

## EMPLOYING SPATIAL INFORMATION TECHNOLOGY IN ANALYZING AGRICULTURAL LAND USES IN URBAN AREAS: THE CASE OF AL-KARRADA EAST

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### **Abstract:**

One of the most significant urban elements that contribute to enhancing the quality of environmental life and improving the urban environment is urban agriculture, which plays a vital environmental and social role in the urban life of cities. One of the major challenges facing the technology dissemination of urban agriculture is the methodology for selecting suitable sites for it, and how to choose the right type of urban agriculture for each area. This is because promoting urban agriculture is linked to two factors: the first is the social benefit it achieves, and the second is the economic aspect represented in its sustainable maintenance. Therefore, solving this problem involves effective spatial analysis of the urban potential of each area, to achieve the research objective through an efficient and effective selection process for urban agricultural sites within the urban area's capabilities. The research assumes that adopting spatial analysis techniques will effectively help in increasing the spread and improving the efficiency of urban agriculture in cities. The study area was chosen in the Al-Karrada sector within Baghdad, Iraq, which is characterized by increasing density of various urban uses and population density, along with the encroachment of built-up areas on the green spaces in the region. By adopting spatial analysis techniques, including satellite imagery and Geographic Information Systems (GIS), the study area was analyzed based on spatial indicators for urban agriculture to develop a suitable strategy for this area to choose sites for urban agriculture that are beneficial socially, economically, and environmentally at the same time. The research found that the transformation of many orchards and agricultural lands into residential, commercial, urban spaces, and other uses has led to a reduction in orchards and open urban spaces in the study area, negatively affecting the environmental, aesthetic, and economic aspects of the region. Therefore, it is important to recommend working on increasing the spread of urban agriculture and employing effective spatial analysis of urban potentials for each area for an efficient selection of urban agriculture sites.

**Keywords:** Urban Agriculture, Social Benefit, Geographic Information Systems, Baghdad.

### **Introduction:**

One of the most significant urban elements that contribute to enhancing the quality of environmental life and improving the urban environment is urban agriculture. It plays a crucial

environmental, social, and economic role in the urban life of cities, in addition to its function as a source of food.

Despite the primary benefits of urban agriculture, awareness of this potential is low in some cities. There is an urgent need to address this and attempt to remove the barriers that prevent the enhancement and widespread access to urban agriculture, achieving its multifunctional benefits. It is clear that widespread access to urban agriculture is not a cure-all for all of the city's problems. However, if implemented well, it can make a significant contribution to addressing a number of urban issues such as the decline in the quality of public spaces, the lack of green spaces, the effects of climate change, gaps in knowledge about food, environment, and agriculture, reduced well-being, and the ability to live in urban areas.

When urban agriculture is realized in the city, such as growing vegetables in soil in a variety of locations including rooftops, inside buildings, on balconies, etc., and using multiple production methods including organic and conventional soil farming, hydroponics, and so on, the widespread access to urban agriculture can be an individual initiative or a collective effort to produce food and non-food products, as well as other services such as education, recreation, healthcare, and more.

### **Research Problem:**

One of the key challenges facing the concepts of urban agriculture dissemination is the methodology for selecting suitable sites for it, and how to choose the appropriate type of urban agriculture for each area, in addition to the transformation of agricultural land use in the city into other uses such as residential and commercial. Therefore, the research will address how to increase the spread of urban agriculture through the effective employment of spatial analysis of urban potentials, facilitating the process of choosing urban agricultural sites and encouraging urban agriculture in an area with high population density, and how to prevent the conversion of most agricultural lands into other uses.

### **Research Objectives:**

The primary goal of the research is to promote and spread urban agriculture, which is linked to three important elements. The first is the social benefit it achieves, the second is the economic dimension represented in its sustainable conservation, and the third element is the environmental dimension, represented in the environmental benefits and maintaining a good environment for the city.

### **Research Significance:**

The significance of the research lies in effectively linking urban infrastructure with environmental structure. Promoting urban agriculture will activate three important elements in urban sustainability: the first is social benefit, the second is the environmental benefits it achieves, and the third is the economic dimension represented in the continued production and conservation of local food.

**Research Methodology:** The research will adopt an analytical approach based on spatial analysis using Geographic Information Systems (GIS), satellite imagery, and comparative analysis between areas.

### **Theoretical Framework:**

**Concept of Urban Agriculture:** Urban agriculture is the utilization of any available space of land in cities, even if small, for food production. The aim is to exploit available resources and unutilized spaces in cities from vacant lands, whether private (inside houses) or public (gardens, spaces between buildings, or in hospitals, schools, and roadside areas) for growing vegetables and various food crops. This may include other food production activities such as poultry farming, animal husbandry, aquaculture, etc., either for the purpose of providing fresh and healthy food to urban residents, or as an income-generating activity (Abu Shaaban and Awad, 2015).

Statistics indicate that more than 50% of the world's population lives in cities, a proportion expected to rise to 68% by 2050 (United Nations, 2018). These urban populations depend on rural areas for food supply. Moreover, the urban poor spend about 40-50% of their income on food. Therefore, urban agriculture could become a source of food and income for the urban poor, instead of a cost (Abu Shaaban and Awad, 2015).

