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Urban Agriculture Approach in The Development of Sustainable Cities: The Case Of Elazığ, Türkiye

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ABSTRACT

Urban areas are generally residential areas that are not considered important in terms of agricultural production. Since agricultural activities are not considered important in urban areas, cities with high population density, especially in metropolitan cities, are deprived of agricultural production areas. When considered from this point of view, cities come to the fore as places where food is consumed, sold and easily available. Although agricultural activities seem to be far from urban areas, the concepts of agriculture and city cannot be considered separately. One of the tools in question for ensuring sustainable urban development is urban agriculture. Urban agriculture is a phenomenon that enables communities in many regions to interact on many issues, beyond being a simple task. Within the scope of this study, the city area of Elazig province was examined from the perspective of urban agriculture. Various suggestions are presented to ensure sustainability in Elazig province, to develop more accurate insights into regional and urban food supply, to increase the importance of urban aesthetics, urban land use, urban environmental management, public health and economic development.

Keywords: Sustainability; Urban agriculture; Urban design; Elazığ.

Sürdürülebilir Kentlerin Gelişiminde Kentsel Tarım Yaklaşımı: Elazığ Kenti Örneği

ÖZ

Kentler denilince akla yerleşim ve sanayileşmenin yoğun olduğu, tarımın yapılmadığı ya da az yapıldığı tarım dışı alanlar gelir. Bu alanlar genelde tarımsal üretim açısından önemsenmeyen yerleşim alanlardır. Kırsal alanlara nazaran kentsel alanlarda tarımsal faaliyetlere önem verilmediğinden dolayı, büyükşehirler başta olmak üzere nüfus yoğunluğu fazla olan şehirler tarımsal üretim alanlarından yoksun bırakılmıştır. Bu açıdan ele alındığında kentler tarımsal üretim alanları olmaktan çok gıdaların tüketildiği, satışa sunulduğu, uzak mesafelerden getirilmiş olmalarına rağmen kolay temin edilebilecekleri yerler olarak ön plana çıkmaktadır. Sürdürülebilir bir kentsel gelişim için söz konusu araçlardan biri de kentsel tarımdır. Kentsel tarım basit bir uğraş olmanın ötesinde yapıldığı bölgelerdeki toplulukların birçok konuda etkileşim kurmasını sağlayan bir olgudur. Bu çalışma kapsamında Elazığ ili Mücavir alanı kentsel tarım perspektifinden incelenmiş, Elazığ ilinde sürdürülebilirliği sağlamak, bölgesel ve şehirsel gıda sağlama konusunda daha doğru anlayışlar geliştirmek, kent estetiği, kentsel arazi kullanımı, kentsel çevre yönetimi, halk sağlığı ve ekonomik kalkınmanın önemini arttırmak için çeşitli öneriler sunulmuştur.

Anahtar Kelimeler: Sürdürülebilirlik; Kentsel tarım; Kentsel tasarım; Elazığ.

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1. INTRODUCTION

As the phenomenon of urbanization in the world increases, access to the green area decreases, people are getting further away from nature every day. The preservation of the ecological balance has been constantly ignored. It is a known fact that natural resources are limited and the bad results of rapid urbanization are irreversible.

The most important problem is that natural resources cannot be managed wisely and disappear rapidly. If countries do not deal with these global problems, there will be a shortage of raw materials and shortages worldwide [1]. Today, the concept of "sustainability" has gained importance as a vital part of the solution to the problems of environmental degradation and reduction of natural resources in the cities. The concept of sustainability, which includes an ecologically based system, is an extremely important value in city planning.

Human is at the core of the concept of sustainable development. It is stated as the basic principles that environmental protection should be made complementary to development programs in order to achieve sustainable development [2].

Alternative urban models are needed for the construction of sustainable cities. The best scenario for building more sustainable cities is to direct people's behaviour towards a more environmental friendly system. One of the most important tools for ensuring sustainable urban development is urban agriculture. Reducing the damage caused by urbanization to the environment, gaining local food consumption experiences will start with the integration of urban agriculture as part of the infrastructure systems of the society. Urban agriculture is emerging as an important tool in landscape planning and design studies to maintain ecological balance and ensure sustainability. Integration of the urban food system with the city has become an integral part of urban ecosystems. Cities have enormous potential for food production. The most reliable and sustainable way of people's food supply is to produce food needs by themselves. The most practical way to provide nutritious and affordable food for citizens is to create opportunities for production in cities.

In the Brundtland Report prepared by the World United Nations Environment and Development Commission in 1987, the contribution of urban agriculture to food production, poverty reduction, and improvement in air, water and soil quality has been emphasized [3].

Urban agriculture contributes significantly to urban sustainability. Urban agriculture is a survival strategy. However, agriculture has been seen as a rural activity and the role of agriculture in the city has been ignored by policy makers until today. The concepts of city and agriculture have recently been matched by many planners and academics. The environmental benefits of urban agriculture have just started to be accepted.

As Luc Mougeot points out, “Urban agriculture cannot be a complete solution to the problems facing the future of cities, but it can be an important part of any program to make these cities more liveable and improve the lives of their inhabitants” [4].

Within the scope of this study, the city area of Elazığ province has been examined from the perspective of urban agriculture. Various suggestions have been presented to ensure sustainability in Elazığ province, to develop more accurate insights into regional and urban food supply, to increase the importance of urban aesthetics, urban land use, urban environmental management, public health and economic development.

2. MATERIAL AND METHOD

2.1. Material

The main material of the study is the urban area of Elazığ Province located in Turkey. Urban agriculture is not a conscious activity in Elazığ province. No studies have been conducted on the inclusion of urban agriculture in municipal development and policies. The concept of “Urban Agriculture” is not included in both national and local laws. The contribution of agriculture to the socioeconomic and ecological structure of the city is still not fully understood. Along with the increasing population growth, the increase in zoning activities further distanced urban agriculture from the city centre. Due to the high value of the land in the city, the urban agriculture has always been neglected (see Figure 1).

Factors envisaging the implementation of urban agriculture in Elazığ province can be listed as items; In terms of climate and soil properties, Elazığ Province has favorable conditions in the cultivation of many products. Elazığ city center is built on a part of the plain called “Uluova”, where there are fertile, alluvial and mostly 1. class agricultural lands.

With the construction of the Keban Dam Lake in Elazığ Province, which has terrestrial climate features, the climate became temperate and showed a transition feature between the continental climate and the Mediterranean climate. This has enabled the vegetation period to increase and the variety of crops to be grown. Suitable soil properties, favourable climatic conditions are quite suitable for urban agriculture.

Although there are many local fruit, vegetable and cereal varieties belonging to Elazığ province; With the spread of ready-made vegetable seedlings and new fruit varieties in recent years, the planting area of domestic seeds has decreased. In this period, in which local food is considered important for ensuring food safety, “urban agriculture” can be used as a means of recycling domestic seeds and varieties to the agriculture of the province.

