).

The environmental conditions that make the practices of UA difficult were limited/infertile land issues, scarcity or contaminated resources, harsh climatic conditions, and disease/pest/weed problems (Table 8). The limited access to high-value land and scarcity of arable land are the most important constraints for people involved in urban farming (Pham-Thanh et al., 2020; Górna and Górný, 2020). Furthermore, public vacant land is not always available for urban farming practices, but it may be used for other marginalized spaces like sport fields. Not only the presence of land but the quality of soil is also an important issue for growing food (Leitgeb et al., 2016; Chaplowe, 1998). Moreover, the shortage of resources and contaminated resources have been identified as UA revitalization inhibition conditions. The scarcity inputs for food production result in low quality food produced in urban areas (Leitgeb et al., 2016). In addition, the success of growing crops is dependent on growing season and weather. Adverse climatic conditions such as heavy rains, flooding, and drought reduced the yield of agricultural production in Vietnam (Nguyen and Kim, 2019). Finally, damage from diseases, pests and weeds are cited constraints of UA in Cuba and Vietnam (Pham-Thanh et al., 2020; Chaplowe, 1998). Depending on location, season, and crops grown, and weeds can inhibit production in urban agricultural systems (Altieri et al., 1999).

Social conditions

The socio-cultural conditions to improve UA are being addressed in many studies and have been identified as follows: social capital and promotion or publicity of UA (Table 8). Community-based and grassroots actions are pivotal factors for healthy implementation

of UA (Pham and Turner, 2020). Local community-supported farmland is more sustainable, and it provides social inclusion among urban farmers, which enables participants to feel strong bonded interests (Mazano, 2007). In this regard, many community participatory processes have been used for the success of UA by strengthening farmers' networks and partnerships. Moreover, the growing movement to promote UA grew at the multiple levels, a large-scale change took place to practice UA, and the movement carried out the function of catalysts that enabled UA development (Altieri et al., 1999). Lastly, encouraging local participation and decision-making are grassroots principles for reinforcing urban farming (Altieri et al., 1999).

Socio-cultural conditions that hinder UA growth are proven to be crime-related problems and limited accessibility of UA services (Table 8). Urban farmers faced challenges of theft due to food shortages in urban areas, and the risk of theft destroys social capital by creating mistrust and fear among city dwellers in Cuba (Altieri et al., 1999; Chaplowe, 1998). Moreover, a crucial challenge was the approach to agricultural inputs (Leitgeb et al., 2016), and it is mentioned that some urban farmers complained about the limited access to agricultural services in Cuba.

Governance conditions

The governance conditions affecting the development of UA were identified as UA policies, the role of non-governmental and governmental organizations, a strong government that may help develop UA, and collaborative partnership among UA stakeholders, and participatory policy-making (Table 8). For successful implementation of UA in Cuba and Vietnam, a strong commitment will, and participation of government or leaders is crucial.

Strong governmental, especially in socialist states, will be affected directly by making it possible to generate urban development plans to preserve agricultural land in urban areas (Górna and Górný, 2020; Pham-Thanh et al., 2020). Supportive governmental UA institutions also play a central role in the growth of UA in Cuba (Leitgeb et al., 2016). Different kinds of UA supporting governmental institutions exist in many cities and countries, including the sole department of UA, research institutions for developing farming skills, urban farmers' educational organizations, legal institutions, and so forth (Leitgeb et al., 2016). These institutions play a role in contributing to the growth of UA independently and simultaneously in cooperation. Not only governmental institutions' endeavors but the role of non-governmental organizations is also important for the success of UA in Cuba (Chaplowe, 1998). Efforts to sustain UA within the regions by non-governmental organizations are key inducers of informally initiated urban agricultural projects (Chaplowe, 1998; Premat, 2009). Likewise, it is found that the support of governmental and non-governmental institutional structures is needed to nurture the development of UA. It is found that a strong participatory approach fosters UA participants' responsibility by involving UA policy making process in Cuba (Altieri et al., 1999), and open debates including stakeholders, internal and external actors in UA systems, may increase the awareness regarding the significance of urban farming systems (Leitgeb et al., 2016). The presence of collaborative partnerships among stakeholders as well as the participation of stakeholders in the establishment of UA policies, has also been found to be an important factor enabling UA (Premat, 2009). Public and private partnerships among UA stakeholders are revealed to have a role in promoting local food policy and its influence on the UA policy building. The last governance enabling conditions