### **Types and Patterns of Urban Farms:**

Classification according to agriculture patterns (Abu Shaaban and Awad, 2015):

1. **Plant Production:** This includes vegetable cultivation, medicinal and aromatic plants, and fruit orchards.
2. **Animal Production:** This encompasses breeding sheep, poultry, cattle, pigeons, ducks, beekeeping, and aquaculture.

Classification according to locations of agriculture (Pearson, Pearson, & Pearson, 2010):

1. Rooftop farming (rooftop gardens).
2. Front or backyard gardens of houses.
3. Gardens in schools, hospitals, public places, and community gardens.
4. Use of agricultural lands and orchards in the city.

Classification according to used agricultural methods (FAO, 2015):

1. **Soil-based agriculture:** The most common method, as seen in traditional farming, home gardens, orchards, and container gardening.
2. **Soil-less agriculture:** This involves using other mediums instead of soil, such as rock wool, peat moss, straw, sand, or gravel. This category also includes hydroponics and aeroponics, which rely on nutrient film techniques, mist, or spray irrigation.

These urban agricultural divisions can be practiced in open fields or in greenhouses.

Differences between Urban and Traditional Agriculture (Mougeot, 2000):

1. Reliance on simple resources.
2. Utilization of small spaces.

3. Providing families with the ability to produce food at home and ensure its safety.

Urban agriculture relies on using unexploited and simple resources. For instance, empty containers, reinforced plastic bags, unusable car tires, and plastic pipes of various diameters can be used, as well as plastic pots filled with soil (FAO, 2015).

Urban agriculture, with its various styles and models, focuses on using available resources in cities to produce food and reduce reliance on sometimes insufficient rural agriculture (Abu Shaaban and Awad, 2015).

Thus, urban agriculture can be defined as the practice of growing, processing, and distributing food in a city. It may include animal husbandry, aquaculture, agroforestry, and horticulture. It is carried out for income-generating activities or food production. This definition encompasses recreational areas and open green spaces in some communities.

It can also be defined as a sector that meets a city's food needs from within the city itself, using and reusing the city's resources. It is a complex system involving a spectrum of concerns from basic traditional activities associated with production, distribution, and consumption, including recreation, economic revitalization, community health and well-being, landscape beautification, environmental remediation and treatment, fitting within the scope of sustainable design, and often linked with political decisions to build sustainable cities (Garfieh, Mohamed Ali, and Ahmed, 2018).

### **Benefits of Urban Agriculture:**

The benefits of urban agriculture can be identified through three fundamental axes: economic, environmental, and social (see Diagram 1). These axes are also the pillars of achieving urban sustainability for cities. Therefore, one of the main objectives of urban agriculture is to create sustainable cities, as follows:

Firstly, Economic Benefit (Gottero, 2023):

1. Increasing food quantities.
2. Providing a source of income.
3. Utilizing plant waste as fertilizer in urban farms and gardens, reducing waste directed to landfills by up to 40%.
4. Reducing transportation costs of food to cities.
5. Investing in unutilized resources such as rooftops, roadside areas, and vacant lands.
6. Rooftop gardens increase durability and protection from weather fluctuations and UV rays, thus reducing cooling and heating costs.
7. Contributing to revitalizing local markets for urban agricultural products, increasing local employment, and reducing unemployment rates.

Secondly, Environmental Benefit (De Zeeuw, van Veenhuizen, & Dubbeling, 2011): Due to the ongoing reduction in agricultural lands caused by population density, especially in third-world countries, farmers have turned to intensive agricultural methods using chemical inputs like fertilizers and pesticides. These practices enable continuous land exploitation without rest periods

for the soil. Furthermore, climate change plays a significant role in affecting the environment, potentially increasing the frequency of natural disasters like droughts and floods, threatening and destroying the agricultural sector, endangering human lives.

Urban agriculture also plays a crucial role in (Abu Shaaban and Awad, 2015):

1. Mitigating high urban temperatures caused by the 'heat island' effect. Heat Island: A detrimental environmental phenomenon in large cities where there is a noticeable change in weather, primarily characterized by an increase in city temperature by up to 5 degrees Celsius compared to surrounding areas. This phenomenon is due to roads, buildings, and various structures absorbing and storing heat during the day and re-emitting it later, leading to higher temperatures and changes in city weather, disrupting the ecological system by trapping smoke, dust, and other elements.
2. Rooftops retaining up to 100% of rainwater, reducing runoff loss and irrigation requirements.
3. Rooftop gardens can also reduce noise, wind, and absorb carbon dioxide emissions.
4. Reducing methane emissions from waste dumps (Alwan K. H., 2023).
5. Decreasing the use of non-renewable energy (Alwan, alkinani, & Obaid, 2020).
6. Urban agricultural practices reduce the use of harmful chemicals in the soil (Ibrahim, 2023).

Thirdly, Health and Social Benefit (Gottero, 2023):

1. Increasing access to healthy food.
2. Enhancing community belonging and social networking opportunities for residents in shared farms and gardens.
3. Improving individual health through consumption of locally grown produce.
4. Increasing physical activity among individuals.
5. Providing food security in economic downturns, disasters, and wars.
6. Urban farmers can help protect public spaces from informal uses.