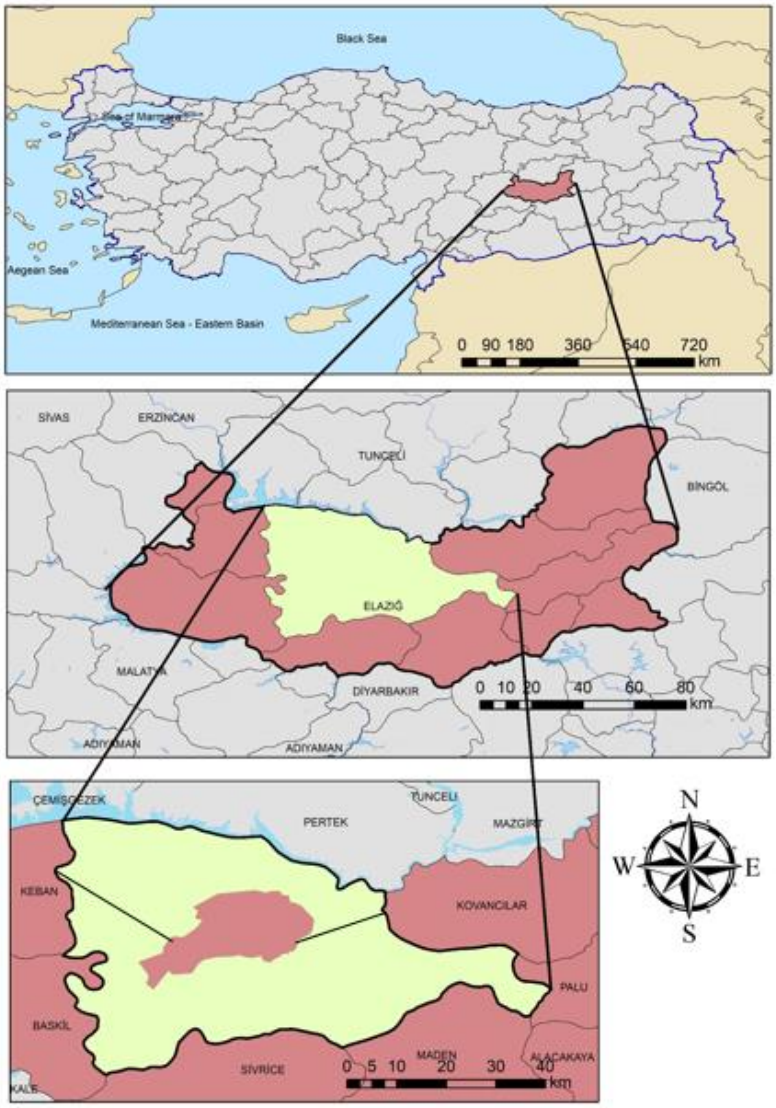

Figure 1: Elazığ location map.

Approximately 77% of the population of Elazığ Province live in urban areas and 23% live in rural areas. Although the urban population is higher than the rural population, the majority of this population migrated from the rural areas where agricultural activities are carried out to the city centre [5].

With the integration of urban agriculture to Elazığ Province, it will be easy for the public to adopt these activities and will not experience any adaptation problems. Urban agriculture can play an active role in providing additional income source for the lower income families who refugees coming from Syria, Iraq and Afghanistan and coming from the provinces of Bingöl, Tunceli and Diyarbakır for various socioeconomic reasons.

As a result of the digitization studies carried out by Şengün and Üstündağ on Elazığ city development plan, the ratio of the areas reserved for green areas to the total development plan area become 9.4%. Although the average of the city centre (9.4%) is generally acceptable, this rate is extremely high in some neighbourhoods and low in some neighbourhoods. According to the Zoning Law No. 3194, the number of green areas per person in urban areas should be 10 m^2. This amount is below 10 m^2 in 17 neighbourhoods covering 69% of the Elazığ population. The amount of green area per person is less than 3 m^2 in 11 neighbourhoods due to their dense population [5]. Urban agriculture can be considered as an option in increasing the number of green areas per capita.

Compared to rural agriculture, urban agriculture emerges as a lower cost and more attractive investment tool in the city for reasons such as convenience in input provision and proximity to marketing channels [5].

There is no land specially designated for urban agriculture in Elazığ city centre. Attention should be paid to the connection between the cultural, economic and environmental aspects of the city in land use applications. Many different types of activities can contribute to the city as a whole within the scope of urban agriculture in Elazığ. In order to develop a special perspective in agriculture-urban relations in the context of urbanization and to examine urban agriculture from a wider spatial perspective, the urban agriculture activities to be implemented in the city area of Elazığ province are listed below;

- Roof, balcony, terrace and wall areas
- Home gardens
- Site gardens
- Unused empty plots
- Roadsides
- Collective (Community, allocation, hobby, etc.) gardens
- Neighbourhood parks
- Institutional gardens
- Urban farms

2.2 Method

As a method, documentary and experimental research methods have been used based on qualitative and quantitative data. Within the framework of the documentary research method, national or international library, archive and internet data related to the subject have been compiled as text or picture. In the frame of experimental research method, the data collected objectively have been analysed and evaluated with the help of measuring tools such as Geographic Information Systems (GIS), observation, interview.

In this context, 1 / 100.000 scale soil maps prepared by Soil-Water General Directorate and revised by General Directorate of Rural Services have been analysed using GIS by ArcGIS software. For this purpose, land use capability (LUC) classification, great land groups (GLG) parameters have been made for productivity analysis. The productivity of the city area of Elazığ province has been revealed in terms of urban agriculture. Google Earth satellite images, population density, other cultural data obtained because of observation have been combined with these data; Urban agriculture typologies and strategies have been presented to Elazığ Province (see Figure 2).