is UA policy. It is crucial to have a city planning strategy for the successful functioning of UA. Additionally, land reform policy, for instance, can serve as a protective device by improving land tenure security and ownership among urban farmers in Cuba and Vietnam (Pulliat, 2014; Leitgeb et al., 2016).

6 Pathways of Urban Agriculture

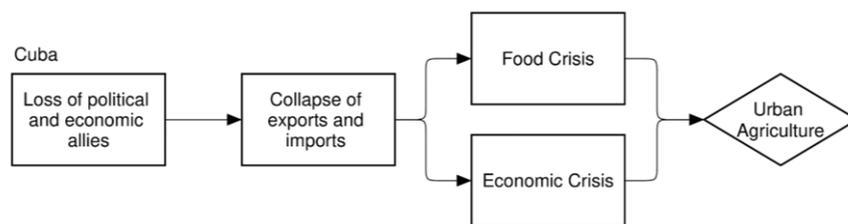
UA has multiple ecosystem services. Ecosystem services are defined as the benefits to humans that arise from the interactions between components of an ecosystem, which include provisioning (e.g. food), regulating (e.g. flood control), and cultural services (e.g.

recreation) (Ring and Schröter-Schlaack, 2011). The provisioning ecosystem services is directly used by people with most direct and tangible support to humans such as food, materials and energy. While the regulating ecosystem services cover the way ecosystems regulate other environmental processes or media, and it enables and facilitate the provisioning ecosystem services. The cultural services, at last, are related to people's cultural or spiritual demands (Kasparinskis et al., 2018). Countries or cities have different emphasis on ecosystem services of UA.

As the Chapter 3 and 5 show, UA in Cuba and Vietnam has a common goal of UA for food supply in urban areas. But based on the necessity, ability and opportunity conditions of UA at Chapter 5, we can differentiate pathways of UA in Cuba and Vietnam. In Cuba, food crisis due to political condition is a major driver in adopting UA. Cuba introduced agricultural activities in urban areas for increasing food production. Cuban UA was motivated by governmental policies for improving food supply. Cuban government decided to use organic and agroecological agriculture method in their agriculture practices by using organic manures, compost, and worm humus, and little use of machinery. In 1998, the Cuban Ministry of Agriculture established the National Urban Agricultural Unit, which is composed of representatives from relevant ministries such as the Ministry of Agriculture, Ministry of Education and Ministry of Defense, to promote the direction and active management of urban agriculture. Cooperation and coordination among several ministries for urban agriculture are named as horizontal policy integration. Policy integration is a process of uniting and harmonizing separate policies to produce an integrated and coherent policy system (Briassoulis, 2005: 50). The sub-programs of urban agriculture were developed at different levels, with urban reforestation programs in the center of the

city; organophonico in the middle of the city; cultivated gardens, herbs, flowers, livestock raising programs, and suburban activities in the suburban areas. The final 29 sub-programs cover a wide range of areas, including production, sales, value added, natural resource conservation and support projects. Therefore, Cuba presents a state UA policy pathway for food availability.

