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The Social Dimension of Urban Agriculture

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Integrated Master in Architecture

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**TECNOLOGIAS
E ARQUITETURA**

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Abstract

Urban agriculture (UA) is becoming a worldwide growing phenomenon. Extensive land degradation and urbanization have made it much harder for Agriculture within the cities, and the impact of the built environment fragility is becoming clearer over time, Thus, Urban Agriculture is being used as resiliency strategy for cities, it provides local food as a tool to de-risk from centralized production system; and food, production, and design are more present nowadays in the innovative forms of green UA since sustainable urban agriculture has a an important role in SDG.

This research aims to provide some insights into the production phase of UA, its concept, different definitions, types categorization, trends that led to it and challenges, using multiple sources research method. Dimensions of UA are also going to be highlighted in this research especially the Social dimension through analysing three case studies which differ in their characteristics and how UA is introduced within it, its proximity to the urban population and the social impact they created and what can we learn from it.

Keywords:

Urban Agriculture, Sustainability, Food Systems, Social Dimension, Challenges, Synergies, Social interaction, Z-Farming.

Resumo

Este trabalho visa providenciar algumas considerações sobre a fase de produção da AU, o seu Agricultura Urbana (UA) está a tornar-se um fenómeno global em crescimento. A degradação extensiva do solo e a urbanização dificultaram a agricultura dentro das cidades, e o impacto da fragilidade do ambiente construído está a tornar-se cada vez mais evidente. Desta forma, a Agricultura Urbana tem sido usada como estratégia de resiliência para as cidades, ela providencia alimentação local como uma ferramenta para minimizar os riscos do sistema centralizado de produção; E alimentação, produção, e Design são cada vez mais presentes atualmente nas formas inovadoras de agricultura urbana verde, uma vez que a AU tem um grande papel na SDG.

Conceito, diferentes definições, tipos de categorização, tendências que levam a ela e desafios, usando múltiplas fontes e metodologias de trabalho. As dimensões da agricultura urbana também serão sublinhadas nesta pesquisa, em especial a dimensão social através da análise de três casos de estudo que diferem nas suas características e em como a AU se insere neles, a sua proximidade à população urbana e o impacto social criado por eles, bem como o que é possível extrair desses casos.

Palavras-chaves:

Agricultura Urbana, Sustentabilidade, Sistemas Alimentares, Dimensão Social, Desafios, Sinergias, Interação Social, Z-Farming.

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List of Acronyms

COVID-19	Coronavirus disease 2019
Eu	European Union
FAO	Food and Agriculture Organization of the United Nations
GHG	Greenhouse Gas
RA	Rural Agriculture
RUAF	Resource Centres on Urban Agriculture & Food Security
SDG	Sustainable Development Goals
UA	Urban agriculture
UAG	Urban allotment Garden
UHI	Urban heat island
UK	The United Kingdom
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
USA	United states of America
WFP	World Food Program
Z-Farming	Zero acreage Farming

Introduction

Cities have a prominent role to play in sustainability, by enhancing food security, promoting sustainable urban food systems, and fighting climate change by introducing eco-friendly lifestyles. Extensive land degradation and urbanization and the continuous increase in the number of the population have -and still - posing global challenges resulting in a search for an innovative solution or maybe an already existing solution that is proving its efficiency over time like urban agriculture.

Since this increasing will be also followed by social, economic, environmental imperatives as the thriving number of urbanites is still until the moment highly dependent on the food coming from outside of the city borders and farmers are using up the natural resources that we need to sustain a balanced ecosystem so they could accommodate the agriculture goods high demand of the growing population (FAO, 2017).

Architects have a big influence and contribution in creating a sustainable system by changing the world views through posing and solving current problems and changing the building user's behaviour by increasing synergies in the 'Human-Building-Nature' triangle which was compromised due to the urbanization and its impacts. By the end of the research, in chapter 5, all the outcomes which were previously discussed in the four chapters, will be used as a base to design the positive impact school.

The research consists of a Theoretical part and a practical part, the theoretical part includes four chapters, each chapter is a build up to the next chapter in order to study the research hypothesis how interconnected is the relationship between Urban Agriculture and the social dimension and to test the applicability of UA in our rapidly urbanizing world.

Chapter one is an approach to the UA concept, the need of it by exploring the trends and challenges, then exploring the types and categorization of UA.

Chapter two explores the social dimension in UA, what defines it, its challenges, and its link to the built environment.

Chapter three includes three case study chosen to press the outcomes of the previous chapters.

Chapter five is the theoretical part conclusions.

Each chapter has a summary by the end of it to highlight the most important outcomes of the chapter.

The practical part of the research, is an application to the theoretical part outcomes, it is a result of the conclusion and the learned lessons in the theoretical part, an adaptation of the social dimension in proposed strategy and project.

Methodology

This research is based on a literature review of published papers, reports, and books to address the importance of urban agriculture.

Three case study were selected in Damascus, Cairo and Lisbon, the case study selection criteria were as follows:

1- Location
2- Country classification (developed/ developing)
3- Urban Agriculture types and categorization
4- Social dimension
5- Lessons learned and recommendations

This criteria was set to highlight the fragility in our food systems within the cities context, and to press the importance and the need for Urban agriculture.

This research applied a comparative case study approach to test the research hypothesis which is the interconnected relationship between Urban Agriculture and the social dimension and its applicability, the comparison was applied according to the approaches of Maslow, Zeunert, 2019, Partalidou and Anthopoulou, 2017, and Gehl, 2011.

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Chapter I

1. Urban, Rural, Agriculture, and Urban agriculture:

An approach to these terms

1.1. The concept of Urban and Rural

The Urban-Rural distinction might be based on the modern binary interpretation which states that the areas either rural or urban and the contradiction in both terms are noticeable in the term 'Urban agriculture'.

Discussing what is urban and what is rural gives more space for interpretation from a philosophical standpoint, and the concepts are more integrated into the contemporary discourse (Schaeffer et al. 2014)[1]. We can trace the difference between the urban/rural back to the Ancient Romans (Rykwert 1988).[2] The city dwellers distinct themselves in the nineteenth century as the opposite of rural farmers.

While the urban system deals with trade, industrial production, education, and legal systems and administration are present; On the other hand, the rural system is linked to the production and supply of food, energy, and fibres (Bairoch 1988). [3]

Even though these two systems supposedly had to vary culturally, educationally, and economically, the two were interconnected. Their relationship has transformed gradually, we can say it is now unclear due to the globalization, industrialization, and specialization of the agricultural sector. Nowadays, whilst the farmers produce for the global market, they could be shopping from the supermarkets and their families could be working or studying in the cities.

However, while the term rural meaning is an area outside the urban; however, using the term urban with agriculture must indicate some contrast to the rural since a rural area is an area outside the urban —'a definition created by and reflecting the opinion of those in the urban realm'.

For example, Europe has a vast urban area and contain many green and peri-urban spaces. Although many urban areas are defined with clear boundaries other regions sprawling, unspecified urban areas (Harris and Fuller, 2014).

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[1] Harris and Fuller, 2014 citing Schaeffer et al. 2014
[2] Harris and Fuller, 2014 citing Rykwert 1988
[3] Harris and Fuller, 2014 citing Bairoch 1988

1.1.1. The definition of Agriculture

Agriculture, in general, is the practice, art, and science of growing plant and raising animals to provide it to meet human needs (Abellanosa, 1987). The word (Agriculture) is derived from the two Latin words Ager (field) and Colo (cultivate) when combining the two words we have the Latin word Agricultura: field or land tillage.

1.1.1.1. Agriculture Types

Regarding agriculture types in general, distinctions had been raised by many researchers, the following points summarize the conclusions of (FAO, 2019) and FAO reports (FAO, 2017).

The lead highlight of Urban agriculture which characterizes it from Rural Agriculture is it is included in and merging within the Urban economic and ecological system (from hereon referred to as "eco-system"), (Figure 1.1). The fact that it is embedded in AND interacting with the urban eco-system (Richter et al., 1995: 6)[4] What distinguish it from RA is not its location within the urban and suburban areas, but the fact that it is an integral part of the urban ecosystem and interaction with it (Richter et al., 1995: 6)[5]. (FAO, 2017).

Figure 1.1: Urban Agriculture and other "Kids on the Block". Smit et al. (1996b) briefly discuss the connection of UA with the urban nutrient cycle and with the urban food system.
Source: (Mougeot, 2000)

On another point of view, agriculture, in general, can be classified on three main classifications; Urban, Indoor, vertical or a combination of the three instead of being classified as strictly urban or rural, the mentioned categories can be represented as a 3D graph with three main axes (Figure 1.2): rural to urban, outdoor to indoor, and horizontal to vertical (FAO, 2009, 2017)

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[4] FAO, 2017 citing Richter et al., 1995: 6
[5] FAO, 2017 citing Richter et al., 1995: 6
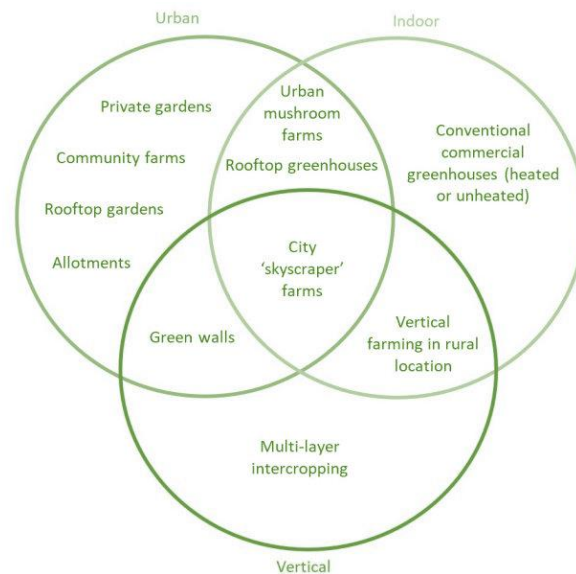
Figure 1.2: Agriculture classification
Source:(FAO, 2017)

1.1.1.2. Conclusions

By highlighting the different distinctions, we can figure out that urban agriculture, as a part of the agriculture system, would also have different distinctions according to the different researchers.

1.1.2. The concept of Urban Agriculture

1.1.2.1. Urban Agriculture definition

A. Mougeot Definition:

According to (Mougeot, 2000) Urban Agriculture can be defined as "The growing of plants and the raising of animals for food and other uses within and around cities and towns, and related activities such as the production and delivery of inputs, processing and marketing of products."

B. Butler and Maronek Definition:

UA is a complex system that includes a variety of concerns staring from the traditional practice of activities associated with the production, processing, marketing, distribution and consumption to several advantages and services related to it, including leisure, bio-economy, commercial projects, individual health, and the beautification of the cities' landscapes to the revitalization of the environment (FAO, 2009, 2017).

C. The Food and Agriculture organization Definition:

UA is the practice of producing crops and raising animals in small areas, such as empty plots of land, backyard gardens, and houses' balconies inside the city whether it is for personal consumption or sale in the neighbourhood markets.(FAO, 2017)

1.1.2.2. Conclusion

Urban Agriculture Definition:

By studying the definitions of UA we can conclude the following: The term (Urban agriculture) describes the practice of growing and cultivating crops, it also includes all types of animal husbandry, aquaculture, and beekeeping in urban and sub-urban areas (within or in the surrounding boundaries of the cities). This practice can be held within private residential spaces like backyards, rooftops or even balconies and walls, or public spaces like community gardens, educational farms, etc...

1.2.   Why do we need Urban Agriculture?

Urban agriculture is a growing phenomenon worldwide, it is not considered a new practice, and it is an old practice, as old as the cities. Through going over multiple sources (FAO, 2009, 2017; Pancrazi, 2016; Ellen MacArthur Foundation, 2018), several trends that led to reviving the necessity of this phenomenon. These trends led to several challenges that can be also linked to the challenges that agriculture in general, the environment and the world we live in are facing. All the discussed points below contributed to reviving the concept of UA.

1.2.1. Trends

The trends concerning the UA can be summarised by the following:

A. Population growth and ageing

-    World population:

Although the rate of growth of world population continues to slow down in the developed countries since the late 1960s, on the other hand, rates are increasing on the developing countries in Asia and Africa (figure 1.3).

The population will continue to expand, it is expected to reach the number of 9.73 billion by 2050 and 11.2 billion by 2100 bringing new challenges to food security and agriculture in general (FAO, 2017) (figure 1.4).
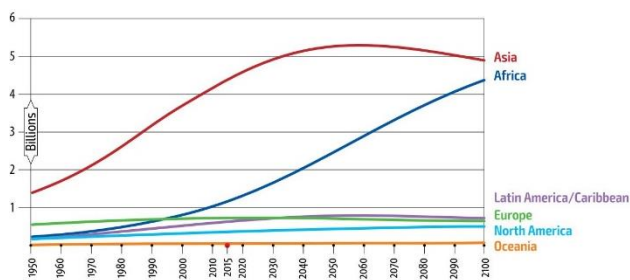
Figure 1.3: Population Growth to 2100, by region (medium variant).
Source: (UN, 2015)
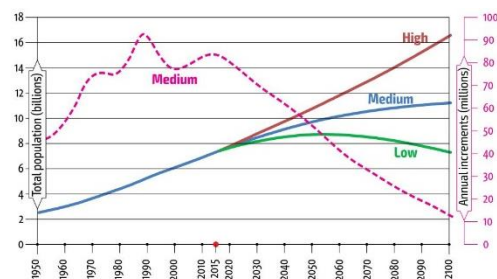
Figure 1.4: Global Population Growth to 2100, by variant.
Source: (UN, 2015)

-    Ageing:

Ageing in rural areas tends to proceed faster than national averages, for example, the average age of farmers in the EU is 51 years old.

B. Urbanization and migration

Urbanization is the dominant demographic event happening in our era, studies indicated that the percentage of Urbanites -who migrated to cities from rural areas- will increase from 30% in 1950 to 54% in 2014 to 60% by the year 2050 (FAO, 2009, 2017) (figure: 1.5&1.6). Rapid Urbanization will result in huge implications for world food security and human livelihoods.
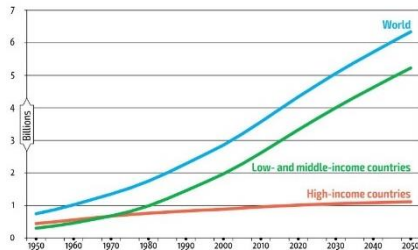
Figure 1.5: Urbanization trends, by region. Source: (UN, 2015).
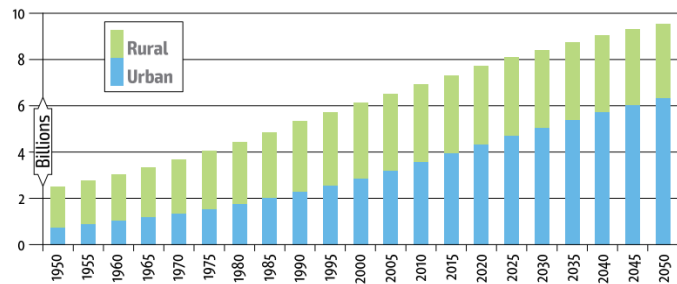
Figure 1.6: Growth in global urban and rural populations to 2050. Source: (UN, 2015).

C. Changing food systems

- *Customer preferences are evolving, and people are changing their diets*

Higher-income countries tend to accelerate a dietary shift towards higher consumption of meat, fruits, and vegetables relative to that of grain crop which put increasing pressure on the natural resources.

Diets nowadays are becoming more energy-dense, higher in sugar, salt, and fat. The demand for commodity crops has increased significantly lately because of the high demand for processed food that is mostly nutrition poor. With these changes, the nutrient content of diets is changing causing a lot of health problems like obesity, overweight and other diet-related diseases. Such transformation in consumption patterns requires a change in employment within the food system: It led to minimizing the number of people working in agriculture, on the other hand, increasing it in transport, wholesaling, retailing, food processing and sale (Cohen and Garrett, 2009)[6](*Nutrition | World Food Programme*, no date; FAO, 2017).

- *People are reconnecting with how and where their food is grown*

In the US, the organic food sale is a growing sector, with double-digit growth in many areas worldwide including India, Europe, and Latin America. The number of farmers' markets selling local products had multiplied in the US by nearly five times from 1994 to 2017 (Ellen MacArthur Foundation, 2018).

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[6] FAO, 2017 citing Cohen and Garret 2009

D. Poverty, inequality, and food insecurity

As another consequence of the mass Urbanization, the world is witnessing inequality in the urban environment due to economic constraints and/or systemic injustice (Figure 1.7). The food crisis has pressed the implications for food security of disregarding agriculture and the pressing need for handling that situation (FAO, 2017).

E. Food Waste

In a world where hundreds of millions suffer from hunger, one-third of food production is lost or wasted (HLPE, 2014; FAO, 2017). This is a negative sign of the ineffectiveness of our food systems nowadays. Reducing waste could minimize the need to increase production (Figure 1.8).

Food loss and waste footprint is an increasing environmental issue. Studies show that the agri-food[7] sector currently uses up around 30% of the world's total energy and that the energy resulting from global food losses is 38% of the total final energy consumed by the whole food supply chain.

This implies that more than 10% of the world's total energy consumption is for wasted and lost food.
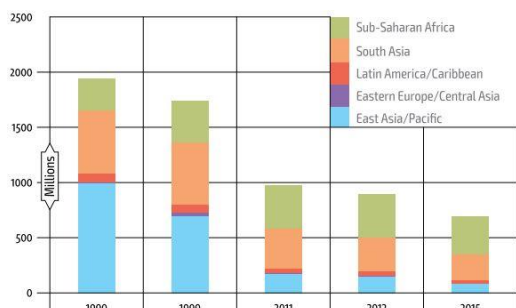
Figure 1.7: People below the poverty line (PPP) of US$ 1.90 per day, 1990–2015
Note: Data for the Near East and North Africa are not available.
Source: FAO Global Perspectives Studies, based on World Bank, 2015
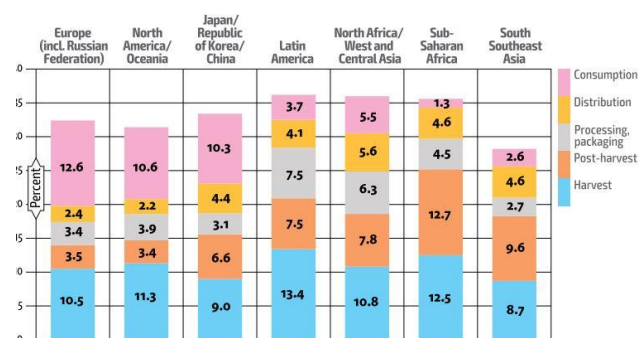
Figure 1.8: Distribution of food losses and waste along the supply chain
Source: FAO, 2017

F. Climate change

The negative impacts on climate change are becoming more and more obvious as time goes by. The rising demands on agriculture with existing farming practices are likely to lead to growing

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[7] Agri-food chains according to FAO are the linked chain of events in the agricultural production of food, the process of production to processing, trading, distribution, and consumption. Literally "from field to fork".

competition for natural resources, increased greenhouse gas (GHG) emissions and carbon footprint, and mounting land degradation and deforestation.