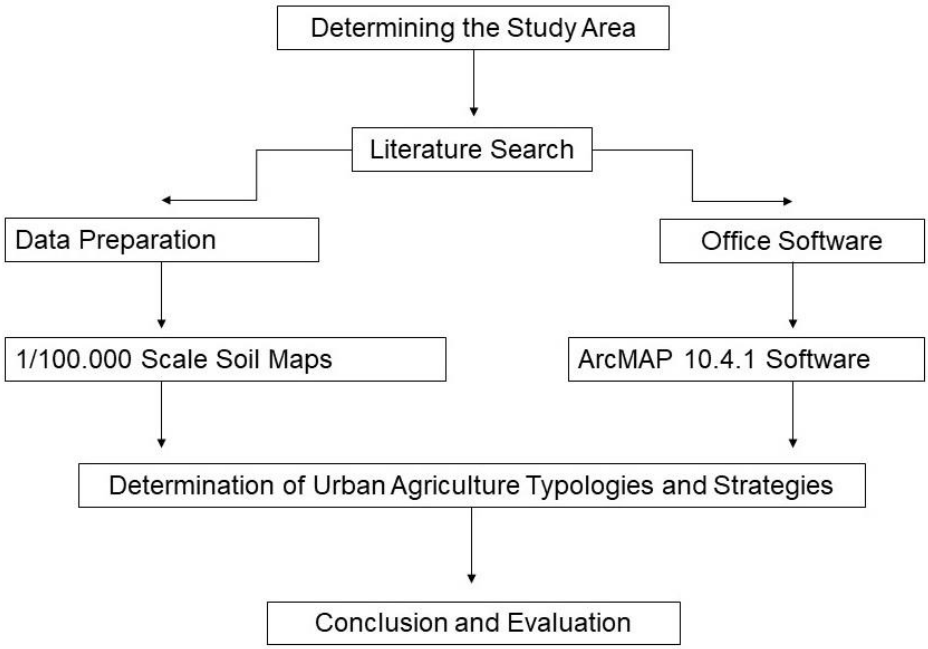

Figure 2: Method flow chart.

3. FINDINGS

3.1. Information about the study area

Elazığ is located in Turkey's Eastern Anatolia Region. The average altitude of the city is 1067 meters. Its area is 9313 km^2 and is surrounded by Malatya, Bingöl, Tunceli, Erzincan and Diyarbakır provinces. In terms of geographical location, it is the junction point of roads connecting the region to other regions.

In Elazığ province, continental climate is dominant. After the establishment of the Keban Dam in 1974, the climate softened. In addition to the continental climate, the Mediterranean climate is also observed in some parts of Elazığ. Temperature values range from -15 ° C to + 42 ° C [6].

According to the 2018 data of European Environment Agency Corine Land Cover Data, 31.22% of Elazığ province is agricultural areas, 1.10% artificial surfaces, 61.20% forest and seminatural areas and 6.48% covered with water bodies [7] (see Table 1).

Table 1: Corine land cover of Elazığ [7].

Land Cover Type	Amount (Hectare)	%
1. Artificial Surfaces	**10206**	**1.10**
1.1 Urban fabric	5759	0.62
1.2 Industrial, comercial and transport units	1631	0.18
1.3 Mine, dump and construction sites	2584	0.28
1.4 Artificial, non-agricultural vegetated areas	232	0.03
2. Agricultural areas	**289458**	**31.22**
2.1 Arable land	122597	13.22
2.2 Permanent crops	6641	0.72
2.3 Pastures	10545	1.14
2.4 Heterogeneous agricultural areas	149675	16.14
3. Forest and seminatural areas	**567464**	**61.20**
3.1 Forest	16130	1.74
3.2 Shrub and/or herbaceous vegetation associations	303317	32.71
3.3 Open spaces with little or no vegetation	248017	26.74
4. Wetlands	0	0
4.1 Inland wetlands	0	0
4.2 Coastal wetlands	0	0
5. Water bodies	**60048**	**6.48**
5.1 Inland waters	60048	6.48
5.2 Marine waters	0	0
TOTAL	**927176**	**100**

According to the Land Use Capability Classification (LUC), the lands in Elazığ Province have been examined in 8 classes. Accordingly, the highest spatial distribution constitutes I. class agricultural lands, the least spatial distribution constitutes VII. class agricultural lands. Looking at the LUC map, it is seen that the I. class agricultural lands are concentrated in the city centre of Elazığ [6] (see Figure 3).

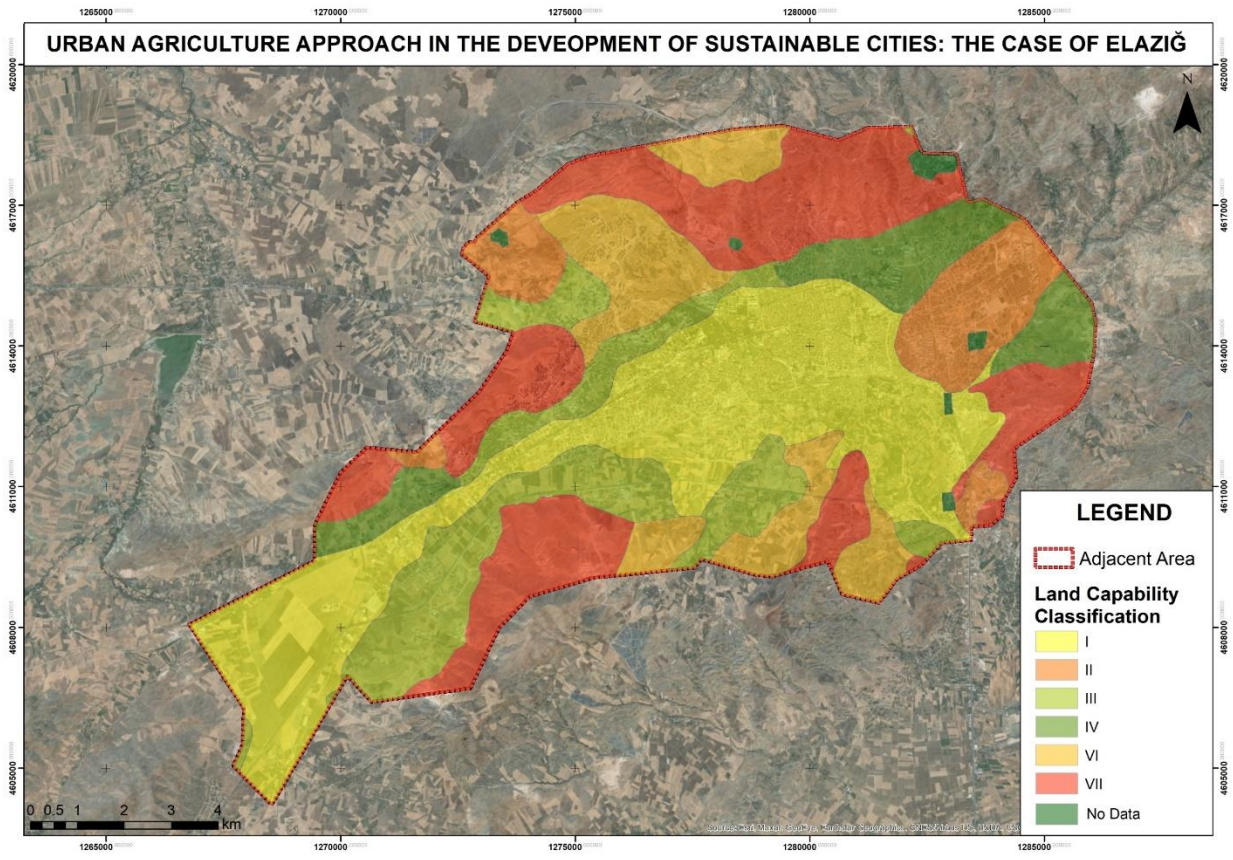

Figure 3: Elazığ province land use capability (LUC) classification [6].

