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and International Studies

PHENOMENON URBAN GARDENING

Bachelor thesis

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.....
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Abstract

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Urbanization and the global population is increasing at a fast pace. Urban gardens have gained popularity as a mean to produce food locally and organically and provide green spaces for urban citizens. This research explores the history, the impact on sustainable development and types of urban gardens and compares four initiatives in Europe and Asia. In the course of the research, primary research was conducted to profile the individual initiatives. The primary research consisted of semi-structured interviews with key individuals of the respective initiative. While the initiatives show a strong diversity in several aspects such as income streams, funding and size, it can be shown that in Europe, the focus is likely on community building and social aspects. Whereas in Asia, the gardens' purpose tends to be food production and the promotion of urban gardening. A common aspect for all the selected initiatives is composting of organic waste and the participation of the general public.

Keywords: Urban gardening, urban agriculture, sustainable development, community garden, allotment garden, roof-top garden, vertical garden, urban farm, guerrilla gardening, urban beekeeping, composting

Abstrakt

Toppi, M. L. *Fenomén Urban Gardening* Bakalářská práce. Brno: Mendelova univerzita. Fakulta regionálního rozvoje a mezinárodních studií, 2016. Vedoucí bakalářské práce: Ing. Alice Kozumplíková PhD.

Urbanizace a celosvětová populace rostou rychlým tempem. Městské zahrady získaly popularitu, jako prostředek pro pěstování lokálních a organických potravin a také poskytnutí zelených ploch městským občanům. Tato práce se zabývá představením historie, vlivu na udržitelný rozvoj a typů městských zahrad a porovnává čtyři vybrané iniciativy v Evropě a Asii. Pro dosažení cíle byl proveden primární výzkum zaměřený na vytvoření profilu jednotlivých iniciativ. Byl proveden kvalitativní výzkum prostřednictvím polostrukturovaných rozhovorů. Zatímco iniciativy prokazují velkou rozmanitost v několika aspektech, jako jsou příjmové toky, financování a velikost, z výzkumu je prokazatelné, že v Evropě se městské zahrady zaměřují na budování komunity a sociální aspekty. Zatímco v Asii se městské zahrady zaměřují na pěstování plodin a podporu městského zahradničení. Společným aspektem všech vybraných iniciativ je kompostování organického odpadu a účast veřejnosti na těchto projektech.

Klíčová slova: Městské zahradničení, městské zemědělství, udržitelný rozvoj, komunitní zahrada, zahradkářská kolonie, střešní zahrada, vertikální zahrada, městská farma, partyzánské zahradnictví, městské včelařství, kompostování

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Introduction

The world's population has been increasing rapidly, from only 3 billion people in 1960 we have reached 7,3 billion in 2015 (World Bank, 2016). This steep increase brings many challenges that needs to be dealt with. With the growing population, there is an increasing demand for food, while land is becoming scarce. Therefore, there is a need of innovative ideas which resolve these modern challenges. In 1900, only 14 % of the world population were living in urban areas, the estimated share of population living in urban areas is 70 % world's population by the 2050, as reported by the Population Reference Bureau (2016).

With the rising awareness of the challenges of growing urban areas, urban gardening and agriculture have increasingly become a discussion topic. They are viewed as an effective mean of lowering the negative effects of urbanization. As such they bring green areas and food production to the source of demand and therefore decrease the emissions resulting from the transportation of food. Also, there is a trend towards organic food in Western societies and locally sourced food has become increasingly popular.

Urban gardening has a positive impact on sustainable development as it produces food locally and reduces the carbon footprint, decreases the heat island effect, improves air quality and supports biodiversity. No less important is the positive effects it can have on enhancing the local community.

This thesis presents an introduction to the topic of urban gardening in the theoretical part, and further in the practical part the thesis aims to compare selected initiatives of four different countries from Europe and Asia. The necessary data was obtained through semi-structured interviews. The objective is to target possible differences of the chosen initiatives and present the different approaches to urban gardening in Europe and Asia.

1 Objective

The main objective of this thesis is to evaluate the differences in approaches to urban gardening of selected countries in Europe and Asia, to assess the diversity of different initiatives and conditions of urban gardening in each selected country.

The sub-targets create a more detailed evaluation as firstly, their objective is to map the diversity between Europe and Asia in the field of urban gardening to describe possible contrasts between the developed and developing countries.

Secondly, as a sub-target a proposal for the Czech Republic is made. Based on this assessment, a proposal of measures to develop urban gardening in the Czech Republic is presented. The aim of this proposal is to present the elaborated lessons learned from the best-practices in the selected countries which had been identified through primary research. Based on these, suggestions and recommendations are made. They aim at increasing the quality of urban gardening in the Czech Republic and bring innovative practices for local gardens.

2 Literature research

The first chapter introduces the history of urban gardening, the historical background is presented in order to bring this phenomenon into context. The aim is to introduce the historical roots of urban gardening for the reader to better understand this phenomenon and its impacts in different eras of our history. Secondly, urban gardening is brought into the context of sustainable development to display the strength of urban gardening and its impacts. In the third chapter, several types of urban gardens such as community gardens and rooftop gardens are presented to with the intention is to introduce this term to readers. Further the basic properties of urban beekeeping are discussed as bees play a crucial role in the nature and their population has declined significantly in many areas globally in the past several years. Next, the role composting of organic waste in urban gardens is presented.

2.1 History of Urban Gardening

The historical development of urban gardening is very complex and differs in each country according to its historical events, legislations and location. For the purpose of this thesis, no specific historical developments are analysed for each country in which urban gardening takes place but a general overview of the development of this phenomenon is given.

Gardens understood as social spaces that were of access to both rich and poor people and were located within or on the outskirts of urban areas can be tracked in Persia at a time of at least 4 000 years ago (Bell et al., 2016). But a form of urban gardening more familiar to how we know it nowadays appeared at first in the 17th century. According to a study of Birky and Strom (2013), allotment gardening, and therefore a part of urban gardening, can be traced back to 17th century in England, where landowners leased their parcels to dwellers who grew crops and kept livestock on parcels of up to half an acre. The following Table 1 presents a brief overview of the timeline of urban gardening in Europe. As mentioned above, urban gardening has been developing in different times and eras across Europe. The first phase was brought with the industrialization, secondly the phase of World Wars and the Great Depression came, followed by the post-war decline that was mainly caused by the increasing living conditions of citizens and finally the revival of urban gardens which is the modern phase of nowadays urban gardening and agriculture.

Table 1 Timetable of urban gardening in Europe (*source: Bell et al., 2016*)

<i>Year</i>	<i>Phase</i>	<i>Key factors affecting urban gardening</i>	<i>Country</i>
1700–1910	Industrialization	<ul style="list-style-type: none"> • Early provision of land for the poor • City Beautiful Movement • New towns and suburbs laid out by philanthropic industrialists 	<i>Pioneers: Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, Ireland, Netherlands, Norway, Poland, Sweden, Switzerland, the UK</i>
1911–1950	The world wars and Great Depression	<ul style="list-style-type: none"> • Allotments as a solution to hunger and unemployment • Victory gardens • International allotment movement • Allotment clubs and associations 	<i>Pioneers plus Croatia, the Czech Republic, Estonia, Italy, Latvia, Lithuania, Spain</i>
1951–1972	Post-war decline	<ul style="list-style-type: none"> • Ending of war • Post-war urban development • Decline of unemployment • Advances in living standards 	<i>Pioneers except former East Germany, Estonia, Latvia, Lithuania</i>
1973–the present	The revival of urban gardens	<ul style="list-style-type: none"> • Increased disconnection between people and nature • Rise of the environmental movement • Neo-traditionalism • Sustainable development • Globalization • Twenty-first century economic depression 	<i>Pioneers and newcomers: Cyprus, Greece, Malta, Portugal, Serbia, Spain</i>

A further and so far the strongest development was brought by the industrial revolution. The mid- and late-nineteenth century was the era when urban allotment and community gardens as we know them today in Western countries were founded. Industrialization brought a large-scale movement of population, as new mines and factories were established people migrated from the countryside into urban areas to start working. These factors led to a fast-paced expansion of both cities and towns. This rapid expansion of population in urban areas was not accompanied by the necessary urban planning which brought pollution, dirty, insanitary and crowded areas (Bell et al., 2016). Not long after the growth of industrial cities, the problem of urban poverty was targeted and local philanthropists and politicians decided to provide the urban people with plots of land to enable them growing fruits and vegetables. The first appearance of urban gardening, as we know it today, can therefore be dated to the nineteenth century where it developed as a reaction to the scarcity of fresh food in the time of shifting from feudal agrarianism to urban industrialism. Due to the impact of industrialism and other historical events that came later in history, urban gardening became to be understood, by politicians, urban planners and gardening advocates, as a tool to help the society by providing them with

fresh food as well as support for clean air and available green areas for leisure time (Bell et al., 2016).

Communal urban gardening of USA and many European countries had three types of urban gardening in common from the 1890s. It was the vacant-lot cultivation association spurred by food insecurity, children's school gardens and civic garden campaigns (Birky and Strom, 2013; Bell et al., 2016).

Another strong wave of urban gardening came in the 20th century in response of the First World War (1914–1918) and the Second World War (1939–1945) and the Great Depression of 1930s (Birky and Strom, 2013; Bell et al., 2016). By the time the U.S. joined WWI, Europe was facing a severe food crisis. Millions of homeless and displaced people, damaged and bombed houses, armies occupying cities was the face of Europe in this era (Bell et al., 2016; Lawson, 2009). The U.S. was farm-raising food to export it to Europe where the war caused a lack of accessibility to food. In reaction to this crisis the War Garden campaign was founded, the purpose was to raise food for the households while farm-raised food was exported. The entire general public took up gardening and started growing wherever they could, gardens could be found in places such as parks and railroad areas, company grounds or simply in backyards. In 1918, it was estimated, 5,29 million gardeners altogether grew an amount of food worth \$525 (Lawson, 2009). A similar campaign called “Dig for Victory” took place in the UK and was set up by the British Professor John Raeburn. The aim was to increase food production by encouraging people to turn vacant areas into gardens.

Another kind of gardens, the so-called Relief Gardens (sometimes called Depression Relief Gardens or Relief and Subsistence Gardens), were set up during the Great Depression in the U.S. to contribute to food production and combat poverty and emotional stress. Initially, charities and municipalities stood by foundation of these gardens but soon state and federal programs provided these gardens with staff, seeds and guidance (Sanyé-Mengual et al., 2015; Bell et al., 2016; Lawson, 2009).

World War II brought a new gardening campaign called Victory Gardens, which was initiated in the U.S. At first, government officials were not keen on starting a new campaign on public gardening but right after the attack at Pearl Harbor the high interest of civils led to the new Victory Garden campaign that was federally guided. As well as the gardening campaigns of WWI, Victory Gardens were aiming to produce food for household food consumption, next to that it was also a way of expressing patriotism (Lawson, 2009). The propaganda was widely spread with posters stating: “*Sow the seeds of Victory!, Your Victory Garden counts more than ever!, Our food is fighting or The Seeds of Victory insure the Fruits of Peace*”. Two examples of such war and victory gardens posters are illustrated in the Figure 1 below. As reported by Birky and Strom

(2013), the United States Department of Agriculture stated that about 44 % of the U.S. fresh vegetables was a result of successful urban gardening campaigns in 1942. However, Bassett (1981) reports that the peak production came in 1944 when 20 million Victory Gardens produced 40 % of the U.S. vegetable supply.



Figure 1 War and Victory garden propaganda posters of the U.S. government. On the left World War I, World War II on the right (source: Mok et al., 2013. Images reproduced under Public Domain)

After WWII allotment and community gardens lost on popularity, this was caused by several aspects, generally they started to be associated with poverty, charity and war time needs. Other factors included the necessity of land for new housing, due to increasing financial stability urban residents did not need to rely on own food supplies anymore and therefore urban gardening turned from duty to a hobby (Bell et al., 2016). However, in recent years urban gardening has been receiving increasing attention and is experiencing a new wave of urban gardeners. As Bell et al. (2016) describe in their *Urban Allotment Gardens in Europe* book: “the interest in urban allotment and community gardening in the early 1970s arose from three important trends: the nascent environmental movement, the financial crisis caused by the 1973 oil price rise and the effects of the European Economic Community (EEC), later European Union (EU). These were trend that influenced the socio-economic, environmental and political character of Europe and the way in which urban gardens were shaped in this new era. The 1970s energy and financial crisis cause high inflation and led to the rise of unemployment and austerity. People turned to them as a reliable way of producing food.” The 1970s factors influencing the increase of interest in urban gardening were furthermore supported in 1992 at the UN Conference on Environment and Development that took place in Rio de Janeiro, where governments together agreed on making sustainable development an agenda for action.

A group of actions to achieve sustainability was formed including urban gardening (Bell et al., 2016).

The role of urban gardening and agriculture in sustainable development is further described and analysed in sub-chapter 2.2.

2.2 Urban Agriculture as part of sustainable development

This chapter presents urban agriculture as a mean towards sustainable development. Properties of urban agriculture supporting sustainable development are listed as well the initiative of reducing food miles is introduced. The aim is to prove and explain the effects of urban agriculture on sustainable development in order to underline its constructive impacts.

2.2.1. Impacts on sustainable development

The year 2008 was the first year in history that the world's urban population, that accounted for over three billion people, exceeded the number of the population living in rural areas (FAO, 2008). According to FAO (2008), by 2020 the developing countries of Africa, Asia and Latin America will be home to 75 % of all urban inhabitants, and to eight of nine of the anticipated mega-cities of the world with populations over 20 million. And by 2030, around two thirds of the world's population is expected to be living in urban areas.

The process of urbanization is followed by an aspect called “urbanization of poverty”: a phenomenon of rural-to-urban migration that is connected with limited employment opportunities in urban areas. FAO data revealed that the number of individuals with chronic food insecurity increased to above 100 million people over two years between 2007 and 2009. The vision is that urban agriculture is able to contribute to urban poverty reduction and urban sustainable development, this by operating as a source of income and livelihoods, and also by increasing the opportunities of accessing food in cities (World Bank, 2013).

FAO (2008) states that: “UPA addresses the three Global Goals that are targeted for as a result of the High Level Conference (HLC) on Food Security (FAO, Rome 3-5 June 2008), i.e. (i) sustainable increases in food production and availability, (ii) economic and social progress and (iii) sustainable management and use of natural resource”. Understanding this statement, Urban and Peri-Urban agriculture is perceived by countries of HLC as an efficient mean of increasing food security, its production and availability, it can support economic and social progress in countries of its location and increase sustainable management and an efficient use of natural resources.

There are several sustainable development goals related to urban agriculture as Game and Primus (2015) present in their study:

- Goal 01 End poverty in all its forms everywhere
- Goal 02 End hunger, achieve food security and improved nutrition and promote sustainable agriculture

- Goal 12 Ensure sustainable consumption and production patterns
- Goal 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

The unification of the advantages of urban agriculture with the goals of sustainable development proves that urban agriculture is potentially a mean of decreasing hunger and poverty, a support for the building of sustainable pattern of food production and while integrating environmental values in development both in developed and in developing areas (Game and Primus, 2015).

