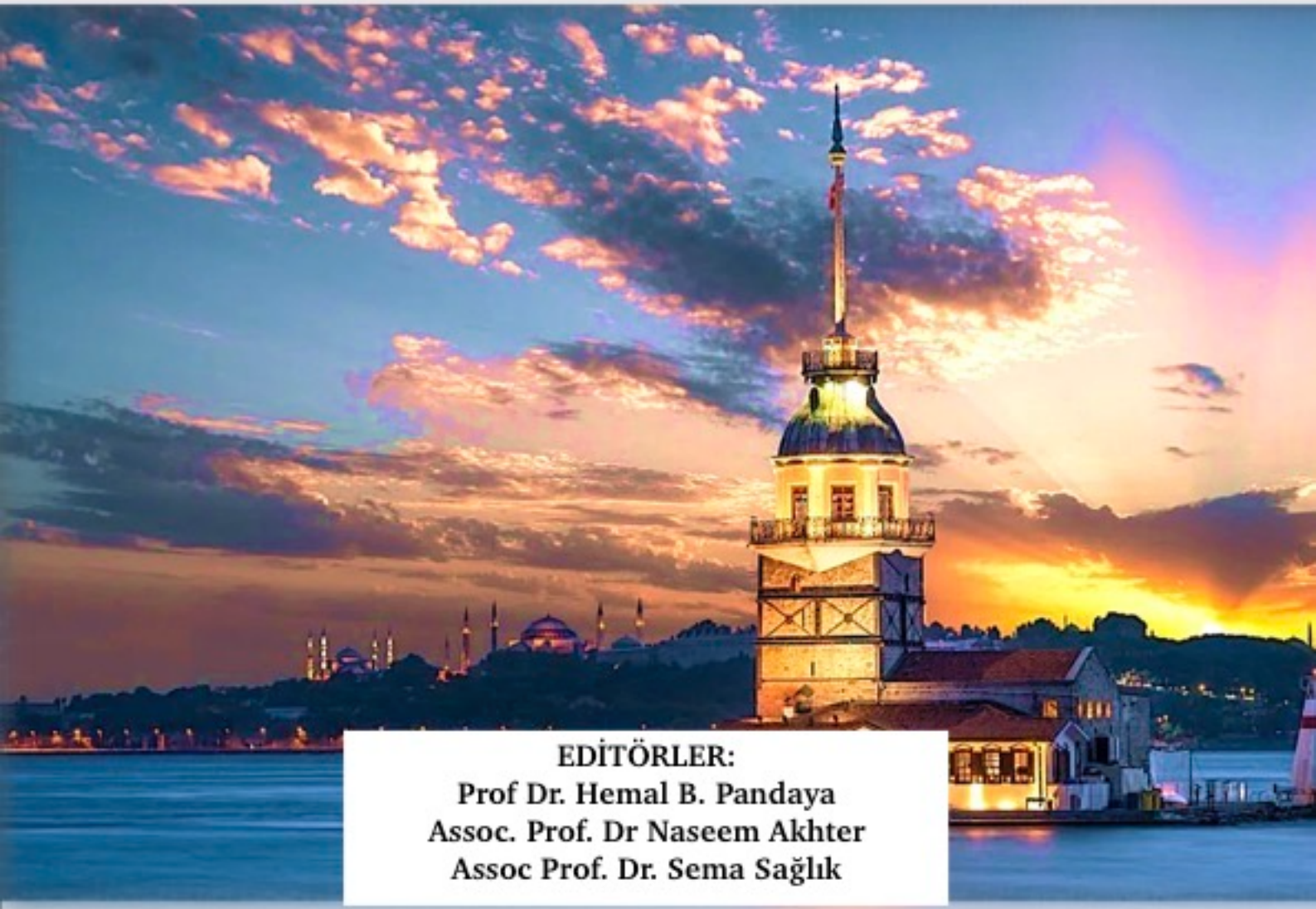
1.ULUSLARARASI ÜSKÜDAR BİLİMSEL ARAŞTIRMALAR KONGRESİ
19-20 TEMMUZ 2024
İSTANBUL