Various size soil groups have been formed for reasons such as climate and topography in Elazığ. Apart from these, there are some types of land that do not have ground cover. Considering the distribution of Great Soil Groups (GSG) in Elazığ Province, the most areal distribution is brown soils (B) and the least areal distribution is basaltic soils (X). Looking at the Elazığ Province Great Soil Groups (GSG) land distribution map, it is seen that most of the alluvial soils are concentrated in Elazığ city centre [6] (See Figure 4).

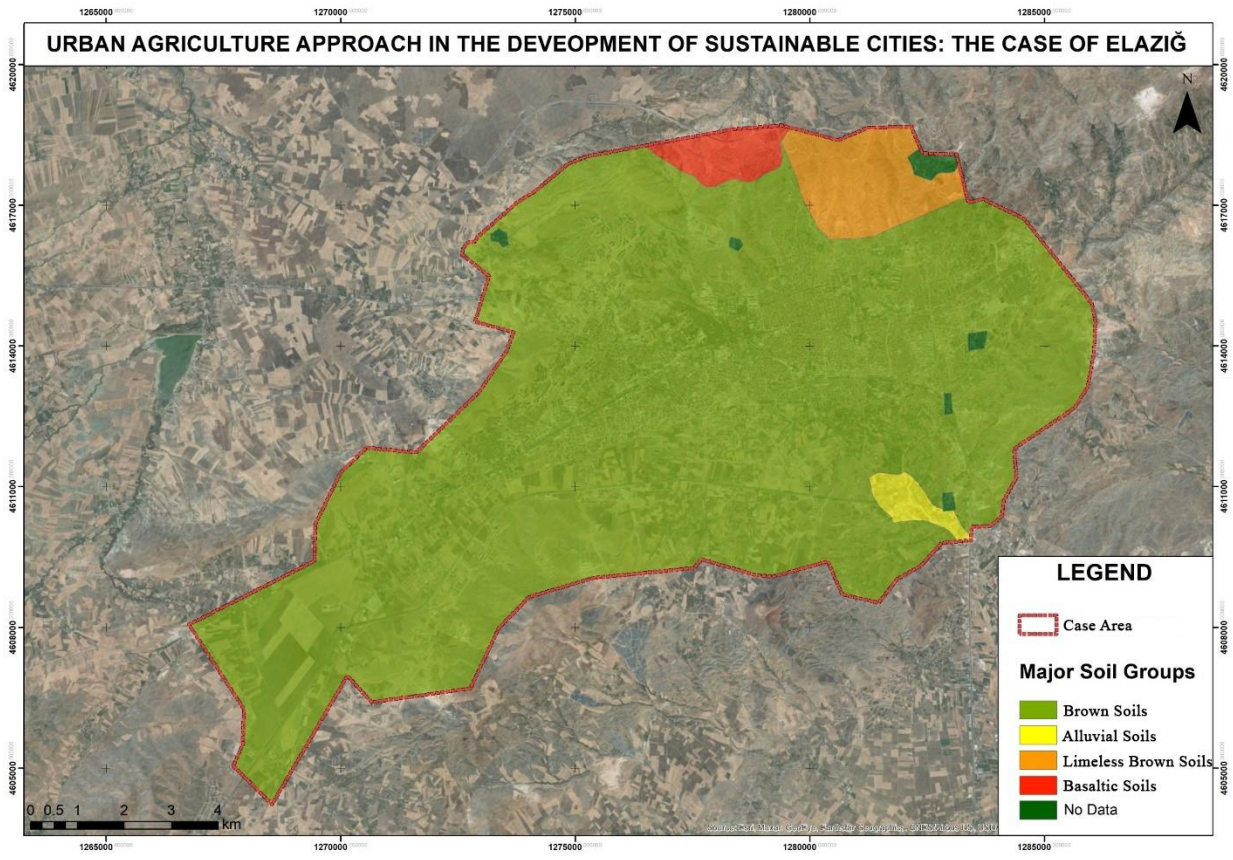

Figure 4: Elazığ province great soil groups (GSG) land distribution [6].

64 people are per square kilometre in Elazığ province, with a surface area of 9,313 km^2. The population density of Elazığ province is 64 / km^2 [8]. According to the Turkey Statistical Institute data, 77% of the province's population lives in urban areas and 23% live in rural areas. Urban population is much more than rural population. There is a continuous migration from the villages to the city centre.

Elazığ city centre was established in the most productive area of the province. Due to the insufficient amount of annual rainfall, dry agriculture system is generally performed in the province. In Elazığ province, large agricultural farms are outside the city. Vegetable production in the city is mostly done in the form of small family businesses. There are usually small livestock enterprises on the city wall and this trend decreases as we approach the centre.

Urban agriculture is not a conscious activity in Elazığ province. The contribution of urban agriculture to the socioeconomic and ecological structure of the city is still not fully understood. With the increasing population growth, urban agriculture has moved further away from the city centre. Due to the high value of the land in the city, the urban agriculture has been ignored.

3.2. Urban development of Elazığ province

Since 1834, the Harput community has descended to the Elazığ Plain, where agricultural activities are carried out [9]. Harput is a historical city where security needs come to the fore and military barracks dominate. Elazığ is a city where transportation and agriculture opportunities are considered [10]. After this date, Harput started to lose its importance gradually. The first establishment place of the city is the section with Sarayatik and Çarşı neighbourhoods [11].

The main urbanization phenomenon of Elazığ started after 1980s. After the 1980s, Elazığ entered a rapid urbanization process due to reasons such as development of transportation, increasing industrial investments, establishment of regional directorates, opening of the university and construction of the Keban Dam in 1974. After this date, agricultural fields lost their agricultural characteristics with the effect of urbanization [9].

Today, Elazığ city shows a rapid development in vertical and horizontal directions [5]. The city centre, whose services are carried out by Elazığ Municipality, consists of 38 neighbourhoods [12].

3.3. The History of urban agriculture in Elazığ province

Elazığ and its surroundings have been one of the important centres where human communities have lived since ancient times. This place has been among the well-known regions since Palaeolithic ages. It has been one of the places preferred by people in the Neolithic and Chalcolithic ages [13].

Agricultural traditions in Elazığ province date back to very old times. Mamuret-ül-Aziz, which was known as that period, consists of wide and fertile valleys located between mountain ranges. Fırat and Murat rivers pass through here [14].

At the beginning of the twentieth century, Elazığ province was ranked 13th in terms of its share in the national income of the country. It is the 22nd largest agricultural region in the Ottoman Empire (including the Balkans) and its control and distribution functions of agricultural production are gathered in the Elazığ province [15].