With the process of urbanization, urban and peri-urban agriculture has from an informal movement become a professional and commercial initiative. Urban and peri-urban agriculture became a crucial component of the strategies of food security. It can also be used by local governments for slum sites and public areas, as well as on environmentally degraded areas as a way to promote health and improved food security (FAO, 2008).

The following Figure 2 illustrated in a study of Game and Primus (2015), presents the opportunities and risks that occur with urban agriculture. Some of the listed opportunities of establishing urban gardens and agricultural initiatives are: (i) freshness of local production; (ii) community bonding as this is a one of the main reasons of founding an urban gardens, urban agriculture brings people from different social groups together and it supports the formatting of new connections, partnerships and communication, urban areas can in certain situation lack personality and boost individuality; (iii) creation of job opportunities with low barriers to entry which helps in an area of a problematic feature of urban spaces and its high population density; (iv) emergency food supply as locally produced food in cities can be used in case of calamities and natural disasters as a direct food supply to the affected areas. Urban agriculture has as stated by the authors' of the study some of the following risks: (i) limited production quantity as urban spaces deal with a lack of free land compared to urban areas but this problem is often dealt with by creating rooftop or vertical gardens; (ii) soil and water pollution that is caused by the high density of population and the area of high emissions; (iii) environmental and health risk from an inappropriate overuse of pesticides and fossil-fuel based fertilizers. The last listed point is contradictory. This is a problem that could also occur in rural agriculture. On the contrary, many urban gardening and agriculture initiatives grow their produce organically. The idea of urban agriculture is knowing where our produce comes from and therefore also being aware of its environmental friendliness and healthiness.

Opportunities for urban areas (in opposition to RA)	Risks for urban areas
Physical Environment	
<ul style="list-style-type: none"> ▪ Less need for packaging, storage, and transportation ▪ Proximity to services, including waste treatment facilities ▪ Waste recycling and re-use possibilities 	<ul style="list-style-type: none"> ▪ Increased competition for land, water, energy, and labor ▪ Reduced environmental capacity for pollution absorption ▪ High levels of air pollutants in cities and microbial contamination of soil and water
Economic Environment	
<ul style="list-style-type: none"> ▪ Potential Agricultural jobs with low barriers to entry ▪ Non-market access to food 	<ul style="list-style-type: none"> ▪ Limited Production Quantity ▪ Varied seasonal Production Quality
Social Environment	
<ul style="list-style-type: none"> ▪ Availability of fresh fruits and vegetables ▪ Community Bonding ▪ Access to green spaces ▪ Emergency food supplies ▪ Soil treatment ▪ Environmental stewardship 	<ul style="list-style-type: none"> ▪ Environmental and health risks from inappropriate overuse of pesticides and fossil-fuel based fertilizers

Figure 2 Opportunities and risks of Urban Agriculture (source: Game and Primus, 2015)

2.2.2. Reducing Food Miles

Referring to food miles we mean the distance food travels from the location where it is growing to the location where it is consumed (Hill, 2008). With today's globalization and the development of global food transport system, the consumer of nowadays has higher expectation about product purchasing. Consumers have the opportunity to choose their grocery from a wide range of food items, regardless of their location or the current season. But the current food system has an environmental cost. The longer the distance food travels, the more fossil fuels are required for its transportation (Hill, 2008). Therefore, producing locally and supporting urban gardening is a way of preventing large amounts of emission created by the food transportation.

A different opinion is presented by Weber and Matthews (2008) in their research they claim the emission created by transport are far less than emissions created by production of food, with transportation accounting for 11 % of total emission and food production accounting for 83 % (Schnell, 2013).

As demonstrated in Figure 3 taken from a study from Hill (2008) the amount of energy used for transportation within the food system in the U.S. accounts for 14 % of the total. Figure 3 demonstrates each step of the food industry system and the percentages of the total emissions accounting for these steps. Even though transporting of produce does not produce the largest amount of emission, the local production and urban gardening is

a mean of avoiding unnecessary transportation of goods and therefore the creation of emission.

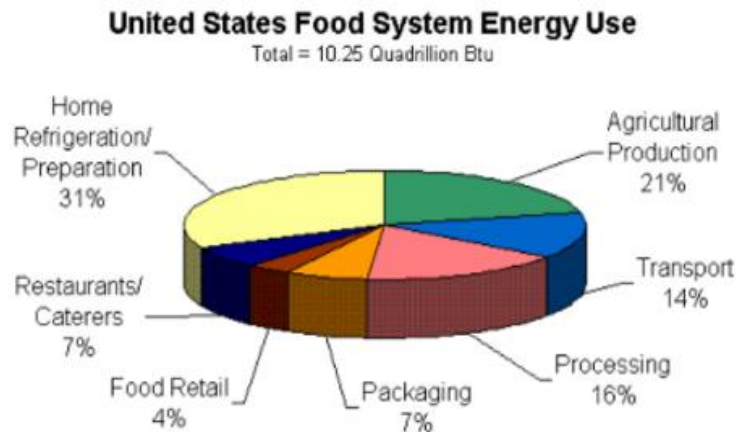


Figure 3 United States Food System Energy Use (source: Hill, 2008)

The idea of Zero Food Miles philosophy is that restaurants, canteens and shops preferably offer and sell local and seasonal products. This way freshness and healthiness of products is ensured as well as the environment is protected avoiding the long transportations challenging for the environment.

Reducing the food miles print and focusing on local suppliers has the following economic, social and environmental benefits for consumers:

- enjoy fresher, healthier food
- support local farmers
- keep their money in the community
- know where their food comes from
- reduce their carbon footprint

(Hill, 2008)

2.3 Types of Urban Gardening

This following chapter describes the different types of urban gardens. The further described gardens are (i) community gardens, (ii) allotment gardens, (iii) rooftop gardens, (iv) vertical gardens, (v) urban farms and (vi) guerrilla gardening. For further description, an overview of the terms urban gardening and urban agriculture will be described for the clarification of the meaning of those terms.

According to World Bank (2013), Urban Agriculture is *„an industry located within a town, a city, or a metropolis, that grows and raises, processes and distributes a diversity of agricultural products from both plants and animals, using human, land and water resources, products, and services found in and around that urban area”*.

Urban Gardening is then a practice of growing vegetables, fruits and flowers in an urban environment. Urban Gardening is often noted to as urban agriculture or urban horticulture (Ecolife, 2011).

Due to the little difference of these two terms, for the purpose of this thesis, both terms are combined.

2.3.1. Community gardens

Community gardens can be located both in urban and rural areas and exist in various countries. They vary in activities and offer according to their location and the needs of the local community. Teig et al. (2009) in their study give a definition of a community garden: *The American Community Gardening Association (ACGA) defines a community garden as any piece of land gardened by a group of people in urban, suburban or rural settings. The format of the garden varies from one large communal plot to many individual plots and can be located in a variety of settings such as schools, churches, neighborhoods, and hospitals. Community gardeners come to gardens to grow flowers, vegetables, herbs and in many instances to connect with nature and the restorative qualities of gardening.* Community gardens are currently growing as an international phenomenon, and as well as urban gardening in general, they are perceived as a mean of improving the quality and quantity of local food supplies, a way of spending leisure time and a recreational activity (Ferris et al., 2001).

Community gardens have evolved over the years from allotment gardens, which were initially set up as momentary reactions to emergency conditions such as the economic depression, war and food shortages. Community gardens also grew in popularity and importance during times of crisis. In the era of WWI and WWII they were a mean of supplying households in urban areas with fresh produce and combated malnutrition which

accompanied the heavy war period. The modern wave of community gardens came in the 1970s, as prices of food were rising and interest in environment was increasing (Chan et al., 2016; Birky and Strom 2013).

Nowadays community gardens are still a way of combating food insecurity. The U.S. Census in 2009 reported that an estimated amount of 43,6 million of U.S inhabitants are living in poverty, that occurred even in situations where cash was available as the problem often was lack of accessibility to food. NGOs along with government agencies like the Canadian FoodShare located in Toronto, JustFood from New York City and the Homeless Garden Project from California collaborate with CSA farms and community gardens inspiring local people to produce food and distribute it to the ones in need (Mok et al., 2014). As it is shown but this example, community gardens are a mean of helping initiatives of this kind, initiatives that focus and social help, environmental protection and development. The community comes together and with each other help and good intentions they help the good causes, and this is one of the strengths of community gardens in general - collaboration, support, neighbourhood gathering and empowerment.

In Australia, for instance, the first community garden was founded in 1977 in Melbourne. Nowadays, there is a number of around 220 community gardens in Australia of which a part is supported by local governments. In contrast, in 2017 it was estimated by the American Community Gardening Association that the number of community gardens in the U.S and Canada together accounts around 18 000–20 000 (including locations such neighbourhood gardens, school gardens and public housing gardens) (Birky and Strom, 2013; Mok et al., 2014). The largest city in the U.S., New York City, has over 500 publicly accessible community gardens (of which 80 % grow food) and is home to over 20 000 community gardeners (of the total city's 8 million inhabitants) (Gittleman et al., 2010; Gittlema et al., 2017). A national study in the U.S. has also estimated that the number of American household taking part in initiatives of community gardening accounts for 1 million (Birky and Strom, 2013). Another example is Toronto where the City Council in 2001 committed to the Toronto Food Charter, which among others claims to encourage community gardens and protect agricultural lands (Mok et al., 2014). In contrast, the municipality of New York City, according to a study from Gittleman et al. (2017), does not acknowledge community gardens as part of its plans for open space and green infrastructure.

The support of community gardens from governments and municipalities differs in each country and city. In some cities of Brazil and Argentina, for instance, local municipalities represent a crucial actor in the urban production and are involved in the activities of community gardens and its development (Orsini et al., 2013).

According to the study of Orsini et al. (2013), it is common for community gardens in Northeast Brazil to find children helping their parents with cultivation in their plots. The same occurs in the U.S. (Hondagneu-Sotelo, 2017). The intention is to pass the agricultural knowledge on and spending together precious parent/grandparent and children time, introducing them to species and practices but also to keep them away from the streets where they could be involved in crime or be subject to violence. These practices, together with the previously mentioned ones, introduce and present the advantages of community gardens.

A further strength of community gardens is presented in other studies dealing with integration of immigrants and refugees in the local society. As community gardens allow people to come together regardless their religion, ethnoses, sexually or age, it is a possibility for them to create connections, partnerships and get a feeling of belonging. It is also an opportunity for immigrants to grow their domestic vegetables and fruits and therefore feel homie. Another purpose of community gardens is as neighbourhood homeland pharmacies (Hondagneu-Sotelo, 2017).

According to a study from Teig et al. (2009), community gardening is recognized as a recreational activity. It is believed that community gardens could promote public health by means of increased physical activity, social engagement and mental health and by improved nutrition. Growing own fruits and vegetables supports its consumption and the expansion of healthier lifestyle. The trendy habits of nowadays support the development and increased interest in community gardening and urban gardening in general.

The second part of this sub-chapter is dedicated to presenting two examples of practice. As for the first one, an example of effective urban development through urban agriculture and community gardening is presented in the city of Rosario, Argentina. The second is a community garden located in Spain, in the peri-urban area of Barcelona and is supposedly the biggest community garden in Spain according Permaculture (2015). The same source claims that Barcelona has more community gardens than any other city in Europe.

- **Rosario, Argentina**

Each spring since 2004, the Rosario city of Argentina hosts a week-long festival called “Rosario grows roots”. It is an internationally recognized festival that is an example of successfully integrated agriculture into urban development. Nowadays Rosario has 1,35 million inhabitants, it is the thirteenth largest urban agglomeration in Argentina and its ports deals with most of the nation's exports of vegetable oil, wheat and soybeans. However, the city was not always prospering. In the period of 1998–2002, the city's economy had collapsed and many factories had to close. This led to the unemployment of one-third of

the workforce. In December 2001, the income of 60 % of the population dropped to a level below the poverty line and 30 % of them were living in condition of extreme poverty (FAO, 2015).

The municipality decided to do a step forward and responded to the crisis by starting an urban agriculture program. In collaboration with two partners, the Pro-Garden program and the NGO Centre for Agro-ecological Production Studies, they agreed on providing 20 gardening groups with seeds and tools, to support them in food production. Soon the program increased in popularity and in over 2 years there were around 800 community gardens that were supplying vegetables to about 40 000 people. Nowadays urban agriculture is included in Rosario's urban development plan and has around US\$380 000 annual budget and in 2004 the city was awarded the "UN-HABITAT International Award for best Practices in urban development" (FAO, 2015).

The example of Rosario city is a proof of the opportunities brought by the implementation of urban agriculture, gardening and community gardens in city's action plan. It shows that with the political and participation of locals, the social and economic situation can be improved. The local community struggling with basic needs gained new opportunity of occupations, income generation and access to food.

- **Can Masdeu, Spain**

The social centre Can Masdeu is a neighbourhood movement that started in the autumn of 2002. The aim was to create a space for intercommunity relations, the area of Can Masdeu community garden is divided into 35 plots and is home to a community of over one hundred people of all ages. Below on Figure 4 is illustrated the Can Masdeu community garden which is located at the outskirts of Barcelona.

This community garden is based on co-management when once a month meetings are run and aspects such distribution of soil, manure and water, the maintenance of water tanks and renovations are discussed. Next to the maintenance aspects also topics such as community engagement events and parties are planned. The objective of Can Masdeu is to practise organic growing and build community. Can Masdeu does not only run a community gardening project but it is also a network of projects (5) that acts against today's world of money, smoke, noise and speed (Vall de Can Masdeu, 2017).



Figure 4 Can Masdeu Squatter House Barcelona (source: thespainscoop.com, 2012; by Regina)

2.3.2. Allotment gardens

As reported by Bell et al. (2016), the name of allotment gardens originally comes from the British usage of an action of a parcel of field being “allotted” to a dweller for their own further use, for instance a garden. Bell et al. (2016) also present a standard definition of allotment gardens produced by the Office International des Coins de Terres et des Jardins Familiaux (eng. the International Office of Allotment and Family Gardens) with the seat in Luxembourg. Quoting: *An allotment is generally an equipped plot with a size up to 500 sq m or sometime more, distant from home and used by individual person or a family for both: non-commercial cultivation of fruit, vegetables and ornamental plants and recreational purposes. It is situated on a ground/site having several plots, laid out and equipped under observation of national requirements (e.g. associated house, gardening infrastructure) and managed by local authorities, private or public bodies or by an association. The allotment gardener has to pay an affiliation fee and/or rent and observe stipulated common rules.*” An allotment garden is therefore a parcel of land in a bigger piece of garden which is divided in several smaller plots. For allotment gardens, parcels here are cultivated individually (as opposed to community gardens). Gardeners usually pay a fee to the association managing the gardens. An allotment garden is often equipped with cottage for shelter or a shed for gardening tools.