G. Conflicts, crises, and natural disasters

They can impose obstacles to the availability and ability to access food and healthcare, and compromise social protection systems leading to the aggravation of poverty and hunger crisis, it could be the main elements to the migration push factor and the increase of the need for emergency food assistance and humanitarian aid. Violent conflict also frequently characterizes protracted crises. Based on the FAO report (2017), "The proportion of undernourished people living in low-income countries with a protracted crisis is between 2.5 and 3 times higher than in other low-income countries".

1.2.2. Challenges

The trends above pose a series of social, economic and environmental challenges to food and agriculture, the following challenges are also concluded by multiple sources method (FAO, 2009, 2017; Mutizwa-Mangiza *et al.*, 2011; Specht *et al.*, 2014a; Specht, Siebert, Thomaier, U. B. Freisinger, *et al.*, 2015; Ellen MacArthur Foundation, 2018).

1.2.2.1. Urbanization challenges

"*Cities, where 80% of the world's food will be consumed by 2050, have a vital role to play in shaping the future of the food system*" Michael Pollan, Author, Professor (Ellen MacArthur Foundation, 2018).

Food security is the main motive of the need of the UA growing phenomenon, as mentioned in the Report of the World Food Summit, food security can be achieved when people, whenever they need, have full accessibility to a sufficient, nutritious and safe food that can fulfil their diets, nutritional requirements and dietary preferences for active and healthy life ((Specht *et al.*, 2014b; Specht, Siebert, Thomaier, U. Freisinger, *et al.*, 2015; Ellen MacArthur Foundation, 2018).

A. Hunger and undernutrition:

A growing number of urbanites is having difficulties in terms of accessing the food and nutrients they need as the poverty rates in many cities are increasing. Poor urbanites in poor and developing cities spend 60% or more of their income on food.

The mass migration trend all over the world caused by several reasons will be followed by social and economic needs and challenges, it will also lead to a limitation of urban agriculture opportunities and green spaces inside the cities due to the high prices of the lands within the

urban areas (UN, 2014).

B. Health concerns and challenges:

Studies done by the FAO showed that most products lose almost 30% of nutrients three days after harvest. Localized urban food production and consumption have an efficient role in promoting efficiency of energy use reducing GHG emissions; they also have positive outcomes in terms of improving the products' taste, shelf life and micronutrient content of food by reducing excessive packaging and shortening distribution supply chains (Ellen MacArthur Foundation, 2018).

Another study compared a locally sourced diet to an equivalent imported ingredient diet: the later one can use four times the energy and produce four times the GHG emission. In the US, the average food products in the supermarket have travelled 2100km before arriving at its destination, and the food system accounts for some 15 to 20 per cent of the energy consumption in the US (Mutizwa-Mangiza *et al.*, 2011).

C. Disconnection with nature:

Since the Industrial[8] and Agricultural[9] Revolutions, city dwellers have gotten progressively detached from nature and food. For example, studies showed in the United Kingdom (UK), that this disconnection could be the source of individual and societal suffering, causing damaging socio-environmental and economic problems such as mental and physical illness. Accordingly, they are critical components to address in future ecological and urban planning debates (Garnett, 2000; GLA, 2008; Turner, 2011).

Indeed, local urban planning has an important role to play in creating areas that connect and re-engage individuals with food sources and nature, as well as promoting volunteering and sustainability (Pancrazi, 2016).

D. Diseases:

Such as diseases with the severe acute respiratory syndrome and associated coronaviruses in bats and other animals; henipaviruses in pigs, bats and horses; Ebola virus in wild animals; and the rabies virus and associated viruses (Bennet, 2006; Calisher et al., 2006; FAO, 2013b, p.111; Jones, 2008; Turmelle and Olival, 2009).

The FAO stated in a report that the risk of serious outbreaks is rising due to the increase in the number of people, animals, plants and agricultural commodity across international borders, and

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[8] Between the mid-17th and late 19th centuries
[9] Between 1760 and 1840

as animal production systems become more intensive due to this change, they weaken food security and slowdown livestock sectors from reaching their full economic potential (FAO, 2017).

- Food Systems and Covid-19:

Even before the pandemic, reports showed that more than 820 million people were already identified as chronically food insecure. Because of the COVID-19 outbreaks among workers, food markets were forced to close, a big food waste occurred, and farmers had to either dump or bury perishable produce due to supply chain disruption and falling consumer demand, this led to difficulties for many urban dwellers in city centres in terms of food accessibility (FAO, 2020).
The recently emerged coronavirus disease 2019 (COVID-19) pandemic has revealed the extreme fragility of cities, the lockdown of the cities has pressed the importance of increasing awareness of the vital importance of food availability for people. It also pressed the point of urban fragility and ineffectiveness of our currently used food systems.

E. Urban Heat Island Effect

Urbanization is well known to produce heat island effects and worsening climate change (Figure 1.9). In cities, we have a big amount of concrete used as a building material, it absorbs a lot of heat; green roofs and walls can help in providing a layer of natural insulation and help in reducing both energy bills and temperature intensification by the urban heat island.

The "urban heat island" effect is the absorbed heat by the building's materials in urban areas during the daytime. In tropical cities, urban heat island monthly intensities can reach 10°C by the end of the night, especially during the dry season (FAO, 2017).

Figure 1.9: The effect of Urban Heat Island (UHI)
Source: (Fuladlu, Riza and Ilkan, 2018)

1.2.2.2. Climate Challenges

The rapid and continuous growth of the world population, alongside the technological and

industrial expansion, has created a need to seek optimal utilization and preservation of natural resources.

"*High-input, resource-intensive farming systems, which have caused massive deforestation, water scarcities, soil depletion and high levels of GHG emissions, cannot deliver sustainable food and agricultural production*" (FAO, 2017).

What we need, under these circumstances, is technological improvements alongside exceptional cuts in the fossil usage in all aspects of our lives, including agriculture, this would help address the negative impacts of climate change and natural hazards (FAO, 2017).

1.2.2.3.   Sustainable development Challenges

The term "sustainable development" describes the aim to satisfy the needs of the current generation without threatening the future generation's ability to meet their needs. It is noteworthy that this kind of ecological sustainability is relevant to economic and technological sustainability, signifying the efficient utilization of resources that can be called social sustainability with a demand for social justice (Madaleno, 2001 citing Ginsberg, 2000).

The second SDG includes the following: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Sustainable development is a universal challenge and responsibility, all countries are interdependent. The 2030 Agenda for Sustainable Development embodies a vision that goes beyond dividing countries to 'developed' and 'developing' countries.

One of the greatest challenges in the path of sustainable development is to achieve coherent, effective national and international governance, with clear development objectives and commitment to achieving them requiring collective responsibility for all countries, and a significant shift in producing and consuming systems in all societies (Specht *et al.*, 2014a; Specht, Siebert, Thomaier, U. B. Freisinger, *et al.*, 2015; Ellen MacArthur Foundation, 2018; Little *et al.*, 2019).

1.3. Urban Agriculture types and categorization: An approach to the third chapter -case studies-

(Lohrberg, Frank, et al., 2016) have sorted UA by different categories based on the scale, production systems and business structure. By examining these three categories, the 'technology' category was inferred; additionally, another category or type of the UA applications is going to be discussed in further detail, namely Zero Acreage Farming, since it is the most applicable and wide-spread form of UA.

Based on the previously mentioned sources, UA can be defined in five categories depending on the following distinctions:

1- Scale
2- Production systems
3- Business Structure/ purpose
4- Technology
5- Z-farming

1.3.1. The Scales of Urban Agriculture

A Spatial Approach to the human dimension

1.3.1.1. Small scale agriculture

Urban Food Gardening:

If we wanted to divide the food gardens according to its production in the gardening level, it could have the following two categories:

- Those based on individual production: a) Family gardens; b) Allotment gardens.
- Those based on collective schemes e.g.: a) Educational gardens; b) therapeutic gardens; c) community gardens.

Squatter gardens can fall into both categories.

Small Scale Agriculture Typologies:

The following are some definition of the mentioned categories:

A. Family gardens:

This term stands for the non-commercial, food-producing gardens that are run by the household, those aim to provide the families with vegetables, fruits and herbs. The type of urban setting highly influences the character of the gardens. In very dense urban areas, balcony or rooftop cultivations in pots are more common, whereas, in detached housing, a part of the garden is allocated to growing vegetables, fruits, or herbs.

B. Allotment Gardens

It is an area subdivided into small plots, which are rented under a tenancy agreement. They usually stem from municipal initiatives on public land and their regulation is highly formalized, sometimes following specific regional or national laws. They may be managed by an organized group, or even established as an allotment garden association.

Allotment gardens emerged in the eighteenth century to cope with urban poverty, and the First World War prompted their expansion.

Family Vs. Allotment gardens:

In family gardens, unlike allotments, there is no institution or organization other than the household. Typically, they are not subject to any policy agenda, although urban plans or Green Infrastructure schemes may set conditions or goals for them.

C. Therapeutic Gardens

This kind of gardens are based on the healing effects of gardening and agriculture applied in it. Typically located inside the city, at physical and mental health care institutions. They can be used for the treatment of several illnesses, diseases, and addictions... etc.

D. Community Gardens

This type is more about community than it is about gardening. They are located on public areas and are supported by public agencies, they are places where people can gather, communicate, network, and identify together as residents of a neighbourhood or community. Most community gardens are accessible for all inhabitants or passers, but individual garden beds or plots are assigned to specific people or groups of people (GARTENPOLYLOG, n.d.).

Figure 1.10 Small Scale urban Agriculture categorization: Urban Gardening
Source: Lohrberg, Frank, et al. 2016

1.3.1.2. Large Scale Urban agriculture

Multifunctionality in urban areas has been associated with farm diversification strategies, mainly addressing urban demand for recreation and tourism.

The farms that adapted their business strategies to an intra- or peri-urban[10] location can be divided into two main groups. The first one implies the provision of on-site services, like leisure and educational farms or therapeutic and social ones. The second group includes local food farms and environmental farms that provide benefits through material or environmental flows, connected to urban metabolism and the urban environment.

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[10] "Peri-urban" agriculture, as used here, refers to farm units close to town which operate intensive semi- or fully commercial farms to grow vegetables and other horticulture, raise chickens and other livestock, and produce milk and eggs.

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1.3.1.3.   Large Scale Agriculture Typologies

Urban Farming level falls into the following typologies:

A. Leisure and Educational Farms

This category is created to meet urban demand by offering a range of recreational opportunities that allow free public access linked to farming activities. Most of those farms are in peri-urban areas. They target the public and range from 'hands-on' experiences with animals or crops—such as feeding the animals or gastronomy, or agritourism connected to the farm's biological production.

B. Therapeutic Farms

Similar to the therapeutic gardens but on a larger scale, on therapeutic farms, 'the animals, the plants, the garden, the forest, and the landscape are used in recreational or work-related activities, for psychiatric patients, mentally disabled persons, people with learning disabilities ...' ((Gallis, June 2007)). The therapeutic use of farming-related activities promotes physical and mental health and well-being.

Therapeutic farms—within a larger concept of care farms that also covers social farms—are a successful concept in the Netherlands, with a strong national organization and over 1,000 care farms, many of them in peri-urban areas, providing day centres for urban patients. In Finland, equine-assisted therapy has a recognized status (Hassin & Van Dijk, 2006).

C. Social Farms

The purpose of those farms is promoting disadvantaged people's rehabilitation and the integration of people at risk of exclusion by offering them job possibilities. It is managed by private farmers, foundations, non-profit associations, or local communities and institutions. In many cases, social farms are initiated spontaneously, by the strong motivation of their promoters; thus, they are often 'bottom-up' experiences, usually detached from specific law and policies.

D. Cultural Heritage Farms

This type covers farms that intentionally contribute to preserving and transmitting the tangible and intangible cultural heritage related to agricultural practices and landscape, through the maintenance of traditional materials and typologies, buildings, crop and breed varieties, and techniques of cultivation. There is not any prevalent trend in location, either intra- or peri-urban.

E. Experimental Farms

It tests new agricultural technologies in addition to methods of production, selection of varieties and breeds, or models of social and economic interactions with their urban environment. This means that the experimental aspect not only involves agricultural innovations (such as aquaponic systems in

Dortmund and seed selection in Frankfurt) but also experiments with different forms of trade on the urban market (Sofia) and models of structuring their activities (such as urban agro parks or holdings in Geneva).

F. Local Food+ Farms

Local food+farms intentionally orientate their production to local markets and foster a more direct relationship with the consumers. They range from direct retail to consumer-producer cooperatives or community-supported agriculture (CSA).

G. Environmental Farms

This type covers farms that have high natural values and/or contribute to biodiversity and agro-diversity (cultivation of local seeds and native breeds) conservation. This also includes farms involved in streamlining material flows from cities (i.e., Organic compost), integrated into plans for flood or fire prevention, and/or contributing to the improvement of environmental quality, being part of green infrastructure, green networks, green belts, natural space protection plans, or the Natura 2000 network (Lohrberg, Frank, et al., 2016)

On-site Experience   Flows

| Leisure Farms | Social Farms | Cultural Heritage Farms | Local Food+ Farms |
| Educational Farms | Therapeutical Farms | Experimental Farms | Environmental Farms |

Figure 1.11 Big Scale urban Agriculture categorization: Urban Farming
Source: Lohrberg, Frank, et al. 2016

1.3.2. Production systems

Agricultural production systems are composed of multidimensional elements and motives which influence production sustainability by interacting in complex ways. (Walters *et al.*, 2016)

This category encompasses the following typologies according to (Little *et al.*, 2019),

A. Ground-based outdoor urban gardens and farms (Figure 1.12)

This type ranges from family gardens and allotment gardens in small scale UA to all big-scale UA types in chapter 1.3.1., it encompasses all ground- agriculture practices from outdoors farming to greenhouses etc.

B. Hydroponic[11] **or aquaponic**[12] **indoor production** (Figure 1.13)

Hydroponic System will be discussed further in case study -1-.

C. Rooftop gardens and farms (Figure 1.14)

Practised at the household level or on industrial, large, commercial scale, rooftop farming has become extremely popular in the past decade as many benefits are possible ranging from improved nutrition for families to economic development and job creation for large operations. (Thebo, Drechsel and Lambin, 2014)

D. Landscaping and nursery businesses

E. Urban livestock.

Figure 1.12 FAO's Farmer Field School in Burundi taught locals to cultivate high-yielding, drought-tolerant crops.
Source: FAO/Rachel Nandelenda

Figure 1.13 Hydroponics and Aquaponics" water-saving systems in Jordan.
Source: FAO

Figure 1.14 Aminata Diop tends her micro-garden. Senegal
Photo: Fabio Massimo Aceto/ Grazia Neri

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[11] It is the practice of growing plants with small amount to no soil by circulating the roots a nutrient-rich water solution. (FAO, 2001)
[12] This practice combines hydroponics and aquaculture where the filtered seafood waste nutrients are used as fertilizer for the plants. (FAO, 2001)

1.3.3. Business Structure/ purpose

Urban agriculture has a spectrum of business structures:

Figure 1.15 Types of UA based on the business structure.
Source (Little et al., 2019)

Figure 1.15 describes the business structure that the UA encompasses

- A- Personal
- B- Communal
- C- Market-oriented

Organized as a for-profit or not-for-profit businesses, most urban farms are helping their communities among their goals. Many personal and community urban gardens exist, but for-profit and not-for-profit urban farms also grow crops for sale or distribution. Not-for-profit urban farms focus is mainly on healthy, inexpensive food production for their community, or employment for community members who face barriers to it, while for-profit urban farms often use a "Robin Hood" business model, selling expensive produce to chefs and at farmers markets to be able to promote selling produce at reasonable prices to their neighbours.

whether by producing food for personal use, creating supplemental income through a "micro-enterprise", or enabling urban residents to start businesses and become entrepreneurs, urban agriculture can be economically important to the farmer.

Also, a lot of -in-between- area exists between gardening and farming. For example, "market gardening" stands for a type of small-scale market-oriented production: growing a varied range of vegetables and fruits on small plots for direct marketing to local consumers. And some community gardens are experimenting with Community Supported Agriculture subscription programs, like Lisbon (explained in case study -3-) whereby community members can access food either by the voluntary work method of working in the garden or by the market-based method of buying into the garden.(Little *et al.*, 2019)

1.3.4. Technologies in Urban Agriculture

Based on the study of the previous categories' characteristics and based on its level of technology used, this category can be derived. The Technology category could range from:

A- Low-tech community farms
It includes all traditional farming/ gardening practices. (Figure 1.16)

B- Medium-tech projects
Those include merging some modern technologies into farming/ gardening practices, like

urban farms using aquaponics or hydroponics system. (Figure 1.17)

C- High-tech projects
Those could cover every aspect and type of UA, it primarily implies to agricultural processes

including the most modern technologies. It utilizes agriculture technology to boost yields,

ensures high quality. (Figure 1.18)

Figure 1.16 View of an urban garden in the Panyu District in Guangzhou, China
Source:
https://www.greenbiz.com/article/how-16-initiatives-are-changing-urban-agriculture-through-tech-and-innovation

Figure 1.17 GrowHaus' hydroponic greenhouse operation in Denver, Colo.
Source:
https://urbanagnews.com/blog/exclusives/getting-serious-about-hydroponic-vegetable-production-2/

Figure 1.18 Dome-Shaped Greenhouse, Granpa leads a high-tech revolution in farming
Source: http://innoplex-agri.org/2014/07/dome-shaped-greenhouse-granpa/

1.3.5.   Zero acreage farming

1.3.5.1.   Z-farming definition:

The term (Z-Farming) stands for "zero-acreage farming", it refers to all the types of urban agriculture characterized by the non-utilization of open spaces or farms(Specht, Siebert, Thomaier, U. Freisinger, *et al.*, 2015)

1.3.5.2.   Types of Z-farming:

Z-Farming may include rooftop gardens, rooftop greenhouses (RTG) and edible green walls as well as the modern forms of Urban agriculture, hydroponic and aeroponic installation and Vertical farming (Specht, Siebert and Thomaier, 2016a, 2016b)

1.3.5.3.   The Difference between Urban Agriculture and Z-farming

Z-Farming can be acknowledged as a complementary practice to urban agriculture, also as a subtype and a specification of it rather than competing practice.

We can distinguish some differences between Z-farming and Urban agriculture, even though it intersects with some soil-based practices of urban agriculture. The main distinction can be identified by the opportunities emerging from recycling the resources resulting from the interaction between buildings and agriculture.

The growing internal migration towards the city centres led to escalating land values, for that, food production is not the priority despite being a basic need.

We cannot get full access to urban agriculture benefits if we do not have enough usable space. Therefore, *Not enough usable space= fewer benefits.*

Therein lies the role of zero-acreage farming i.e. z-farming:

Z-farming primary function is non-conventional spaces utilisation, for example, buildings that had a short shelf life, rooftops, vertical spaces using non-traditional agricultural methods such as hydroponics and aquaponics. Implementing alternative production approaches helps in adapting food production on the availability of resources.

1.4.   Summary

TRENDS

Challenges

POPULATION GROWTH AND AGEING

URBANIZATION AND MIGRATION

CHANGING FOOD SYSTEMS

POVERTY, INEQUALITY, AND FOOD INSECURITY

FOOD WASTE

CLIMATE CHANGE

CONFLICTS, CRISES, AND NATURAL DISASTERS

A

Urbanization challenges

• Hunger and undernutrition
• Health Concerns and challenges
• Diseases, outbreaks, and pandemics
• Disconnection with nature:
• Urban Heat Island Effect

B

Climate Challenges

• Greenhouse gas emissions
• Conservation of natural resources

C

Sustainable development Challenges

• sustainable urban agriculture

Figure 1.19 Urban Agriculture trends and challenges
Source: The Author

23

PRODUCTION SYSTEMS

A- Ground-based Outdoor
   Urban Gardens and Farms
B- Hydroponic or Aquaponic
   Indoor Production
C- Rooftop Gardens
   and Farms
D- Landscaping and Nursery
   Businesses
E- Urban Livestock.