Figure 5. Pathway to Urban Agriculture for Food Availability in Cuba

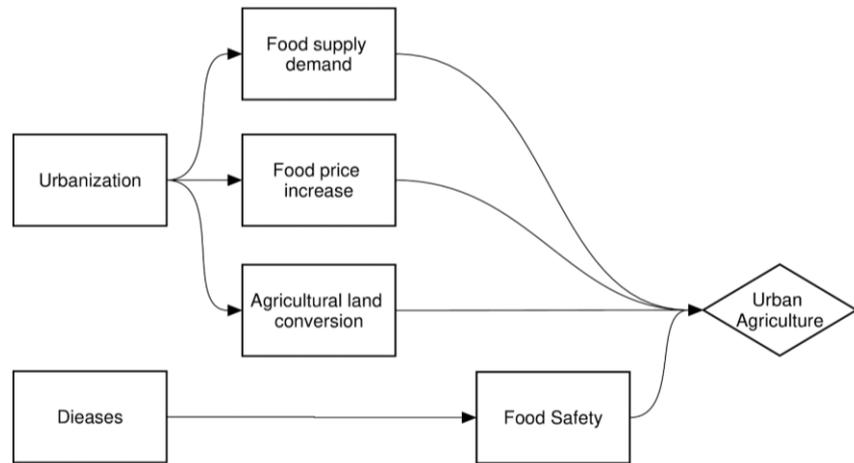


In Vietnam, UA emerged as a means to mitigate the adverse effects of fluctuation and imbalance in income and expenditures on food situation (Pulliat, 2015). Simultaneously, food safety played a role as an important driver in adopting agricultural activities by urban dwellers. Recognition of risk of pesticide residues in agricultural products motivated urban agricultural activities. Concerns about food safety and agricultural activities in urban areas are steadily increasing, with urban community citizens at the center for safe and nutritious food production in other countries (White, 2011). Comparing with Cuban UA, Vietnamese UA has no specialized legal system or professional governmental organizations for handling UA. In Vietnamese UA, voluntary participation by urban dwellers is remarkable. Therefore, Vietnam presents a participatory UA pathway for food access and safety.

Figure 6. Pathway to Urban Agriculture for Food Access & Safety in Vietnam

Urban Agriculture in Cuba, Vietnam and Democratic People's Republic of Korea

Vietnam



7 Lessons for DPRK

DPRK recognized importance of UA highlighting food supply. But UA is not legally identified and strategized yet. In practice, three limitations to implement UA exist in the DPRK: 1) the land problem to farm in the city, 2) the education of urban residents unfamiliar with farming and the dissemination of agricultural technology to them, and 3) the national organizational measures to facilitate UA (Lee, 2006). As the Chapter 5 shows, three problems are enabling and constraining conditions of UA in Cuba and Vietnam. Above all, land availability is a basic environmental condition to enable UA. In Cuba and Vietnam as socialist states, land reforms influence land access for UA.

Considering three confirmed problems affecting the implementation of urban agriculture in DPRK, this chapter tries to find some lessons of UA from Cuba and Vietnam for DPRK.

7.1 Lessons from Cuban Urban Agriculture

As the chapter 6 shows, Cuba presents a state UA policy pathway for food security. For overcoming the limitation of the national organizational measures to facilitate UA, Cuba is an excellent model with a successful experience of UA through well-organized policy instruments for increasing food availability. Cuba faced a big challenge of food supply in the 1990s. Almost three-fourths of Cuba's trade was with the Soviet Union. The collapse of the Soviet Union in 1991 and the United States' trade embargo in 1996 prevented importing foods and agricultural materials such as pesticides, fertilizers and machines. Cuba tried organic agriculture with less materials such as fertilizers and pesticides against

deficiencies of foods and agricultural materials. Cuban organic UA is based on appropriate technology. A design for appropriate technology takes into consideration the culture in which the technology will be used in order to provide the best type of technology for that society (Wicklein, 1998). DPRK's farmland is believed to have been devastated by the large amount of chemical fertilizer, and fundamental soil improvement should be preceded (Jeon and Lafent, 2019). The government of DPRK is making great efforts to make up for its insufficient chemical fertilizer supply with organic fertilizer (Kim, 2013; Cha, 2019). Like Cuba, DPRK can design an appropriate technology of UA to meet basic needs on food supply and to be affordable in practice.