Allotment gardens were first used in England in the 17th century which is connected with the origin of the terminology as mentioned above. Landowners back then rented a plot of field to dwellers in order for them to grow their own fruits and vegetables. Although we

recognize this practice as allotment gardens it was only in the 19th century when gardens corresponding with today's allotment gardens were founded. They were used as a mean of food supply in the era of industrialization when urban areas faced an increasing migration to towns and cities and were challenged by lack of accessibility to food, overpopulation and insufficient sanitation system (Bell et al., 2016). Allotment gardens played an important role during WWI and WWII as well. During WWII, for instance, allotment and other gardens produced around 10 % of the total food consumption in the United Kingdom (Speak et al., 2015).

Table 9 Allotment demand and supply 1935–1978 in the UK (source: Bell et al., 2016)

<i>Year</i>	<i>Total number of plots</i>	<i>Total acreage</i>	<i>Percentage vacant</i>	<i>Numbers on waiting list</i>
1935	609,352	59,403	18,130 (3%)	(not available)
1950	1,039,233	105,281	62,839 (6%)	33,744
1960	801,061	85,169	101,512 (12.6%)	6,573
1970	532,964	58,242	111,126 (21%)	5,870
1973	467,755	52,300	36,274 (7.7%)	27,208
1975	439,750	47,455	24,965 (5.5%)	83,298
1977	497,793	49,873	20,572 (4.1%)	121,037
1978	479,301	49,105	23,178 (4.7%)	(not available)

According to Speak et al. (2015), the number of allotment gardens has dramatically decreased over the past decades, from around 1,5 million in 1950 to 250 000 today, caused by several factors of which the most important is the lack of available land as new plots for buildings are needed. The decreasing trend in the supply of allotment gardens is also illustrated in the Table 2, where the initial statistical data of 1935 present 609 352 plots for cultivation. From the peak in 1950 of 1 039 233 plots as presented in the Table by Bell et al. (2016), the number of supplied gardens was constantly decreasing while the demand kept an increasing trend from the 1970. The market of allotment gardens is to this date facing a shortage of supplied spots. The same trend is described in the report of Buck (2016), who found that over 30 % of local authorities in the UK acknowledged that around 100 to 400 people were on their waiting list waiting for a plot for cultivation, while 8,5 % reported to have over 1 000 waiting people on their list. With the current trends in life-style, conscious consumption, organic food, environmental protection and appreciation of leisure family time, the demand for allotment and other gardens is constantly increasing and, due to the lack of available land, is not satisfied. One of their advantages is, as with other types of urban gardens, they reduce ecological footprint by supplying fruits and vegetables to the closest neighbourhood and they do not support long-distance transport and the industrialization of agriculture and horticulture (Gibas, 2013).

The Office International des Coins de Terres et des Jardins Familiaux released an information sheet in 2016 where, among other things, compares the total surface in each country of the federation. These countries are: Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Japan, Luxembourg, Netherlands, Norway, Sweden and Switzerland. As it emerged from the comparison of the data, Germany has the highest number of total surface of allotment gardens, accounting for 45 000 ha. After a large gap comes Denmark with 1 200 ha and Netherlands with its allotment gardens accounting for 1 000 ha (Office International du Coin de Terre et des Jardins Familiaux a.s.b.l, 2016). The data for the total surface of allotment gardens in Great-Britain was not released in this sheet but due to the long tradition and popularity it will presumably be one of the highest.

Following two specific cities practicing allotment gardens are briefly present for the reader to have examples from practice.

- **Hanover, Germany**

Hanover is, due to the numerous parks and allotment gardens, also known as the “City of Gardens”. Local gardens are a crucial part of the city's green infrastructure and it has also a strong advantage from other cities as its allotment garden movement is well developed compared to others. In 2011 Hanover was entitled the “German Capital of Biodiversity”. There are about 1 000 ha of allotment gardens, divided in 20 000 plots spread over 270 allotment association through the city of Hanover, covering around 5 % of the urban area of the city (Hannover, 2017; Urban Allotment Gardens, 2017).

- **Poznan, Poland**

According to Speak et al. (2015), there are 83 allotments in Poznan, spread over an area of 848,5 ha. Generally, with approximately only one third of allotments gardens growing vegetable, plots are rather used for leisure time and relaxation than food production. The few plots growing vegetables usually consist of a vegetable of an average size accounting for around 30m² (Urban Allotment Gardens, 2013; Speak et al., 2015).

2.3.3. Rooftop Gardens

The beginnings of rooftop garden date back to the 8th century BC, when the Hanging Gardens of Babylon, one of the seven wonders of the world, were founded. Already at that time the builders created an irrigation systems that ensured a continuous soil moisture of the vegetation (Bohuslávěk et al., 2009). Throughout the years many cultures were using rooftop gardens for a variety of reasons such as thermoregulating shield or as a symbol of high position in the society. Except from the Hanging Gardens of Babylon,

none of other historical rooftop gardens show signs of horticultural activities (Čermáková, Mužíková, 2009).

Nowadays with the increasing urbanization cities face a growth of built up areas and at the same time a lack of open spaces for creating green public areas. The greening of roofs, establishments of green spaces, gardens and farms on the top of buildings appears to be the solution of the new millennia and its struggle of concrete and glass visage of urban areas.

There are three basic different forms of Green Roofs: 1) *Extensive Green Roof* – these green roofs are not meant to be used as roof gardens, they consist of natural low maintenance green roofs; 2) *Semi-Intensive Green Roofs* – basic garden green roofs; 3) *Intensive Green Roofs* – parks and gardening including Urban Agriculture. Rooftop farming (Intensive Green Roofs) can be further specified in: 1) Rooftop Farming (open-air) and 2) Rooftop Greenhouses. (Sanyé-Mengual et al., 2015; Livingroofs, 2017; IGRA, 2017) Five years ago, rooftop farms were considered utopias only illustrated in pictures, but nowadays they emerge all over the world, making the city greener from above. (De Boer, 2012) As listed below rooftop gardens have many advantages for urban areas which support their rapidly expanding implementation.

Advantages and reasons for building a rooftop garden are:

- Support of urban food production and reduce of carbon footprint
- Brings green spaces to urban areas
- Promotes individual, community and cultural diversity
- Supports biodiversity
- Creates job opportunities in the field of research, design, construction, landscaping/gardening, health and food production
- Improves air quality and reduce CO₂ emissions (retention of carbon dioxide, produces oxygen and captures dust from the air)
- Keeps down the city's temperature, heat island effect¹
- Thermal insulation of buildings
- Noise damping
- Retains part of the rainfalls that would otherwise runoff the roof without any

¹ The Heat Island describes a phenomenon where urban build up areas have a higher weather temperature that the rural areas in the surroundings. The Heat Islands can negatively affect communities economically

use

(Čermáková, Mužíková, 2009; Bohuslávek et al., 2009; City Farmer, 2003)

As reported by Liu et al. (2016), the estimated size of China's roof space is 1 million hectares. The Chinese government has reserved for cultivation a minimum of 120 million hectares. This makes the total roof space in China 0,08 % of the total minimum cultivation space set by the Chinese government. According to Astee and Kishnani (2010), the total vegetable consumed in Singapore could be by an estimated 31 % supplied by rooftop farming. Other examples given by Liu et al. (2016) constitute that rooftop farming could in fact cover a considerable part the of the consumption of local populations. Another presented case study shows theoretical data that as much as 77% of Bologna's, Italy vegetable consumption could be satisfied by the already existing roofs in the city (Liu et al., 2016).

Following are three examples of urban gardens and farms in the world. The below given examples represent each an urban garden in the US, Japan and the Netherlands to become acquainted with three different gardens implemented on three continents.

- **Brooklyn Grange, New York, USA**

Brooklyn Grange is the leading rooftop farming and intensive green roofing business in the US and was founded in 2010. It operates the world's largest rooftop soil farms, which all together have over two acres of rooftops under cultivation locating on two roofs in New York, Brooklyn and Queens (represented in Figure 5 and Figure 6). The yearly produce is estimated at 50,000 lbs of organically-cultivated harvest. Brooklyn Grange has a range of activities from growing and distributing fresh local vegetable and herbs to hosting events and educational programs, providing urban farming and green roof consulting and partnering with non-profit organizations that focus on healthy and strong local communities in New York. Currently Brooklyn Grange is also keeping egg-laying hens (Brooklyn Grange, 2016).

(increased air conditioning costs, increasing summertime peak energy demand), environmentally (air pollution, greenhouse gas emissions) and with heat-related illness and water quality. (EPA, 2017)



Figure 5 Brooklyn Grange (source: brooklyngrangefarm.com, 2016)



Figure 6 Brooklyn Grange (source: brooklyngrangefarm.com, 2016)

- **ACROS, Fukuoka, Japan**

ACROS Fukuoka Prefectural International Hall (illustrated in Figure 7) is a centre of international, cultural and information exchange. This garden consists of 15 steep vegetated terraces in a nearly 100 000 m² of park. Over 120 different plants and 50 000 plants in total can be found in the park. This garden is not for horticultural purpose. The building offers a music hall, a gallery with permanent exhibitions, a museum, conference facilities, government and private offices, parking areas and retail space. (The International Greenroof & Greenwall Projects Database, 2017)



Figure 7 ACROS Fukuoka Prefectural International Hall (source: greenroofs.com, 2017)

- **DakAkker, Rotterdam, The Netherlands**

The DakAkker was founded in 2012 as one of the projects of the City Initiative The Luchtsingel and exhibition-site during the International Architecture Biennale. It is currently organized and maintained by the Environmental Centre Rotterdam. This roof garden grows fruits, vegetables, herbs and keeps bees. Harvest crops are delivered to local restaurants and sold during festivals. The activities found in this roof garden are not only horticultural as education programs are also held. Children from elementary schools get not only theoretical information but they have also the opportunity to plant as real rooftop farmers. (Luchtsingel, 2017) The rooftop garden is shown in Figure 8 below.



Figure 8 The DakAkker rooftop garden (source: luchtsingel.org, 2017)

2.3.4. Vertical Gardens

Vertical gardening and farming, sometimes also called as sky farming, is another type of urban gardening and agriculture. Vertical farming consists of cultivating vertical surfaces. There are various options of vertical cultivation. One of them is growing greens on the vertical surfaces of buildings or walls. On Figure 9 an example of vertical gardening is shown for illustration. It is a method of bringing greens into urban areas and re-use otherwise non-usable surfaces. Another option of vertical farming is cultivating greens and vegetables vertically in different layers above each other to increase productivity and the volume of harvest. This is generally done in indoor areas.



Figure 9 An example of vertical gardening in a small scale (source: uniqueinteriorstyles.com, 2017; by EcoWalls)

Professor Dickenson Despommier, from the Columbia University in New York, is a strong supporter of the concept of Vertical Farming. Despommier defines Vertical farming as „*the concept of cultivating plants or animal life within skyscrapers or on vertically inclined surfaces*” (Specht et al., 2014).

According to Despommier „*The Vertical Farm is the enterprise for creating an eco-city in which all human activities reflect ecological process.*” In his TEDx talk, he also claims that one indoor acre can produce as much food as 10 acres of outdoor farmland (TEDxWindyCity -- Dickson Despommier -- The Vertical Farm, 2010).

Advantages of a Vertical Farm discussed by Despommier are:

10. Can grow bio-fuels, plant-derived drugs

9. Uses abandoned city properties
8. Supplies fresh produce for inner city dwellers
7. Creates new jobs
6. Remediate gray water
5. Allows repair of damaged ecosystems
4. Uses 70% less water, no agro-chemicals, no fossil fuels
3. No crop loss from severe weather events
2. Year-round crop production
1. No agricultural runoff

(TEDxWindyCity -- Dickson Despommier -- The Vertical Farm, 2010)

The advantages given above are relevant for indoor vertical farm where: (i) outdoor weather conditions do not create a restriction for cultivation and (ii) the irrigation system can be fully formed. Next to the given advantages, vertical gardening is as well as rooftop gardens a tool against the heat island effect, noise damping and a support to biodiversity in urban areas.

In the second part of this chapter two examples of vertical gardens are presented. The first one is a vertical garden in Milan, the so-called Bosco Verticale, the second one located in Singapore and it is a vertical garden producing leafy greens.

- **Bosco Verticale, Milan, Italy**

Bosco Verticale, Eng. Vertical Forest, as a model of sustainable residential building, is a project that aimed to support the urban biodiversity and regeneration of the environment. It is an innovative method for metropolitan reforestation that uses the system of vertically grown plants and trees. Two residential towers were created, 110 and 76 m high respectively. Those two buildings consist of 9 000 planted trees and over 20 000 plants of a wide range. Plants were distributed over the building considering the sun exposure of the facade. The area of each Vertical Forest would on flat land equal to an area of 7 000 m² of forest in number of trees. The two buildings are illustrated on Figure 10 and 11.

The main advantages of the vegetation system of Vertical Forest is that it increases biodiversity in the city by contributing to the construction of a micro-climate, it absorbs CO₂, produces oxygen and last but not least it produces humidity. It is seen by the architects as a magnet for and a symbol of the spontaneous re-colonization of the city by animal life as well as vegetation (Stefano Boeri Architeti, 2017).



Figure 10 Vertical Forest (source: stefano boeri architetti.net, 2017)



Figure 11 Vertical Forest (source: stefano boeri architetti.net, 2017)

- **Sky Greens, Singapore**

According to the Sky Greens official website, it is the world's first low carbon, hydraulic driven vertical farm. The aim of Sky Greens is to produce safe and fresh vegetables while using a minimum amount of water, energy and land resources. Sky Greens focuses on growing leafy vegetables with the ambition of growing locally and harvesting daily. Among the offered vegetables are Sky Chinese Cabbage, Sky Lettuce, Sky Spinach and a wide range of other local leafy greens (Sky Greens, 2014).

The vertical farming system of Sky Greens is made up of rotating tiers which are mounted on a A-shape aluminium frame as shown in Figures 12 and 13. Each tier then has various pots where the produce is harvested. There is no need for artificial lighting as every vegetable gets the necessary amount of sunlight by the rotating systems. This, together with the rotation being carried out by a hydraulic water-driven system, helps Sky Greens with lowering the energy use (Sky Greens, 2014).

An important part of Sky Greens properties is the direct harvest and storage. The Sky Greens harvesting system consists of harvesting and packing right where the leaves grow, which creates the strong advantage comparing to the traditional land-based farming. By directly harvesting and packing, double handling is diminished and costs and wastage are therefore reduced (Sky Greens, 2014). This helps protecting the environment as well as to reduce the financial burden.