The importance of agricultural crafts has been known by the notables of Harput. Community representatives were aware that agriculture was the main contributor to the development of the local economy of the Ottoman Empire and the welfare of the people of Harput. Therefore, in 1908, II. After the announcement of the Constitutional Monarchy, the idea of opening an agricultural school was put forward in Harput. This idea led people to work, the place was determined, money started to be collected. Meanwhile, the administrative level of the city also made various attempts to establish a textile factory in the Harput plain. In this way, silkworm growers operating in different villages will be able to bring the product they grow

here, turn it into silk and export it to Europe. But the start of World War I prevented the establishment of the agricultural school and the textile factory [15].

As in many regions of Anatolia, viticulture was very common in Harput and its surroundings [16]. Many grape varieties were grown in the region. Grape cultivation was made for different purposes such as edible, winter, dried nut, molasses and winemaking. In particular, wine growing has improved. Many mulberry trees have been grown because of silkworm and silk production. Mulberry is consumed both freshly and dried. Some of the dried mulberry has been turned into flour and used in desserts. Some of them are made of raki (Turkish drink) for use in meals, flaxseed and sesame seeds were grown and their oils were extracted. Although dairy products are not diverse, each family has produced enough milk products, cheese, curd, yogurt, butter, milk cream and sour cream. For a long time, Harput has been an important bazaar centre where people from the surrounding villages come and buy more agricultural tools [15].

It is rumoured that sericulture came to the Harput plain in the 1860s. With the increase of mulberry gardens, the city has turned into a silk-breeding centre. Mulberry fields have been created here and hundreds of family houses have been turned into silkworm production centres [15]. Elazığ has become the silk centre in the east of the Ottoman Empire and Bursa in the west. Even a silkworm school named “Darü'l Hakik” was established in Elazığ [10].

According to Saraçoğlu [17], one of the most important income sources of the region was "weaving". Harput and its surroundings are specialized in making silk fabrics called “Cicekli, Ceharkezi and Cetari”. In addition to meeting the needs of the local people, the woven silk fabrics were sent to neighbouring provinces and Istanbul for sale [16].

Hüseynik neighbourhood (now called Ulukent) become famous for its red and blue printing production. Summer clothes required for the soldiers of the Ottoman army were prepared here. The Syriac fence, which is produced in Harput region, has a red fabric type and sold in every Ottoman province, has become a very popular fabric. In order to dye the fabrics produced by the weavers, special dyes with a century-old history, which have been passed down from generation to generation as a professional secret, have been used. Root dye plant (*Rubia tinctorum*), fresh walnut shell, thuja and different plants were used to obtain durable red dye [15].

According to Baykara [18], the plant called Cehri used in yellow paint production around Harput was grown in large quantities. In Harput region, 130.000 tons of Cehri was produced towards 1885 and sent to Europe via Samsun province. Later, with the advent of artificial dyes, its production decreased, and in 1906 the amount of production decreased to 8.000 kilos [16].

Flaxseed was used to prepare candle oil. Many families have oil producing workshops. The flax seeds prepared here were exported to the surrounding cities. Throughout the 19th century, the cities and villages around Harput were brighten with this oil. Oil production decreased to a certain extent with the spread of kerosene lamps [15].

4. RESULTS AND DISCUSSION

Urban agriculture is one of the most important concepts of sustainable development as it addresses almost every aspect of sustainability. Urban agriculture is part of the urban ecological system and can play an important role in the urban environmental management system [19].

Urban farming styles are practiced in various forms and scales worldwide. Urban agriculture covers different forms from plants grown in small containers to large farms. There are many examples of cities in the world where agriculture is integrated into urban policies and strategies as a land use activity on a local, regional, national or global scale.

Integrating agriculture into cities encompasses a variety of forms, from incorporating agriculture in urban planning to developing close food supply networks [20].

The "Social Urbanism Model" initiated by the Mayor of Medellin in Colombia between 2004-2007 is an important urban planning approach. This project, which includes urban gardens, has gained an international character in providing a significant investment in the poor and most violent neighbourhoods, and has taken as an example world strategy to modernize and beautify the city [21].

Since the early 2000s, China has started to adopt a development strategy known as the "Urban Rural Integration Policy". Cities are integrated with rural areas in this process. As a result, village lands were transformed into state-owned urban development areas. One of these policies, the Plant Basket Program (cailanzi gongcheng), covers regional policies and plans to ensure an adequate regional supply of fresh vegetables, meat, dairy and seafood products. This has had successful regional results in most of China. According to estimates, the proportion of vegetables produced and consumed within the municipal boundaries was 40% in Beijing, 50% in Shanghai, 40% in Nanjing and 70% in Chengdu [22]. These examples have given rise to some insights into developing more sustainable cities that incorporate urban agriculture into open space infrastructure.

Urban agricultural practices vary from region to region and are carried out in different types, scales and locations. Uncertain regulations may deter urban food production. Producers may avoid producing food for fear of possible violations or penalties due to uncertainty. It should be clearly stated which parts of the city will be allocated to urban agriculture. Identifying areas that could potentially be used for urban agriculture

should include micro-planning elements. According to the urban agricultural production scale, large-scale areas should be located at the city periphery, and small-scale areas should be located close to the city centre (see Figure 5).

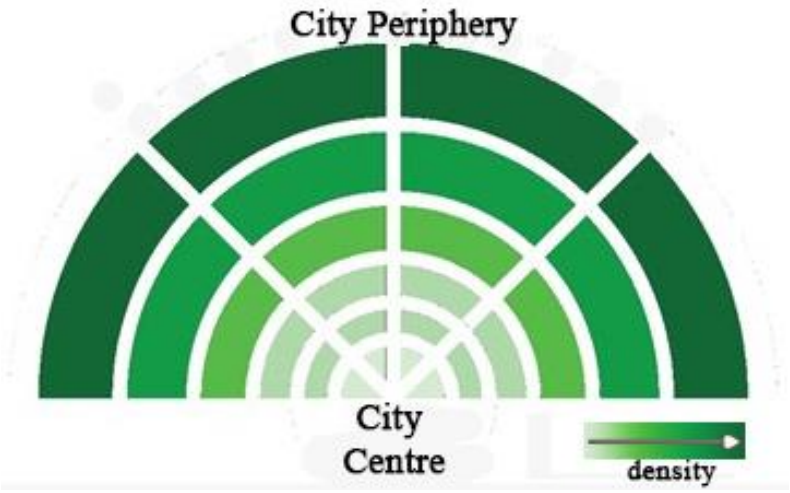

Figure 5: Urban agriculture production scale.

Women make up an important part of the urban agriculture population, as farming, processing and sales activities related to urban agriculture can often be combined with other tasks at home more easily. A high level of education is not required for urban agricultural activities. For this reason, urban agriculture can be implemented as an employment tool for women and children with low education level in Elazığ province.