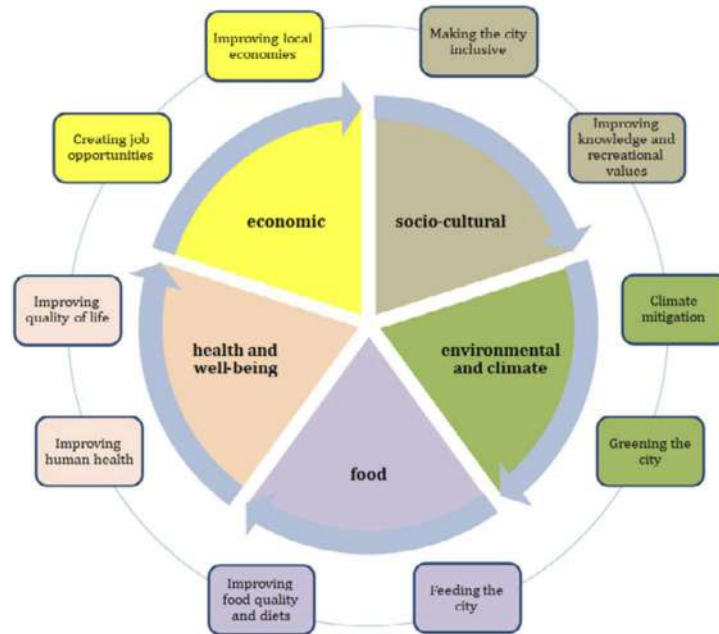


Diagram (1) illustrates the benefits of urban agriculture (Gottero, 2023).

Thus, the picture of the potential benefits achievable through urban agriculture becomes clear, and they can be succinctly explained in Table (1).

Benefit Area	Key Benefits
<b>Cultural - Social</b>	<ol style="list-style-type: none"> <li>1. Enhancing community choices and developing a sense of belonging.</li> <li>2. Sense of place.</li> <li>3. Advancing education, knowledge, innovation, and awareness about food, agriculture, and the environment.</li> <li>4. Improving recreational activities, leisure, and tourist attraction.</li> </ol>
<b>Environment and Climate</b>	<ol style="list-style-type: none"> <li>1. Reducing the impact of heat islands and urban heat.</li> <li>2. Increasing the quality and quantity of urban green spaces and green infrastructure.</li> <li>3. Conserving urban biodiversity.</li> </ol>
<b>Food</b>	<ol style="list-style-type: none"> <li>1. Improving food security.</li> <li>2. Enhancing food quality.</li> </ol>
<b>Health</b>	<ol style="list-style-type: none"> <li>1. Enhancing physical and mental health.</li> <li>2. Improving the quality of the local climate.</li> <li>3. Reducing the spread of pollutants and their treatment.</li> </ol>
<b>Economy</b>	<ol style="list-style-type: none"> <li>1. Improving local economies.</li> </ol>

	<p>2. Creating new employment opportunities.</p> <p>3. Fostering economic diversity and integration.</p>
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Table (1) illustrates the benefits of urban agriculture (Gottero, 2023).

**Practical Framework:**

**Study Area:**

Al-Karrada East in Baghdad City: History of the Study Area (Al-Karrada East): In ancient times, the area known as Al-Karrada East was called Kaloaza. Originally an isolated village, Kaloaza gradually came to denote the southern part of Baghdad, east of the Tigris River.

Al-Karrada East is an area deeply rooted in history, dating back to the Old Babylonian era. It has seen the rise of ancient civilizations, as evidenced by its archaeological mounds. This region is home to one of the oldest documented codes of law in human history, predating Hammurabi's code by two centuries. The laws of Pythagoras and other mathematical principles were known in this region since the Old Babylonian period. Artifacts found in the Aishan hills of Al-Karrada date back to the New Babylonian, Sasanian, and Islamic periods. These hills were once the site of a renowned village known as Kaloaza.

Al-Karrada East retained its ancient name, Kaloaza, through various phases of Islamic history, even after the fall of the Abbasid Caliphate in 1258 AD. It was famous for its antiquity, being older than Baghdad itself (Al-Karmali, 1329 AH). It had a significant commercial market before Al-Mansur built his round city, with people visiting it once a month on Tuesdays, hence the name 'Tuesday Market'. The area was an important and well-known town in the Abbasid era, bustling with life and stationed by the Caliph Al-Mansur in 201 AH (Ibn Al-Athir, 1965, p. 324). It was an agricultural area in the Abbasid period and thereafter, maintaining this characteristic until the end of the Ottoman rule in Iraq.

In the Abbasid times, Al-Karrada served as a leisure spot for the affluent, with a large central mosque for Friday prayers, indicating its significance in that era. Its prosperity is believed to have been linked to the construction of Al-Rusafa on the eastern side of the Tigris, opposite Al-Mansur's round city, and continued until its decline following the Mongol invasion of Baghdad. The region was known for activities and functions like agriculture, trade, and leisure services.