Figure 12 Patented vertical gardening system (source: skygreens.com, 2014)

Figure 13 Patented vertical gardening system (source: skygreens.com, 2014)

2.3.5. Urban Farms

The specification of the concept of an urban farm is to a certain extent problematic. The main problem occurs when trying to define what a farm is and what the difference between a farm and a garden is. Some sources (Greensgrow, 2017; Slate, 2014) believe the difference is made by the purpose of the produce. While community gardens grow food for their own purposes, an urban farm assumes a level of commerce. The product grown in an urban farm is according to those sources raised to be moved from the farmer or a grower to the user, these recipients can be restaurant or the food can be sold on farmers' markets as well as it can be used as supply for charities. However, as Slate (2014) explains, inexpertly taken: *"A garden produces food for private use, whereas a farm produces food (or flowers or fiber) for others"*. By convention, the difference would be that a farm breeds animals but nowadays community gardens have chickens, goats as well as beehives. The United States Department of Agriculture officially defines a farm as: *any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the year"* (United States Department of Agriculture, 2016). This is important for farmers as it defines when they qualify for a federal loan, subsidy or grant.

Hanson et al. (2012), is also addressing this topic in his book where he reports that he is often asked on his lectures and talks "what is an urban farm?". Although it could look like a clear matter - simply farming in a city, providing a clear definition proves challenging. After creating a questionnaire with his colleagues farmers, community supporters and gardeners he put all the information and ideas he has received through his survey and proposed a definition for urban farming: *"An urban farm is an intentional effort by an individual or a community to grow its capacity for self-sufficiency and well-being through the cultivation of plant and/or animals."* (Hanson et al., 2012). Further he

continues explaining that a farm can be an organization both for-profit and non-profit and can produce anything from flowers to herbs, vegetables, fruits and have animals in the range of a city. This second definition of urban farms differs with the view presented in the first two sources as according to Hanson, an urban farm can also be run as a non-profit organization. However, we can assert that urban farms as a part of urban gardening and agriculture, are a mean of supporting local production, thanks to which the help for a city or town that is decreasing its dependence on non-renewable natural resources, fossil fuels in this case. They support biodiversity in cities and are a mean of educating the youth about food production and security, nature and animal welfare.

Engaging information were reported by Tibesigwa and Visser (2016), in their study focused on the gender inequality in household food security among small-holder farm households in urban and rural South Africa. Among other they report that in South Africa, from rural agriculture only a little part of the produce is supplied to markets as it is primarily used of self-consumption. Whereas products grown in urban agriculture are supplied mainly to urban markets and only a small part is for self-consumption, which agrees with the assumptions of the first paragraph of this chapter, that farming assumes a certain level of commerce. Furthermore, Tibesigwa and Visser (2016) state that 64,2 % of urban farmers in Nairobi, Kenya are women while in Harare, Zimbabwe the proportion of women in urban farming is 55 %. The prevalence of women participating in urban farming occurs in other cities of Africa such as: Bissau (Guinea-Bissau), Bangui (Central Africa republic), Yaounde (Cameroon). FAO (2012) reports that the predominance of women in urban farming in this area is caused by their poor socio-economic position.

Although the vision of fully self-sufficient cities is still perceived as unrealistic and urban farms are generally not recognized as a mean of feeding the entire population as it would not have the capacity for it (Hanson et al., 2012), urban farms have the potential to provide agricultural produce for a significant part of the population. Several studies show that nowadays urban food system in many countries is partially supported by urban gardening and agriculture and its production in urban farms and types of urban gardening. Data of 2003 present that 44 % of Vancouver's and 14 % of London's inhabitants are growing food in their gardens. According to a study, inhabitants of London could together produce an estimated amount of 232 000 tons of vegetables and fruits. Reportedly, half of the consumption of vegetables in Havana, Cuba come from urban food production (Brown and Carter, 2003). Havana is an inspiring example of the city's possibilities of supplying a large part of fresh vegetables and fruits through urban gardening and urban farms. On the contrary, most of urban areas in the U.S are with their food production still below their potential. An example is the state of Massachusetts, which is producing 15 % of the state's food needs, although it would have the potential to produce around 35 % of its food needs (Brown and Carter, 2003).

As studies on the potential and possibilities of urban farms were presented, further two examples of successfully-run urban farms initiatives are discussed below. The aim of two case studies is to showcase the impact of urban farms and agriculture on local food systems and sustainable development. The first presented example is Havana, Cuba. As the country struggled with importing products in the past year, Cuba had to become self-sufficient and that is what made urban farming nowadays the supplier of most of Havana's fresh vegetables. The second example is an urban farming project in Chicago which has a great impact on the local community through its educational and job-training programs.

- **Havana, Cuba**

Cuba's food crisis came in 1989, when Cuba, with the disintegration of the Soviet bloc, lost its trading partner and became cut off from food imports and other traded items such as oil, fertilizers, mechanical parts and animal feed. The 2,2 million residents of Havana were lacking access to food and most of them started experiencing hunger. Cubans were forced to focus on a local food system and self-sufficiency and local inhabitants were supported in their initiatives by the government who offered training, three compost production sites and several veterinary clinics in urban areas. Unintentionally Cuba's urban farming system became organic as there was no access to fertilizers farmers could use for their produce. By 1998, the city had over 8 000 urban farms which were together producing almost half of Cuba's vegetables (Clouse, 2014; The Architectural Review, 2014). Urban farms in Havana cover over 35 000 ha of land and the workforce of urban agriculture in the city has increased from 9 000 to more than 44 000 between 1999–2006 (Green economy coalition, 2012). Some argue the development of urban farming in Cuba has come on the expense of urban and social development, however it is undoubtable that Cuba is the exemplary city of the implementation and the stability of food system based on urban farming.

- **Windy City Harvest, Chicago, United States**

This is an urban agriculture project of the Chicago Botanic Garden, which was launched in 2008. It is an education and job-training program which focuses on sustainable urban agriculture. The aim is to take part in building a local food system, greener economy and healthier communities. By 2013, this project has mentored 71 adults who had undertaken the Apprenticeship program and managed to place 90 % of graduates to relevant full-time and seasonal jobs. In the period from 2008 to 2013, Windy City Harvest has harvested and produced over 300 000 pounds of high quality produce. Currently Windy City Harvest projects runs several partial projects such as an Apprenticeship project, the Entrepreneurship and Careers project, and the Corps project which aims to give job training to previously incarcerated people and veterans to help them find a permanent employment (Chicago Botanic Garden, 2017).

2.3.6. Guerrilla Gardening

Guerrilla gardening is another type of urban gardening. Although it also consists of growing plants and food in urban areas it is in its base significantly different from the other types of urban gardening and agriculture presented in this thesis. It is an activity of growing plants, edible flowers and occasionally vegetables and fruits in urban areas without permission from the local government, in order to make low-maintenance, temporary gardens in urban areas. The aim of guerrilla gardening is not primarily the local production and sustainable development, but it is typically a political message to the municipality's authorities about occupying the public land which originally belongs to the population and the scarcity of beautiful public places. Unused land, facades and infrastructure are planted and functionally converted with the activities of guerrilla gardeners. This activity is often done at dusk or during the night (Douglas, 2014; Holzer, 2014; Mikadze, 2014).

According to Rasper (2014), guerrilla gardening was initiated in the 19th century when people, especially in large and fast developing cities, started feeling the need of planting desolate places and making neglected places more beautiful. As Douglas (2014) reports, guerrilla gardening first appeared when inhabitants were protesting against the gentrification of Lower East Side in New York in 1973 and has been growing in meaning since then. Nowadays, in London the municipal authorities are facing several struggles with guerrilla gardening activists as the authorities do not agree with the illegally and unpredictability that is created by guerrilla gardening. However green-minded and gardens-supportive the authorities might be, such initiatives lacking rules and borders pose an issue for the city (Mikadze, 2014).

A generally used method of guerrilla gardening are the so called “seed bombs” which are balls made of clay soil and contain seeds. They are usually thrown to an empty neglected space, they are left there and with enough rain and luck they will begin germinating and with some time they will start rooting (Rasper, 2014). Some guerrilla gardeners decide to regularly visit the planted area to water seeds bombs in order to support its germination however, some of the chosen areas are not accessible and the nature in this case has to help itself.

In the following part of this chapter an important actor of guerrilla gardening in the U.S. is portrayed. He lives in Los Angeles and uses guerrilla gardening as a mean of creating a stronger happier and healthier community and fights against the lack of access to healthy fresh products.

- **Ron Finley “The Gangsta Gardener”, Los Angeles, United States**

“Growing your own food is like printing your own money”. Ron Finley

This guerrilla gardener lives in South Central Los Angeles and wants to fight the lack of fresh healthy food in his poor neighbourhood. He is also a founding member of the Los Angeles Green Grounds, which is a volunteer initiative that is active in community gardening in the streets of Los Angeles completely for free and so far has planted over 20 gardens (as of 2014). Finley states that, where he lives, people are dying of curable diseases due to the insufficient quality of food. Further he explains that the obesity rate where he lives is five times higher than it is in Beverly Hills, for instance, which is around 10 miles from South Central Los Angeles. He decided to take action and change the state of people's health condition through planting food forests in the street grounds in his neighbourhood.

His vision is to put people to work and get kids off the streets, he wants to let them know the joy and pride of growing their own food and make gardening appealing to the public, “make it sexy, make it gangsta”, as he describes it. Despite, his intentions are good, they have not been supported by the municipality authorities as originally, he was warranted to remove the food forest in front of his house. Below in Figure 14, Finley's garden is illustrated to have an idea of the immediate improvement of the environment when setting a garden. Figure 15 illustrated the progress made by Finley's street food forest.

Finley states that Los Angeles has 26 m² of vacant lots (as of 2014) that could be used for growing plants and partially satisfying the community's demand. He compares the size of vacant lots only in Los Angeles to 20 Central Parks and an area as big it could grow 724 838 400 tomato plants. By introducing gardening to local people and educating kids, he hopes in transforming his neighbourhood in sustainable healthier community (RON FINLEY: A guerrilla gardener in South Central LA, 2013). Ron Finley believes gardening can improve the state of its neighbourhood and by creating access to fresh food he wants to fight the bad health conditions of this community. By teaching children about the nature and gardening, by introducing them the beauty of vegetables he wants to increase their consumption of fruits and vegetables and support a new generation of garden growers (RON FINLEY: A guerrilla gardener in South Central LA, 2013).



Figure 14 The transformation of a sidewalk in South Central Los Angeles into a food garden (source: RON FINLEY: A guerrilla gardener in South Central LA, 2013)



Figure 15 The development of Finley's food forest on the street (source: commonthread.alternativeapparel.com, 2013)

2.4 Urban beekeeping

Ancient Egyptians were already keeping bees in hives, however modern beehives have been developing since the mid-19th century (Kučmaš, 2016). Bees play a crucial role in the circle of nature, they pollinate flowers and trees and create the balance of gardening and the blooming of flowers, fruits and vegetables. Reportedly 85% of the cultivation of fruits and vegetables profits from numerous insects and their pollination. The primary pollinators are mainly bees for most plants (Office International du Coin de Terre et des Jardins Familiaux, 2013; Wróblewska et al., 2016). Bees are also dependent on flowers since it is their source of food. Several studies and authors (Normandin et al., 2017; Rasper, 2014; Wróblewska et al., 2016; Wright, 2017) report that urban areas are more fitting for bees than rural areas for several reasons.

As Banaszak-Cibicka et al. (2014) describe in their study, the intensification of agriculture and also the increasing growth of the area used for cultivation are causing a loss of biodiversity in the landscapes of agriculture. Rural areas are more often formed by large block of uniform plants which create a disadvantage for bees looking for biodiversity. On the contrary, urban areas offer a wide range of different plants, they are formed by parks and gardens, allotments and balcony flowers, all small plots of land growing different plants. The high floral diversity in urban areas makes an important supply of forage for bees (Normandin et al., 2017). Another important advantage of urban areas is the lower use of pesticide on flowers as farmers are using pesticides and chemical to increase their production. The high use of plant protection agents on large-scale farms causes a decline in numbers of bees (Office International du Coin de Terre et des Jardins Familiaux, 2013). According to Rasper (2014), the temperature in urban area is 2–3 degrees higher in average than in the countryside which extends the season for bees and makes winter easier for them.

There has been a decline in the number of bees globally and it became an environmental concern globally. For this reason, it is necessary to create favourable conditions for bees by planning parks and gardens with exuberant floral access to pollinators and creating a movement for gardens that are pollinator-friendly (Fukase and Simons, 2015; Normandin et al., 2017). Urban agriculture therefore creates a major role in fighting the decline of number of bees and supporting the development of bees. Placing gardens in urban areas ensures access to forage for bees. It is of great importance to keep a diversity of plants growing in these gardens as purely vegetable gardens are only of a limited suitability for bees.

Cities and urban gardening initiatives all over the world have been starting their beekeeping projects in order to bring biodiversity to urban areas and their gardens and support bee's development. In the second part of this chapter an initiative is presented to

provide an example of successful beekeeping projects in practice. It is located in Berlin and is an example of the strong potential of urban beekeeping and its rapid development within the whole city.

- **Berlin is Buzzing! (Berlin summt!), Germany**

According to Goethe Institut (2017), on average one third of bees in Germany die yearly. In some regions, this number is even higher. This initiative started in 2011, and was launched by the Environmental Forum for Action and Co-operation as a reaction to the declining number of professional beekeepers and bees itself, caused by pesticides, diseases and the lack of access to nourishment bees face nowadays. This initiative aims to raise awareness of the problem of decreasing numbers of bees and draw attention to the necessity of creating forage for bees worldwide, whose lack was caused by the one-crop agriculture methods of large agricultural companies nowadays. Approximately 700 amateur beekeepers care for about 3.200 hives in the city of Berlin. Beehives are situated on dozen sites, including the parliament, planetarium, the Haus der Kulturen der Welt cultural centre and on the roof of the Berlin Cathedral. Other locations are provided by residents who want to take part in the development of the environment prosperous for bees and ensuring a future prosperity of those pollinators (Berlin summt, 2017; Benjamin and McCallum, 2011; Goethe Institut, 2017).

2.5 Organic waste and composting

The aim of composting is to reduce waste production and utilize the usable organic waste in order to decrease the amount of waste entering landfills. An important characteristic of composting is the reduction of methane gas that is being released from landfills due to the content of organic waste. When households throw their organic waste to the garbage, it further arrives to landfills where they are densely packed which causes a deprivation of oxygen leading to a decomposition process without oxygen and with producing a greenhouse gas – methane. Biological waste created in household accounts for 40 % of our total waste which leads to making landfills one of the largest origins of greenhouse gasses. At the same time is compost an important soil amendment that improves soil fertility (Community composting, 2008).

Composting and the re-use of organic waste is an integral part on urban gardening that would be valuable to include it in every urban garden, community garden or farm but the collecting of organic waste can be done in households throughout the city as well. The movement of community composting is based on a group of people, households, collecting their organic waste and composting it. It can be done in allotment gardens, or it could be collected by an organization, both ways it aims to decrease waste production but also to educate individuals about sustainable practices. Such community composting

movements are *Community Composting Network* in United Kingdom and the *New York City's Community Composting Roundtable* (BioCycle, 2015).