According to the data of Boğaziçi University Kandilli Observatory, many neighbourhoods where the old settlements were located in the city centre were completely damaged due to the 6.8 magnitude earthquake that occurred in Sivrice district of Elazığ Province on January 24, 2020. Urban agriculture can be integrated into the redesign and planning of these neighbourhoods.

During the pandemic period that affects all countries in the world, sustainable urban agriculture can be an important tool both in the protection of the environment, biodiversity and natural resources, and in the provision of reliable food for the city people.

In recent years, with the increase in population density in settlements in the city, the importance of building elements such as roofs, balconies, terraces and walls has increased. Roof and terrace gardens are of great importance as they support some insect and bird populations. Green walls can help shape courtyards and gardens both ecologically and from a human health standpoint. A prime example in this area is the richly diverse planted wall gardens of artist and botanist Patrick Blanc. Balcony, terrace, wall and roof gardens can be used in terms of urban agriculture in every neighbourhood in the city of Elazığ. However, it is even more important in neighbourhoods with high population density.

Recent studies have revealed that home gardens cover a significant part of the green areas of the city [23]. According to Oluoch et al. [24] the main characteristics of a home garden are:

- It is convenient to work at any hour because it is close to home
- Micro-scale, usually the size of a small plot
- Production is primarily for household consumption
- Management of the garden is provided by the household (wife, husband, children)
- Close to the water source
- Low-cost inputs are used
- Suitable for the cultivation of different types of vegetables
- Local vegetables and fruits are grown more.

Home gardens are traditionally used in the neighbourhoods of Elazığ city area. It can be given priority to home gardens in the neighbourhoods where single or two-storey houses where low-income people live are densely located. Neighbourhoods with high population density and suitable for roofs, balconies, terraces and wall gardens are shown in Table 2 in the Elazığ central area. The use of home gardens is traditionally done in the neighbourhoods within the Elazığ central area. In neighbourhoods where single or two-storey houses with gardens and low-income people are concentrated, home gardens can be given priority.

Site gardens are very important in terms of providing social environments for people living on the same site. While the zoning areas are developing, the areas where agricultural activities can be carried out should be included in the planning. In the neighbourhoods where the site areas are dense and suitable, urban agricultural areas can be created in the site gardens. Urban agricultural areas can be created in site gardens in neighbourhoods such as Ataşehir, Çayda Çıra, Sürsürü, which are newly opened for development, and in neighbourhoods where site areas such as Abdullahpaşa, Cumhuriyet, Çatalçeşme, Doğukent, Hilalkent, Karşıyaka, Olgunlar, Ulukent are dense and suitable.

There are many empty, unused, abandoned and idle lands in the city. Fertile lands in cities that have not yet turned into concrete areas can be turned into individual gardens. Local administrations can inventory the vacant lands in the city and rent them temporarily or periodically to be used in urban agricultural activities. Urban agriculture practices can be carried out in unused empty areas in all neighbourhoods within the Elazığ central area.

Table 2. Proposed agriculture typologies in the central districts of Elazığ.

	Typology								
Neighborhoods	Roofs Balconies Walls	Home Gardens	Site Gardens	Unused Empty Lands	Roadsides	Collective Gardens	Neighbourhood Parks	Institutional Gardens	Urban Farms
Abdullahpaşa		X	X	X	X		X	X	
Akpınar	X			X			X	X	
Aksaray		X		X	X	X	X	X	
Alayaprak		X		X	X	X	X	X	X
Ataşehir			X	X	X	X	X	X	
Cumhuriyet			X	X	X		X	X	
Çarşı	X			X			X	X	
Çatalçeşme		X	X	X	X	X	X	X	X
Çayda Çıra			X	X	X	X	X	X	
Doğukent		X	X	X	X	X	X	X	X
Esentepe		X		X	X	X	X	X	
Fevzi Çakmak		X		X	X		X	X	
Göllübağ		X		X	X	X	X	X	
Gümüşkavak		X		X	X		X	X	X
Harput		X		X	X	X	X	X	X
Hicret	X	X		X	X		X	X	
Hilalkent			X	X	X	X	X	X	
İcadiye	X			X			X	X	
İzzetpaşa	X			X			X	X	
Karşıyaka		X	X	X	X	X	X	X	X
Kesrik	X	X		X	X		X	X	
Kırklar	X	X		X	X		X	X	
Kültür	X	X		X			X	X	
Mustafapaşa	X	X		X	X		X	X	
Nailbey	X			X			X	X	
Olgunlar			X	X	X		X	X	
Rızaiye	X			X			X	X	
Rüstempaşa	X			X			X	X	
Salıbaba	X	X		X	X		X	X	
Sanayi	X	X		X	X		X	X	
Sarayatik	X			X			X	X	
Sugözü		X		X	X	X	X	X	
Sürsürü		X	X	X	X	X	X	X	
Ulukent		X	X	X	X	X	X	X	
Üniversite	X			X	X		X	X	
Yenimahalle	X			X	X		X	X	
Yıldızbağları		X		X	X	X	X	X	
Zafran		X		X	X	X	X	X	

The most well-known examples of green infrastructure in cities are found on the roadsides. Due to the aesthetic and functional properties it provides to the environment, many trees, shrubs, groundcovers, etc.

plants are used. However, with the increase in the number of vehicles in the city centres in recent years, the soils are faced with the threat of pollution due to the heavy metals caused by the heavy traffic circulation in the lands close to the highways. Cadmium, lead, nickel, zinc, mercury, copper and chromium are the leading heavy metals polluting the soil due to traffic. These heavy metals pose a threat to human and environmental health.

Heavy metal uptake of plants varies. In general, the highest amount of heavy metal accumulates in leaves; the lowest content accumulates in seeds [25]. Urban agricultural areas can be created by introducing restrictions in land planning for some products (such as not growing leafy vegetables in the areas close to the roads) on the roads where there is no traffic in the neighbourhoods of Elazığ city centre.

The term collective gardens refer to any cultivated land in which producer groups operate. These gardens are named differently according to the geographical region in which they are located. The term collective gardens is an umbrella term that encompasses various names such as family gardens or communal gardens in France, allotments in the UK, community gardens in the USA, hortas urbanas in Portugal. The first collective gardens have been established in the nineteenth century with increasing industrialization and urbanization [26].

Community gardens are a form of urban agriculture often reported to have food, social and environmental benefits [27]. Community gardens are today the largest component of urban agriculture. Community gardens are at the heart of any successful future work of urban agriculture [4]. Essentially, a community garden consists of land divided into small parcels for use by many individuals (or families), usually for food production. Production is usually done for personal use, family or friends. The resulting products are rarely sold. Community gardens members share responsibility for common areas. One of the main benefits of community gardens is, access to land for city dwellers who do not have enough space to grow their own food. These gardens provide access to fresh fruit and vegetables and engage residents with the local food system [28].