ZFARMING

**Small Scale
Agriculture**

A-Family Gardens:
B-Allotment Gardens
C-Therapeutic Gardens
D-Community Gardens

TECHNOLOGY

A- Low-tech Farms
B- Medium-tech Projects
C- High-tech Projects

SCALE

**Large Scale Urban
Agriculture**

A- Leisure and
   Educational Farms
B- Therapeutic Farms
C- Social Farms
D- Cultural Heritage Farms
E- Experimental Farms
F- Local Food+ Farms
G- Environmental Farms

**BUSINESS
STRUCTURE/
PURPOSE**

A- Personal
B- Market-oriented
C- Communal
D- Mixed

**URBAN AGRICULTURE TYPES
AND CATEGORIZATION**

Figure 1.20 Urban Agriculture types and categorization
Source: The Author

Chapter II

2. Dimensions of Urban Agriculture: The Human and Social Dimension

This chapter summarizes the different dimensions of Urban Agriculture based on (Zeunert, 2019)book, then a look in-depth at the social dimension of UA based on multiple resources.

2.1. An approach to the human-social dimension

Starting from the benefits of UA to the motives behind it building upon Maslow's hierarchy of needs and dimension of UA, the social dimension can be concluded as follows.

2.1.1. Benefits of UA and its connection to Maslow's hierarchy of need

Maslow's hierarchy of needs (Figure 2.1) has been adopted by a range of disciplines and motives to explain human behaviour. It consists of five levels: physiological needs, safety needs, love and belonging needs, esteem needs, and self-actualization needs. The first level encompasses the basic needs, such as food, water, air, exercise as well as proper nutrition, vitamins, health, etc. In their research (Partalidou and Anthopoulou, 2017) aimed at developing a typology of gardeners using statistical analysis and based on Maslow's theory of the hierarchy of human needs to provide evidence of actually experienced benefits from urban gardening (Small Scale UA).

Figure 2.1 Maslow's Hierarchy of human needs

According to (Partalidou and Anthopoulou, 2017), what motivates urbanites to get involved are various motives[13], those motives vary in time and place according to socioeconomic causes[14]. These motives could be an indicator of:

- Personal or community needs, or both (Hope and Ellis 2009)
- Environmental (Farges 2015)
- Social and economic needs (Broadway 2009)

Based on Maslow's hierarchy of needs model, the benefits gained through practising UA can be summarized as follows:

1. Food accessibility

It is considered one of the most cited motives[15] to Urban Agriculture plays a vital role in developed and developing countries as follows:

- In developing counties:

Providing food to those who are in need (Check p 10 challenges, Hunger and undernutrition) and among vulnerable groups to survive, this represents the 1st level of the hierarchy (Figure 2.1) and also supporting the groups that are bereft of fresh nutritious food.

- In Developed counties:

Healthy food is considered a basic need not a 'luxury', but it is being threatened by the current globalised food system. Poor access to healthy food corresponds with poor nutrition, it indicates that a person is not effective and exposed to disease, which, according to Stein (2005) is related to Maslow's first level of physical needs.

2. Mental health benefits

Those can be added to the list of UA's benefits, according to (Partalidou and Anthopoulou, 2017 citing Wunder 2013; Pitt 2014), the benefits are gained by the practice of 'getting your hands dirty'. A list of twenty benefit statements following previous work by Waliczek et al. (1996) was concluded. Additionally, Lee (2001) has concluded that gardeners valued gardening most of all as a hobby, leisure activity is done for pleasure on their recreation time. UA practitioners felt healthier, glad about their accomplishments and less stressed, those benefits are also linked to the physiological, self-esteem, and self-actualization needs of Maslow's hierarchy model.

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[13] Partalidou and Anthopoulou, 2017 citing Wunder, 2013
[14] Partalidou and Anthopoulou, 2017 citing Smit and Nasr, 1992
[15] Partalidou and Anthopoulou, 2017 Alaimo et al., 2008; Premat, 2009

3.   Quality of life and environmental benefits

Urban gardens have a positive impact on the quality of life and sustainability of contemporary cities according to some policymakers and urban planners[16]. Existing UA-related literature presents environmental benefits[17] and aesthetic values[18] that UA adds up to the city.

Based on the research of Partalidou and Anthopoulou (2017) mentioned that urban gardening may reconnect people with nature (solving one of the urbanization challenges, disconnection with nature), by providing a place to develop planting skills, raising awareness about biodiversity and enhance closeness to the ecosystem according to Krasny and Tidball (2009) argument.

Rodie and Paparozzi (1998) stressed the importance of meeting aesthetic needs in the process of meeting all human needs and outlined the connections between landscape-related issues and Maslow's hierarchy.

4.   Social benefits

Many other cited benefits can be derived from community-based engagement and socialising in the gardens. Social integration, the establishment of social capital and strengthening linkages within communities are considered important benefits of UA, to name but a few [19].

Krasny et al. (2014) argue that peoples' nostalgia, especially urbanites, creates a motive that encourages them to collective planting.

"People are driven by strong memories of the past and a sense of loss that such conditions (ethical, environmental, rural values) no longer exist in cities" (Partalidou and Anthopoulou, 2017)

According to Coding and Barthel (2013), gardens keep collective memories about how to grow food in an urban environment and encourage place-making. While Wang and Xu (2015), stated that the role of the 'sense of place' is the main motivation in urban gardening, it refers to the group of feelings, meanings, knowledge, attachments and obligations related to a space that can be modified physically and upgraded by people's efforts but also changes people themselves (Partalidou and Anthopoulou, 2017 citing Cighi 2008).   Place-making is a significant need amidst changing environment driving engagement and contribution to identity creation especially on our current globalised world that continues to be marked by change[20] (Zeunert, 2019).

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[16] Partalidou and Anthopoulou, 2017 citing Taylor and Taylor-Lovell 2012; Bendt et al. 2013
[17] Partalidou and Anthopoulou, 2017 citing McClintock 2010
[18] Partalidou and Anthopoulou, 2017 citing Zasada 2011
[19] Partalidou and Anthopoulou, 2017 citing Glover et al. 2005
[20] Partalidou and Anthopoulou, 2017 citing Booth 2015 citing Massey 1997

Conclusions:

On the light of the pandemic of COVID-19, (Check p. 11: 1.1.2.1. Urbanization challenges: Diseases, Food Systems and Covid-19) people did not flock to jewellery shops, cars, or accessories. Everyone flocked to the markets to get vegetables, fruits, bread, and dairy products. Simply everyone returned to the base of the pyramid of needs.

Building upon the eleventh goal of the SDG (make cities inclusive, safe, resilient, and sustainable), it is necessary to rebuild our strategy in dealing with the city as part of the food chain through the integration of food systems in the city planning and land use, as there are nearly a billion people around the world who live in urban areas practising agriculture within city limits.

2.1.2. Dimensions of Urban Agriculture

The following is a summary explanation of the dimensions of UA as (Zeunert, 2019) distinguished them:
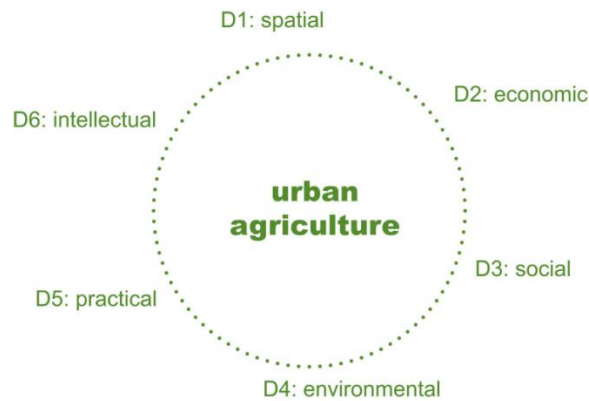
Figure 2.2 Dimensions of Urban Agriculture
Source: (Zeunert, 2019).

1- Spatial Dimension

This dimension is represented by all the spatial and physical characteristics and all its related categories (explained in chapter 1.3), it also includes the hierarchal classification of the agriculture (Local to regional to the global).

2- Economic Dimension

The economic dimension encompasses the financial aspects of UA.

3- Social Dimension

This dimension will be discussed further in the next section (2.2).

4- Environmental Dimension

The environmental dimension includes several environmental concerns and topics such as:

- National/ city / individual food self-sufficiency and self-reliance (Zeunert, 2019 citing Hopkins, 2008; Markham, 2010; Grewal and Grewal);
- Ecological and spatial footprints (Zeunert, 2019 citing Rees, 1992; Wackernagel, 1994; Maas, 1999: 61–63, 94–115; Weller, 2009; 440–441; MVRDV, 2009, MVRDV, 2010);
- Energy and seasonal intensity, greenhouse gas emissions, fossil fuel use across the food and agricultural spectrum, and life-cycle analysis (growing, processing, and distribution[21]

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[21]Agrobiodiversity: The variety and variability of animals, plants and micro-organisms used directly or indirectly for food and agriculture, including crops, livestock, forestry, and fisheries. It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel, and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators). (FAO, 1999a)

(Zeunert, 2019 citing FAO, 1999; Kremen and Miles, 2012);
- Climate change, resilience, and adaptation
- Biodiversity and agroecology[22]
- Food miles[23], local and short food supply chains.

5- Practical Dimension

This dimension encompasses UA's practical rather than theoretical aspects. There is a big amount published work outlining food production methods in technical, horticultural[24] and gardening-related topics, as well as in community-based digital resources like websites, instructional videos, online networks, and blogs. Practical discourse merges the boundaries between strict urban agriculture and smaller rural projects, it distinguishes individual, family, small scale, collective, community, and shared growing forms.

6- Intellectual Dimension

What significates the intellectual dimension of UA is related to its perceived value - a quantitative and qualitative value spectrum that traverses governance, policies, discourse, and professional decision-making stakeholders (planners, urban designers, architects, and landscape architects) and the interests of the community. Ergo, Intellectual dimensions involve many of the mentioned five dimensions[25].

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[22] is a scientific discipline, a set of practices and a social movement. As a science, it studies how different components of the agroecosystem interact. (FAO, 2020)

[23] Stands for the distance food is transported from the time produced until it reaches the consumer. Food miles are one factor used when testing the environmental impact of food, such as the carbon footprint of the food (Engelhaupt, 2008)

[24] The term horticulture comes from the Latin root hortus, which means garden. A garden is defined as a place where horticultural produce is grown. (FAO, 2001)

[25] Zeunert, 2019 Citing Mougeot, 2011; Aubry et al., 2012; Curry et al., 2014; Hardman and Larkham, 2014b; Hunt, 2015; Kennedy and Liljeblad, 2016

2.2. Social Dimension

The social dimension of urban agriculture mainly encompasses three social-related topics:

1- Social influences
2- Challenges
3- Potentials

Urban agriculture is an essential part especially for subsistence-based economies and for people outside of the workforce. By the beginning of the 20th century, it was estimated that nearly 200 million urban dwellers contributed 15–20% of the total food production[26]. With the significantly growing number of urbanites practising urban agriculture and given its impact on their lives, the social dimension is a vital part of the UA discourse.

The social influences are '*reflecting positive and transformative stories of community cohesion and engagement, social inclusion, poverty and crime reduction, intergenerational education, and meaningful work opportunities*'[27].

Benefits and possibilities vary from physical health to psychological wellbeing[28] and many other possibilities depending on the case.

Concerning challenges, they involve food security and nutrition, the right to access common land to grow food (see trends p.7 and challenges, p.10, Chapter 1), achieving urban beautification and[29] restrictive cultural and social perceptions.

The previous three points will set criteria for analysing the case studies in Chapter 3 and as an addition to the point explained above, additional criteria will be added to analyse the case studies chosen, namely: Key issues for implementing UA within the chosen case studies.

2.2.1. Urban Agriculture Challenges

2.2.1.1. Aesthetics

Meyer describes aesthetics as "the art and science of perception, not just a formal category of how something looks" (Zeunert, 2017: 212). Urban agriculture, as the case with any social-related activity, is not a priority in urban design as the aesthetic perceptions are affected by a set of influences.

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[26] Zeunert, 2019 citing Armar-Klemesu, 2000: 103; Burton et al., 2013: 87
[27] Zeunert, 2019 citing Patel, 1991; Malakoff, 1995; Garnett, 1996; Pretty, 2002; Butler and Moronek, 2002; Mason, 2006; Sumner et al., 2010; Fox, 2011; Net- tle, 2014
[28] Zeunert, 2019 citing Kaplan,1973; Brown and Jameton, 2000; Flores, 2006; Lee-Smith and Prain, 2006; Hassink et al., 2007; Duchemin et al., 2008; Blaine et al., 2010; Hodgson, 2010; Firth et al., 2011; DLA et al., 2011; Allen and Wilson, 2012; McClintock et al., 2013).
[29] Zeunert, 2019 citing Creasey, 2010; Zeunert, 2011; Gyertyán, 2014

Integrated food production within the cities challenges traditional Western urban/rural separations (Explained in 1.1. The concept of Urban and Rural), it is rare to trace small scale urban agriculture typologies within the cities even as "spatially truncated" typologies such as fruit trees rather than orchards or fruiting grapevines rather than full- scale vineyards.

The British and Western European cultural and historical landscaping traditions favoured the use of ornamental plants and turf grass for elite estates and the avoidance of 'shared' agricultural associations in public spaces greatly influenced the design trends in post-colonial countries and spread around the world. For example, in the US is covered with over 80 million hectares of non-native grass. These widespread practices being reflecting unconscious impacts of cultural anchoring[30].

When it comes to green spaces, organized planting is the dominant worldwide (Zeunert, 2016) rather than food-producing plants planting, the aim is urban beautification rather than food production since formal aesthetics are hard to achieve with edible and annual plants[31] (Zeunert, 2019).

2.2.1.2.   Perception

 Furthermore, and besides aesthetics, focusing on socio-cultural awareness has a significant contribution in reducing demand for environmentally intensive food commodities and enhancing local food systems.

"Highly processed, mass-produced, packaged, refrigerated, and frozen food is distributed globally through supply chain logistics, with accompanying marketing promoting Western aspirational lifestyles as part of a trend where uselessness, leisure, and adornment have taken over as part of a larger overwhelming urge to appear modern and sophisticated" (Zeunert, 2019 citing Yu, 2010: 3).

Twentieth-century modernisation has and still is setting urban agriculture aside in most urbanized areas[32].

Mechanization of agricultural systems contributes to the reduction of agricultural labour.[33] It also influences shaping cultures, practices, landscapes, crop varieties, and food.[34]

The ageing of farmers in developed countries (check p.7 trend number 1), indicates that the

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[30] Zeunert, 2019 citing Stone, 2016; Pollan, 2008
[31] Zeunert, 2019 citing Zeunert, 2011: 13–14
[32] Zeunert, 2019 citing Sumner et al., 2010; Weis, 2010; Morgan, 2013: 20
[33] Zeunert, 2019 citing Weis, 2010; Langridge et al., 2014; Lowder et al., 2016
[34] Zeunert, 2019 citing Norberg-Hodge et al., 2001; Steel, 2008; Roy and Ong, 2011; Speak and Kumar, 2016; Chapter 31

instability of intergenerational food production security and the critical shortfall in recruiting the younger generation.

Urban agriculture potentials encompass paradigm shift through integration among young urbanites in food systems. Altering consumers' behaviour and demand can help in restructuring agricultural and UA practices across the previously mentioned dimensions.

Local, artisan, Slow Food, Food not lawns and 'locavorism' movements have taken small but important steps and paved the way for enhancing the awareness of food systems, justice and associated social impacts (Zeunert, 2019 citing Nabhan, 2002; Moustier and Danso, 2006; Ladner, 2011; Chapters 31, 31, 35 and 36); (Gehl, 2011).

On the other hand, some researchers, DuPuis and Goodman (2005: 359, 364), critique local food movements as realms of "inequality and hegemonic domination", designed to meet the needs of elite socio-economic social echelons.

In this context, it is noteworthy that higher food prices in alternative/small-scale food systems can be the result of industrial-scale production and managing financial measures.

There may also be a need to overcome idealistic perceptions of urban agriculture, where romantic small-scale agricultural ideals fail to take into consideration time and labour-intensive farming practices and the austerity in subsistence-based lifestyles.

There is a growing number of books contributing to dispelling the myth or anchoring support for UA such as Carpenter's popular Farm City (2011), in addition to some famous figures and influencers (Michelle Obama's expansion of the White House vegetable garden in 2009) and "*ethical food tourism (aiding food system transparency); and cooking and food documentary television (revealing consumption/production links and increasing demand for local, high-quality produce – though may conversely reinforce rural/ urban binaries or conceal agro-industrial ecological and animal rights realities*"[35] (Zeunert, 2019, p. 168)

2.2.1.3.   Social Viability

Urban agriculture sustainability can help to be ensured by establishing purposeful social community networks[36]. These available, interrelated networks can provide many benefits[37], for example, providing gratis/temporary unutilized land use, collective, community and volunteer work

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[35] Zeunert, 2019 citing Pretty, 2002; Sumner et al., 2010; Berry, 2015; Imbert, 2015; Chapters 31 and 35
[36] Zeunert, 2019 citing Allen, 2010; Allen and Wilson, 2012
[37] Zeunert, 2019 citing Blaine et al., 2010

opportunities, and exchanging skill, knowledge, and resources. These benefits are vital when financial support is missing, as social capital and community synergies can make the difference between UA viability and failure. (Zeunert, 2019, p. 168)

2.3. Urban Agriculture spaces in Built Environment: Jan Gehl's human activity categorizations

In his book, Life Between Buildings, Jan Gehl discussed peoples' movement and behaviour between buildings discuss the functionalist principles of city planning. Especially the book was written in times which many cities have given priority to the cars rather than pedestrians, Gehl highlighted the physical environment and activities in outdoor spaces, as the number of people going out rises, the possibility of them meeting rises, and the more social interaction would be developed, the built environment enhances people interaction.

Gehl distinguished the human activities in public spaces three categories:

1- Necessary activities (e.g. shopping, walking)
2- Optional activities
3- Social activities

Necessary activities take place regardless of the quality of the physical environment, while the optional activities take place depending on a significant degree on what the place has to offer and how it affects people's behaviour and feelings about it.

Social activity is the result of both of necessary and optional activity, it is the spontaneous result of people sense of enjoying the place and engaging in optional activities based on their interest in engaging in such activity. Designers have a big role in creating lively cities by designing good outdoor spaces that will encourage optional time spent outside to encourage people's engagement in social activities.