2.6 Urban Gardening in the Czech Republic

Urban gardening initiatives in the Czech Republic do not have as long a history as they do in other parts of the world as for example in the United Kingdom or the United States. In the Czech Republic, the first initiatives of gardening in the urban areas, as we know them today, started widely spreading in 1911–1950, the period of World War I and II, and the Great Depression (Bell et al., 2016). In this time gardening in the city was primarily in the form of allotment gardens which were discussed in the sub-chapter 2.3.2. People were mainly responding to the lack of fresh food, poverty and hunger. Allotment gardens were a mean of ensuring the supply of fresh and healthy food. However, only a few years ago the modern initiatives of urban gardening occurred in the Czech Republic.

In 2012, two pilot projects were launched in Prague. The first one was founded at the housing estate *Jižní Město* in a former cultural centre as a so-called KC Zahrada. The project was initiated by Lucie Lankašová and Kristina Regalová from the association KOKOZA (KOMunitní KOMpostování a ZAHrada, *Eng. Community Composting and Garden*) (Hoffman, 2015). Soon after launching this project they became only supervisors and nowadays they are supervising several urban gardening projects over the Czech Republic, they run composting workshops and sell vermicomposting containers.

The second pilot project launched is a community garden Prazelenina, considered as the model example of urban gardening in the Czech Republic (Hoffman, 2015). This urban gardening initiative is further described and discussed in the practical part. Both gardens share a vision of creating a green city and a closed cycle of food (Městské zahradničení: balkony, terasy, komunitní zahrady, samozásobitelství, 2015).

Urban gardening does not have a strong legislative base in the Czech Republic which makes it harder for the initiatives to develop and operate. As Hoffman (2015) reports, new initiatives face several complications, such as insecure expensive short-term rentals of land and complicated collaboration with the executives of municipality departments.

Only sparse mention of urban gardening occurs in the strategic documents of Ministry of Agriculture, Ministry for Regional Development or Ministry of the Environment. The following table brings an overview of the references of urban gardening in the strategic documents of the previously mentioned Ministries, no reference was found by the Ministry for Regional Development.

Table 3 Overview of the references to urban gardening in the strategic documents of three Ministries of the Czech Republic (source: own table based on Ministerstvo zemědělství, 2014; Ministerstvo životního prostředí 2016a, Ministerstvo životního prostředí 2016b)

Ministry	Name of strategic document in Czech	Reference to urban gardening
Ministry of Agriculture	Český venkov a zemědělství v podmínkách měnícího se podnebí, 2014	This document addresses urban agriculture as a strategy to reduce the risk of climate change and disaster impact. It could help as a mean for diversification of food supply and decrease the dependence on imported food supply, it supports biodiversity and creates the mitigation of the urban heat island effect.
Ministry of the Environment	Státní program environmentálního vzdělávání, výchovy a osvěty a environmentálního poradenství na léta 2016–2025	<p>One of the educational goals of this strategic document is to promote the (re)creation of stimulating environment, opportunities for direct contact with nature. One of the methods of acquiring this target is to methodologically lead regions and local governments and encourage the emergence of public green spaces of which community gardens as well.</p> <p>Secondly, measure to ensure a functional and ecologically stable system of green areas in settlements are given, which include increase of number of realized green areas and elements on horizontal and vertical structures, including rooftop gardens.</p>
Ministry of the Environment	Strategie ochrany biologické rozmanitosti České republiky 2016–2025	This document only mentions urban gardening when it evaluates the current state of housing estates and their biodiversity, saying there is a lack of adequate support of civic activities, such as community gardens.

3 Methodology

The bachelor thesis is divided into two parts, a theoretical and a practical part. The theoretical part of this thesis is made of a literature research based on Czech and foreign literature resources and online sources. This part is focused on introducing the topic. Firstly, a historical overview of the occurrence of gardening in urban areas is given. Secondly, examples of the impacts of urban gardening on sustainable development are presented to prove its role in sustainability. Further, different types of urban gardening are presented as well as urban beekeeping and composting in urban areas are described. Finally, a chapter is devoted to bringing urban gardening into context in the Czech Republic.

For the practical part, four countries were chosen to evaluate the difference in approaches to urban gardening in Europe and Asia and further make a comparative analysis of the findings. The chosen countries are *the Czech Republic, United Kingdom, Philippines and Thailand*. The Czech Republic was chosen as the place of study and homeland of the author, for which a proposal is further presented as well. United Kingdom is included in the selection as a good example as it is the origin of first allotment gardens and therefore urban gardening initiatives. The Philippines are included as an example from Asia as it has several efficiently working urban gardening projects and the knowledge of English of locals enabled to conduct an interview. Lastly Thailand is included as the author took part in a project located in Thailand while collecting data for the thesis, therefore it was an opportunity to personally visit the chosen initiative and conduct an interview.

The chosen initiatives for each country are (i) Prazelenina for the Czech Republic, as it was one of the first two pilot projects of urban gardening and it is considered an example model of urban gardening in the Czech Republic (Hoffman, 2005); (ii) Skip Garden in London, United Kingdom, as it is a good practice of urban gardening in a metropolis, the founders had to be creative in order to make this garden run on a constantly changing development site and decided to use skips to grow their produce; (iii) Joy of Urban Farming as an example of a successfully running urban gardening initiative in the Quezon City; (iv) for an example initiative of Thailand Mr. Nakorn Limpacuptathavon's urban garden was originally chosen, however despite all the efforts to contact the so-called Veggie Prince, no contact was made, therefore a personal interview held in Bangkok, Thailand at the rooftop garden of the Faculty of Agriculture of the University of Kasetsart was used.

The practical part of this thesis is divided in two parts both built on primarily obtained data. The first part describes data obtained from each initiative. Further, in the second part a comparative analysis of four chosen initiatives is made.

To reach the aim of this thesis necessary data were collected by means of semi-structured interviews with members of selected initiatives from each chosen country. Semi-structured interviews have a defined purpose, a certain warp and a great flexibility of the whole process of gathering information (Hendl, 2005). For our purposes one personal interview and two interviews through skype were held and one responded communicated through Messenger.

Questions of the semi-structured interview included questions about (i) foundation and size of garden, (ii) problems with permits, (iii) the initial purpose of founding the garden, (iv) initial funding, (v) covering maintenance costs of the garden, (vi) income, (vii) beekeeping in the garden, (viii) handling of organic waste, (ix) destination of produce, (x) educational activities, (xi) community participation, (xii) type of workforce, (xiii) impact on sustainable development.

Finally, a proposal for the Czech Republic is made. This proposal is based on lessons learned from the best practices presented throughout this work. Initially the initiative of the Czech Republic is evaluated together with other countries, during these comparisons several characteristics were targeted which have the potential to become better and more suitable as conditions for urban gardening in the Czech Republic. Based on the acquired knowledge, suggestions and recommendations are made.

4 Presentation of findings

In this chapter, the four chosen initiatives from four different countries will be presented. The following text is based on data obtained in semi-structured interviews. The transcripts of all the interviews can be found in Appendixes

4.1 Prazelenina, Czech Republic

The first presented urban gardening initiative is the community garden Prazelenina, which is located in Prague, Czech Republic. The interview was held with Mrs Lída Kasalová via Skype on the 4th of May 2017.

The community garden Prazelenina was founded in 2012 and it had to change its location and move to a new piece of land three times since its foundation. The size of Prazelenina is 1230 m² and it includes 134 beds, each of them with the size of 1m², where members grow and produce their own vegetables.

The problems with permits and limitations of Prazelenina are related to its frequent relocation. In the year 2017 Prazelenina is starting its 6th season at its third site. The first piece of land was leased only for one year and therefore the community garden had to soon move to a new location. The second location, which became home to this group of passionate city growers, was the areal of Holešovice brewery where Prazelenina could stay for 3 years after which their contract was terminated as the land was needed for a new construction. This was the same reason for having to leave the first site as well. After having to change location, Prazelenina came back to its original site for another year. However, the search for a new site did not end and a new site where Prazelenina moved in spring 2017 was found.

When the team of Prazelenina searched for their last location, the aim was to find a bigger piece of land. In the process of searching the team found out that every bigger piece of land in Prague is managed by the municipality of Prague and not by the administrative units of the individual city parts. Therefore, the current piece of land is leased directly from the municipality of Prague. Prazelenina otherwise does not take usually advantage of support from neither the municipality nor the government, although the municipality of Prague 7 is fond of this initiative. This is due to the fact that one of their key objective is to maintain the initiative's independence.

An important condition for the current site is connected to its location. As it is by the river Vltava, the community garden needs to be able to evacuate the garden in 24 hours which brings certain limitations in the facilities of this site as they need to be transferred in case of emergency.

The initial purpose of founding Prazelenina was to create a space for growing crops and creating interpersonal relationships in the city.

The initial funding of Prazelenina as well as its maintenance costs are covered by the yearly charge for the cultivation spot from the members. The charge is 1 000 czk per season (April to October). At the founding of Prazelenina, one of the members bought a caravan which serves as a garden café. Prazelenina paid this caravan off after some time when they had money available. The garden café also serves also as an income source for the community garden.

Currently, the community garden currently does not have a beekeeping project but there are discussions on having a bumble-bee hive on the site as the members are environmentally sensitive and perceive the bee problem as well.

There is a composting site for organic waste in the garden. Also, the waste that comes from the café is being recycled and composted and the coffee ground is used in the beds as fertilizer.

Each member of Prazelenina is growing their own vegetables in the rented bed therefore the produce goes to the grower and member. However, there are several common beds being cultivated as well. The produce that come from the common area is further used on the garden's harvest party where it is cooked for everyone.

Prazelenina runs workshops on baking bread for the public and it collaborates in other activities with other organizations such as Dolní Holešovice and Dox, the Centre of contemporary art. In winter 2016, there was a first year HO HO Holešovice beneficial ball raising money for the construction of a children's playground on the Ortonovo square in Prague organized by Prazelenina and the Dolní Holešovice association. Around 120 000 czk was collected.

Prazelenina has no paid workers, it is formed and run by volunteers only. And the impact it has on sustainable development is made by the decreased purchases of vegetables in supermarket as members grow their own vegetables while they build social networks as well. Generally, Prazelenina is trying to promote an ecological attitude.

4.2 Skip Garden, United Kingdom

The chosen urban gardening initiative of the United Kingdom is the Skip Garden, located in London at the King's Cross development site. The interview was held with Mr Paul Richens, the gardens managers, via Skype on the 21st of April 2017.

The Skip Garden was founded in 2009 on the of King's Cross development site and it has transferred to a new location four time, due to the ongoing constructions in the area. The current size is 650 m².

Initially the developer (from the King's Cross development site) was not keen on letting this project on his site as there has been previous complications with growers on a development site in South London. However, Skip Garden, in collaboration with a law firm, who worked *pro bono*, prepared a *meanwhile lease* contract to protect both the developer and the growers. Interestingly, Skip Garden's leasing contract became a model to a new UK's law called *Meanwhile leasing*. The entire growing at Skip Garden takes place in skips, filled with soil and used for growing vegetables. This makes it easier to move the whole garden when the developer needs to start a new construction.

Skip Garden is a project of the charity Global Generation. The founding Director of Global Generation aimed by this project to bring people together and start a community. According to Richens, gardening is a good way to put disparate people together.

Skip Garden was initially funded by a national lottery grant (the Big Lottery) and the developer himself. The developer liked the idea of having a community garden on the site and help with the community. Also, he donated seven rubbish skips to the garden to help starting it and grow crops.

Currently, Skip Garden is 48 % self-supporting. The rest that helps covering the maintenance costs are grants from different sources. The diversity of financial sources helps the garden not to be dependent on one source and risk failure. Part of money for maintenance costs are given by the developer and some by the local council as Skip Garden works with school children and youth groups. Also, one employee works full-time on applying for grants.

The 48 % of income comes from different teams of activities of the garden. There is events team who prepares weddings, birthday parties and hen parties at the garden site. Next is the youth team, which brings educational programs to kids, about green issues, public speaking or helps kids finding a job right after finishing school. The range of activities is wide and the members often act parental. Furthermore, the garden has a Kitchen, a café, that serves food and prepares catering for events. This is an important stream of income of the Skip Garden. The target is to reach 75 % of self-supportance.

Skip Garden has started a beekeeping project collaborating with the company Urban Beekeepers who own the two hives at the garden site. The aim is to train young people to be beekeepers and to have pollinators in the garden itself brings better production. The honey produced is used in the café and sold on markets, it generates a small income for the garden as well. Beekeeping in London has been receiving increasing interest. One of

the reason for this the fact that bees are dying in droves on the country side due to the spraying. Some of the big famous stores such as Selfridges, have bees on the roof as well. The spreading of beekeeping project over London has got to a point that there are worries if there is enough food for them. This is why Paul Richens, from Skip Garden, lectures people about what bees need, such as what sort of flowers bees need.

Organic waste in Skip Garden is handled in a big composting system. Everything is composted and turned into soil for the plants. There is also vermicomposting.

The food produced is used in the Skip Garden Kitchen. The garden is able to produce green leafy salad throughout the year in a 12-m poly tunnel.

Skip garden has a wide range of educational activities with Primary and Secondary school children, teenagers and youth groups as well as local families, local office and construction workers. One of the projects is called Lunch & Learning which takes place every second week and it brings primary school students together with building workers and office workers. They are put in team and they do a project together such as sow seeds or make something. As mentioned above, other projects teach kids about green issues, they practice public speech or they are helped with finding a job after finishing school.

There is also a participation of the general public, as the garden team runs Twilight Gardening sessions every two weeks during the summer and there are also many random visitors.

There are both full-time and part-time workers, as well as interns and volunteers in the garden. Volunteers are local or located people or unemployed people who just want to be doing something or get skills.

As impact on sustainable development can be considered several things. The running of the beekeeping project and supporting the present of bees and for them the right flowers in urban areas is one important area. Secondly, Skip Garden works on people understanding the importance on individual actions for sustainable development and is inspired by the motto „*think globally, act locally*“.

4.3 Joy of Urban Farming, Philippines

In this sub-chapter, a chosen filipins' urban gardening initiative is presented. It is the Joy of Urban Farming located in Quezon City, Philippines. The interview was held with Mr Raul Norbe via Messenger in the period of the 31st of March to the 19th of April 2017.

This urban farm was founded in 2010 as one of the projects of the Vice Mayor Joy Belmonte after her election as Vice Mayor of Quezon City. Since the foundation, the

urban farm had to move once but soon currently transferring to their third site. The size of the first urban farm was 750 m². The second site which was 1500 m², was demolished and the Joy of Urban Farming is now transferring to a 450 m² site.

There were no problems with permits when establishing this urban farm as it is a project of food production of the Local Government Unit.

As mentioned above the purpose of founding Joy of Urban Farming was creating a project to develop food production. The farm is producing green leafy vegetables that can be harvested within one to two months' period. Further there are tomatoes, eggplant, cucumber, radish, sweet potatoes, onions as well as herbs such as mint, tarragon and basil.