EDİTÖRLER:
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KONGRE KİTABI

CONGRESS ID

CONGRESS TITLE

1. INTERNATIONAL ÜSKÜDAR SCIENTIFIC RESEARCH AND INNOVATION CONGRESS

DATE AND PLACE

19-20 JULY 2024, İSTANBUL ONLINE PRESENTATIONS

ORGANIZATION

ISARC INTERNATIONAL SCIENCE AND ART RESEARCH CENTER

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Ersegün ALPER Salih PARLAK	Bursa Technical University	Preferred Old Tree Species Around Historical Buildings In The Historical Provinces Of Bursa And Bilecik
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URBAN AGRICULTURE, URBAN GARDENING IN KAYSERI

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ABSTRACT

Different alternatives are emerging for the sustainability of agriculture in order to meet the food needs of rapid urbanization and the increasing population in cities. Urban agriculture, which is the general name for agricultural practices carried out in the city, actually includes many processes and activities. At the regional level, in order to ensure the appropriate and effective use of resources and to activate the local potential, it is needed to take measures to ensure citizens' access to sufficient and healthy food and to protect and develop the natural resources of the region. Although diverse crops are produced in the TR72 Central Anatolia Region, agricultural production activities in covered areas such as greenhouses are very limited. Therefore, Central Anatolia depends on other regions for many agricultural products, especially fruits and vegetables. However, with urban agriculture, this dependency will disappear and new job opportunities will emerge in urban gardening areas. Consequently, it is evaluated that the development of production techniques in urban agriculture in accordance with scientific innovations as well as the planning of urban agricultural areas and the dissemination of practices will play an important role in making Central Anatolia Region stands out as a "self-sufficient region".

Keywords: Urban agriculture, urban gardening, sustainability, development, Kayseri

1. Introduction

Settled systems in urban agriculture; there are multiple benefits such as safe harvesting, low energy usage, low profit cost, low water usage, low transportation cost, wide product range, maximum crop yield and increased growing area (Açıkgöz and Memlük, 2004). ZFarming (zero-acre farming), defined as a form of agriculture that does not use agricultural land or open space, but instead uses unused areas; approach to agricultural land or open space use (as a form of agriculture that uses worked fields instead); rooftop gardens, greenhouses on roof gardens, green walls, indoor farms, vertical greenhouses (productive facades) are very durable forms on or in many that lie idle, and all kinds of food production related to breaking production (Ackerman et al. 2014). Greenhouse cultivation is one of the leading urban agricultural

practices in Turkiye and in the world. However, the basic input heating cost in greenhouse production is quite high, except for Turkish coastal regions (hot regions). However, for the reasons mentioned above, the use of city centers only for settlement purposes and the fact that urban transformation is carried out at the expense of agricultural areas have made the situation what it is today, and the urban-rural divide has deepened both in Kayseri province and throughout the region.

Considering that two-thirds of the world's population and 95 % of Turkey's population will live in urban areas by 2050, the importance of ensuring food security as well as livable areas with a high quality of life is unquestionably accepted. Urban agriculture, which is the general name for agricultural practices carried out in the city, is defined as a local system in which processes such as production-processing-distribution-consumption-disposal and recycling take place within the city or on its periphery. Achieving more balanced and holistic development basically requires that access to resources be equally easy for citizens residing in each settlement. The accessibility of food, as a basic source of life, has always been one of the most important factors in determining the location of human settlements, and therefore food resources were located in primitive settlements in direct connection with the urban structure (Ackerman et al. 2014). It is necessary to discuss the concept and content of urban agriculture, which is accepted as the reintroduction of agriculture to cities, to understand its necessity for food supply and security, and to produce urban policies and urban development strategies for sustainable and resilient cities. Climate changes, poverty and health problems are some of them (Yenigül, 2016). In current industrial food production systems, damage to the natural environment, low nutritional quality of agricultural products, and high energy consumption due to long distances traveled in food transportation lead to criticism of these systems. In this context, infrastructures should be established so that every city can supply basic foodstuffs from its own surroundings. Today, since the increasing cost of fuel used for food transfer exceeds the cost of fuel used in production, fruit and vegetable prices reach consumers much higher than the cost in the producer's field. It is aimed to achieve this balance with urban agriculture (Çarıkçı, 2019).

In addition to access to healthy food, urban agriculture is also a valuable tool in terms of social equality and economics. In general, urban agriculture envisages transferring food production activities from a certain number of existing production facilities to a large number of urban residents. Activities such as the production, processing, sale, cooking and recycling of local food are economic factors that provide income for families, support social participation and cohesion, and also reveal the cultural aspects of nutrition. As can be understood from here,

urban agriculture is recommended as a solution to many environmental, social and individual problems (Ackerman et al. 2014).