The planners of the city of Seattle in the USA saw urban agriculture as an integral and necessary component of the city's open space network and adopted the goal of "one private community garden for 2,500 households in each neighbourhood" within the comprehensive urban plan [4]. There is no community, allocation or hobby garden in Elazığ Province. Collective gardens can be established at different scales depending on the population densities in the neighbourhoods located in the city.

In densely populated neighbourhoods, neighbourhood or city parks are other suitable areas for urban agriculture. Located in Detroit, Michigan, USA, “Lafayette Greens Edible Urban Garden and Park” consisting of fully organic and productive gardens is designed as a tool to beautify the city centre and help

educate residents about health, environmental responsibility and how to grow food [1]. Provided that the standards regarding urban agriculture activities to be held in the parks by local administrations are determined, urban farming areas can be created within the park in all neighbourhoods within the city of Elazığ.

The most suitable lands for urban agricultural practices are public lands. Unused and idle land offers great opportunities for the creation of urban agricultural lands. In Elazığ, institutional gardens for food production, donation, education, social integration and hobby purposes can be used partially or completely for the purpose of spreading urban agriculture.

Urban farms are large-scale farms established on large lands around the city by individuals, private companies or public institutions to meet the food needs of the city or to make commercial profits, and where all kinds of plant and animal activities are carried out. There are many successful examples of urban farms in the world. Medical University of South Carolina Urban Farm Charleston, located in Charleston, South Carolina, USA, was originally a parking lot and non-productive green space, but was converted into an urban farm by landscape architect Bill Eubanks and has become a base for a variety of activities. In addition to producing food, the farm provides a service network that promotes healthy eating and living for college students and the people of the Charleston area [1]. In the province of Elazığ, urban farms can be established in neighbourhoods close to the city periphery.

Every city has a value. Historical places, local dishes, natural and cultural values are some of them. Urban agriculture is a unique opportunity for Elazığ province to stand out not only with its historical architecture but also with its green, healthy and agricultural spaces. Considering the potentials of Elazığ province, it has many opportunities in this regard. The evaluation of these opportunities depends on the people and the managers of the people. However, urban sustainability discourses have long been neglected in Elazığ's urban planning.

Consumption of local products is expressed as an important element of urban agriculture [29]. According to Bosco and Marcelli [30], urban agriculture will expand in many cities as the food movement to consume local products becomes widespread. Local food systems are seen as a strategic policy tool in cities, not only in terms of environment or food security, but also because of their contribution to rural-urban systems [18].

Local products are important in ensuring food safety based on the principle of human access to healthy and fresh food. There are many local plant varieties grown in Elazığ city. However, with the preference of imported seeds and seedlings with high economic returns, the demand for local varieties decreased. Although local varieties cannot compete with imported varieties economically, they are more valuable than imported varieties in terms of health and taste. Urban agriculture is of great importance in ensuring local

food security. Acquisition of cultural food habits and local food consumption experiences will begin with the integration of urban agriculture as part of the community's infrastructure systems.

Gender equality is a fundamental societal value. The inclusion of women in the development period covers the near future.

The position of women in the development process was mentioned for the first time in the 1970s, and how development projects affect men and women became the agenda. Following this, the "Women's Year Declaration" was published together with the United Nations First World Women's Conference in 1975 [31]. Urban agriculture offers special benefits to women as producers or suppliers of foodstuffs in cities. Urban agriculture is a viable alternative for women who do not have access to formal employment due to their limited education or sociocultural factors that limit their free movement. Urban agriculture often encourages the use of national practices. Urban agriculture requires little cash, given that it can be done with low capital, low inputs and technology. Therefore, it is affordable and accessible to women with limited education and resources. Urban women can reduce their agricultural food expenditures. Excess production can turn into income generating activities through the direct sale of foodstuffs in the market [32].

The vast majority of urban farmers in the world are women. Only women's labour is used in 80% of agricultural enterprises in Kampala. In Kenya, this rate is 56%. In Yaound, Cameroon, 87% of urban vegetable farmers are women. Poland, Thailand, Senegal and Zimbabwe are other countries where female producers are said to outnumber urban male producers [33]. Women, who are the main actors in all stages of the urban food system (production, processing, marketing, food sales, etc.), have a fundamental structure in being accepted as an important focus group for urban planners [34].

In order to determine the role of women in urban agricultural activities, first of all, it is necessary to define the people working in urban agricultural activities. According to the literacy status of Turkey Statistical Institute data, while the number of illiterate men in Elazığ 4.419; the number of illiterate women is 18.120 in 2017 [35]. Accordingly, the number of illiterate women is more than four times the number of illiterate men. A high level of education is not required for urban agricultural activities. For this reason, these activities can be easily implemented by women with low education levels.

Urban agriculture offers practical, sustainable and alternative solutions to poverty, unemployment and food security as an important tool of urban development with the employment and additional income it creates in urban areas. Urban agriculture can play an important role in the lives of women with low income, living in slums, having economic disabilities, low income and low standard of living. For this purpose, it is important for women to take an active role in democratic life, to strengthen their ability to participate

actively in society, to strengthen their positions in the family, to acquire basic skills and competencies, to ensure their integration into the labour market, and to contribute to social and economic equality.

Diyarbakır Hevsel (Efsel) Gardens which an important urban agricultural garden in Turkey has been nominated to UNESCO in 2013, while 2015 has been declared World Heritage by UNESCO. Hevsel Gardens, which reveal a unique value that is open to public use, can be an exemplary model for Elazığ Province.

Local administrations have a very important role in the development of urban agriculture. Urban agriculture should be included in local policies to ensure sustainability, to develop more accurate understanding of regional and urban food provision, to provide urban aesthetics, to provide urban environmental management and to increase the importance of public health and economic development in Elazığ province. Municipal policies should have embracing approaches that view urban agriculture as part of the entire urban food system, covering different sectors such as food, environment, health, land use at national and local levels.

CONFLICT OF INTEREST STATEMENT

There is no conflict of interest among the authors.

CONTRIBUTIONS OF AUTHORS

F.Ç.: Conceptualization, methodology, software, validation, formal analysis, investigation, resources, writing—original draft preparation.

Y.M.: Conceptualization, methodology, software, validation, formal analysis, investigation, resources, writing—original draft preparation.

O.A.: Conceptualization, methodology, software, validation, formal analysis, investigation, resources, writing—original draft preparation.

REFERENCES

[1] Philips, A., 2013. Designing Urban Agriculture: A Complete Guide to the Planning, Design, Construction, Maintenance, and Management of Edible Landscapes. Canada, 276 p.

[2] Topal, A. K., 2004. Evaluating the sustainability of Turkey's urbanization process. Turkish Administrative Journal. 107-130.

[3] Boukharaeva, L. M., Marloie, M., 2015. Family Urban Agriculture. Springer International Publishing, Switzerland, 215 p.