The project was initially financed by the Office of the Vice Mayor of Quezon City. In addition, garden tools, nurseries and organic fertilizers were donated by the Department of Agriculture and the Department of Environment and Natural Resources.

The ongoing maintenance costs are covered with the tools donations by the two government departments, as mentioned above, and further a yearly allotted budget to maintain the project is given from the Office of the Vice Mayor of Quezon City.

There is no income generated by Joy of Urban Farming as the produce goes to the employees of the Local Government Unit, to a School feeding program and in case of need it is given to areas besieged with calamities as part of food supplies.

Presently, there is no beekeeping project in the urban farm but it is possible to go into it. There are such projects outside Quezon City area or in municipalities of Philippines that are not fully urbanized.

The organic waste is being composted and turned into organic fertilizer. Joy of Urban Farming has a vermi-composter and poultry manure is used as organic fertilizer most of the time.

The educational activities of Joy of Urban Farming are in a form of Urban Farming Orientation Seminar which is delivered to schools, non-governmental organizations, public organizations and others who request the seminar.

Joy of Urban Farming has so far established over 100 urban farm sites in the city. They helped founding the garden and play an advisory role, the further maintenance are the responsibility of each garden individually. They provide gardening materials including

seeds, soil, tools and nursery. The further produced food is for their own purposes. That is the participation of the general public with Memorandum of Understanding².

Currently there are three agriculturists employed within the farm, one project head and two support staff and further four garden caretakers. All of them are employed under the Office of the Vice Mayor.

The Joy of Urban Farming has five areas of interest, (i) food production, (ii) income generation or livelihood, (iii) environmental conservation/protection and preservation, (iv) health and wellness consideration and (v) psycho-spiritual realization. With these the interviewer believes in the sustainable urban farming in a highly-urbanized area like Quezon City.

4.4 AKU Roof top garden, Thailand

In this sub-chapter, the results from the interview with Pasinee Sunakorn, Associate professor at the Faculty of Architecture at Kasetsart university in Bangkok, Thailand, are presented. The interview was held personally at the AKU Rooftop garden in Bangkok on the 25th of November 2016.

This rooftop garden is located on the 7th floor roof top of the Faculty of Architecture in Bangkok. It was founded in 2012 and has a size of 196m². It is the project of Associate professor Pasinee Sunakorn.

At the beginning of this project, there were no problems with permits, however there is a limitation of law of the weight the garden can have on the roof, that needs to be followed. The weight AKU Rooftop garden can have on roof is 300kg/m². The weight allowed on roof tops of buildings depends on the purpose and use of each building. For instance, on parking buildings it is 800kg/m² and on a library-roof it is 500kg/m².

The idea of founding AKU Rooftop garden occurred after the flooding that hit Bangkok in 2011. At that time, employees at Kasetsart university that lived on campus, were cut off from the rest of the world as they could not leave the campus due to the flooding. Therefore, the aim of the garden was to feed university employees on everyday basis. Secondly, the purpose of founding this garden was to promote urban gardening within the university and to use Kasetsart University as an example university.

² Memorandum of Understanding is a nonbinding agreement between at least two parties banding the terms of an understanding, containing the requestments and responsibilities of each party (Investopedia, 2017).

The AKU Rooftop garden was funded by the Thai Health Promotion Foundation who wanted to support the project. The income is generated by selling the garden's produce to staff and the university canteen and is used to cover the maintenance costs and to pay the garden caretakers.

At this moment, AKU Rooftop garden does not have a beekeeping project. However, they compost their organic waste. The organic composting takes place in three barrels and results in a biological liquid.

The whole food production, as mentioned above, is sold to the staff and university canteen where it is used for food preparation.

Mrs Pasinee Sunakorn report that the rooftop garden does not officially hold any educational activities. However, when the author of this thesis and other members of the student group visiting this garden arrived to AKU Rooftop garden, they were given a tour and the whole system of gardening was introduced which can be considered as an educational activity. Also, Mrs Sunakorn holds lectures in a classroom at the garden of Building greenery, on the subject of green roof and vertical greenery.

As the participation of general public are considered visits of community members to the rooftop garden.

AKU Rooftop garden, has two employed garden caretakers who look after the harvest and the process of food production.

The question of impact on sustainable development has remained unanswered therefore cannot be presented in this sub-chapter.

5 Comparative analyses

In this part, a comparison of the four selected initiatives is made. The aim is to evaluate the differences in approaches to urban gardening of selected countries through the chosen initiatives. The comparison is divided into four parts. The first one presents the general characteristics of the chosen initiatives, secondly the chosen economic aspects are evaluated, next the environmental aspects are compared, further the social aspects are compared and finally the impacts on sustainable development of the four initiatives are compared.

5.1 Basic properties of the chosen urban gardening initiatives

The Table 4 below illustrates how the chosen urban gardening initiatives differ in size and type of urban garden and presents the year of foundation. Except the AKU rooftop garden, the chosen initiatives had to change their site several times and with that their size was changing, Table 4 presents the current sizes. Currently, Prazelenina is the largest with its size 1230 m², while the smallest is AKU Rooftop garden with 196 m². The table also presents the different purposes of founding the gardens. While the European initiatives were founded for the purpose of creating relationships, community and an urban growing area, the Philippine initiative was founded for the purpose of food production and Thai both for food production and promoting of urban gardening at its location, the university.

Table 4 Basic properties of the chosen initiatives (*source*: own table)

	<i>Year of foundation</i>	<i>Size (in sq. m)</i>	<i>Type of urban gardening initiative</i>	<i>Purpose of foundation</i>
<i>Prazelenina (CZ)</i>	2012	1230	Community garden	Urban growing and interpersonal relations
<i>Skip Garden (UK)</i>	2009	650	Community garden	Community engagement
<i>Joy of Urban Farming (PHL)</i>	2010	450	Urban Farm	Food production
<i>AKU Rooftop garden (THA)</i>	2012	196	Rooftop garden	Food production and promotion of urban gardening within the university

Further, the matter of problems with *limitation* caused by *permits* is compared. Joy of Urban Farming is the only initiative that did not have to deal with problems or limitations caused by permits. The reason for this most probably is that it is a project of a Local Government Unit on Food Production therefore they are supported by the government and are not facing any complications with permits. Prazelenina, Skip Garden and AKU Rooftop garden faced certain limitations or problems with permits. Prazelenina faced problems with the location of their garden as their contracts have been only short term. However, the current location, leased by the municipality of Prague which could ensure a more stable lease, includes a necessary flood protection measures due to the location by the river, and brings little limitation to the equipment of the garden. Skip Garden's limitation where firstly caused by the location and the leasing of the chosen land. However, this problem was solved by a contract called a meanwhile lease. AKU rooftop garden's limitation is the location on roof. According to the law, there is a limit of weight they can have on roof, which is 300kg/m².

5.2 Economic aspects

As economic aspects, we firstly compare the *initial funding* of each chosen initiative, the findings are illustrated below in Table 5. While Prazelenina did not receive any grant, the rest of initiatives received external financial help for starting the project coming from different sources. Skip Garden received a grant from the national lottery and the site developer, Joy of Urban Farming was financed by the Office of the Vice Mayor and AKU Rooftop garden received financial help by the Thai Health Promotion Foundation. Similarly, it implies for the covering of *maintenance costs*, which was the next question of interest. Skip Garden and Joy of Urban Farming, receive financial help which helps them running the project. In the case of Joy of Urban Farming it is government support and Skip Garden is partially self-supportive, however 52 % of maintenance costs are received in grants from several sources. Prazelenina covers its costs by the membership fee and the income generated from their café and AKU Rooftop garden covers its maintenance costs by the revenue generated from sold harvest.

Table 5 Initial funding and maintenance costs (source: own table)

	<i>Initial funding</i>	<i>Covered maintenance costs</i>
<i>Prazelenina (CZ)</i>	Own resources, caravan purchased by a member, later paid off	Membership fee, café income
<i>Skip Garden (UK)</i>	Grant from national lottery and the developer, rubbish skips from the developer	48 % self-supportive, rest is in grants
<i>Joy of Urban Farming (PHL)</i>	Grant from the Office of the Vice Mayor, garden tools etc. From government departments	Budget from the Office of Vice Mayor, materials from government departments
<i>AKU Rooftop garden (THA)</i>	Grant from the Thai Health Promotion Foundation	By the income from sold harvest

The next economic aspect compared is the *income generated* by the gardens and the destination of food production. As illustrated in the Table 6, Joy of Urban Farming is as the only one not generating income. Prazelenina receives the membership fees and has a café that generates income. Also Skip Garden has a café which generates income as well as it organizes events (weddings, birthday parties etc.) and another source of income are the children's project taking place in the garden. AKU Rooftop garden's income is generated by selling the garden's harvest to university staff and canteen.

The usage or *destination of food production* partially differs. Joy of Urban Farming's food produced goes to the employees of the Local Government Unit, a School feeding program and also to areas besieged with calamities as a source of food. Both AKU Rooftop garden and Skip Garden use the food produced for further local gastronomy purposes. Skip Garden runs its own Skip Garden Kitchen, a café where the food produced is cooked, while AKU Rooftop garden sells the harvest to university staff and canteen where it is cooked. The harvest of the community garden Prazelenina serves for the own purposes of each member renting its flower bed. However, there are also common spaces whose harvest is at the end of the season cooked for everyone on a harvesting party.

Table 6 Income and food production (source: own table)

	<i>Source of income</i>	<i>Usage of food produced</i>
<i>Prazelenina (CZ)</i>	Own café and membership fee	Own purposes, harvest party at the end of the season
<i>Skip Garden (UK)</i>	Organized events, children's projects, Skip Garden Kitchen	Skip Garden Kitchen
<i>Joy of Urban Farming (PHL)</i>	No income generated	Employees of Local Government Unit, School feeding program, areas besieged with calamities
<i>AKU Rooftop garden (THA)</i>	Harvest sold to university staff and canteen	Sold to university staff and canteen

5.3 Environmental aspects

The first analysed environmental aspect is whether the urban gardening initiative has a beekeeping project. Only one of the chosen initiatives has beehives. Although only Skip Garden has a beekeeping project currently, there is a chance Prazelenina will have a bumble-bee hive in their community garden as well as there are discussions going on. Joy of Urban Farming and AKU Rooftop farm are also not currently having beehives in their garden.

Next, *composting and handling of organic waste* in the chosen initiatives is evaluated. All four urban gardens have reported they are composting their organic waste. Skip Garden and Prazelenina, are fully composting the organic waste coming from their café. Prazelenina uses its coffee ground to fertilize the flower beds. Both Joy of Urban Farming and Skip Garden have vermicomposting taking place in their garden, while AKU Rooftop garden has three barrels on its roof for composting of organic waste which results in biological liquid.

5.4 Social aspects

In the social aspects, educational activities, community participation and the labour force is evaluated. Firstly, *educational activities* are presented. Two of the chosen initiatives run educational activities. Both Skip Garden and Joy of Urban Farming have educational activities, while Prazelenina and AKU Rooftop farm do not have any. Nevertheless, the interview and presentation of the garden given by Ms Sunakorn is assessable as

educational activity. Prazelenina runs a workshop on bread baking, however it was evaluated by the author as an activity of community participation rather than an educational course. As mentioned previously, Skip Garden is focused on community participation, therefore the range of offered activities is wide as well as the number of participants. Joy of Urban Farming members also educate youth about urban agriculture and lead educational seminars.

Secondly, the *participation of the general public* in the garden or the project is compared. All four gardens reported there is a participation of general public in the project, although they are on different levels. Skip Garden and AKU Rooftop garden state there are visitors coming to their gardens that can visit the site and enjoy the green space in their urban area. Skip Garden also runs Twilight gardening session for the public. Joy of Urban Farming's participation with general public is formed by the help given to the community with founding their own urban gardens. Prazelenina organizes bread baking workshops for the public, and in 2016 they co-organized a beneficial ball, collecting money for a children's playground.

Lastly the *labour force* of the chosen initiatives is compared. As illustrated in Table 7 below, each urban gardening initiative except Prazelenina, who fully works based on volunteers, have employees. Skip Garden has both employees and volunteers and has interns for three months' periods as well. AKU Rooftop garden as well as Joy of Urban Farming have employees only with no volunteers. AKU Rooftop garden has two employees, Joy of Urban Farming has three agriculturists and four garden caretakers, while Skip Garden has several employees and interns in the departments of office staff, kitchen staff, event staff, gardening team and youth team.

Table 7 Labour force (source: own figure)

	VOLUNTEERS	EMPLOYEES
<i>Prazelenina (CZ)</i>		
<i>Skip Garden (UK)</i>		
<i>Joy of Urban Farming (PHL)</i>		
<i>AKU Rooftop garden (THA)</i>		

5.5 Conclusion of the comparison

This chapter gradually evaluated the answers received by the representatives of the chosen urban gardening initiatives. Firstly, a basic overview of the gardens was illustrated to create a picture of the further compared gardens. The presented gardens were two community gardens, an urban farm and a rooftop garden in the order Prazelenina, Skip Garden Joy of Urban Farming and AKU Rooftop garden.

The financial sources for founding the garden differ for each initiative, however except of Prazelenina, all the chosen gardens received financial support by individuals or government units. Also for the covering of maintenance costs two out of four gardens receive financial support. Interestingly only the selected initiative from Philippines does not generate any income while both chosen initiatives from Europe and Thailand's initiative generate their own income.

Surprising is the fact that only Skip Garden runs a beekeeping project of all chosen initiatives, considering the advantages and opportunities brought by beehives and the importance of supporting them in a garden. Leastwise, all chosen initiatives compost their organic waste.

Only half of the chosen initiatives have educational activities, Skip Garden and Joy of Urban Farming, while all selected urban gardens report community participation in their projects. Educational activities are an opportunity for the garden not only promote green spaces in urban areas and local production, but also to educate the community about the strengths of urban gardening and how to treat the nature to protect it and not damage it. It would be effective if Prazelenina and AKU Rooftop garden would include educational activities such as workshops about green issues, gardening, bees' protection, composting, to their activities and therefore to support the development of urban gardening and environmentally friendly activities.

Interestingly, Prazelenina is the only one of the selected initiatives who fully runs based on volunteering. This fact is probably connected with the source of finances for the garden as there is no external support and the garden operates with only limited finances. The most employed workers occur in Skip Garden, which is at the same time the initiative with the widest range of activities to offer and a running café.

From the comparison, we can see that however each garden can differ, it cares about bringing green spaces to urban area and support local production. The gardens distinguish by financial means which subsequently reflects in their activities. While Skip Garden and Joy of Urban Farming are large projects by themselves who include and influence many people, Prazelenina and mainly AKU Rooftop garden, are smaller projects that are only a side activity of its members.

6 Recommendations for the Czech Republic

This chapter is dedicated to recommendations for the development of urban gardening in the Czech Republic.