Research conducted in recent years by various organizations and institutions such as WHO, FAO, UNICEF and APA shows that by increasing accessibility to fresh vegetables and fruits through urban agriculture, healthy and affordable food can be provided, especially for low-income families and individuals with limited access to food (Rasouli, 2012). Especially in terms of ensuring local development, local production is considered an important factor in urban agriculture. Urban agriculture is an important step in creating sustainable cities that challenge the loss of green space that today occurs as a result of faltering economies, climate changes, population growth, threats of natural disasters, increasing construction and urbanization trends. Since it requires less transportation and less packaging costs in the context of production's proximity to the market, it also reduces dependence on fossil-based fuels and even electricity. In addition, it would be appropriate to mention the relationship between urban agricultural practices and waste management (Kanbak, 2018). In our country, where the urbanization rate climbs from 50% to 70%, the product cycle accelerates and consumption habits change very rapidly, waste management emerges as an important part of the circular economy and as an important opportunity with its greenhouse gas reduction potential in the fight against climate change (Yenigül, 2016; Orpak, 2021). For all these reasons, this compilation research was carried out in order to convey information on many different subjects such as urban agricultural practices, the usage areas and benefits of urban agriculture over the years, and what should be followed in urban agriculture, and to guide new agricultural projects.

2. What is Urban Agriculture? What Depends on Success in Urban Agriculture?

Modern agriculture includes growing techniques based on the use of water rich in nutrients, such as hydroponics, aeroponics or aquaponics, instead of soil (Bridgewood, 2003).

Urban Agriculture, on the other hand, refers to all agricultural activities in the urban fabric (urban) and around cities (peri-urban), which may include the cultivation of vegetables, fruits and other specialty crops (e.g. medicinal plants and ornamental plants) and animal farming (Orpak, 2021).

The success of urban farming practices, as in traditional rural agriculture, depends on several factors. These; climate, weather conditions, light, insects, land and other growing areas, land tenure, healthy and clean soil or other growing medium, water, labor, operating funds, financial and technical support, agricultural knowledge and skills, processing and transportation infrastructure, distribution channels, consumer demand and suitable markets. Urban planners and local governments regarding the implementations; They should consider in detail the issues

of access to working areas, land use rights and policies, and financial and technical support opportunities, and in addition, they should plan public policies in areas such as the organization of training programs necessary to increase agricultural knowledge and skills, production, processing, distribution and transportation infrastructure (Yenigül, 2016). Thus, urban agriculture, as a practice whose positive multidimensional effects are evaluated, can only be carried out in accordance with its purpose through multidimensional planning.

3. Urban Agriculture Examples from Turkey and the World

First of all, if we look at the USA, whose experience in urban agriculture goes back about 50 years, as an example of good practices; Lynchburg Grows (Lynchburg, Virginia), Kansas City Community Farm (Kansas City, Kansas), Earthworks Urban Farm (Detroit), Green Youth Farm (Chicago), Red Hook Community Urban Farm (New York), Growing Power (Milwaukee), and Hollygrove Market and Farm (New Orleans) can be considered among the successful examples of developing hybrid urban agriculture (Rasouli, 2012). In this sense, the USA, which seems to have succeeded in blending commercial and non-commercial practices, also seems to have succeeded in spreading the practices to different areas of the country as a result of early experimentation.

One of the approaches to the planning and design of productive landscapes on an international scale is the Continuously Productive Urban Landscape. The Edible Cities Initiative is an initiative that repurposes urban areas for food production. Cities in the Edible Cities Network are Netherlands-Rotterdam, Norway-Oslo, Germany-Aldernach, Berlin, Spain-Barcelona (Sant Feliu de Llobregat), England-London (Letchworth Garden City), Slovenia-Šempeter-Vrtojba, Tunisia-Carthage, Uruguay-Montevideo, Cuba-Havana etc can be listed. It is recommended to examine the "Baix Llobregat Agricultural Park" in terms of management approach as an example of the urban agriculture area on the city perimeter in Barcelona, Spain. In addition, innovative understandings and practices in urban agriculture, which has gained international importance, should be researched and, in order to be implemented, studies should be carried out in cooperation with central government, local government, universities, private sector and non-governmental organizations. “Hydroponics, Aeroponics and Aquaponics” can be listed as innovative urban agriculture practices (Yılmaz, 2015).