Production of food in urban areas through urban agriculture contributes to improving balance of distribution of agricultural products at the national level. Foods were produced and consumed locally due to the transportation costs. Agricultural activities were conducted with the small scale instead of the large scale due to the lack of agricultural machines. The Cuban conditions are very similar to the current conditions of DPRK. Against political and economic crisis, DPRK can adopt urban agriculture for overcoming food shortage by producing vegetables and fruits in urban areas. Planting fruit trees is deeply linked with a key policy of DPRK, *Wonrimhwa*, since the late of 1990s. *Wonrimwha* means greening urban and rural areas, including a provision of recreational and cultural spaces (Park and Lee, 2014: 5170). Under *Wonrimhwa* policy, DPRK authorities encouraged planting fruit trees to produce persimmons, apples, pears, peaches, apricots, and cherries in urban areas (Park et al., 2021: 5). Cities execute projects for planting more than five fruit trees per household (*Rodong Shinmun*, April 28, 2004). This approach is also linked with other new key policy, *Gwasuwonhwa*, which means orcharding. Since 2014, the

word *Gwasuwonhwa* has appeared in *Rodong Shinmun* (Park et al., 2021). *Gwasuwonhwa* shows the party's interest in food as a provisioning service of urban forests. In addition, urban agriculture and urban agroforestry were combined by cultivating woody perennial plants in conjunction with crop and animal farming. The term "urban food forestry" was thus coined in integrating elements of urban forestry, urban agriculture, and agroforestry. Urban food forestry is defined as "the intentional and strategic use of woody perennial food-producing species in urban edible landscapes to improve the sustainability and resilience of urban communities (Clark and Nicholas, 2013:1652). Urban food forestry improves food security and enhances resilience of the food system by 1) increasing physical food availability with the new planting of food trees, 2) increasing economic and physical access to food by providing low-cost food from local sources, 3) improving food utilization by providing a free source of nutrient-dense foods, and 4) buffering shocks to food supplies (Clark and Nicholas, 2013). Therefore, urban food forestry can contribute to urban sustainability by overcoming urban poverty.

In addition, Cuban case of urban agriculture shows good combination of policy instruments. Cuba settled legal framework of land use right and benefit sharing through agricultural reforms. It brings lessons to DPRK for creating foundation for successful urban agriculture. DPRK has already established a legal foundation of urban green space management. The Act of Green Space adopted in 2010 regulates green space planning, the establishment and management of green spaces, and rules and control of green space management (Park et al., 2021). Several Acts can include contents of planting fruit trees in urban areas with multiple and specific perspectives such as urban planning, urban management and urban beauty. DPRK can link the urban green space management system

with urban agriculture.

As abovementioned, DPRK faces the problem of the education of urban residents unfamiliar with farming and the dissemination of agricultural technology to them. Cuba paid high attention to research and education on urban agriculture. Cuba is still leading education and training of UA. DPRK needs to share knowledge and skills of UA with Cuban experts and invest research and education on urban agriculture with the long-term perspective.

7.2 Lessons from Vietnamese Urban Agriculture

Vietnamese UA produce various food not only fruit and vegetables but also livestock and fish. Therefore, UA contributes to improving dietary diversity and calorie availability. Having direct access to a wider variety of foods via UA can play a potentially important role in protecting the poorest urban dwellers as they cope with an economic crisis that hit on the heels of a food price crisis (Zezza and Tasciotti, 2010: 272). Vietnamese UA case presents a possibility of urban agroforestry through adding livestock cultivation and fishing. The DPRK has successfully implemented an agroforestry project supported by the Swiss Agency for Development and Cooperation (Xu et al., 2012) and has established the Agroforestry Strategy and Action Plan 2015-2020 for implementation (Kim et al., 2016). This research finding indicates that the DPRK emphasized planting perennial wood fruit- and nut-producing species in urban areas. Therefore, it may be concluded that agroforestry policy was an integral part of the urban greening policy in the DPRK.

As the chapter 6 shows, Vietnam presents a participatory UA policy pathway for

food safety. Government encouraged farmers to move to safe production. In 2016, national television launched a government programme 'Say no to contaminated foods' and in recent years Vietnamese media reported a number of food related risk ranging from pesticide residues in vegetables to microbial contamination in meat (Pham and Turner, 2020: 1). There is no information on food safety in DPRK. But UA considering food safety can contribute to improving living conditions for urban dwellers in DPRK.