Firstly, the municipalities should focus on supporting the urban gardening initiatives or giving space to its realization rather than plan the withdrawal of already existing urban gardens. An example is the allotment gardens located at Kraví hora in Brno (Klvač, 2011). The municipality has been planning for several years to cancel the existing gardens to create a new park for the public. However, the intentions of creating a new public park could be appealing for the inhabitants of Brno, an important fact is that the existing allotment gardens are a better source of nutrition for pollinators, such as bees, as parks do not offer a diverse and necessary source of pollen for bees.

Another example is the planned use of the *Jižní centrum* area in Brno, where a complex of shopping and administrative buildings, parking spaces are planned (Klvač, 2011), rather than to create an urban community garden with fruits orchards, herbs and flowers for the public. The reasons are the financially more appreciated awards of building complexes of buildings, selling the land to developers rather than to build a community green area.

In the strategic document of the Ministry of Environmental Protection called *Strategie přizpůsobení se změně klimatu v podmínkách ČR* (2015) measures to reduce the risks associated with temperature and air quality are listed. However, there is no mention of urban gardening as a tool to reduce those risks. Urban gardening is a mean of lowering the city's temperature and its heat island effect as mentioned by several authors (Čermáková, Mužíková, 2009; Bohuslávek et al., 2009; City Farmer, 2003). Therefore, listing urban gardening and support its development would support the decrease of heat island effect in urban areas.

As learned from the case study of Prazelenina, urban gardening initiatives struggle with the available land for realising their project. Municipalities could therefore help urban gardening initiatives by providing them with available land on longer terms. The soil of the available land does not necessarily have to be suitable for growing plants as there are several alternatives ways of gardening in beds or bags or skips such as in the case of Skip Garden in London.

Partially self-sustainable urban gardening projects could be started or supported as in the case study of Skip Garden. *Jižní centrum* area in Brno would be suitable location for an urban gardening initiative, the location offers a wide area available for growing and would create an example contrast of the urban area and a green growing space in the heart

of the concrete. These projects offer important environmental education for the current and next generation and create a valuable mean of connecting to nature.

7 Discussion and conclusion

The aim of this is to evaluate the differences in approaches to urban gardening in the selected countries of Europe and Asia, for the purposes of this thesis the Czech Republic, United Kingdom, Philippines and Thailand were chosen. The theoretical part creates a profile of urban gardening to introduce the term to the reader. The historical context of urban gardening is presented, followed by a description of the importance of urban gardening for sustainable development. Furthermore, types of urban gardening are described as well as urban beekeeping and composting. Urban beekeeping and composting were included in the theoretical part as beekeeping in urban areas is growing in importance considering the extent of dying bees in rural areas caused by spraying and chemicals. As urban gardening is an environmentally friendly movement, promoting local production, biodiversity and the decrease of heat island effect, composting was included as it plays a major role in the protection of the environment.

The practical part interprets the results obtained by collecting data throughout the research. To collect the necessary data a qualitative research was conducted. By conducting semi-structured interviews with the representatives of the selected urban gardening initiatives data on each project's specifics was collected. The research sample includes four interviews, three of which conducted via Skype and one held personally at the urban garden. The representatives were chosen from four different countries both from Europe and Asia.

The questions for the interview were structured to cover different areas of characteristics, such as the economic, environmental and social aspects of the different urban gardens. The questions attempt to create a profile of each initiative for a comparison of the four urban gardens from Europe and Asia along the above-mentioned dimensions.

The results demonstrate that each selected urban gardening initiatives differs, however there are some aspects that are common for all of them. The least external support is received by Prazelenina, although it is its custom choice. The rest of the gardens received grants and financial help for the founding of their projects. Currently, two out of four initiatives are receiving financial help, while the two others cover the maintenance costs with the generated income. Interesting is the finding that while the two European initiatives focus on enhancing the community, the initial intention of the Asian initiatives was food production (promoting of urban gardening in the case of AKU Rooftop garden as well). For all of them is characteristic the composting of organic waste, which has been presented throughout the thesis as an important part of urban gardening. Secondly, all the gardens share a participation of the general public, even though to a different extent, some run certain activities, others have outside visitors to the garden. Generally positive also was the evaluation of the impact on sustainable development.

Another difference between European and Asian selected initiatives is the labour force taking part in the garden. While Prazelenina and Skip garden have volunteers (with Prazelenina being run solely by volunteers), Joy of Urban Farming and AKU Rooftop farm do not have any volunteers within the garden, only employees.

Surprising was the finding that only one of the selected urban garden runs a beekeeping project. As mentioned in the theoretical part, beekeeping in urban areas plays a major role nowadays, due to the expansion of bees worldwide. Presumably most of the urban gardens would have beehives on their site to increase awareness and support bees' development, nevertheless the results from the research sample brings different findings. One out of four interviewed gardens have beehives on their site, but a positive sign is that two other mention the possibility of having beehives in their garden, one of which has ongoing discussions about this matter.

Due to the size of the research sample, it is difficult to carry out a generalization of the results. However, bases on the comparison of the semi-structured interviews conducted, it can be concluded that the main difference is the purpose of the urban gardens. While the selected European urban gardens focus on community enhancing, the selected Asian urban gardens focus on food production and promoting of urban gardening. The common feature of all the gardens are the composting of organic waste and community participation.

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Appendixes

Appendix A Transcripts of interviews

Transcript of interview with Mrs Lída Kasalová, Prazelenina, the Czech Republic

Location:	<i>Prague, Czech Republic</i>
Name of garden:	<i>Prazelenina</i>
Name of interviewer:	<i>Lída Kasalová</i>
Date of interview and method:	<i>4. 5. 2017; via Skype</i>
Type of UG:	<i>Community garden</i>
Permanent or transferable:	<i>transferable</i>

When was the garden founded and what is its size?

The garden was founded in 2012 and its size is 1230 m². There 134 beds with the size 1 m² each.

Did you have any problems with permits and why?

This is our 6th harvesting season and the garden had to be moved three times so far. The first land that was leased had a contract for one year and then we had to move. The next location was the areal of the Holešovice brewery, where we were for 3 years and then the contract was terminated since there will be some construction going on which was the same reason at the first land leased. Then we moved back to the original land for another year. Here again we received a contract just for one year so we already started solving the next moving which took place this year in spring. When we were looking for the last location we wanted a bigger land and we found out that all the bigger lands in Prague are directly managed by the municipality of Prague and not the town hall or some administrative units of the individual city parts.

So, this last piece of land we are currently at is leased directly from the municipality of Prague and they gave us a good price.

Otherwise we don't really want to receive any support from the municipality nor the government as an association. Prague 7's town hall likes our initiative and they are pleased to support us. However, the members of Prazelenina are not keen on that as they do not want to come to a situation when they would be receiving financial support and the donor would later on try to influence the activities of Prazelenina. To maintain our dependence.

Also, our new location is by the river Vltava, one for this reason we need to have flood protection measures and in case of emergency we need to be able to evacuate the garden (two caravans, toilets, dust bins) in 24 hours. So, we cannot have many things around in order to follow the emergency measure in case of need.

What was the initial purpose of founding the garden?

Creating a space for growing crops and creating interpersonal relationships in the city.

How was the project funded (financed) initially?

Someone from the members brought a caravan and I think then little by little Prazelenina bought it from the member when they had the money.

How are the maintenance costs covered? Do you receive regular financial grants and which?

We are all volunteers and the maintenance costs are covered with the charge for the cultivation spot from the members.

Does your garden have any income?

We run a Garden Café which is open every day and that brings us income. Plus, the yearly hire of cultivating spots of the members, that is 1 000 czk from April to October.

Do you hold a beekeeping project? How is beekeeping in urban areas perceived generally in the Czech Republic?

Currently we don't have one but only recently members of Prazelenina started discussing the possibility of having a bumble-bee hive. Our members are very environmentally sensitive and perceive the bee problem as well. So currently there is not one but we are discussing it.

How do you handle your organic waste?

We are composting. Also, the waste that comes from our Café is being recycled and composted. Also, the coffee ground we give to the flower beds. We try to approach everything in an environmentally friendly way.

What is the destination of your produce?

Each member of Prazelenina is renting a bed where he produces anything he wants and then the produce is his. We also have a few common beds and the produce that comes from these beds is used on our harvest party where we cook for everyone from our produce.

Do you have educational activities, if yes on what basis do they work?

Some of our growers are passionate home bakers and they sometime bake a bread for our Café. So, as people liked the bread and kept asking where it is from and how they could make it we decided to start a workshop on bread baking.

Is there any community participation, do you interact with the general public?

We collaborate with other organizations such as Dolní Holešovice and Dox, the Centre of contemporary art on different events and activities. So, all the things we organize and take part in are in response to the demand of people.

Also, in winter there was for the first time a HO HO Holešovice benefit ball and the money collected were used for the reconstruction of children's playground on the Ortonovo square. It was organized by Prazelenina and the Dolní Holešovice association. We have collected around 120 000 czk which is a lot of money.

Is your garden built on volunteers or do you have paid workers?

No paid workers, only volunteers.

How would you evaluate your impact on sustainable development?

I think there is an impact for sure, as people grow their herbs and some vegetables, they buy less vegetables in the supermarkets and at the same time they build social networks. Generally, we are trying to have an ecological attitude.

Transcript of interview with Mr Paul Richens, Skip Garden, United Kingdom

Location:	<i>London, United Kingdom</i>
Name of garden:	<i>Skip Garden</i>
Name of interviewer:	<i>Paul Richens, Gardens Manager</i>
Date of interview and method:	<i>21.4.2017, Skype</i>
Type of UG:	<i>Community garden</i>
Permanent or transferable:	<i>transferable, in skips</i>

What is the size of Skip Garden?

It's 650m², which is probably our smallest garden to date on the development site. What happens is that it is a very big site but as they have been building we have been moving there and back. This has been our fourth site, I think I sent it to you in the briefing document I sent you. So we are very grateful even to get a small piece of land in London, I mean the land is very expensive in a big city.

Did you have any problems with permits and why?

It was interesting, we were very proud because when we were initially working with the developer (Argent) we had a very expensive law firm in London to do charity work, it's called *pro bono* work, they decided to help our Skip Garden so they wrote a lease to work with the developer which would have cost us huge amount of money if we had to do otherwise and it was called a *meanwhile lease*. Later on, the government, at that time a labour government, actually used that as a model to actually write a piece of UK law called *Meanwhile leasing*. So, it means, basically we have this meanwhile lease so as the developer does not want you to build on it then we can stay there. So, we pay a small amount of rent to make it legal but we have obligations on both sites. So, they have obligations to warn us and we have obligation to move when they want. It has actually worked very well. Before we started, and we started in 2009, there was a group down in South London who were borrowing a piece of land from a developer and when it came time for the developer to build on it, they didn't want to move because they said it was harvest time etc. And actually, it sent a chill through all the developers in London, they were really frightened. So, one of my ambitions was to actually give our auction, the developer on this site a really good experience because they all know each other. So, what you don't want to happen is for this to stop. There is lots of bits of that waiting to be built on and it can be used by to community for a short-term gardening and it's good for community. So, I'm very proud that the government used this model that we set up to actually make this law which is good.

What was the initial purpose of founding the garden?

It was really Jane Riddiford who is the founding Director of Global Generation, the charity. She is more interested in community engagement and she was saying that this is like a new community in London and it's about how you get people together. So, she is very keen to start a community. And gardening of course is a brilliant way to get disparate people who are from different walks of life to work together. Gardening is not rocket science, you can do things and people then work together and start working with each other and that's the important thing. As the Gardens Manager I wanted to practice and show Londoners how to grow organic vegetables in the hardest places i.e. a development site - and why.

How was the project funded (financed) initially?

So, the initial funding of Skip Garden was actually partly through a national lottery win, a grant, and the developer as well. The developer (Argent) liked the idea of actually having us on site to help with community. So that's really what kicked-started us. And also, they gave us seven rubbish skips for us to make the garden so that was really good.

How are the maintenance costs covered? Do you receive regular financial grants and which?

Yes, of course. It costs a lot around those sorts of things. It is interesting, we are now 48 % self-supporting and 52 % is in grant. That comes from all sorts of sources. We have seen a lot of our friends and other charities go down because they relied on one source. With all these things, it's diversity which actually keeps you alive as in nature. If you are a generalist you survive better than if you are some one thing that only eats pink daisies or something like that. So, have many different sources. The developer gives us some money, we get some grants from the local council because we work with the school children and youth groups. And then we got somebody working fulltime who spends all her time applying for grants. She is doing very well. It's her full-time job basically looking for money.

Does your garden have any income?

The 48 % is generate, we have several teams within the group. We have an event team, Guen does events. We have had like three weddings, a hen party, children parties, corporate events and that brings in quite a lot of money. Surprisingly, because they like the environment. It's an unusual site with skips and garden, it's a funky site. People like that. Although I can't quite imagine why do people want to get married there but anyway. So that's the events and then the youth team. They are the ones that run the things for the youth group called The Generators. We take them from about 13–14 up until to when they leave school. We teach them about green issues, we teach them public speaking, we teach them lots of things. Basically, we help them along. That works very well. We also work with kids that just left school but are not finding jobs. We are trying to get them into work. Lot of people don't have the parental family background to get into do working experience so we are acting like a parent. We also work with primary schools, a whole range of community events. That's another stream of money.

Another one is the Kitchen. We have a cafe. They not only serve food, every day but Monday, but also if people want for a wedding or something else like that then they produce it. They might make most money from all of us actually. Then the gardeners team. What we do is that there is a lot of new restaurants in the area and they have planters outside of the restaurant so we plant them in a sort of organic way, with a view towards supporting bees. We are not a corporate low maintenance, we do very interesting planting. These restaurant like the idea, they like the idea of being slightly different. We work for a supermarket chain, we work for google, they got their offices and we did the planters on their roof, we got some restaurants. We topped 60 000 (pounds) last year so we made a lot of money, we do quite well.

We are aiming for 75 % (self-supportance), that would be wonderful. To make a thing like this work you need money, you need people and of course that increases your cost. But we're doing it carefully and we're proud that we survived. There is a lot of charities that go under.

Do you hold a beekeeping project? How is beekeeping in urban areas perceived generally in the United Kingdom?

Yes, that has actually been quite important. We do it from several different ways. So, we've actually made a relationship with a company called Urban Beekeepers. They actually own the hives. On all the sites, we've had two bee hives. And not only is that good for the garden, because we get more fruit because of that. But we also train young people to be beekeepers as well. So, every year they run a program and about ten young get to trained as beekeepers. But we also use it in the cafe and we sell it at markets as well. So, it's also a very small income stream. So, all in all it's a really good project. We've brought the bees on top of the classroom. It excites people, people like honey.