Agriculture was the primary and influential factor in the area, as it supplied other cities with various food items and fruits (Ihsan Sabah Hadi, 2024). During the Abbasid period, the area served as a support system for Baghdad, providing it with vegetables, fruits, and other foodstuffs. Agricultural production was abundant, and agriculture flourished even after the fall of Baghdad, with most orchards remaining fruitful, frequented by Baghdad's residents during holidays (Isaac, 1948, p. 77). However, it was later neglected.

Upon the British entry into Baghdad, Al-Karrada was a small village separated from the city by dense orchards and numerous farms (Figure 5-1). Since the early decades of the twentieth century, urbanization began encroaching upon it, increasing its population. The British established several official institutions in the area to control it. After the British occupation, the importance of leisure

and entertainment services increased, a stark contrast to their reduced significance during the Ottoman era, where many influential figures from the occupying authority spent their leisure time enjoying the beauty of its gardens, fields, and water.



Figure (1) depicts the Al-Karrada area in 1918, which consisted of orchards and mud houses.

Source: <https://www.pinterest.com/>

### **Location and Topography:**

The Al-Karrada East area is situated within the Al-Rusafa district, (Al-Karrada Secondary Sector), and has an approximate population of around 650,000 according to the Municipal Council of Al-Karrada. Al-Karrada East occupies the southern part of Eastern Baghdad on the eastern bank of the Tigris River, directly connected to the city center. Due to its geographical location in a central plain area, it is connected to various parts of Iraq through several outlets. This strategic location has significantly contributed to its transformation into a commercial area and a major transit center for vehicles, leading to an increase in its population and establishing it as a major consumer market. The topographical position of Al-Karrada and the nature of the surrounding land have been fundamental factors in its genesis and development. The area originated around the meander of the Tigris River and is characterized by its flat, alluvial plains with fertile soil suitable for agriculture. Most of the land comprises riverbank soils with good drainage, adjacent to the buried river basin soils enriched with silt, extending at a lower elevation.



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Sesban Restaurant and Orchard in Al-Jadriya:

This is one of the orchards in the Al-Jadriya area, where a restaurant was built in the late 1990s without cutting down any palm trees in the orchard. The construction of the restaurant was done legally, and a meeting was held with the owner of the restaurant and the orchard. This restaurant and orchard represent urban agriculture with recreational and tourism aspects (Garfieh, Mohamed Ali, and Ahmed, 2018).



Figure (1) shows images of the restaurant and the orchard behind the restaurant. Dated 23-01-2019.

Middle East Nursery in Al-Jadriya:



Figure (2) shows images of trellises, seedlings, protected cultivation, and the nursery. Dated 23-01-2019.

Haji Naji Orchard in Al-Jadriya



Figure (3) shows images of some of the date and palm production, and citrus trees in the orchard. Dated 15-09-2014.

Spatial Analysis and Comparison of Land Use in the Study Area for the Years 2000, 2007, and 2019: Land uses were mapped by the researcher using the Arc GIS program on aerial images of the study area for the years 2000, 2007, and 2019. By employing Geographic Information Systems (GIS) and satellite imagery, a comparison was made across these years. The following figures were used to understand the changes in land use over time during the period between the mentioned years. The calculation of land use areas in the program revealed the subsequent table for the specified years. This method is effective in analyzing land use (Zianab Abbas Ahmed, 2020).

Table (1) Comparison of Land Uses for the Years 2000, 2007, and 2019 in Square Meters

النسبة المنوية	المساحة الكلية لاستعمالات الأرض لعام 2019	النسبة المنوية	المساحة الكلية لاستعمالات الأرض لعام 2007	النسبة المنوية	المساحة الكلية لاستعمالات الأرض لعام 2000	الاستعمال
0.5%	93200	0.4%	77750	0.4%	77059	الديني
13%	2389175	15%	2725500	17%	3000561	المفتوحة
11%	2050605	10%	1888650	9%	1766921	الصناعي
2%	306185	1%	291680	1%	244389	مستشفيات
11%	1923085	7%	1283445	6%	1211116	تعليمي
8%	1306245	5%	927940	3%	698575	تجاري
0.4%	55480	0.2%	44895	0.2%	44895	فضاء حضري
10%	1788700	14%	2597320	14%	2597320	زراعي
3%	530790	3%	511975	2%	434535	اداري
42%	7536695	44%	7812790	44%	7989404	سكني
100%	17977145	100%	17977145	100%	17977145	المجموع

Source: The study based on satellite imagery and the Geographic Information Systems (GIS) database prepared for the study area, and the survey of land uses in the study area.