When we look at Turkiye, it can be seen that urban agriculture has a long history, especially in Istanbul, even if it is not in its current sense. "Yedikule Gardens", which were effective in meeting Istanbul's vegetable needs from the Byzantine period until the late 20th century, are one of the first examples of urban agriculture in Turkiye. Yedikule Gardens in Istanbul and Meram Vineyards in Konya can be counted among these sources of inspiration. Atatürk Forest

Farm in Ankara is one of the first examples of urban agriculture (Açıkgöz and Memlük, 2004). Medicinal and aromatic plant production, which started with roses in the Western Mediterranean Region, especially in Isparta, has been continued with lavender in recent years. The production areas of plants such as sage and fennel are also increasing. In Kocaeli, it has been observed that the Metropolitan Municipality has planted medicinal and aromatic plants in a wide area within the city periphery with the "Medicinal Aromatic Plants Project (TABİP)". The news that the village of Deregümü, located on the periphery of the province of Isparta and connected to the center, started migration from city to village with the production of grapes, which can be described within the scope of urban agriculture, was featured in the national media. At this point, it is also known that the village produces greenhouse tomatoes that are sold outside the region. From this point of view, it is evaluated that a protective step can be taken in the field of urban agricultural practices by preserving the existing agricultural production role of this rural area, which is adjacent to the city and in the expansion area, and by integrating this area into the city. News about the grape production of Deregümü village can be accessed from the link below. Akdeniz University's project titled Rising Trend Aquaponics: an example of sustainable urban agriculture for a sustainable environment essentially serves applied teaching activities at the faculty of aquaculture (Orpak, 2021).

4. Urban Agriculture Models

Urban agriculture can be done in areas that concern the entire city geographically, as well as in areas that concern an individual or a community, such as the interior of a building. Based on this, it should be noted that urban agriculture can be produced at different scales in space (Kayasü and Durmaz, 2021):

- On an architectural scale: interior, balcony, terrace and roof productions, vertical gardens

- At the neighborhood scale: residential gardening, market gardening, StreetSide (pot production), park gardening (edible landscaping),

- On an urban scale: allotment gardens, community gardens, hobby gardens, greenhouse cultivation, fringe fields, urban farms, guerrilla gardening.

4.1. Vertical Gardens (Vertical Farming)

Vertical garden applications are a method of positively evaluating the buildings that have become increasingly tall due to the increasing urban population and the fact that cities have a single or small number of centers. Although the development of skyscrapers or high-rise buildings is largely attributed to modern urban planning, it is stated that technological, social

and economic developments are also effective behind this situation, and it can be said that this situation is mainly triggered by the need for housing as a result of rural-to-urban migration (Birkby, 2016; Çarıkçı, 2019).

4.2. Flowing Water Culture Devices (Hydroponic and Aquaponic Systems)

Hydroponic system is a soilless farming practice in which plants develop by obtaining nutrients from liquid solutions. In the system where the roots of the plants are placed in nutrient solutions, the transformation of the liquid solution and the necessary nutrient needs are constantly monitored.

As for the aquaponic system, this is simply taking the first one step further by including fish in the hydroponic system. In this system, while the fish produce waste with high nutritional value for the plants, the water of the aquarium always remains livable for the fish as the plant roots serve to filter the water reaching them (Orpak, 2021).

4.3. Community Gardens (Agrihood)

After vertical farming practice, which perhaps requires national acceptance due to its costs, and flowing water culture systems, where individual practices are possible, on the contrary, it would be appropriate to examine community gardens, which can be positioned at a medium scale compared to these two. Gardens located on public, vacant and open land in the city (for example, the sites of community centers, churches and schools). It is usually run by horticulturists or a non-profit organization/association. These include educational gardens, healing gardens and social gardens (Yavuz et al. 2023).

4.4. Allotment gardens: Types of gardens consist of areas divided into small plots, usually rented through municipal contracts. They can be managed by an organized group or even through the formation of a gardening association. Its functions mainly have a leisure approach.

4.5. Roof Gardening: Gardening can be done on the roofs of buildings in areas where the inside and surroundings of the building are not sufficient. Here, cultivation can be carried out in open and covered environments (greenhouses, tunnels, etc.).

4.6. Hobby Gardens: Hobby gardens established in cities are examples of urban agricultural areas that are highly demanded by urban people. In the planning and design of hobby gardens, the provision of expert support and the functionality of rational management and monitoring mechanisms are important in terms of sustainability of natural resources and healthy food production.