There's a very famous London beekeeper, called John Chapple and he said that 20 years ago when he started, it was only him in his area. And now there are 19 other bee keepers. So, there's been a huge increase in bee keeping, a lot of interest. I think people can see that London is very good for bees. And they are dying in droves in the country side because of the spraying. So, it's become a refuge really. And it's also a way to fight this loss of bees. So yes, London has become very keen. Some of the big famous stores like Selfridges have bees on their roof as well. So, lots of places now have bees. To the point now that there is a worry that there is not enough food for the bees. And that's part of my agreement. I do a lot of teaching as well to show people what bees need, what sort of flowers bees need. Because people don't know. In my life - I started my own company in 2008 as a trainer, a gardening trainer. I found really that it was excellent because back in the 70s and 80s vegetables were so cheap to buy in supermarkets that most people stopped growing them at home. So, most of your generation hadn't got the skills how to grow vegetables and don't know much about natural history. But I think gardening and gardening with your kids is nice. And it worked out very well because lots of people wanted to learn how it works. So, I've been so busy since 2008 when I started my company. I worked for the skip garden, I have this roof garden and I also do training. There's another charity called Sustain and an offshoot of that is called Capital Growth. And when we had the Olympics in London in 2012, the Mayor wanted 2012 new growing spaces in London to make it greener. But Sustain found that people wanted to do it but didn't have the skills. So, they set up a training allotment in Regent's park, one of the royal parks in London. And myself and five other lecturers run training sessions there. On different subjects, on composting, on growing organically, on the seasons, just basically a whole range of things to try and get people up to speed so they can start to grow and understand why they're doing stuff. So, for that's been an excellent employment at the end of my career really. And that's probably why I won't retire. Because I want to keep on teaching, and I enjoy it so much.

How do you handle your organic waste?

So, for example I try not to let any organic waste leave the site. So, we have a big composting system. So, everything is actually composted and turned into compost for the soil for the plants. And I would show people that it's a very simple process, that you can do it at home. We also run wormeries, where we use this species of worms that would take kitchen waste and they'll produce rich soil.

What is the destination of your produce?

Food which goes to the kitchen, skip garden kitchen. Yes.

I mean, when we first started we didn't have a big cafe. We were actually selling them into the local restaurants. Because we are an organic garden and a lot of our local restaurants like the idea of being local and also of being organic. Interestingly we couldn't afford to be a certified organic site, it costs about 5 000 pounds per year to actually register. So that's why we couldn't afford that. So that I used to do is to bring the chefs out to the garden and show them my practice. I explained them that we can't afford the certification and how we do things. And all of them actually agreed and are quite happy. But these days restaurants and cafes make it through a huge amount of food. Especially restaurants. But I'm proud to say that every day there is enough lettuce and green leaf outside for them to make a bowl of lettuce. So, they add that to what they are selling, so they can say that some is coming from the garden. But I always say I'm a garden, not a farm. So, we do supply the kitchen, and that's where it all goes, but most of it is about teaching people how to grow organically in London.

Do you have any educational activities?

Yes, there is a lot of those. I think my favourite one is - we do a system called Lunch & Learning every second week. We get a primary school coming in and we mix them up with local building workers and office workers. They come in, we team them up in groups and then they do a project like they might sow seeds, or they might make something or they do a hunt in the garden. And it's basically to make them mix up. And that's always good fun. Working with that age group - up until secondary school - they are enthusiastic and they are fun. We also work with these generators, they do projects. So yeah there is quite a lot of educational work as well. The theme behind that, run by the charity is - they are saying "I, we and the planet". So, it's about yourself, the group and the planet. So, getting them to look at those things. And it actually broadens the way they look at the world. So, it's a very useful thing to do.

Is there any community participation, do you interact with the general public?

I mean yeah, every day we get random visitors coming in. We get a lot of student groups coming in. So, they come to us and we show and explain them what we're doing. In the summer, we do a thing called twilight gardening. So, office workers come in after long days of work behind the computers and put their hands in the soil - and it's good for them. And also, you're mixing people up. You know, people who might work next door to each other wouldn't normally speak. And we've had great friendships being started on these nights. So, they do two hours of garden work and then we feed. So, we have a big community meal. We take up to 15 people on the session and that runs right through from May until November. Every two weeks. So that's been good fun. And also, it's good for the garden, because we can get so much gardening work done in two hours every two weeks. So, it really keeps the garden going. And that's free labour for us.

Is the garden built with volunteers or do you have paid workers?

So, there's levels. We have the staff, the office staff, the kitchen staff, the event staff and the gardening team and the youth team. The youth team has got three people, the gardening is four, we're paid. But none of us work full-time. I work two days; the others work two or three days as well. So, we all work in a short time. The kitchen staff is full-time. The office people are full-time. The events work two days as well.

The next level after that is the interns that work with us. We have interns on each of the different group teams. So, there's a kitchen, an office, a gardening interns etc. They get paid 10 GBP per day. They work with us for like 3 months.

And then we have volunteers, people that just like to come and help in the garden. They might be local people, or retired people or even people that are unemployed and just want to be doing something or get skills. We have quite a few of them and they come and go.

And then there's things like Twilight, that's slightly different. They apply to come on the Twilight sessions, they are like volunteers.

We also get corporate groups coming for a day and they want to work in the garden so we get that as well.

How would you evaluate your impact on sustainable development?

It would be nice to think that we are changing minds. Certainly, I think a lot of people who do come are suddenly more aware not only that there is an issue but that they can do something about it. I think the trouble with people when it comes to sustainability is that people think it's not down to them it's down to somebody else. You know, that somebody else should be doing it. So, we try to bring it down to the level of - you know - there is a phrase "think globally, act locally". And the challenge is to make people actually live by that. So, you might think globally but you could act in your own backyard.

I do have issues with the developer. The trouble is, it's very difficult trying to work with them because they change. The staff changes all the time. So, you think you actually got a handle on these people and you educate them and that's fine. And eventually they leave off to another site and you got to start to work again. And often, one of the things we actually wanted is to actually work with developers. Now there is a thing that people like us, which they call "tree huggers" don't work with developers. There is kind of a split in society. So, the big bad developer and the sort of bearded "tree hugger", green people. So, Jane is very keen to actually bridge that gap, to actually try and understand it from their point of view. Which is mostly about money. But to basically wiggle in through the cracks and get them to do better things. And I think we've done some good work there. They are more aware now of not planting stuff which is not bee friendly for instance. You know mono agriculture is using a lot of very nasty chemicals. And it's killing a lot of bees. So, the country side is just about mute. But London isn't. London is actually very vibrant in wildlife. Because there is no spraying going on. So, bees need plants that produce good nectar and pollen for them. So, if you actually educate the developer and some of them instead of putting pretty flowers with lots of colour, they would put on flowers that bees can actually use. So, it's small changes like that. You know it's been hard work. But you work with one group and then they move on to another site. So, it can be quite frustrating. And you know we had a very nice swimming pond next to our site. And we put in wild flowers around the banks. But the contract came to an end, they bulldozed it and put down a monocrop lawn. And it broke my heart, after all the work we had done.

So, I'm not sure. I'd like to think we have - and on an individual level we probably have an impact - but in terms of the whole organism of the developer, it's about money. It's always about money. And if it doesn't make them money, they're not interested in it. So, it's difficult.

But green spaces - you know I've not only worked for this Skip Garden, but I also got a roof garden as well. On an office block. And we get people coming through it. But basically, it's a bit of green space. You know if you have been sitting in front of a computer all day, there's nothing nicer than go and sit in between some flowers and plants. So, there's a spiritual aspect to this as well. Humans can't just live in concrete blocks. They need to be linked in with nature. They might

not know it but they do better when they can look at green things - it calms them, in some funny way. So, I'm very keen on that side as well.

So, there's so many issues here. It's about better food - we grow organically. And telling people about that, telling them about the issues of buying food from the supermarkets, which come from farmers who are just interested in making their profit and not about how good they are. So, there is many threads really. And they all kind of come together in an organic garden. So, we do the best we can. But I think people who come there, I mean you see them just kind of like, you know they walk up through the development site and inside they've come home. They just love the greenness of it all, they feel like a human being then. I mean don't forget that gardens are made by human beings, you know there is no other species on this earth that makes gardens. I think it's in our DNA as a species, to have green, to grow things.

Transcript of interview with Mr Raul Norbe, Joy of Urban Gardening, Philippines

Location:	<i>Quezon City, Philippines</i>
Name of garden:	<i>Joy of Urban Farming</i>
Name of interviewer:	<i>Raul Norbe</i>
Date of interview and method:	<i>31. 3.- 19. 4. 2017; by messenger.com</i>
Type of UG:	<i>Urban Farm</i>
Permanent or transferable:	<i>Permanent</i>

When was the garden founded and what is the size?

The Joy of Urban Farming Project is one of the projects of Hon Vice Mayor Joy Belmonte after her election as VMayor of Quezon City Local Govt Unit in the Phils. in 2010. The 1st Urban Farm measured only 750 sq mtrs area. In 2013, we moved to another site measuring 1500 sq mtrs. with the same crops planted. Leafy veggies, i.e. lettuce, cabbage, broccoli, etc..Fruit bearing, Roots and Tubers and Herbal. Due to massive infrastructure devt., our 2nd site was demolished and we're transferred lately to a 450 sq mtrs site. You can see our new site in my FB Page or Joy of Urban Farming FB Page.

Did you have any problems with permits and why?

No permit required, since this is a Local Govt Unit project on Food Production.

What was the initial purpose of founding the garden?

Food production. Green leafy veggies can be harvested within one to two months' period. Aside from leafy veggies, we grew Fruit bearing veggies i.e. tomatoes, eggplant, cucumber, bitter gourd, etc... Roots and Tubers Veggies, i.e. radish, sweet potatoes, onion, etc. including Herbal Delicacies/ Plants, i.e. mint, tarragon, basil, etc...

How was the project funded (financed) initially?

By the Office of the Vice Mayor of Quezon City Local Govt Unit and garden tools, nurseries, organic fertilizers, etc by Dept Agri or DENR.

How are the maintenance costs covered? Do you receive regular financial grants and which?

No Financial (help) from Dept Agri or DENR but only material grants such as garden tools, nurseries, organic fertilizers, etc...we've MOU (Memorandum of Understanding, author's note)

with that Govt Agencies. Yearly allotted budget to maintain the Proj came from the Office of the Vice Mayor. No financial grants outside.

Does your garden have any income?

No income from the Proj since the produce goes to the employees of the Local Govt Unit, to School feeding program, given to areas besieged with calamities, etc. as part of food supplies.

Do you hold a beekeeping project? How is beekeeping in urban areas perceived generally in Philippines?

Presently, no beekeeping project in the area. Yes, there are beekeeping projects outside Quezon City (QC) area or in municipality not fully urbanize. We're not yet exploring beekeeping project inside the farm, but it's possible to go into it.

How do you handle your organic waste?

We do composting for organic waste turning organic fertilizer and we've vermi-composting. We used poultry manure as OF. most of the time.

What is the destination of your produce?

The produce goes to the employees of the Local Govt Unit, to School feeding program, given to areas besieged with calamities, etc. as part of food supplies.

Do you have educational activities, if yes on what basis do they work?

We've regular Urban Farming Orientation Seminar delivered to school, Barangay unit, NGO's group, PO's group and those who requested us for Seminar, we deliver it with food budgeting came from us.

Is there community participation on your project?

So far, we already established more than a 100 urban farm sites in the city. And those who requested us to adopt urban farm in their respective area are responsible to do the maintenance. We provide gardening materials including seeds, soil, tools, nursery, etc. They only shared labour and manual workers to care of the farm after its establishment. We gave materials, they gave us their labour and attention. And the produced are for them. That's their participation with Memo of Understanding.

Is your garden build on volunteers or do you have paid workers?

We've 3 Agriculturists (incl. me) - 1 Project Head, 2 Support Staff and 4 Garden caretakers. All of us are paid workers under the Offs of the Vice Mayor. Local Barangay Govt Unit adopted urban farming in their respective area, paid their own caretakers, either salary, allowance or in per diem basis depending on their budget. We have not reached full volunteerism system on urban farming.

How would you evaluate your impact on sustainable development?

Yes, I am a believer of sustainable urban farming in a highly-urbanized area like QC. But most importantly, passion, dedication and a little innovation on gardening are necessary for its progress. Presently, I am designing a "FOOD4MEDICINE BOX GARDEN".

Food Production. Income generation or Livelihood. Environmental conservation/ protection and preservation. Health and wellness consideration and Psycho-Spiritual Realization. Those the Five Bundles of Joy, we Got from Urban Farming.

Transcript of interview with Mrs Pasinee Sunakorn, AKU Roof top garden, Thailand

Location:	<i>Bangkok, Thailand</i>
Name of garden:	<i>AKU ROOF TOP GARDEN (Faculty of Agriculture Kasetsart University)</i>
Name of interviewer:	<i>Pasinee Sunakorn, Associate professor</i>
Date of interview and method:	<i>25. 11. 2017, personal interview</i>
Type of UG:	<i>Roof-top garden</i>
Permanent or transferable:	<i>permanent</i>

When was the garden founded and what is its size?

The garden was founded in 2012, and its size is 196m².

Did you have any problems with permits and why?

We didn't have any problems when starting the garden but there is a limit of weight we have to follow. We can have on roof it is 300kg/m². On parking buildings, it is 800kg/m² and on a library-roof it is 500kg/m².

What was the initial purpose of founding the garden?

The idea of founding a garden was a reaction to flooding in Bangkok in 2011, when employees at university had no access to food which was a problem. Also, the purpose was to promote urban gardening within university and using Kasetsart University as an example university.

How was the project funded (financed) initially?

We have received help from the Thai Health Promotion Foundation who wanted to support our project.

How are the maintenance costs covered? Do you receive regular financial grants and which?

The maintenance costs are cover from earnings from vegetable sell.

Does your garden have any income?

We generate a little income from vegetable sell to staff and canteen. And it is used for paying the garden caretakers.

Do you hold a beekeeping project?

No, we don't have a beekeeping project in our garden.

How do you handle your organic waste, do you compost?

Yes, we do organic composting, which result in biological liquid. We have 3 barrels for this purpose.

What is the destination of your produce?

Everything we produce is sold to staff and the university canteen.

Do you have educational activities, if yes on what basis do they work?

Not at the moment. But there is a classroom up on the roof where I teach Building greenery on the subject of green roof and vertical greenery.

Is there any community participation, do you interact with the general public?

Sometimes we have visitors coming to the garden.

Is your garden build on volunteers or do you have paid workers?

We have two employees, two ladies, who take care of the garden.

How would you evaluate your impact on sustainable development? *Unanswered*

Appendix B Photo documentation



Figure 1 AKU Rooftop garden: The system of composting of organic waste, resulting in biological liquid; author: Dominik Koršala



Figure 2 AKU Rooftop garden: Garden's site; ongoing interview with Ms Pasinee Sunakorn; author: Dominik Koršala



Figure 3 AKU Rooftop garden: Meeting with garden's staff; author: Dominik Koršala



Figure 4 Joy of Urban Farming: Garden's site – food production; author: Raul Norbe



Figure 5 Joy of Urban Farming: Garden's site – leafy vegetables production; author: Raul Norbe



Figure 6 Joy of Urban Farming: Project implementation; author: Raul Norbe