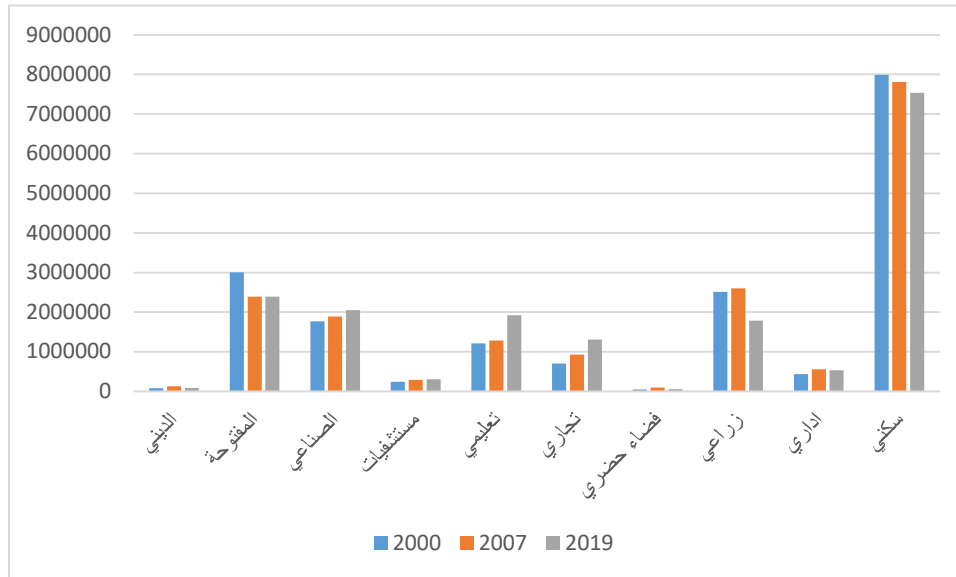


Figure (4) Comparison of Land Uses in the Al-Karrada Area for the Years 2000, 2007, 2019

Source: The study based on satellite imagery and the Geographic Information Systems (GIS)

database prepared for the study area, and the survey of land uses in the study area.

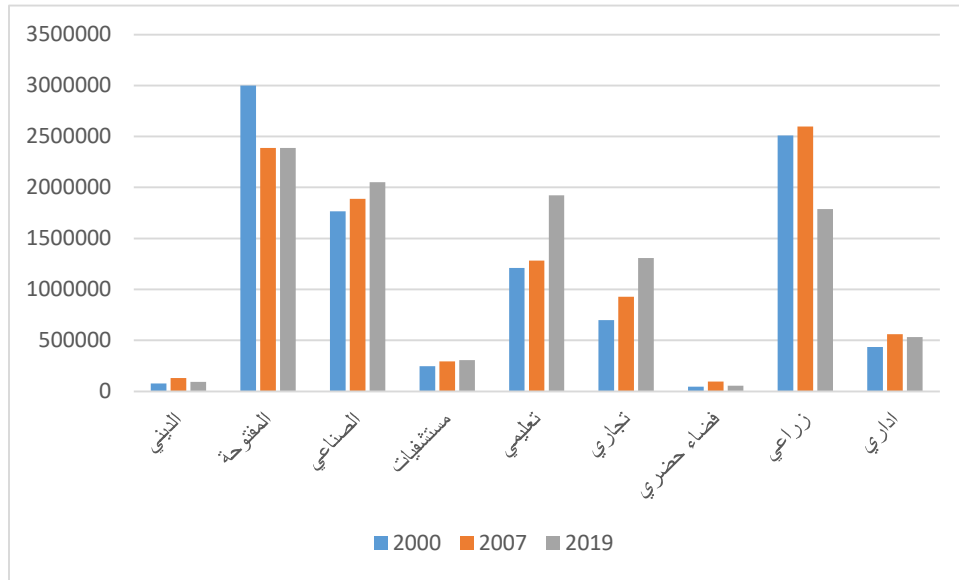


Figure (5) Comparison of Land Uses (excluding residential use) in the Al-Karrada Area for the Years 2000, 2007, 2019 Source: The study based on satellite imagery and the Geographic Information Systems (GIS) database prepared for the study area, and the survey of land uses in the study area.

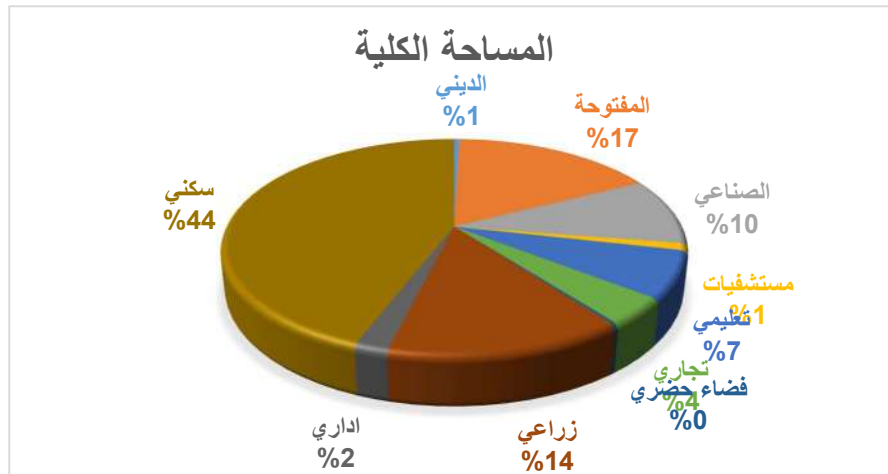


Figure (6) A diagram showing the percentage of total land use area for the study area in the year 2000.