5. Goals of Urban Agriculture

• To ensure the continuity of safe and healthy local food production (Ackerman et al. 2014).

• Cultivating organic and natural products.

• To utilize vacant lands for production.

• To ensure recognition of plant species.

• Sharing information about crop cultivation.

• To give basic education about agriculture to children and young people and to train them in this regard.

• To ensure integration with the soil.

• Providing affordable products.

• To create the spirit of solidarity.

• To improve neighborhood culture and neighborly relations.

• Creating a social gathering area.

• Bringing different generations together.

• Organizing festivals and events.

• Building social capital and encouraging community participation and encouraging community participation (Ergun, 2020; Kayaüstü and Durmaz, 2021).

6. Advantages of Urban Agriculture

Any area without special features where light, temperature and humidity are adjusted according to the plant (vertical farming takes up less space)

• The carbon consumed for the production of 1 kg of dry matter is less, with 1 liter of water, more units of dry matter are produced, the damage to the environment is less.

• Close distance (consumption close to the consumption area)

• Earning space

• Save time: 45 days in the field and 21 days in this

• Covering capital in 18 months

• Ecology tuning

• Using water economically

• Low carbon footprint and environmental impact

• Independent of climate

• Fresher, lower transportation and cost-effective production

• Vegetables and some fruits (especially green arugula)

• Production without risk (negativities such as high and low temperature and humidity in ecological conditions do not occur in this production system)

7. Key Benefits of Urban Agriculture

Urban agriculture has important benefits in terms of the sustainability of cities in three different dimensions: ecological, economic and social. Contributions of urban agriculture from an ecological perspective: positive contribution to urban landscape quality by increasing urban open-green areas by utilizing idle areas, increasing biodiversity, decreasing heat island formation in cities by increasing green infrastructure, reducing surface water flow and increasing the flow of water, which is important as a natural resource, into the soil. ensuring the retention of air pollution, making a positive contribution to air quality by reducing air pollution caused by exhaust gases by marketing the products on-site, etc. can be listed. Contributions of urban agricultural areas include adaptation to climate change and flood, inundation, etc. is also considered as risk reduction (Rama and Damsten, 2018). From an economic perspective, urban agriculture is an important means of employment. On-site production contributes to the prevention of economic losses arising from processing-cooling-packaging and transportation (Açıkgöz, 2021). Urban agricultural areas are also areas that allow recreational activities and socialization. It has been observed that during the epidemic period, it had positive effects on the physical and mental health of urban people, who had the opportunity to meet with nature, especially in production landscapes such as urban agricultural areas.

8. Conclusion

Considering the global problem of climate change, natural resource consumption and environmental threats, there is concern for the future of new generations. Today, traditional urban agriculture practices may be insufficient to solve the problems. For this reason, innovations are needed to create a more livable future and to also provide social and economic opportunities. Innovative urban agriculture practices, including open-air farms, vertical farming, roof gardens-greenhouses, interior design and turning the physical areas of closed

factories or businesses in idle organized industrial zones into agricultural production areas, are on the agenda. Finally, the vacant facilities or structures (factories, farms, businesses, etc.) in the highlighted cities have been converted into greenhouses or greenhouse-like production areas, especially for production with doors, to reduce the cost increases (mostly transportation) that have recently occurred in cases such as pandemics, natural disasters, wars and economic crises. In these areas, it will be possible to prevent our needs for vegetables (tomatoes, cucumbers, peppers, eggplants, greens, etc.), which are among our basic food needs, by producing them on site. The basis of these cost increases is the increase in fossil fuel prices (diesel oil and gasoline). These fuels are used both in various stages of production under field conditions, and in the transportation channels of the distribution chain of these products, vehicles consume fuel in the transportation of vehicles from city to city, region to region or country to country. For this reason, the idle capacity mentioned in large industrial cities such as Kayseri will contribute to the meeting of the city's own needs of products that can be produced with new methods, especially in greenhouses or covered areas, and indirectly to the increase in agricultural employment. In addition, Urban Gardening should also be included on the other side of urban agriculture. Urban Gardening tends to become an important means of income and food source for many people in the near future. Especially with the vertical gardening technique, individuals will have the opportunity to produce vegetables and fruits in extremely limited areas. On the other hand, the recreational use of urban gardening tends to be an invaluable experience, especially for the children and elderly population.

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