Social activities include children's play, greetings and conversations, communal activities of various kinds such as Urban Agriculture, and also meeting and hearing other people, they occur spontaneously as a direct consequence of people moving about and being in the same spaces.(Gehl, 2011)
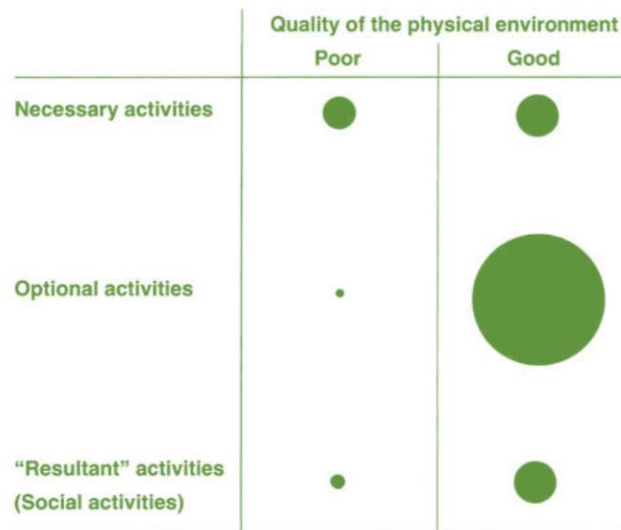
Figure 2.3 Graphic representation of the relationship between the quality of outdoor spaces and the rate of occurrence of outdoor activities.
When the quality of outdoor areas is good, optional activities occur with increasing frequency. Furthermore, as levels of optional activity rise, the number of social activities usually increases substantially
Source: (Gehl, 2011)

The starting point for defining the three categories of outdoor activities is the street, and by taking a deep look at it we can notice how necessary, optional, and social activities happen in an interrelated pattern. Social activities integrate into all potential scenarios, people walk, sit, and talk. Ergo, the study of the subject of outdoor activities is not confined to a single or a limited category of activities. Life between buildings is not just about pedestrian traffic or leisure or social activities. Life between buildings encompasses a whole range of activities, which has a synergy with one another to create meaningful and attractive communal spaces in cities and residential areas. (Gehl, 2011)

- **Conclusions:**

In this context, and depending on Gehl's theory, Urban agriculture in all of its shapes, scales and categories is an important part of the human activities and it is very based on its physical environment, it ranges from necessary activity (in the case of developing country as a need to survive, refer to case study no.1 and 2 in chapter 4) to an optional activity (in the case of a developed country, as a hobby) to a social activity (in the case of community or social gardens).

According to Gehl, social activities and their interweaving to form a communal fabric have received considerably less attention, therefore, architects and urban designers and other stakeholders play a big role in introducing urban agriculture into the building and the urban fabric as a need for the upcoming challenges in the next years.

2.4. Summary

AN APPROACH TO THE HUMAN-SOCIAL DIMENSION

MOTIVES BEHIND URBAN AGRICULTURE

1- Personal or community needs, or both
2- Environmental
3- Social and economic needs

THE BENEFITS GAINED
THROUGH PRACTISING UA URBAN AGRICULTURE

1- Food accessibility
2- Mental health benefits
3- Quality of life and environmental benefits
4- Social benefits

Figure 2.4 An approach to the Human-Social Dimension
Source: The Author

THE SOCIAL DIMENSION OF URBAN AGRICULTURE

1-SOCIAL INFLUENCES

a- Community cohesion and engagement
b- Social inclusion
c- Poverty and crime reduction
d- Intergenerational education
e- Work opportunities

2-CHALLENGES

a- Aesthetics
b- Perception
c- Social Viability

3-POTENTIALS

a- Changing consumers behaviour and demand
b- De-centralize food production
c- Food accessibility

Figure 2.5 The social dimensions of Urban Agriculture indicators
Source: The Author

URBAN AGRICULTURE IN THE BUILT ENVIRONMENT

HUMAN ACTIVITY CATEGORIZATIONS ACCORDING TO JAN GEHL

a Necessary activities
(UA practices in developing countries)

b Optional activities
(UA practices in developed cities)

c Social activities
(Social UA farms/ gardens)

Figure 2.6 Urban Agriculture in the Built Environment
Source: The Author

Chapter III

3. Case Studies

In this chapter, two aspects will be discussed to measure the 'applicability' of UA and its proximity to the urban audience based on the following criteria building upon chapters 1.3 and 2.3 as follows:

1- Location
2- Country classification (developed/ developing)
3- Urban Agriculture types and categorization
4- Social dimension
5- Lessons learned and recommendations

It will be also used in analysing the case study chosen.

3.1.   Syria: Damascus

3.1.1. Food Security in Syria:

Nine years of conflict in Syria has -and still is- causing devastating losses on the lives and the economy of the Syrians. According to humanitarian organizations it is the largest displacement crisis since World War II with about 6.7 million Syrians internally displaced and 5.6 million are registered as refugees outside of the country.

Accordingly, this has caused a sharp rise in food and fuel prices, underpaid employees, the loss of livelihoods and diminished food production have led to extensive food insecurity in Syria. There are 9.3 million people food insecure and a further 2.2 million vulnerable people under the threat of the loss of livelihoods and food insecurity. (WFP, 2020)

3.1.2. Al-Masri Hydroponic rooftop farm:

As a consequence of the bad conditions mentioned previously, Abdul Rahman al-Masri, a 23-year-old Syrian civil engineer has decided to come up with a project that could support him financially without the limitation of regular employment, alongside personal use.

Abdul- Rahman has chosen to work in the food production sector as a way of making a living through and meeting the constant demands of food. He launched his project on the rooftop of his seven-storey building in 2018 with a 4 million Syrian liras (approx. 7,720 USD) loan in the rooftop of his home, located in Beit Sahem in the suburban area of Damascus.

Working with what is available: a 65 m^2 rooftop, and very limited funds and resources, he has chosen hydroponics system, a method of growing plants in a water-based and nutrient-rich base after two years of experiencing and failing (Figure 3.3).

According to him, choosing this system was because of its flexibility, where it can be applied anywhere, as he aspires to expand his project to grow more produce with better quality and prices.

Al-Masri checks the plants and the level of water in the hydroponic tubes daily (Figure 3.4), where the water runs through plastic tubes connected on different levels to water the plants. He cultivates around 30 tons of various vegetables which he plants depending on the time of the year and sells his produce to the local markets in order to pay off the loan and support himself to get married and continue his education.

Al-Masri is setting an example for people about the possibility of improving their quality of life with the available resources even in a conflict zone. His neighbours are touched by his efforts and encouraging him to move on with his project as he took full advantage of the unoccupied rooftop space and created something useful and profitable simultaneously. (Abdul-Rahman Al-Masri, 2020) (Reuters and Elkatouri, 2020)

Figure 3.1 Abdul-Rahman Al-Masri rooftop
Source: Source: https://alkhabar-sy.com

Figure 3.2 Al-Masri checking the plants
Source: Source: https://alkhabar-sy.com/

3.2. Egypt: Cairo

3.2.1. Dawar El Ezba Cultural Centre

With a population of more than 700,000, Ezbet Khairallah is the largest informal settlements in Cairo, but also one of the most densely populated areas (Figure3.3, Figure 3.4).

As an independent cultural organization, Dawar Arts trying to utilize a variety of arts-based programs for recovery, discussion, and social change within the social structure.

Simultaneously, they enable psychosocial interventions cooperating with individuals and communities affected by poverty, war, displacement, and other kinds of hardship as this organization experts consist of artists, educators, community organizers, physicians, and health workers.

The cultural centre functions as a living landmark within the neighbourhood:

The design of the building rethinks the use of available building resources to imply a more aesthetic and functional value, given the large number of metal and wood workshops in the neighbourhood.

Dawar Kitchen is a social enterprise, the main objective of this business is to provide dignified jobs and professional training for migrants, refugees, and Egyptian women. By catering and other forms of food production, "We pride ourselves on fair working conditions and a participatory approach that ensures worker engagement in core decision-making and business planning" says Hosam Araby, the designer of this project.

As much as the design is sustainable thinking oriented, it is would be clear that the kitchen will act as a cultural revitalizing agent within the area, and should act as a vibrant landmark an exhaustive study of the building function.(Hana Abdel, 2020) (Figure 3.3)

Figure 3.3 Dawar el-Ezba Neighbourhood
Source: https://news.ninetiesfm.com/2020/06/01

Figure 3.4 A view of the centre

Figure 3.5 A view of the centre

3.2.2. The Living Wall:

The living wall within the project, a sail look-alike element, reassembles an application of urban agriculture (Z-farming); it is a mesh fabricated from recycled advertisement banners and UV resistant tarp, the highlight of this element is an easy fix prototype that can be latched on any structure using ratchet belts and elastic wires (Figure 3.6, Figure 3.7).

The living wall is designed to offer a natural input within the space for every storey of the building starting from ground floor till theatre floor, an element that would also contribute to air-purifying, sound-insulating and heat-reducing alongside the plantations which all include shade shrubs selections and few spices that can be used in the kitchen. (Figure 3.8)

This natural feature adopts a water circulation system for sustainable use of water, where the intake is recycled by the pump into the barrel and towards the pockets. Furthermore, the building aims to implement environmental elements while preserving the aesthetics and functional design for visitors and visitors and neighbourhood residents. (Hana Abdel, 2020)

Figure 3.6 The living Wall view
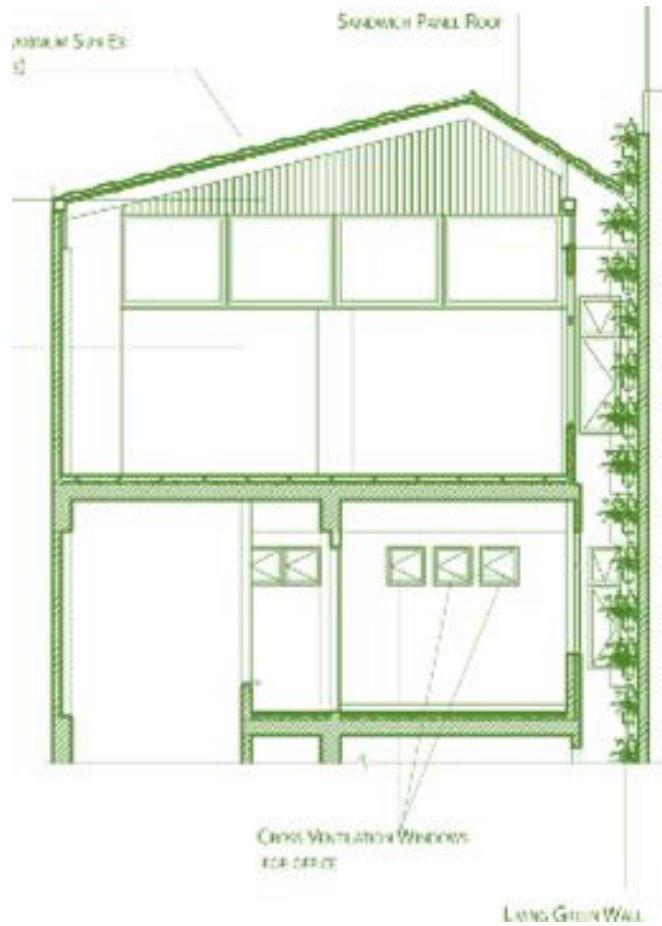

Figure 3.8 The living Wall materials

Figure 3.7 Section

Source:https://www.buildings-mena.com/project/cairo-dawar-el-ezba-cultural-center

3.3. Portugal: Lisbon

3.3.1. The Green Structure of Lisbon

According to the municipality of Lisbon's environmental strategy, the green structure of Lisbon consists of three main elements:

a- The green corridors (check p.52 Chapter 5.1.2)
b- The Horticultural gardens
c- Green recreational spaces

In this section, the second classification will be analysed as a case study, whereas the first two classifications will be explained as an introduction to the concept of the fourth chapter, (the area strategy and the practical part).

3.3.2. Urban Agriculture in Portugal in general.

Five hundred thousand of the Portuguese population live in Lisbon. Small scale UA is widely practised in the inner yard; citrus trees, Loquat trees can be found, alongside subsistence horticulture. In suburban municipalities, shifting farms (due to continuous urbanization) and roadside agriculture plots are common, where vegetables, flowers, and vineyards are grown. Some municipalities include forms of animals for dairy production.

In the area surrounding the city, along the Tagus valley, riverine horticulture is actively present as a highly profitable form of peri-urban agriculture (Camara Municipal de Lisboa, 2020).

Figure 3.9 Agriculture in the city
Location of existing urban farms, parks to be implemented in the near
future and other formal spaces and agricultural production projects in Lisbon
Source: Camara Municipal, 2020

3.3.3. The Urban Allotment Garden (UAG) Program

This program started in 2011, now, it has about 9,1 hectares with 800 plots in 20 municipal horticulture parks that are open to the local families, only a part of the total 125,9 hectares dedicated to urban agriculture in Lisbon. The UAGs is implemented mostly in parks where other aspects coexist, such as lawns/sitting areas, playgrounds, kiosks, sports equipment, cycle paths, among others, so they can be visited by everyone.

Despite the plan including a renovation of the local markets and partnership with local producers which is being processed, UAGs purpose is social inclusion and self-consumption by the owners within the framework of a social participative and biodiverse green infrastructure.

Among the other benefits which UAG Program served, it created local citizenship networks, contributed to improving security and awareness (Camara Municipal, 2020)

Figure 3.10 Urban allotment Gardens in Lisbon
Source: Camara Municipal de Lisboa

3.3.4. Vale de Chelas:

The Chelas Valley was, until 2011, mostly an abandoned and poorly maintained area. Its remodelling translates into a factor of landscape and environmental enhancement by the spatial organization of areas of indefinite use, mostly unoccupied (Figure 3.11).

Figure 3.11 Vale de Chelas 2011
Source:
http://www.icaam.uevora.pt/content/download/2372/12826/version/1/file/Hortas+urbanas+na+cidade+de+Lisboa+-+MJFundevilla.pdf

Since social sustainability is linked to urban agriculture, from the perspective of being an activity that promotes the sense of community, as well as its integration in urban society. In this context, the Lisbon City Council has decided in recent years to intervene in various locations in the city.

Now, with roughly 15ha, Vale de Chelas (figure 3.12), is the largest cultivated allotment garden in Europe. It is an example of social-horticultural gardens[38]. 6.5ha of plots of 150 square meters each located in a once derelict area in the centre of an area of social deprivation that suffered from segregation problems. Lisbon intervened in some recent social allotment parks located in poor areas like Vale de Chelas.

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[38] Cabral and Weiland, 2014 citing Luz & Pires, 2015

Figure 3.12 Vale de Chelas now

Figure 3.13 Colégio Valsassina students' garden
1st cycle students working in the urban garden of Vale de Chelas
Source: https://jra.abae.pt/plataforma/artigo/horta-urbana/

3.4. Summary

Table 1 Case Study Comparison table

Case Study			Case -1-	Case -2-	Case -3-
Location	Country- City		Syria- Damascus	Egypt- Cairo	Portugal- Lisbon
Country classification	Developing		✓	✓	
	Developed				✓
Type	Scale		Small Scale	Small Scale	Small Scale
	Production System		Rooftop hydroponic farm	Vertical agriculture	ground-based farm
	Technology		Medium tech	Medium tech	Low-tech
	Business Structure		personal	Communal	Communal
	Z-Farming		Re-utilized Rooftop	Vertical Z-Farming	-
The Social dimension	**Social influences**		-Work opportunity -Food accessibility - Conflicts	-Work opportunity -Food accessibility -Poverty -Intergenerational education	-Community Cohesion and engagement -Poverty and crime reduction -Intergenerational education
	Challenges	Aesthetics	- Organized planting in the hydroponic tubes - Functionality over beautification	- Organized planting on a repetitive module - Functionality and interior beatification	-Organized planting Semi- organized spontaneous planting -Overall Urban beautification
		Perception	- Although being a personal initiative, it is role model initiative to encourage urban community participation in the food cycle	- Socio-cultural awareness-focused - Social justice	- Socio-cultural awareness-focused -Reintegrating UA within the urban context - Social justice
		Social viability	- Z-farming as a business model or for personal use could contribute to people as individuals and community toward self-sufficiency and fighting hunger	-Ensuring community networking through training various activities and training.	- Ensuring community networking
	Potentials		- More social cohesion (The neighbours' reaction to the initiative). - More food accessibility especially during the time of the conflict. - An influence to fight poverty and unemployment.	- An influence to fight poverty and unemployment. - An easy replicable element that would help to ensure food accessibility	- An influence to fight poverty and unemployment. - De-centralize Food production - Recreational activity - More food accessibility - Changing Consumers' behaviour and demand
UA Activity Categorization	Necessary		✓	✓	
	Optional				✓
	Social				✓

Chapter IV

4. Theoretical part Conclusions

Building Upon the previous chapter we can conclude the obvious two-way relationship between the social dimension and Urban Agriculture, Urban and peri-urban agriculture is an old phenomenon in worlds' societies and people perception of their relationship with their food is transforming due to the trends and challenges mentioned in chapter I p. 7; and an extensive in-depth look at the social aspect of UA and human activities were taken in chapter II, p.31; additionally, although three of the case studies in Chapter III, p.48 were presented within the capitals of the three countries, *traces of social injustice, shortage in food source or even unutilized spaces are noticeable, disregarding if the country developed or developing*, what makes the socio-economic need for UA very obvious.

Studies about the social dimension of the various types of UA are still quite a few, further studies should be done to go further with implanting this important necessary activity into our lifestyles before it is not an optional activity anymore, Pandemics, conflicts and many other events in our modern world are showing how fragile our built environment is, so, starting from the local communities and investing in the social dimension is a must to create a positive impact.

By applying both the small scale and the large-scale types of agriculture, a city would multiply its sources of food, and at the same time bring the beginning of the food cycle closer to its ending. This would create more independent urban centres and create a more resilient food system, while also having the advantage of freeing rural space to its original wildlife[39], lessening CO_2 emissions in the process.

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[39] Tak, K. et al. (2007) The South Korean forest dilemma. Int. Forest. Rev. 9, 548–557

Chapter V

5. The project: Positive Impact School

Located within the University of Lisbon Campus, close to the residential areas in Campo Grande and Entre campus, the main aim of the project is to promote sustainability aspects especially UA technologies, applications, as a way to survive and a lifestyle or even a possible investment or job opportunity under the current and the predicted challenges the world would face if we didn't take action to prevent it or slow it down through a set of social activities inside and outside the building.

The Sustainability school is not a school in the conventional meaning, as it is an interactive zone/gathering point for all people with different ages/ jobs/ lifestyles/ backgrounds promoting the building as an Experience not as a Function through the ´feedback loop-based functional program, building users could be ranging from children, youth to adults.

The school as a social hub, an epicentre, influencing and promoting Urban Agriculture alongside sustainable technologies by having an interrelationship between the building, itself, the urban surrounding, and the local community: influencing it and being influenced by it based on the Urban design and design concepts, when it comes to UA social viability, the chosen plot for the implantation can also be of equal importance as it is located inside the central green corridor

Urban wise, these objectives are transferred to the Pedestrian and cycling Network proposed for the project, expanding its influence on the urban fabric.

In the light of choosing Lisbon as European green capital 2020, and the project location within the central green corridor, the sustainability school is designed as a pilot project manifesting sustainable technologies in general and urban agriculture (UA) in particular since it is important to instil wider knowledge about UA as it is becoming a worldwide growing phenomenon.

Extensive land degradation and urbanization have made it much harder for Agriculture within the cities, and the impact of the built environment fragility is becoming clearer over time, Thus, Urban Agriculture is being used as resiliency strategy for cities.