Generally, from Table (1) and Figure (4) illustrating the comparison between the main land use areas in the Al-Karrada area for the years (2000, 2007, 2019), and also Figure (5) which shows the same comparison excluding residential use to clarify the comparison between different uses more distinctly (given the significant area of residential use), we find a clear decrease in the use of open spaces and agricultural land during the period from 2000-2019. The decrease in open space use was about 20%, while agricultural use recorded a reduction of 31% during the same period. In contrast, there was a noticeable increase in commercial and educational use. The increase in



commercial use from 2000 to 2019 was around 87%, while the increase in educational use was approximately 59% compared to 2000. This is attributed to the rise of private education in Al-Karrada at all levels - primary, secondary, and university.

This was accompanied by a slight increase in urban open spaces, which doubled in comparison to 2000, where their value was initially low, not exceeding 0.2% of the total use in the Al-Karrada area in 2000, reaching only 0.4% in 2019. It is also noted that the increase in health use, due to the rise in private investments in this sector, was about 25% compared to 2000.

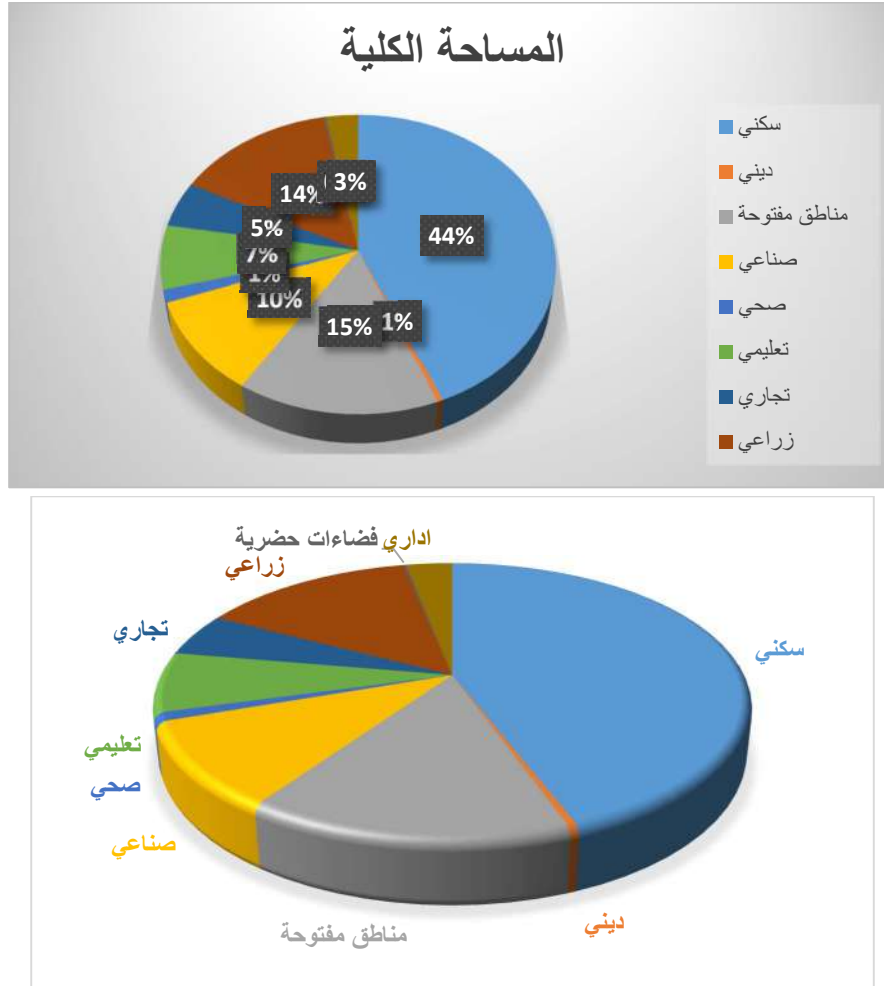


Figure (6) A diagram showing the percentage of total land use area for the study area in the year 2007.