[4] Nordahl, D., 2009. The New Urban Agriculture. London, England, 195 p.

[5] Şengün, M. T., Üstündağ, O., 2011. A Geographical View on the Distribution of Green Space Uses in Elazığ City Center. Eastern Geography Magazine; Vol 14, Number 22. Erzurum.

[6] Elazığ Provincial Directorate of Agriculture and Forestry, 2020. Accessed on 09.10.2019 from https://elazig.tarimorman.gov.tr/

[7] European Environment Agency (TÜİK), 2019. Accessed on 21.12.2023 from https://www.eea.europa.eu/en

[8] Anonim, 2019. Accessed on 09.10.2019 from https://www.nufusu.com.

[9] Mor, A., Çitçi, M. D., 2011. Environmental Problems of Elazığ City. Eastern Geography Magazine; Vol 13, Number 19. Erzurum.

[10] Akdemir I. O., 2013. Geographical Analysis of the Urbanization Process of Elazığ. Fırat University Harput Application and Research Center, Harput Symposium From Past to Future, Elazığ.

[11] Karakaş, E., 1999. Development of Elazığ City. Journal of Urban Agriculture. Volume: 9 Issue: 1, Page: 129-154, Elazığ.

[12] Elazığ Municipality, 2019. Accessed on 09.10.2019 from https://www.elazig.bel.tr.

[13] Baş, Y., 2016. History of Sarıyakup Village in Elazığ Province. Eastern Geography Magazine; Bingol University Journal of Social Sciences Institute, Year: 6, Volume: 6, Number: 12. Bingol.

[14] Fırat University, 2019. Accessed on 28.01.2019 from http://web.firat.edu.tr/cografya/eg/dogal.html#2.3.%20%C4%B0klim

[15] Anonim, 2018. Accessed on 15.12.2018 from https://www.houshamadyan.org/tur/haritalar/mamuret-uel-aziz-vilayeti/harput-ovasi/yerel-oezellikler/evler-ve-mimari.html.

[16] Hayli, S., 1992. Historical Geography of Harput. Ph.D. thesis, Fırat University, Elazığ.

[17] Saracoğlu, H., 1956. Doğu Anadolu ,Cilt 1, Türkiye Coğrafyası Üzerine Etüdler, Maarif Vekaleti Neşriyatı,İstanbul.

[18] Baykara, T., 1988, Anadolunun Tarihi Coğrafyasına Giriş I, Türk Kültürünü Araştırma Enst. Yay.86, Seri 7, Sayı A. 7, Ankara.

[19] Bruinsma, W., Hertog, W., 2003. Annotated Bibliography on Urban Agriculture. Leusden, The Netherlands: ETC-RUAF Foundation, pp. 446-467. http://www.ruaf.org/sites/default/files/annotated_bibliography.pdf

[20] Callau, S., Montasell, J., Villa, A., 2017. Food Cells and Food Nodes. Two new concepts for rethinking traditional urban and food planning practices. The case of Barcelona's metropolitan region (pp: 111-128). In: Soulard, C., Perrin, C., Valette, E. (Ed.), Toward Sustainable Relations Between Agriculture and the City. Springer International Publishing, Switzerland.

[21] Hammelman, C., 2017. Relying on urban gardens for survival within the building of a modern city in Colombia (pp: 159-170). In: WinklerPrins, A. (Ed.), In Global Urban Agriculture. CAB International, Boston, USA.

[22] Horowitz, S. S., Liu, J., 2017. Urban agriculture and the reassembly of the city: lessons from Wuhan, China (pp: 207-219). In: WinklerPrins, A. (Ed.), In Global Urban Agriculture. CAB International, Boston, USA.

[23] Gray, L., Diekmann, L., Algert, S., 2017. North American urban agriculture: barriers and benefits (pp: 24-37). In: WinklerPrins, A. (Ed.), In Global Urban Agriculture. CAB International, Boston, USA.

[24] Oluoch, M. O., Pichop, G. N., Silué, D., Onyango, M. O., Diouf, M., Shackleton, C. M., 2009. Production and Harvesting Systems for African Indigenous Vegetables (pp: 145-175). In: Shackleton, C. M., Pasquini, M. W., Drescher, A. W. (Ed.), African Indigenous Vegetables in Urban Agriculture, U.K.

[25] Lock, K., Zeeuw, H., 2003. Health and environmental risks associated with urban agriculture. (pp: 244-278). In: Sida (Ed.), Annotated Bibliography on Urban Agriculture. Stockholm, Sweden.

[26] Scheromm, P., Mousselin, G., 2017. The Proliferation of collective gardens in Lisbon (Portugal) and Montpellier (France): Urban residents demand and municipal support (pp: 201-218). In: WinklerPrins, A. (Ed.), In Global Urban Agriculture. CAB International, Boston, USA.

[27] Byrne, J. B., Pickering, C. M., Guitart D. A., Castley, R., 2017. A Political ecology of community gardens in Australia: From local issues to global lessons (pp: 118-133). In: WinklerPrins, A. (Ed.), In Global Urban Agriculture. CAB International, Boston, USA.

[28] Parece, T. E., Campbell, J. B., 2017. A survey of urban community gardeners in the USA (pp: 38-49). In: WinklerPrins, A. (Ed.), In Global Urban Agriculture. CAB International, Boston, USA.

[29] Viljoen, A., Bohn, K., How, J., 2005. More food with less space: Why bother? (pp: 19-31). In: Viljoen, A., Bohn, K., How, J. (Ed.), In Continuous Productive Urban Landscapes: Designing Urban Agriculture For Sustainable Cities. Architectural Press, Oxford, UK.

[30] Bosco, F. J., Marcelli, P. J., 2017. Gardens in the city: Community,politics and place in San Diego, California (pp: 50-65). In: WinklerPrins, A. (Ed.), In Global Urban Agriculture. CAB International, Boston, USA.

[31] Doğan Günday, P., 2011. Ekonomik Kalkınmada Kadının Önemi ve Katkısı. Yüksek Lisans Tezi, Dokuz Eylül Üniversitesi, İzmir.

[32] Hovorka, A., 2003. Gender. (pp: 279-323). In: Sida (Ed.), Annotated Bibliography on Urban Agriculture. Stockholm, Sweden.

[33] Dubbeling, M., Merzthal, G., 2006. Sustaining urban agriculture requires the involvement of multiple stakeholders (pp: 19-51). In: Veenhuizen, R. (Ed.), Urban Agriculture for Green and Productive Cities. Ruaf Foundation, Philippines.

[34] Dulac, N., 2003. Reuse of organik wastes in agriculture. (pp: 511-553). In: Sida (Ed.), Annotated Bibliography on Urban Agriculture. Stockholm, Sweden.

[35] Turkish Statistical Institute (TÜİK), 2019. Accessed on 09.10.2019 from https://www.tuik.gov.tr.