The Sustainability school is not a school in the conventional meaning, it is an interactive zone, a gathering point for all people with different ages/ jobs/ lifestyles/ backgrounds promoting the building as an Experience not as a Function through three main concepts, Urban, Architectural and Social.
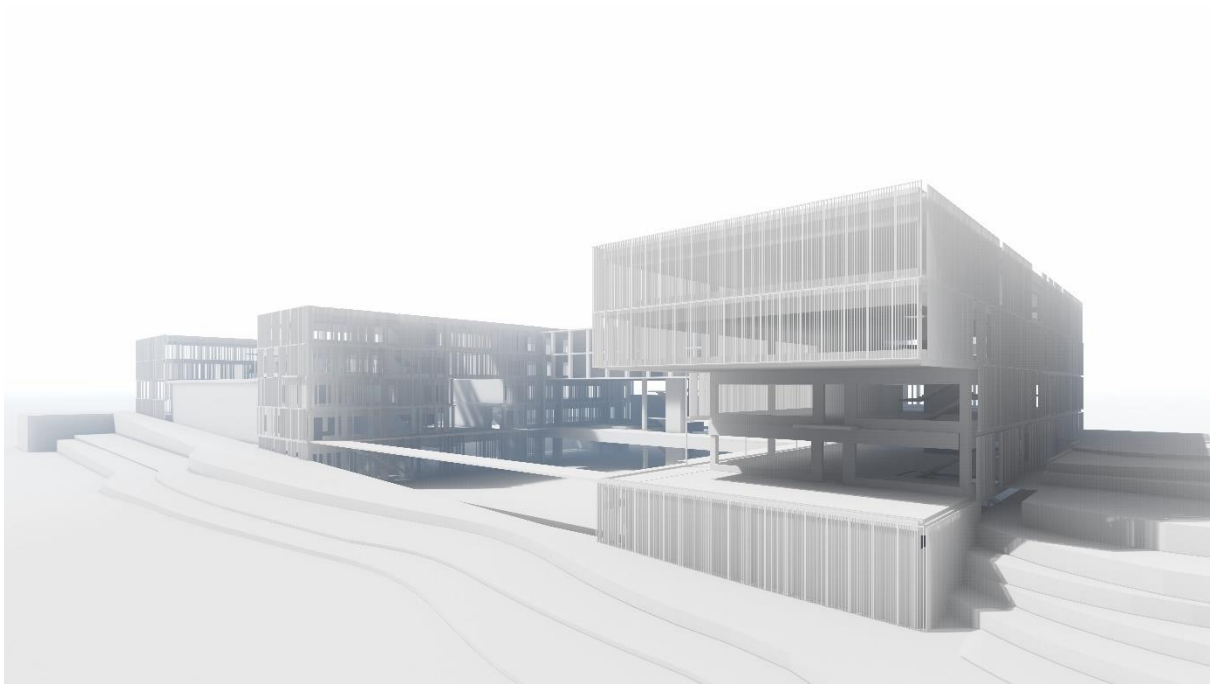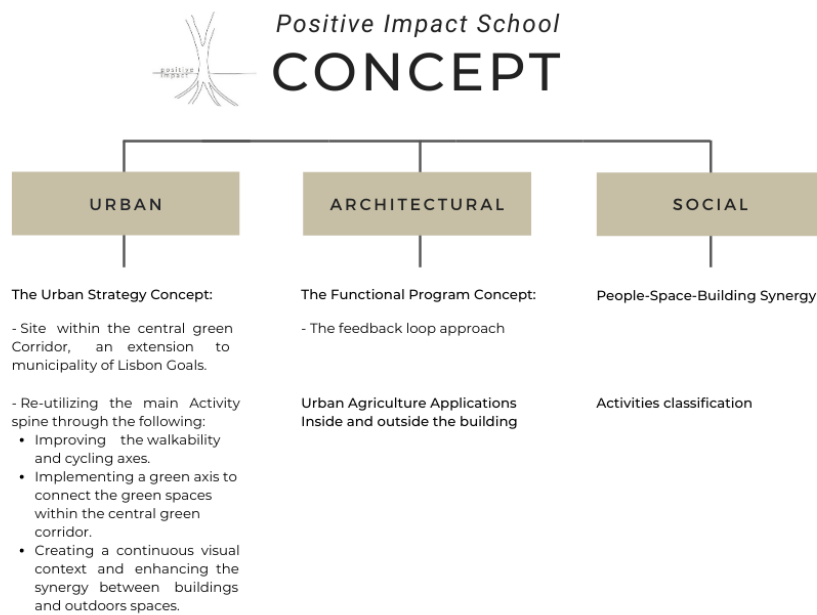
Figure 5.1 Positive Impact School
Source: the author

Positive Impact School
CONCEPT

URBAN	ARCHITECTURAL	SOCIAL

The Urban Strategy Concept:

- Site within the central green Corridor, an extension to municipality of Lisbon Goals.

- Re-utilizing the main Activity spine through the following:
  • Improving the walkability and cycling axes.
  • Implementing a green axis to connect the green spaces within the central green corridor.
  • Creating a continuous visual context and enhancing the synergy between buildings and outdoors spaces.

The Functional Program Concept:

- The feedback loop approach

Urban Agriculture Applications Inside and outside the building

People-Space-Building Synergy

Activities classification

Figure 5.2 Green community Strategy
Source: the author

5.1.   The Urban Strategy Concept

The urban strategy has emerged from the following paragraphs.

5.1.1. Lisboa Capital Verde 2020

Lisbon has been chosen as the Green Capital of Europe for 2020, the selection jury stated that it is worth pointing out that its significant advances towards environmental sustainability started at a time of economic crisis. The Jury felt that it can be an inspiration and a role model for many cities throughout the EU, it obviously, present that sustainability and economic growth go hand in hand.

The five main aspects Lisbon strategy encompasses are Energy, Water, Mobility, Waste and Green Infrastructure and Biodiversity.

5.1.2. The Green Corridors[40]

The Lisbon Municipal Master Plan, approved in 2012, constituted of a territorial base and a macro-program for the city's green structure, the green corridors contribute to connecting isolated green area, making them more attractive and easily accessible by walking or cycling.

From Monsanto to the East, nine green corridors were created connecting important areas of the city, contributing not only to the implementation of Lisbon's Local Biodiversity Action Plan but also to climate mitigation and adaptation.

On one hand, Green corridors allow the safeguarding of biodiversity and natural elements, on the other, they assist to solve problems such as soil sealing and air pollution. Therefore, they carry a valuable social and cultural function in an urban or peri-urban context.

In social terms, green corridors are spaces promoting outdoor recreational and leisure activities, while encouraging mobility. They also contribute to the promotion of informal education, the conservation of cultural heritage and the improvement of landscape heritage. (*Press – Lisboa Green Capital 2020*, 2020)

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[40] Green corridor is a linear unit overlapped on elements of the ecological structure that allows a natural continuum, promoting the articulation of historical, cultural and landscape heritage and contributing to improving the environmental quality of that territory.

5.1.2.1. Central Green Corridor

The Central Corridor is a discontinuous green structure, resulting from the overlapping of small and medium green areas integrated within the urban fabric, based on low-density spaces, especially in public use facilities, like Jardim Zoológico, and Cidade Universitária, Estádio Universitário, Parque Hospitalar, and LNEC.

Mário Soares Garden is the most prominent park in this corridor. This garden represents a starting point for the interconnectedness with the green spaces of Parque Hospitalar and LNEC, the target of intervention that allowed the opening to the public, functioning as a green corridor between Mata de Alvalade / Quinta do Narigão e a Quinta das Conchas e dos Lilases, encompassing recreational and leisure areas and a horticultural park. The University Stadium, as well as Cidade Universitária green spaces integrated into facilities with great importance to the ecological continuum. (Camara Municipal de Lisboa, 2020)
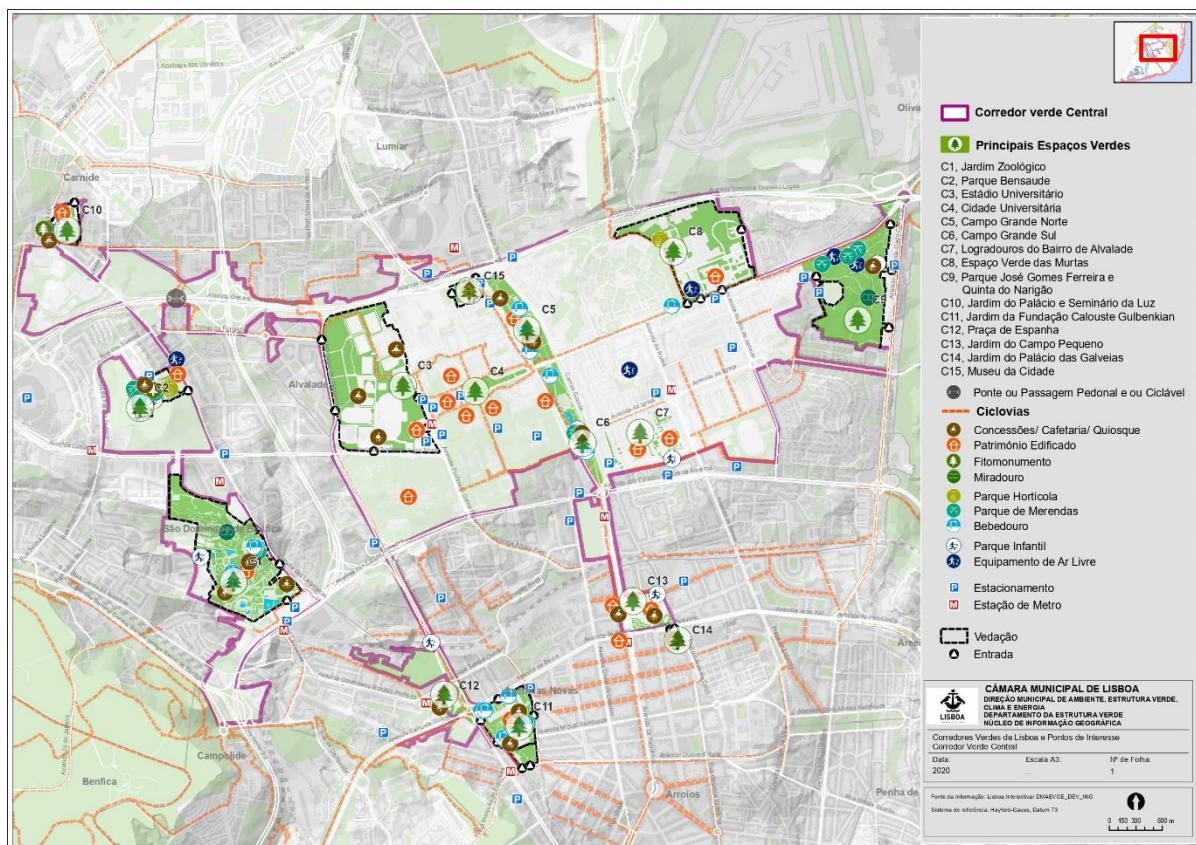
Figure 5.3 Central Green Corridor - Points of interest.
Source: Municipality of Lisbon

5.1.3. The Urban Strategy

The overall site strategy will focus on the implementation of sustainable strategies through two of the goals stated previously, namely, mobility and green infrastructure to reinforce the social dimension. Considering these goals, Lisbon municipality has made the following aspects:

a- Mobility

Improving the infrastructure for urban furniture, pedestrians, and bikers, enhancing the coordination of multimodal transport to provide for easy and fast mobility options and renewing the public transport fleet (Carris).

b- Green Infrastructure and Biodiversity

350 ha of new green space are being established and are to be publicly available by 2022 as a way to fight the urban heat island effect (UHI), minimize the effect of floods, increasing water retention capacity; improving air quality; creating quiet areas with less exposure to noise sources and increasing biodiversity; which is a challenge given the fact how small and compact Lisbon is.

Lisbon intends to continue its rapid progress in developing new green areas, targeting 20% more land than in 2012 (+400ha) throughout the nine green corridors. Simultaneously, the target is to raise the resilience of the green infrastructure to heatwaves resulting from climate change, flash floods and water scarcity. (Camara Municipal de Lisboa, 2020; *Press – Lisboa Green Capital 2020*, 2020)

The project site is located within the University of Lisbon Campus, close to the residential areas in Campo Grande and Entre campus, The school is a social hub, an epicentre, influencing and promoting Urban Agriculture alongside sustainable technologies by having an interrelationship between the building, itself, the urban surrounding, and the local community: influencing it and being influenced by it.

The urban objectives are translated into an improved pedestrian and cycling network of the surrounding area, expanding its influence on the urban fabric and creating more positive and connected spaces, alongside green axes contains applications of urban agriculture and urban furniture, and functions as a connection the existing ecological network within the Central green corridor.
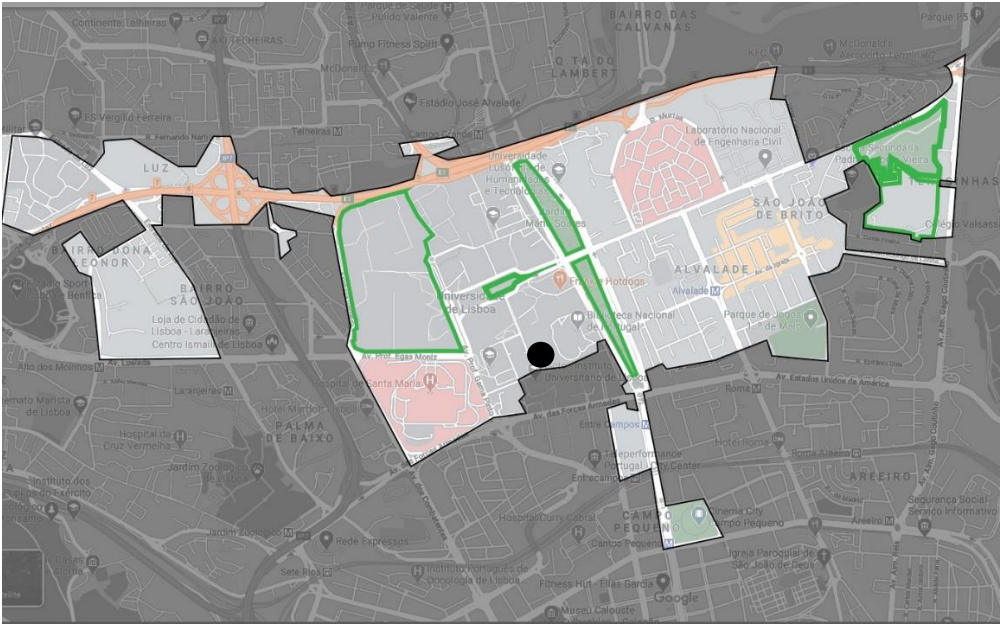
Figure 5.4 The Project Location within the central green corridor borders
Source: The Author

The Urban strategy was also a clear result of the SWOT analysis of the location:
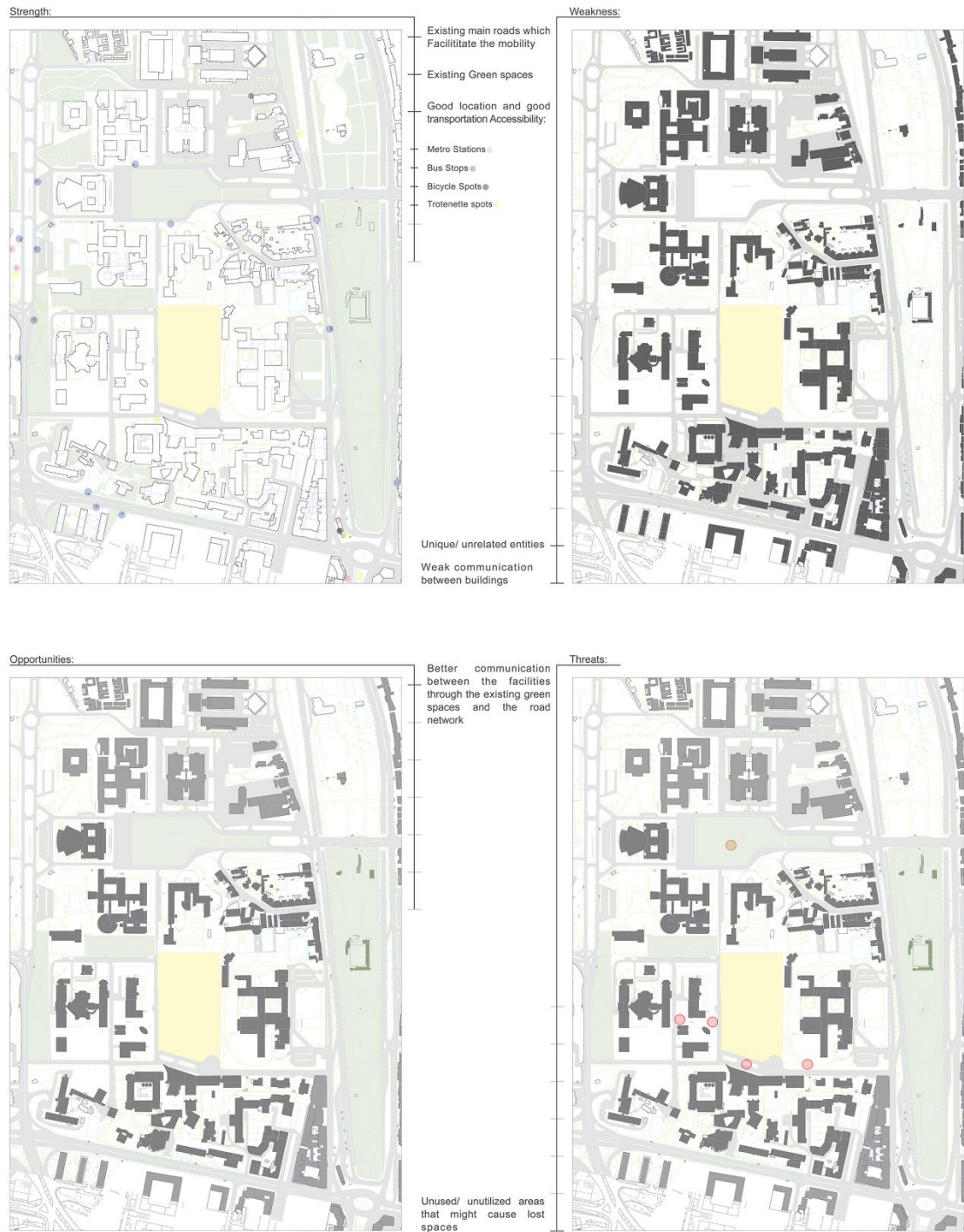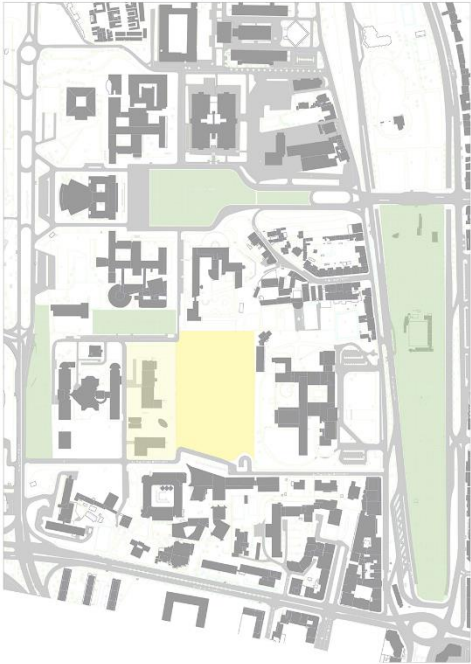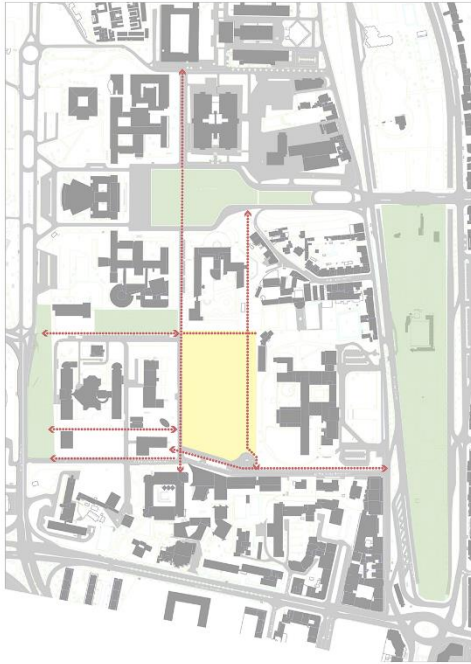
SWOT Analysis:

Strength:

Existing main roads which
Facilititate the mobility

Existing Green spaces

Good location and good
transportation Accessibility:

Metro Stations
Bus Stops
Bicycle Spots
Trotenette spots

Unique/ unrelated entities

Weak communication
between buildings

Weakness:

Opportunities:

Better communication
between the facilities
through the existing green
spaces and the road
network

Threats:

Unused/ unutilized areas
that might cause lost
spaces

Figure 5.5 SWOT Analysis
Source: The Author

Proposal Diagrams:

Plot Limits+Possible Connections

Connections Strategy
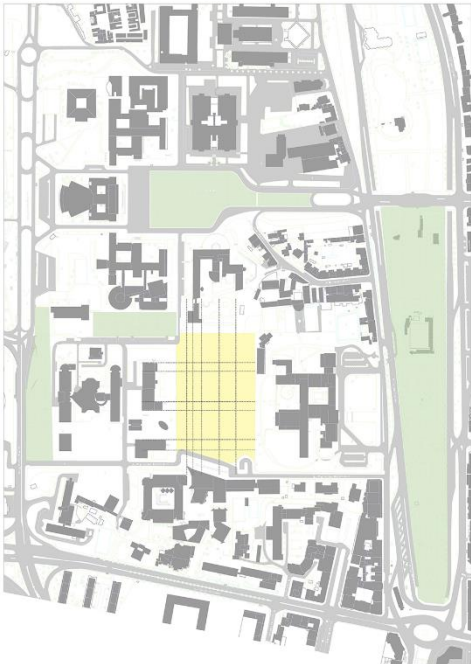
Grid Lines

Urban Spaces Contexts & Spaces Difinetion

5.2. The design Concepts

Gehl Architects · Urban Quality Consultants · Gl. Kongevej 1, 4.tv · 1610 Copenhagen V · Denmark · www.gehlarchitects.dk
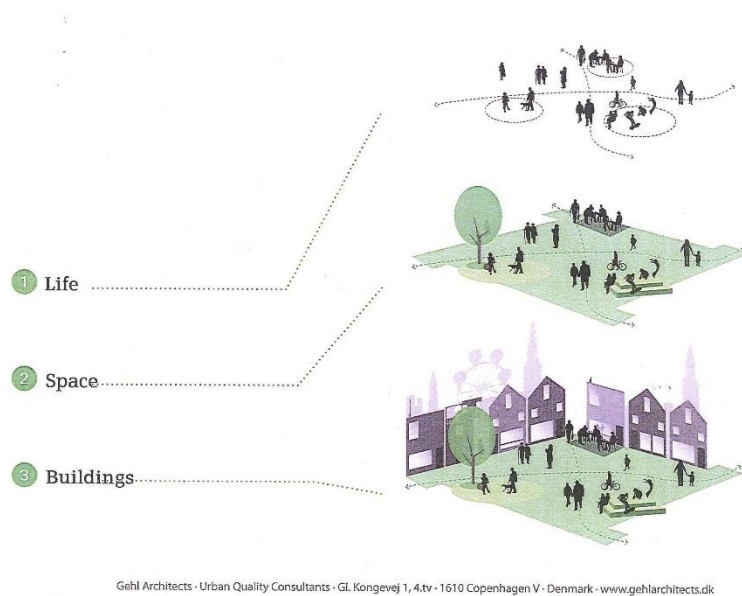
Figure 5.6 Urban quality

The design concept is based on Jan Gehl approach (Figure 5.6), the idea that the development of any building should be focused on people from the beginning of a planning process; then on public space and buildings, in the light of project location within the central green corridor and the strategies and goals of the municipality within the area.

1. People

This approach studies activities of all possible building users who will spend time within the building and the university compound, which are the area residents, students, employees, visitors of all ages.

2. Space

Public space makes an essential aspect of the design. It should offer various activities and should include different places - squares, plateaus, pedestrian areas, gardens, Improving the pedestrian and bicycles routes, and the overall 'walkability' of the area, which would attract all groups to create synergies with their environments and interact with it.

3. Buildings

This includes connecting indoors and outdoors spaces in the best probable manner, Gehl supports that quality and nature of buildings becomes more utilized in alignment with the nature of public space and interior activities, in order, which further enhances the quality of life.

At an abstract level, Gehl's theory, Gehl summarized the characteristics of good design: designs that

gather, integrate, invite, and open up, it has four aspects: gathering rather than separating, integrating rather than segregating, appealing rather than revolting, and opening up rather than close in. (Gehl,2011)

Gehl also defined good design by its ability to integrate the community no matter what their gender, age, income, sexual orientation, occupation, nationality, immigration status, and ethnic group.

Also, according to him, good design should open up, for example, a building that has windows directly on the street will be open to pedestrians who can participate indirectly in the building experience by watching the Building users even if they do not enter.

The essential part of Gehl's philosophy is that human contact in outdoor public spaces is a basic need and a must, while some people like illegal immigrants, runaway teenagers, introverts may not want to have this contact. Correspondingly, Ray Oldenburg says that cafes, bookshops, restaurants, and barbershop, etc… or as he calls them: "third places" are more important places for human contact and socializing than the outdoor space between buildings.

5.2.1. Activities classification within the project:

Building upon the previous paragraph, main functions of the building encompass various social activities that would promote the sense of connectedness and community, ergo, promoting the social dimension like many social activities that will be accommodated by the Positive Impact School like learning together, eating together, co-working, discussion areas, social spaces... etc. and based on the following Scheme:

5.2.1.1.   Urban Agriculture primary-related Social Activities
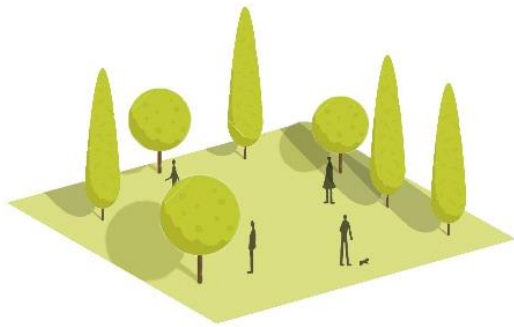
Figure 5.7 Gathering Socio-agricultural Spaces
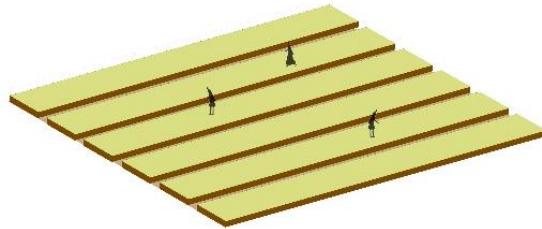
Figure 5.8 Outdoors Urban Agriculture
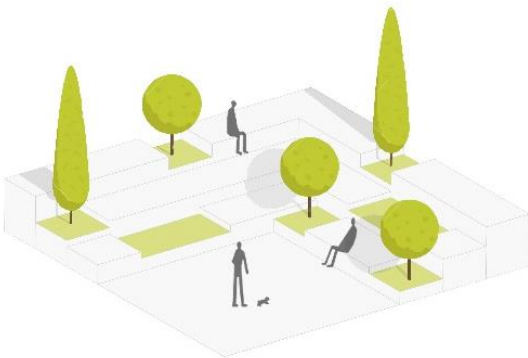
Figure 5.9 outdoors resting Spaces

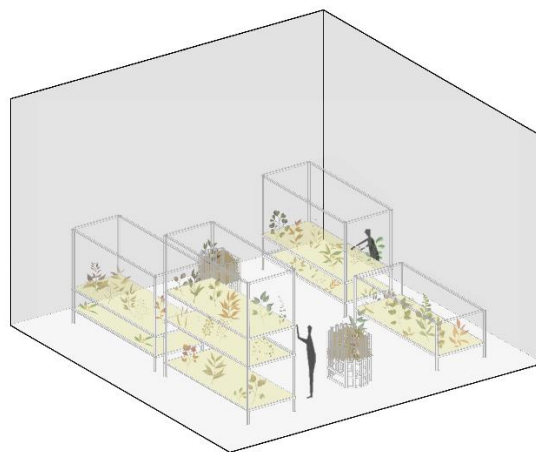*Figure 5.10 Rooftop Garden*
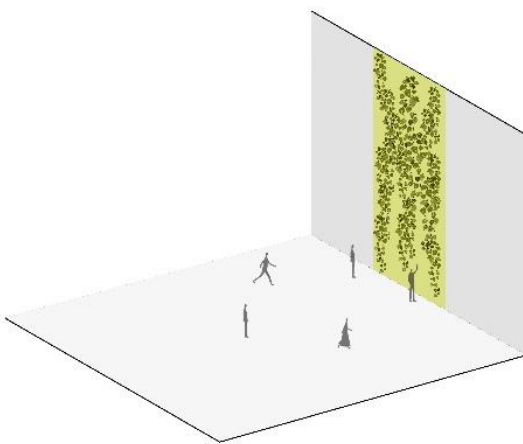
Figure 5.11 Vertical Garden
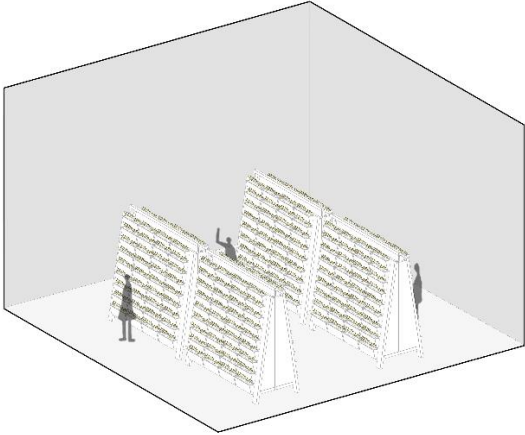

Figure 5.12 Permeant/ temporary exhibition

Figure 5.13 Indoors Urban Agriculture

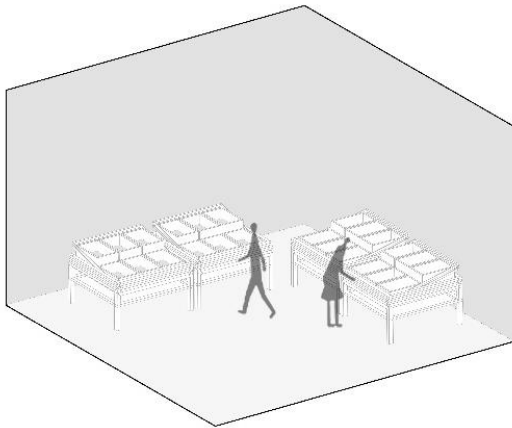## 5.2.1.2. Urban Agriculture Secondary-related Social Activities
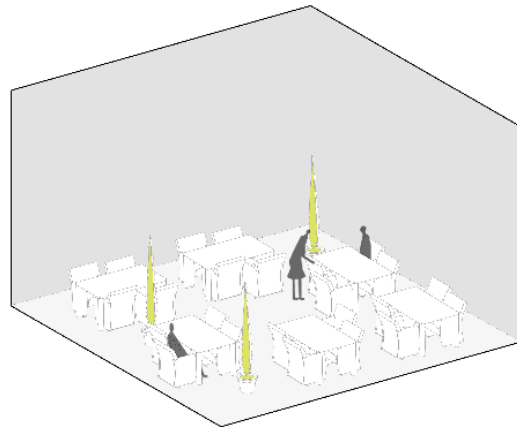

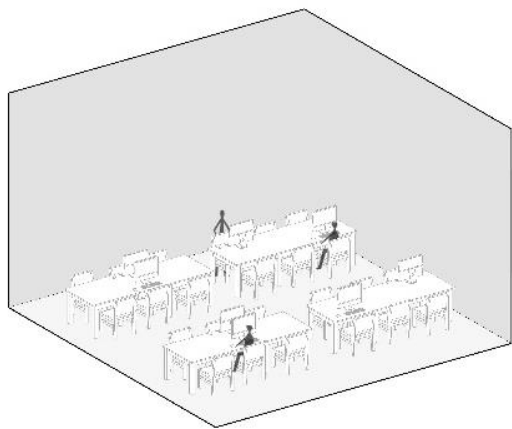*Figure 5.14 Local farmers Market*

Figure 5.15 Gathering for food and beverages

Figure 5.16 Coworking Spaces and workshops
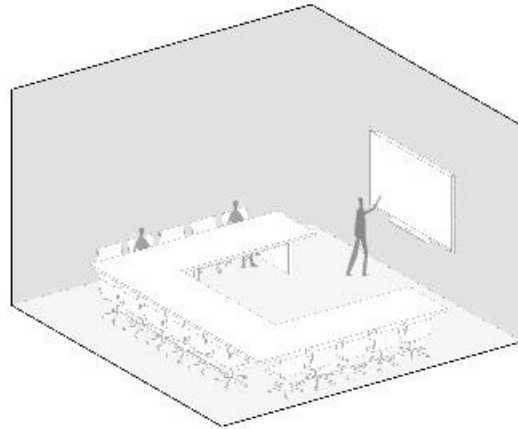
Figure 5.17 Meeting, conferences, training and online streaming Spaces
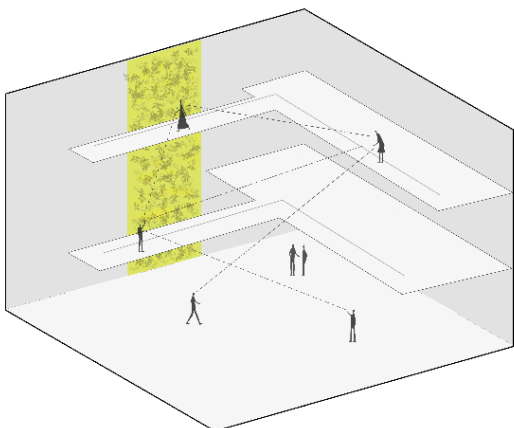
Figure 5.18 Open Spaces across the floors enhancing visual connection and emphases some functions' spaces such as the Expo area and the indoors urban Agriculture floors overlooking the café area

5.2.1.3. Urban Agriculture- urban design-related Social Activities
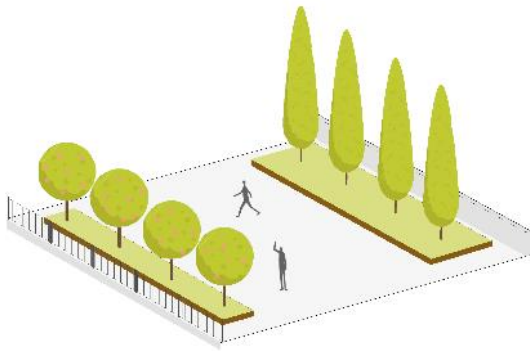
Figure 5.19 edible street foodscape
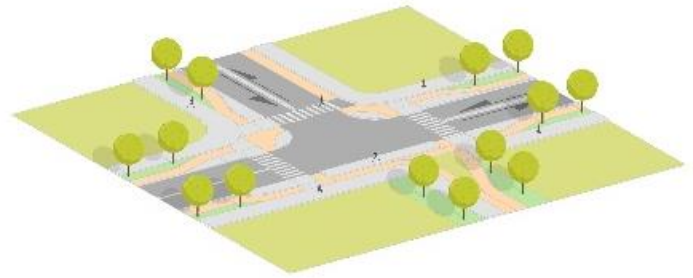*Food producing integrated with existing landscape design.*

Figure 5.20 Better mobility
Emerged within the mini green corridor, cycling and walking trails.

Source: The Author

Main Axes Section

The Axes were devided in a seperated way, the green bouleverd/ Axe was added to provide the pedstrians with shadow, to decrease the noise, and to add a sense of seperation between the public spaces and the facilities' plot areas.
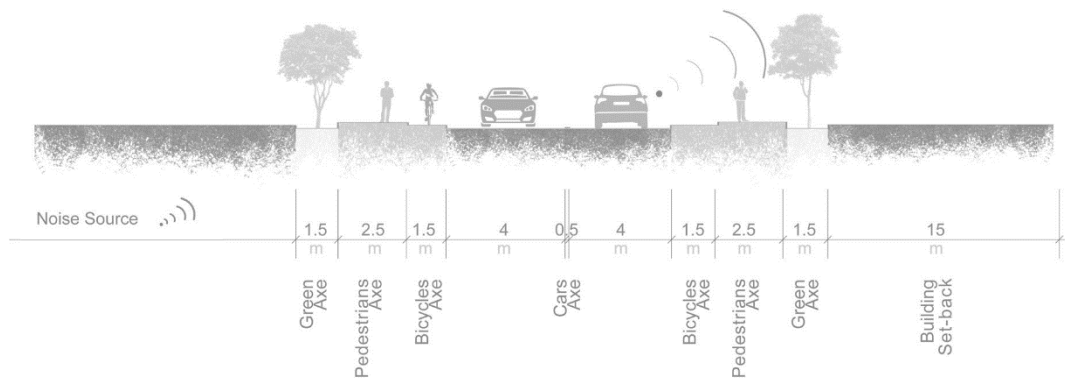

Figure 5.21 Section shows the mini green corridor implantation in the street
Source: The Author

5.3.   The functional program concept:

The functional program is based on the Lean methodology:

It consists of the -Build, Measure, Learn- cycle which is a way to collect and analyse feedback (The feedback Loop), those found in the Lean Start-up Book (ERIC RIES, 2011) The process is concerning learning fast so you can build fast. This is done by analysing early and using the outputs to improve your knowledge (Figure 5.17).
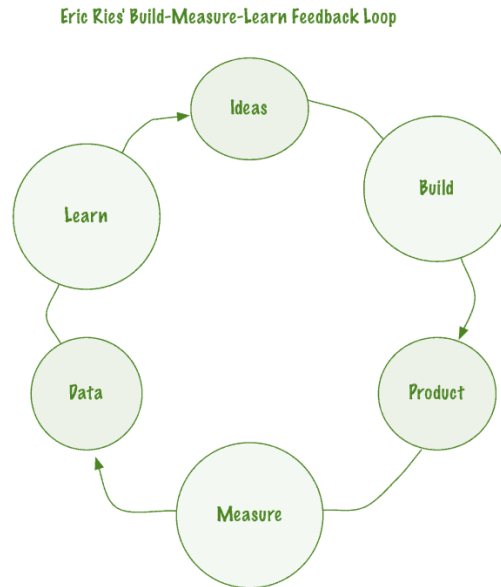

Figure 5.22 The Feedback Loop
Source: (ERIC RIES, 2011)

5.3.1. Why feedback loop?

Because it is closely related to behaviour change and motivation and it affects it according to Bandura[41] through his studies on that subject back on the 60s. Through his various published papers, Bandura noticed that people with a clear objective and a means to evaluate their progress toward that objective increased the probability of achieving it., (The more we believe we can achieve a goal, the more likely we will do so), this is the concept of self-efficacy which Bandura further developed this belief.