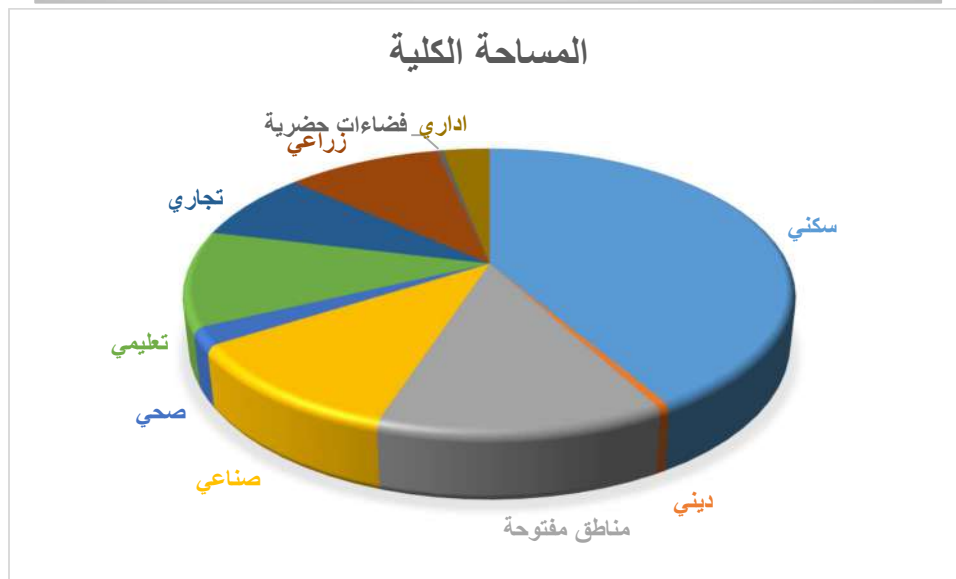
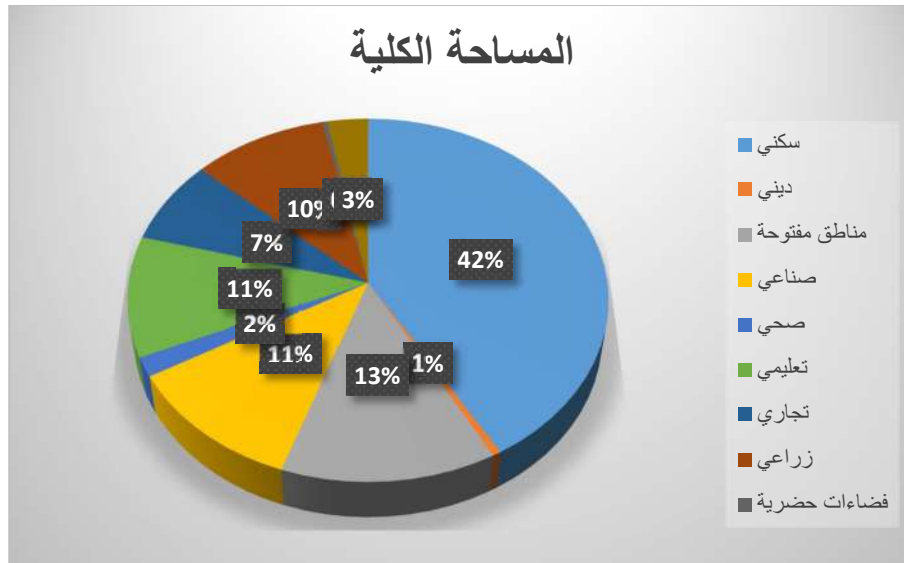
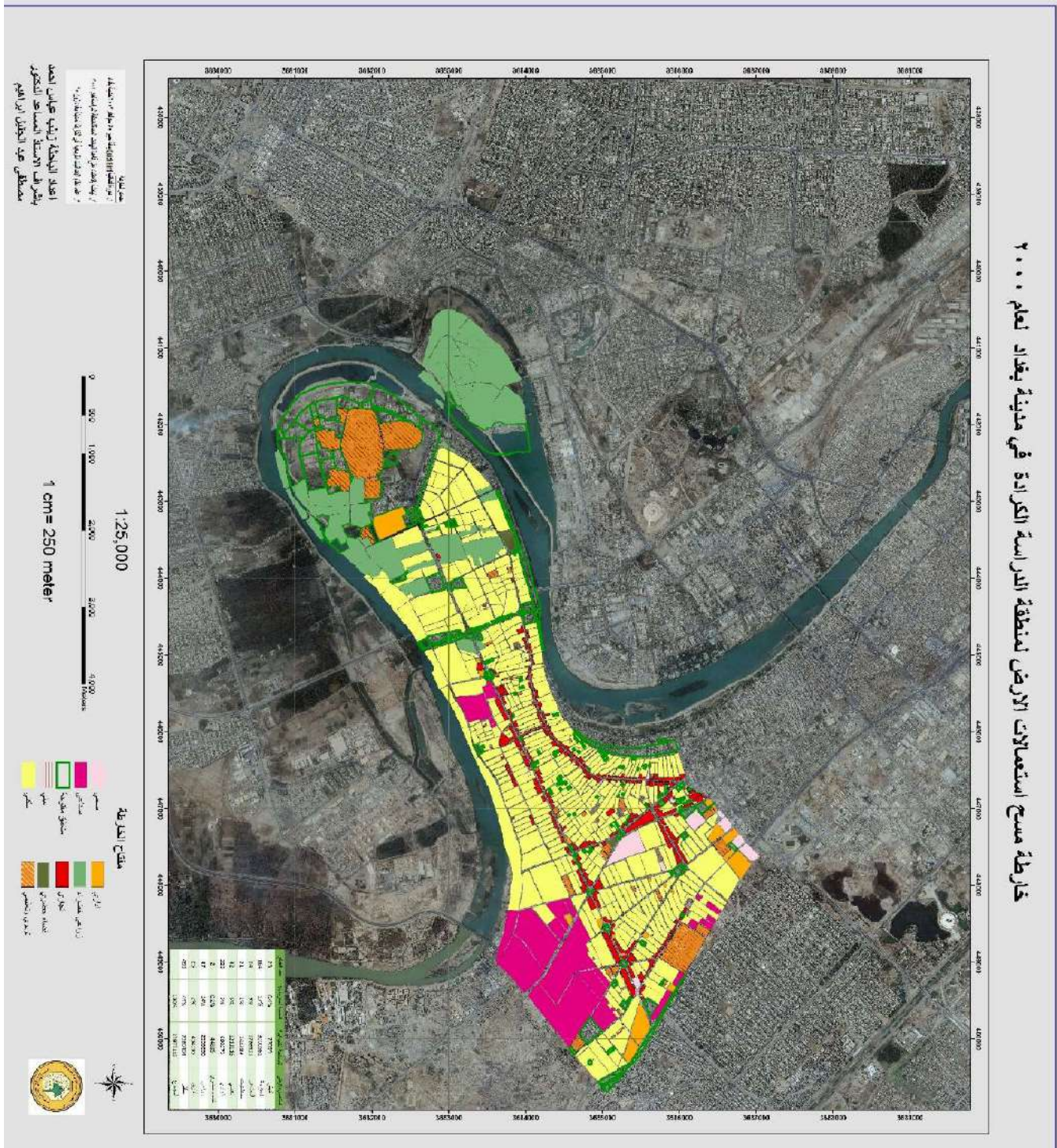