8 Conclusion

The implications of revitalizing urban agriculture in DPRK were confirmed in this study

through urban agriculture examples in Cuba and Vietnam. It is expected that DPRK's urban agriculture will be able to be activated through diversification of land use rights to encourage general citizens to produce food, establish urban agricultural institutions in each local government, and integrated urban agriculture and urban planning & policy. This could boost food supplies in cities in, and redefine the urban food system in a more sustainable way in DPRK.

The state UA policy pathway to food availability in Cuba gives lessons to DPRK for enhancing food supply in urban areas. It is quantitative approach to design UA policies and strategies. The participatory UA pathway to food access & safety gives lessons to DPRK for increasing income and offering better access to food for urban dwellers. Two pathways can contribute to designing and implementing UA in DPRK for food security and safety. In practice, UA projects can be a theme for cooperation projects between DPRK and other countries (including Cuba and Vietnam) or international organizations such as FAO for food security. More case studies of UA in developing countries can give some lessons for designing an UA model in DPRK.

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Articles from *Rodong Shinmun*

농업성에서 로동자들과 도시 주민들에게 사철 채소를 원만히 생산 공급할 대책을

강구. (1959, Feb 22). p.4.

도시에 파묻혀 있는 모든 예비를 동원하여 100만 톤 알곡 증산 투쟁에 나선 농업

협동 조합원들을 적극 지원하자!. (1961, Jan 29). p.1.

도시주민들에게 식량을 보장할 데 관한 내각 지시 시달. (1955, Mar 7). p.1.

미래의 도시농업-수직농장. (2014, Jul 4). p.6.

식량위기극복과 농업발전을 위한 노력. (2018, Jun 20). p.6.

식품문제해결에 도움을 주는 도시농장. (2018, May 14). p.6.

Appendix

List of included articles for analysis

No.	TITLE	Country	Year	Journal
1	Livestock Development in Hanoi City, Vietnam— Challenges and Policies	Vietnam	2020	Frontiers in Veterinary Science
2	'If I want safe food I have to grow it myself': Patterns and motivations of urban agriculture in a small city in Vietnam's northern borderlands	Vietnam	2020	Land Use Policy
3	An analysis of factors affecting residents' perception of peri-urban agriculture in Hanoi, Vietnam	Vietnam	2020	Management Science Letters
4	Agricultural restructuring towards raising added values and sustainable development in Hanoi city, Vietnam	Vietnam	2019	IOP Conference Series: Earth and Environmental Science
5	Farmers' landholding strategy in urban fringe areas: A case study of a transitional commune near Ho Chi Minh City, Vietnam	Vietnam	2019	Land Use Policy
6	Microbial contamination along the main open wastewater and storm water channel of Hanoi, Vietnam, and potential health risks for urban farmers	Vietnam	2016	Science of the Total Environment
7	Demand for food quality and urban and peri-urban farming and marketing system in Hanoi	Vietnam	2007	Acta Horticulturae
8	Urban agriculture in Havana - Evidence from empirical research	Cuba	2020	Miscellanea Geographica
9	Increasing food sovereignty with urban agriculture in Cuba	Cuba	2016	Agriculture and Human Values
10	Scarcity and abundance: Urban agriculture in Cuba and the US	Cuba	2012	Architectural Design
11	Sustainable urban agriculture in Cuba	Cuba	2011	Sustainable Urban Agriculture in Cuba
12	State power, private plots and the greening of Havana's urban agriculture movement	Cuba	2009	City and Society
13	The urban agriculture of Havana	Cuba	2009	Monthly Review
14	The socialization of science and technology: The Urban Agriculture Program in Cuba	Cuba	2007	Tailoring Biotechnologies
15	Urban agriculture and sustainable urban systems: A benefits assessment of the garden movement in Havana, Cuba	Cuba	2002	International Journal of Environment and Sustainable Development
16	The greening of the "barrios": Urban agriculture for food security in Cuba	Cuba	1999	Agriculture and Human Values
17	Havana's popular gardens: Sustainable prospects for urban agriculture	Cuba	1998	Environmentalist