Accordingly, feedback loops allow us to assess progress towards our goals which is social integration and implementing the importance of urban agriculture within our society and introducing it as a lifestyle or even a probable job opportunity, and course-correct accordingly to meet them.

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[41] Albert Bandura: OC is a Canadian American psychologist who is the David Starr Jordan Professor Emeritus of Social Science in Psychology at Stanford University

5.3.2. The Feedback Loop projection on the Functional Program

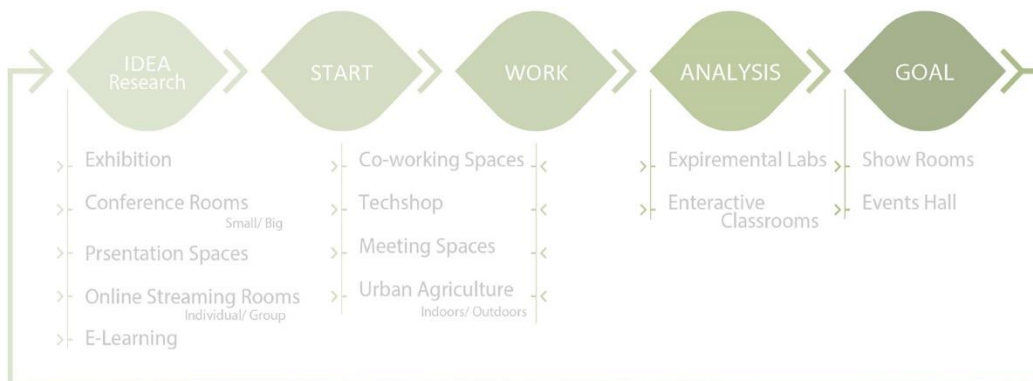The functional program spaces are interconnected using the feedback loop approach considering the social dimension.

Figure 5.23The functional loop on the project -1-
Source: the author
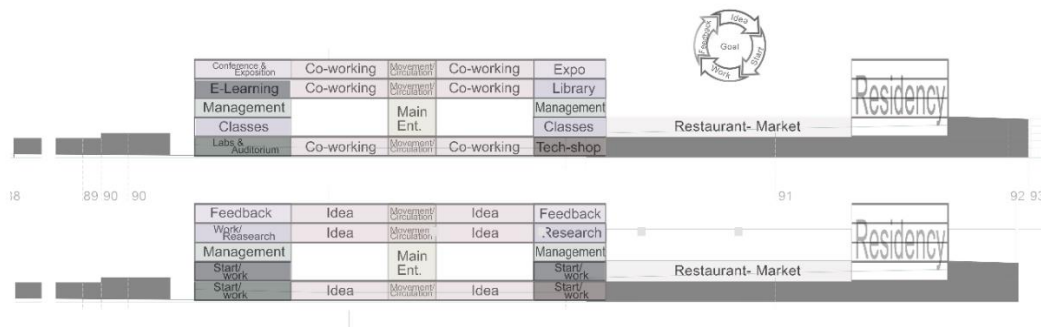
Figure 5.24: The functional loop on the building levels
Source: The author

**Functional Program
& Feedback loop**

Project Center
Outdoors
UA

Outer corridor
Semi-public Courtyard
Indoors UA
Public Courtyard
Rooftop Garden
Restaurant &Local Market
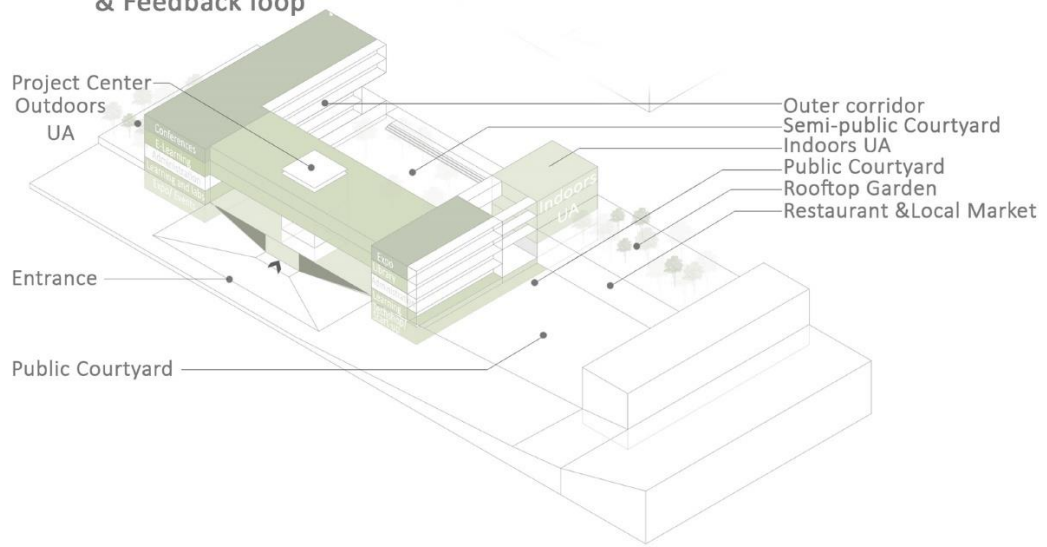
Entrance

Public Courtyard

Figure 5.25 Functional Program and the feedback loop diagram
Source: The author

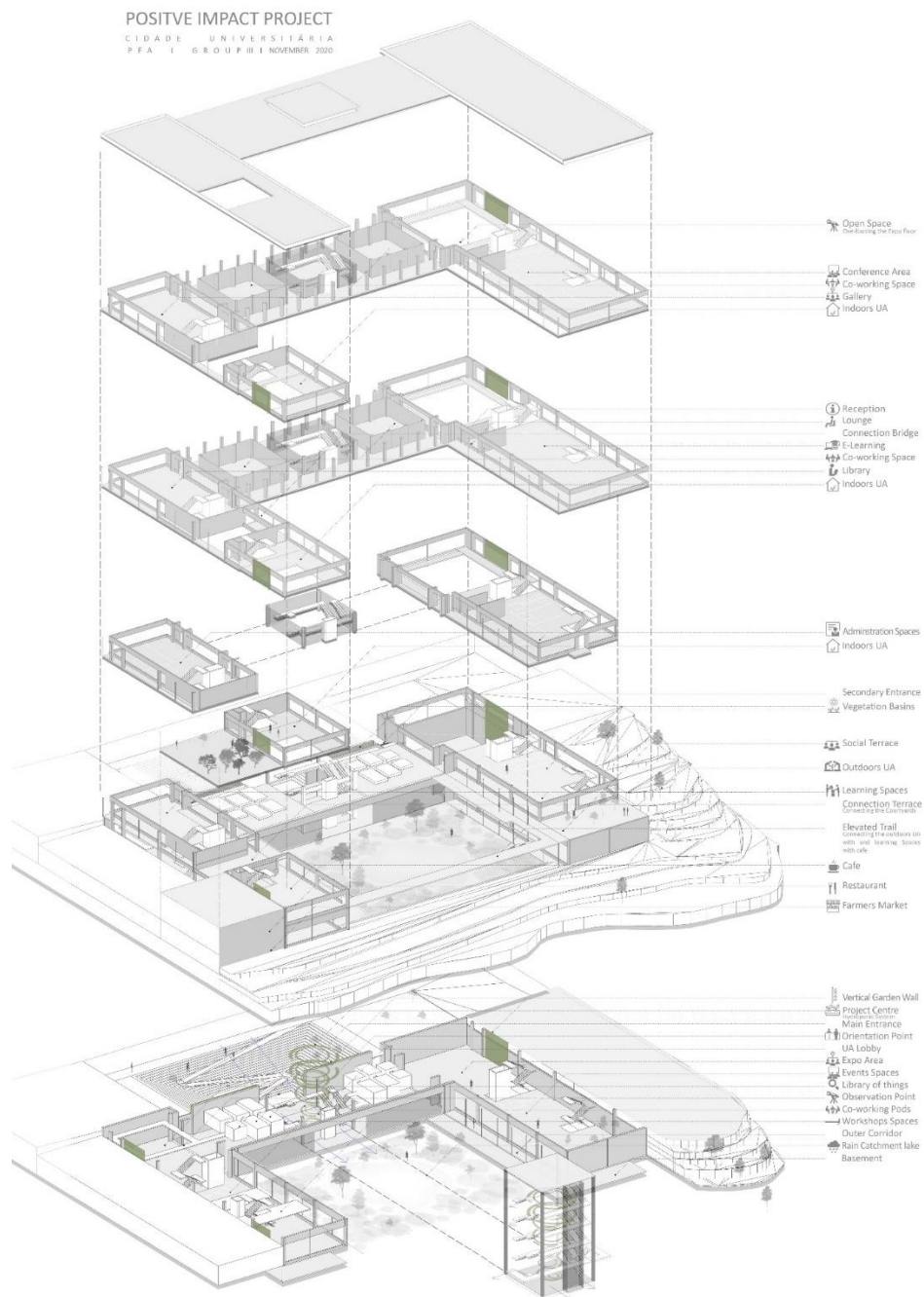### 5.3.3. Urban Agriculture Applications within the project

Figure 5.26Exploded Axonometric
Showing the UA applications within the building
Source: The Author

6. Practical part Conclusions:

Urban agriculture is one of the most social activating practices, it increases social interaction, promotes health, gives a sense of community and comfort, supports local economies by creating job opportunities, gives the first step towards food security; as the urbanization has -and still is- bringing mounting challenges in numerous dimensions, local communities are the major player in reversing these effects, by promoting the social dimension and activating the social engagement and network, a bigger impact would result, ergo, governments, urban designers, architect should impose a social- urban agricultural-based approach towards more sustainable urban system through inviting for behaviour change and creating a sense of appreciation of the food sources and increasing synergies in the 'Human-Building-Nature' triangle which was compromised due to the urbanization and its impacts.

All in all, it is really important to look for a way to make our urban environment more sustainable and eco-friendly and instil wider knowledge about agriculture and food sourced in our children since their little to create a sense of appreciation when they grow up which would create a sustainable green community in the future, Agriculture in all of its applications, types has a positive impact, therefore, having laws, facilities and active community concerned about this topic will have positive outcomes indeed.

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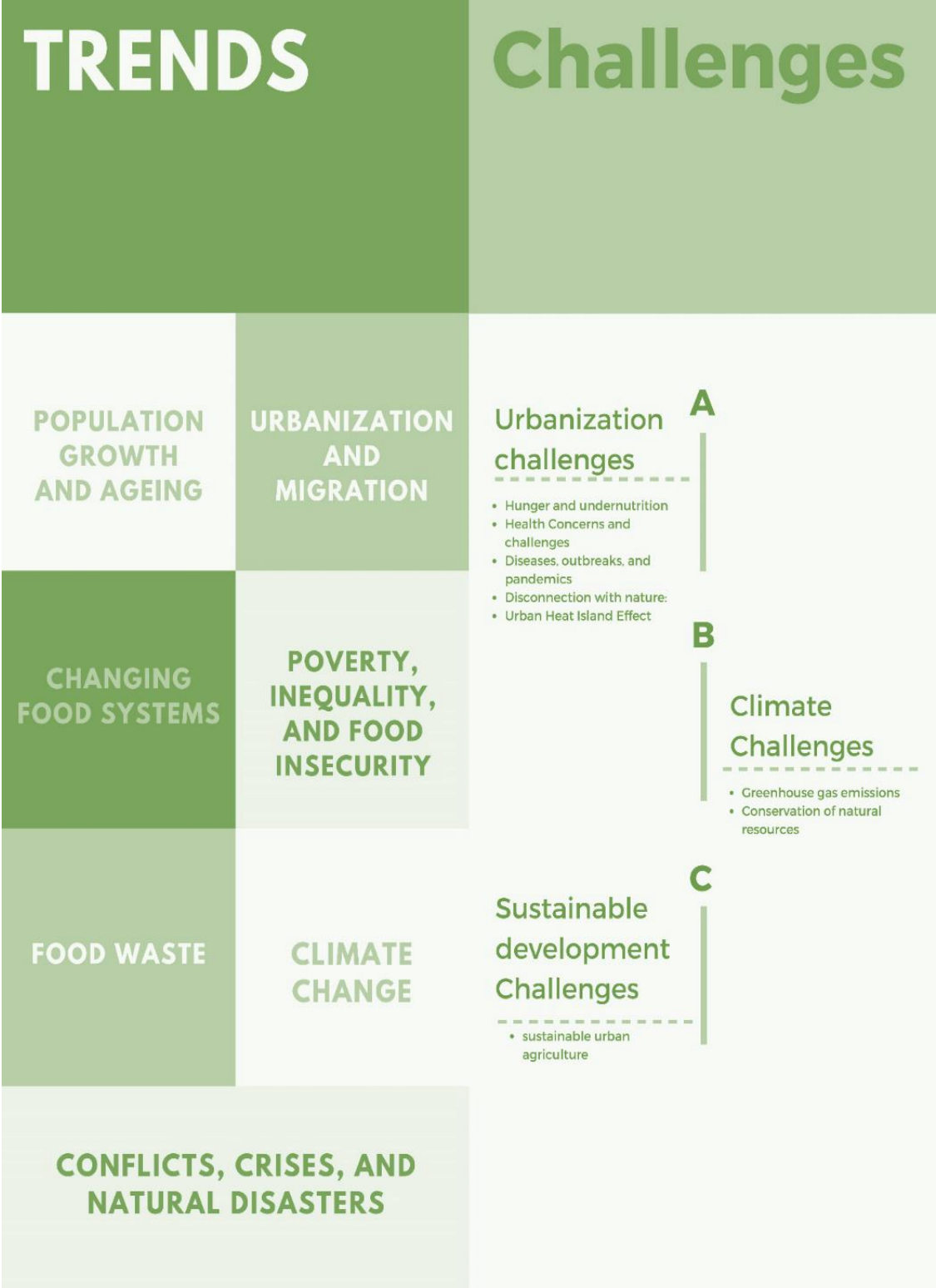
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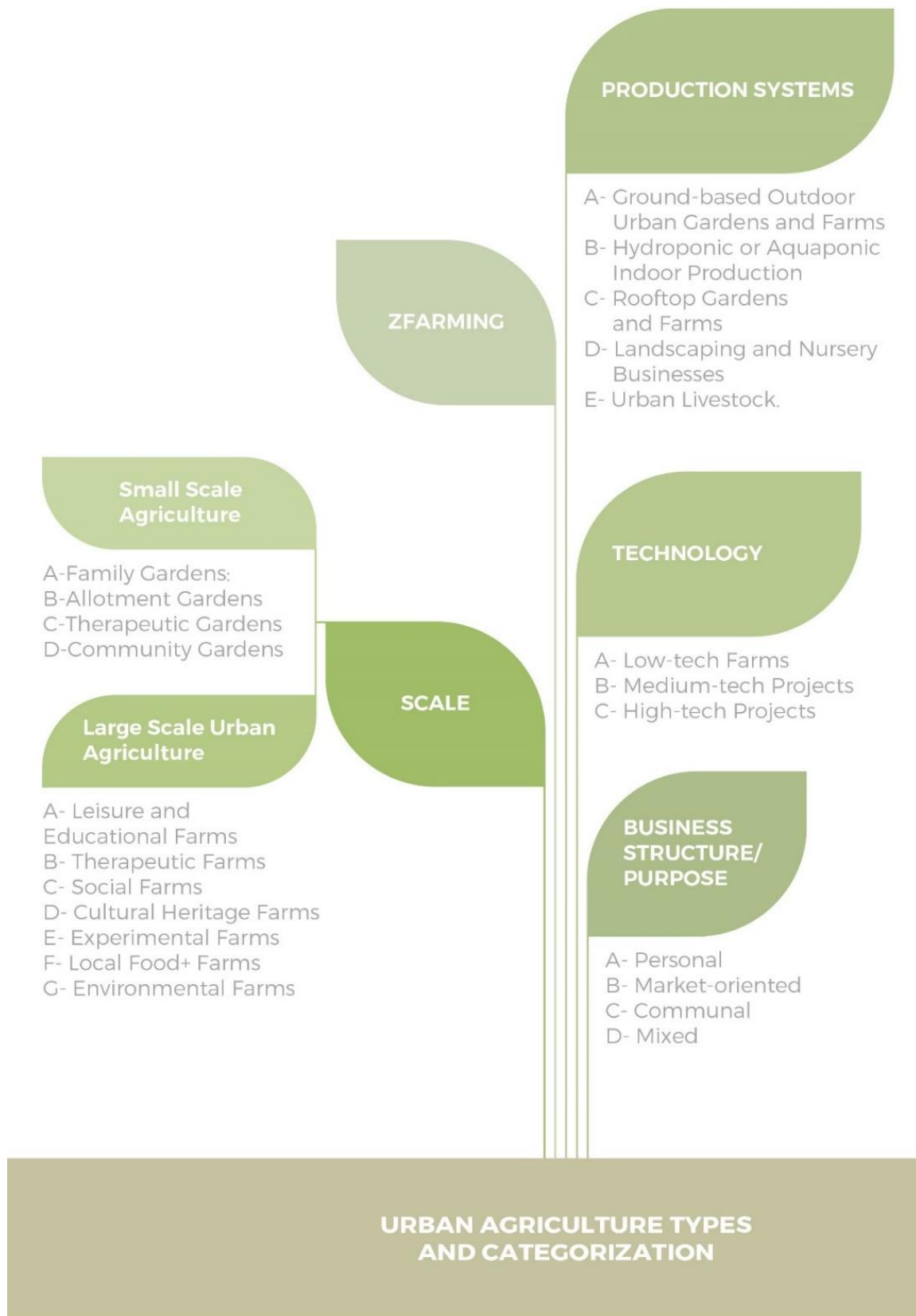
Supplementary Materials

Appendix 1: Chapters' Summaries

Chapter I:

UA trends and challenges

PRODUCTION SYSTEMS

A- Ground-based Outdoor
   Urban Gardens and Farms
B- Hydroponic or Aquaponic
   Indoor Production
C- Rooftop Gardens
   and Farms
D- Landscaping and Nursery
   Businesses
E- Urban Livestock.

ZFARMING

**Small Scale
Agriculture**

A-Family Gardens;
B-Allotment Gardens
C-Therapeutic Gardens
D-Community Gardens

TECHNOLOGY

A- Low-tech Farms
B- Medium-tech Projects
C- High-tech Projects

SCALE

**Large Scale Urban
Agriculture**

A- Leisure and
   Educational Farms
B- Therapeutic Farms
C- Social Farms
D- Cultural Heritage Farms
E- Experimental Farms
F- Local Food+ Farms
G- Environmental Farms

**BUSINESS
STRUCTURE/
PURPOSE**

A- Personal
B- Market-oriented
C- Communal
D- Mixed

**URBAN AGRICULTURE TYPES
AND CATEGORIZATION**

UA Types

Chapter II:

AN APPROACH TO THE HUMAN-SOCIAL DIMENSION

MOTIVES BEHIND URBAN AGRICULTURE

1- Personal or community needs, or both

2- Environmental

3- Social and economic needs

THE BENEFITS GAINED
THROUGH PRACTISING UA URBAN AGRICULTURE

1- Food accessibility

2- Mental health benefits

3- Quality of life and environmental benefits

4- Social benefits

An approach to the Human-Social Dimension

THE SOCIAL DIMENSION OF URBAN AGRICULTURE

1-SOCIAL INFLUENCES

a- Community cohesion and engagement

b- Social inclusion

c- Poverty and crime reduction

d- Intergenerational education

e- Work opportunities

2-CHALLENGES

a- Aesthetics

b- Perception

c- Social Viability

3-POTENTIALS

a- Changing consumers behaviour and demand

b- De-centralize food production

c- Food accessibility

The social dimensions of Urban Agriculture indicators

URBAN AGRICULTURE IN THE BUILT ENVIRONMENT

HUMAN ACTIVITY CATEGORIZATIONS ACCORDING TO JAN GEHL

a   Necessary activities
(UA practices in developing countries)

b   Optional activities
(UA practices in developed cities)

c   Social activities
(Social UA farms/ gardens)

Urban Agriculture in the Built Environment

Chapter V:

Case Study			Case -1-	Case -2-	Case -3-
Location	Country- City		Syria- Damascus	Egypt- Cairo	Portugal- Lisbon
Country classification	Developing		✓	✓	
	Developed				✓
Type	Scale		Small Scale	Small Scale	Small Scale
	Production System		Rooftop hydroponic farm	Vertical agriculture	ground- based farm
	Technology		Medium tech	Medium tech	Low-tech
	Business Structure		personal	Communal	Communal
	Z-Farming		Re-utilized Rooftop	Vertical Z-Farming	-
The Social dimension	**Social influences**		-Work opportunity -Food accessibility - Conflicts	-Work opportunity -Food accessibility -Poverty -Intergenerational education	-Community Cohesion and engagement -Poverty and crime reduction -Intergenerational education
	Challenges	Aesthetics	- Organized planting in the hydroponic tubes - Functionality over beautification	- Organized planting on a repetitive module - Functionality and interior beatification	-Organized planting Semi- organized spontaneous planting -Overall Urban beautification
		Perception	- Although being a personal initiative, it is role model initiative to encourage urban community participation in the food cycle	- Socio-cultural awareness- focused - Social justice	- Socio-cultural awareness- focused -Reintegrating UA within the urban context - Social justice
		Social viability	- Z-farming as a business model or for personal use could contribute to people as individuals and community toward self- sufficiency and fighting hunger	-Ensuring community networking through training various activities and training.	- Ensuring community networking
	Potentials		- More social cohesion (The neighbours' reaction to the initiative). - More food accessibility especially during the time of the conflict. - An influence to fight poverty and unemployment.	- An influence to fight poverty and unemployment. - An easy replicable element that would help to ensure food accessibility	- An influence to fight poverty and unemployment. - De-centralize Food production - Recreational activity - More food accessibility - Changing Consumers' behaviour and demand
UA Activity Categorization	Necessary		✓	✓	
	Optional				✓
	Social				✓

Appendix 2: Additional Urban planning plans, Groupwork & Workshop
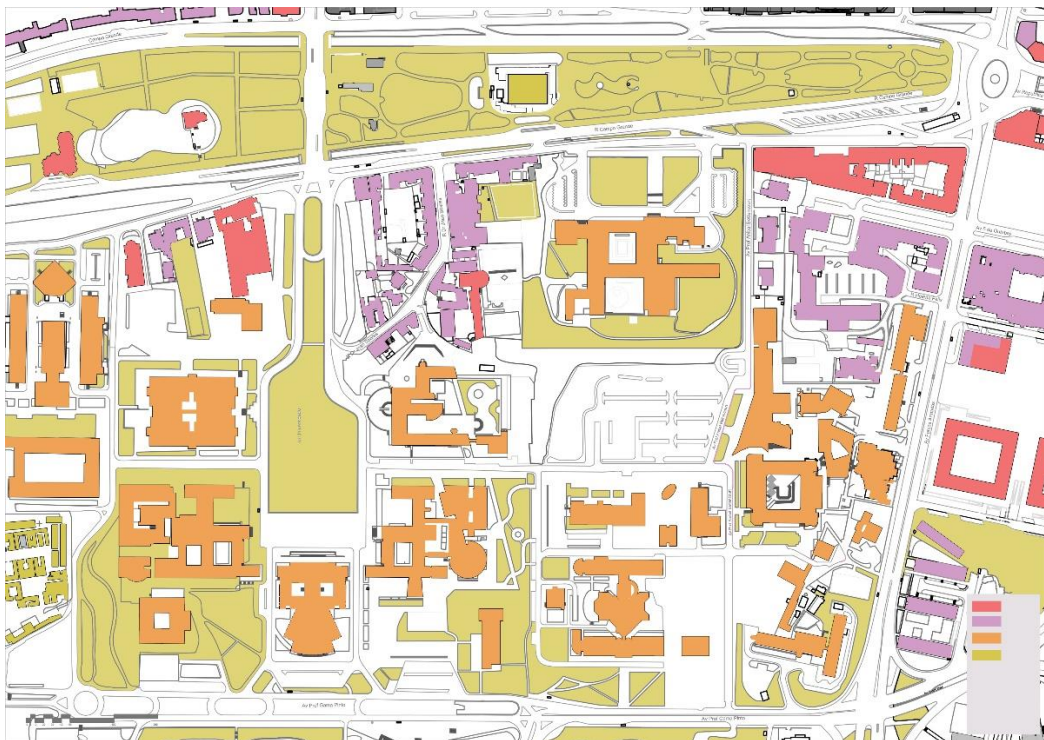
Urban planning:
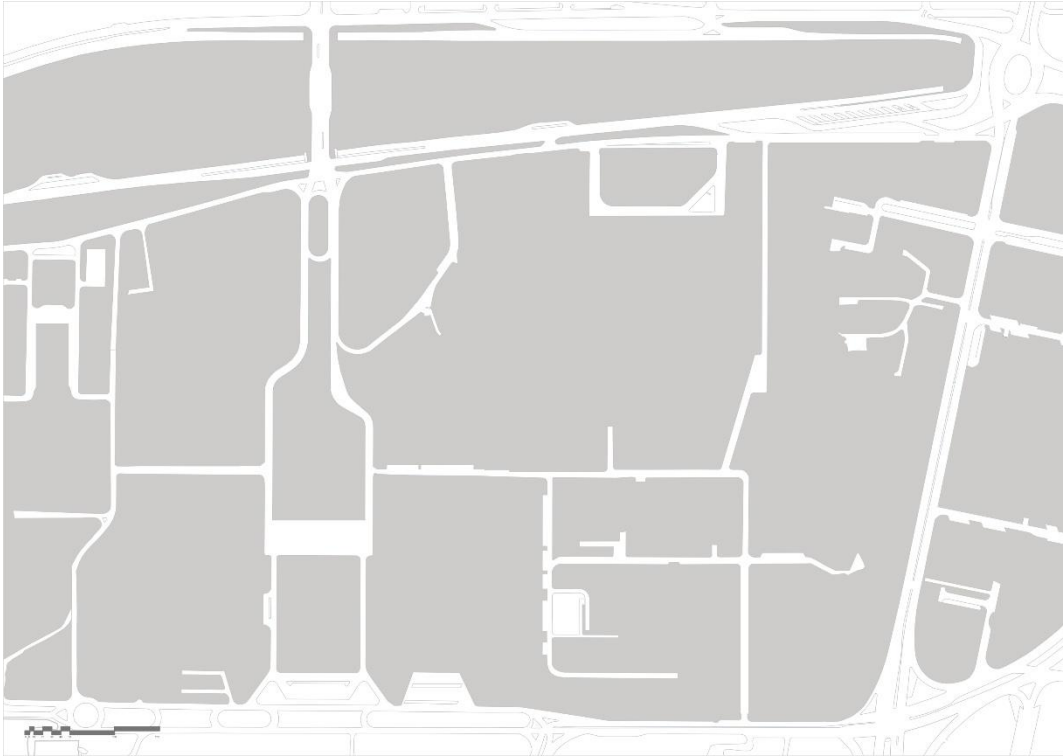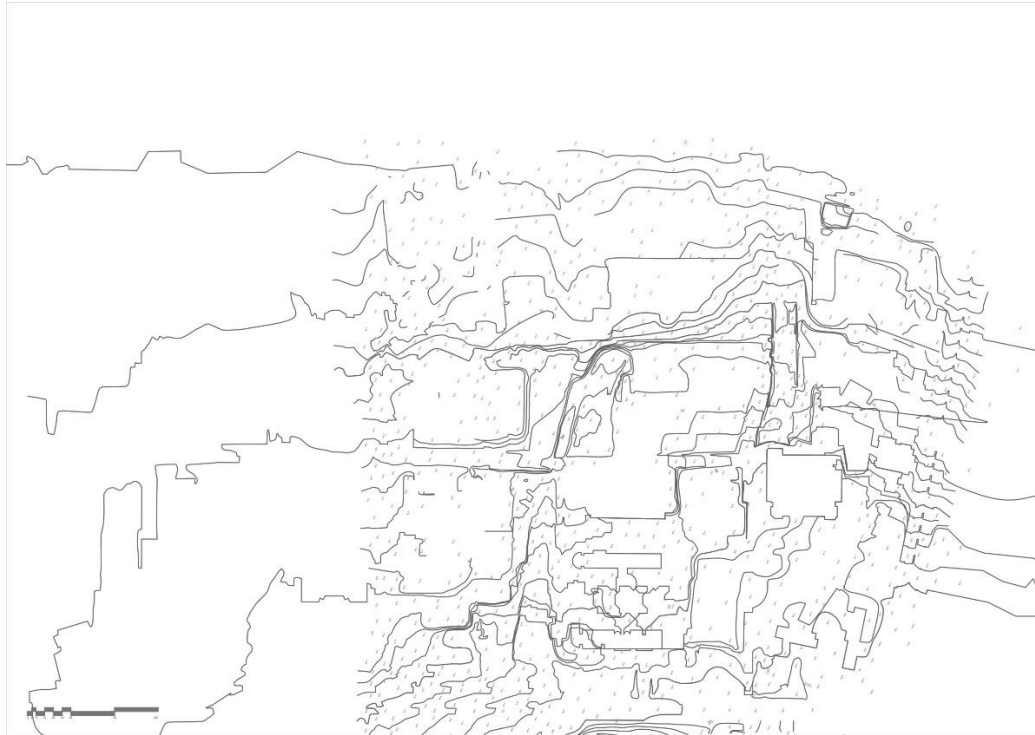

The Urban Fabric of the Location
Source: The Author
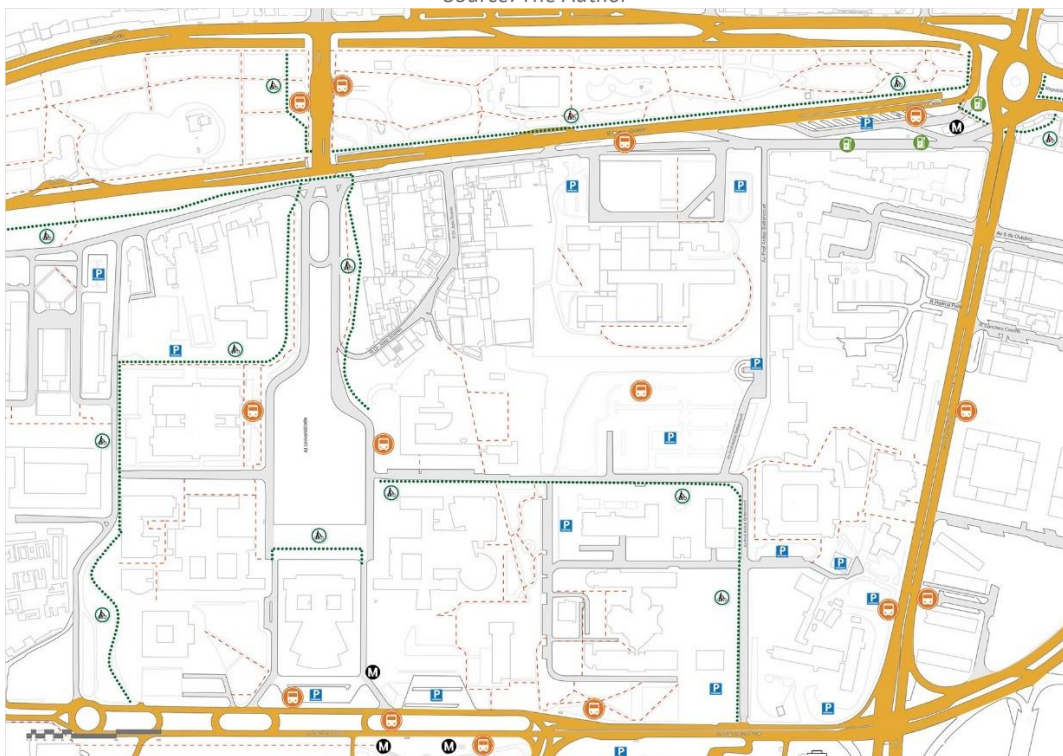
The Mobility Plan of the location
Source: The Author

Solid Void plan
Source: The Author

Building Use plan
Source: The Author

Topography

Urban Studies

Proposal:

85

Residential
Area

Building Use

Based on the study of the sun direction during Summer and winter, The Functions of the School were devided into five buildigs. in one hand to keep the lighting conditions suitable for urban farming, on the other hand, to make the residential part accessible from Entre Campos and Cidade Universitaria areas

Sustainability School

Coworking/ Administration

Tech-Shop- Start-up

Residential

Urban Farming

10 5 0 10 20 30 40 50 60 70 80 90

M

Group Work:

Proposal:

Proposal Diagrams:

Plot Limits+Possible Connections
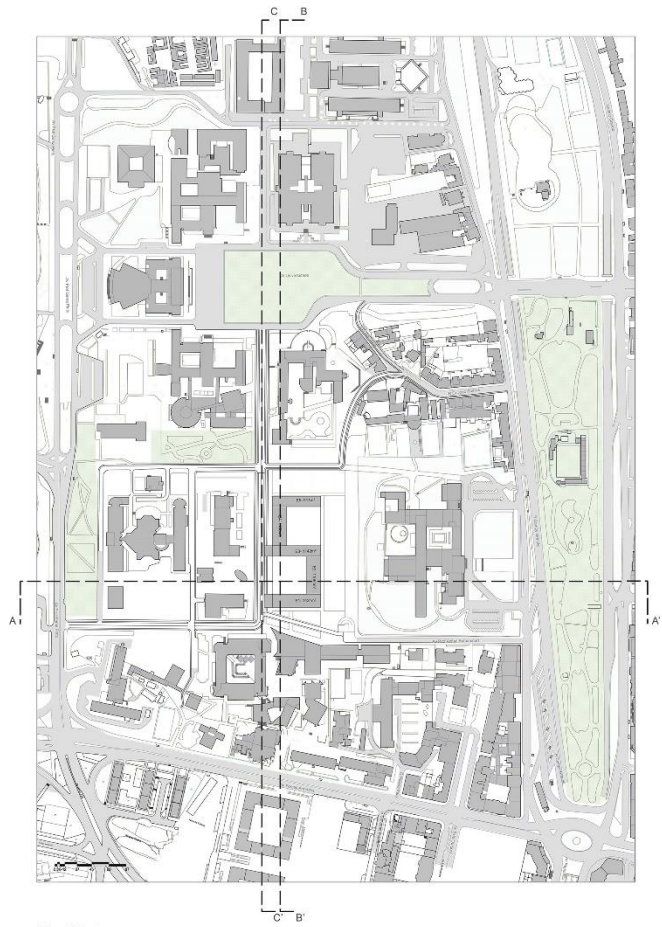

Connections Strategy

Grid Lines

Urban Spaces Contexts & Spaces Difinetion


The Functional program:

Commercial   Market
   - Shared Eating zone
   - WC

Food Production Urban Farming
   - Composting zone
   - Storage

Sustainable School Classrooms
   - Offices
   - Auditorium

Social-tecnologic fablab
   Repair shop
   Material Library

Incubation and Entrepreneurship Centre
   Common Spaces
   Offices

School Residence Individual Rooms
   Distribution/circulation
   Common areas (kitchen and living room)
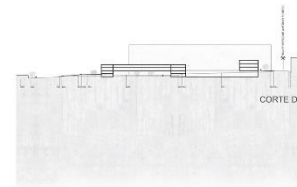
The Strategy:

The proposed strategy aims to create better connections for the buildings with the surrounding ones by creating a 'Positive Space' that can facilitate the conversation between the building and create a visual order to the urban context.

* Reutilizing the activity spine
* Making the street that surround the area occasional
* Enhancing the area accessibility by:

- Taking Pedistrian experience into concideration
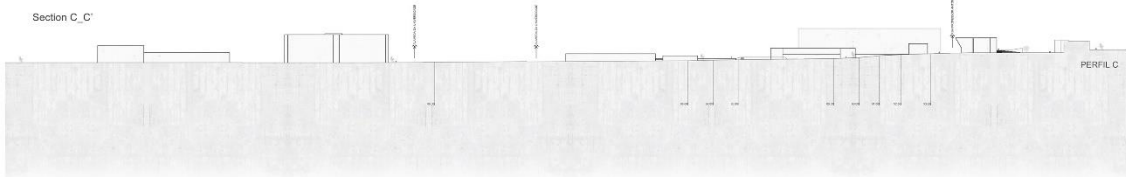- Seperating cars and bicycles pathes and creating new ones

Sections:
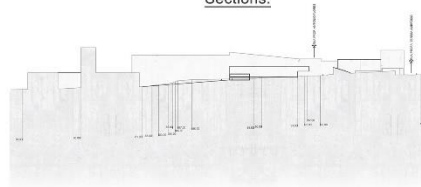
Section A_A'

Section B_B'

CORTE D

Section C_C'

PERFIL C

Rana Shehabi - Tiago Sarsfild Barros - Isabel Ávila

Workshop:

The Workshop aim was to create a retrofit to social housing building alongside imposing new strategy to transform the building. The proposal allowed for the creation of new typologies, also using the square as a module. There were created t1, t2, t3, and duplex typologies. These typologies were thought according to the current lifestyle, either for temporary housing, couples, or families. The square rhythm was taken to the extreme, also being present in the facade and the pillar-beam matrix. To add, we also created a "shell" enveloping the building in a logic of inverted column to add to the apparent weight of the building. This shell originated gallery spaces – The public space surrounding the building and from the ground floor to the roof. The typologies are accessible through the galleries. Both the ground floor and the rooftop are designed as public spaces to facilitate social meetings between neighbours. We also seek to bring green areas to both these places with the intent of improving their quality. To solve the issue of the ground floor, more height was added, making it an effective communal space. The rooftop, another common space, aims to strengthen the concept of liveable rooftops. To summarise, the first concept of the proposal was to bring square-like order with a restructuring of space and a bigger focus on public spaces. The double heights seek to generate a hierarchy of spaces, and the creation of galleries allow for a different inside/outside relationship. The

intervention in the public space assumes the reduction of cars and parking spaces and replacing them for green areas. These changes should pique the interest of a younger population that might bring a new community-oriented lifestyle to this territory.