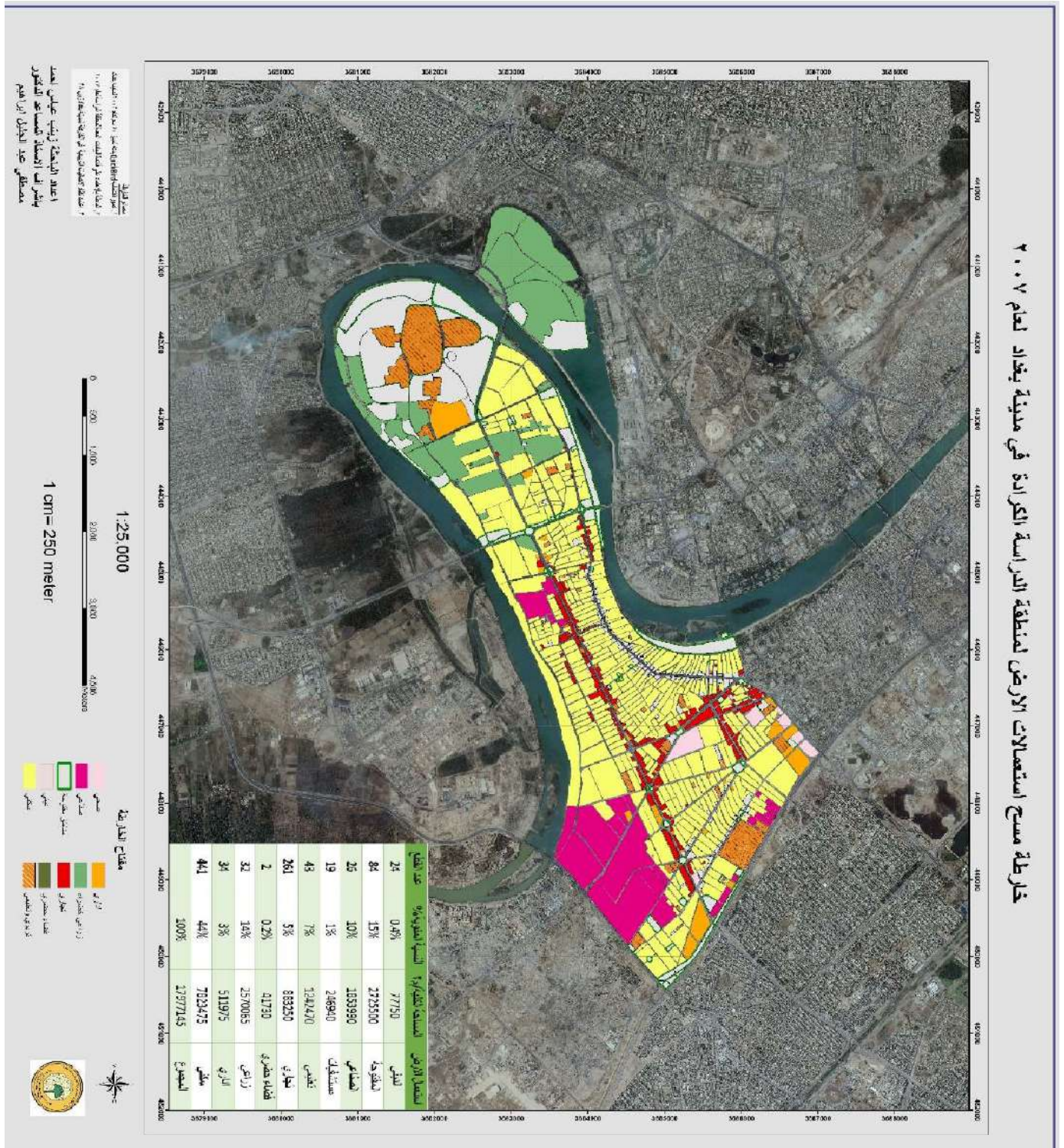
Figure (7) A diagram showing the percentage of total land use area for the study area in the year 2019.

Through the analysis of land use maps and the calculation of the areas of primary uses in the Al-Karrada area, it becomes evident that residential use predominates significantly. This is logical, as it is the primary use in the city. This is followed by open and agricultural areas and industrial zones during the three years in which residential uses were monitored. This is also logical, given that the predominant characteristic of the Al-Karrada area is the widespread presence of orchards and agricultural lands. Observe the following maps:



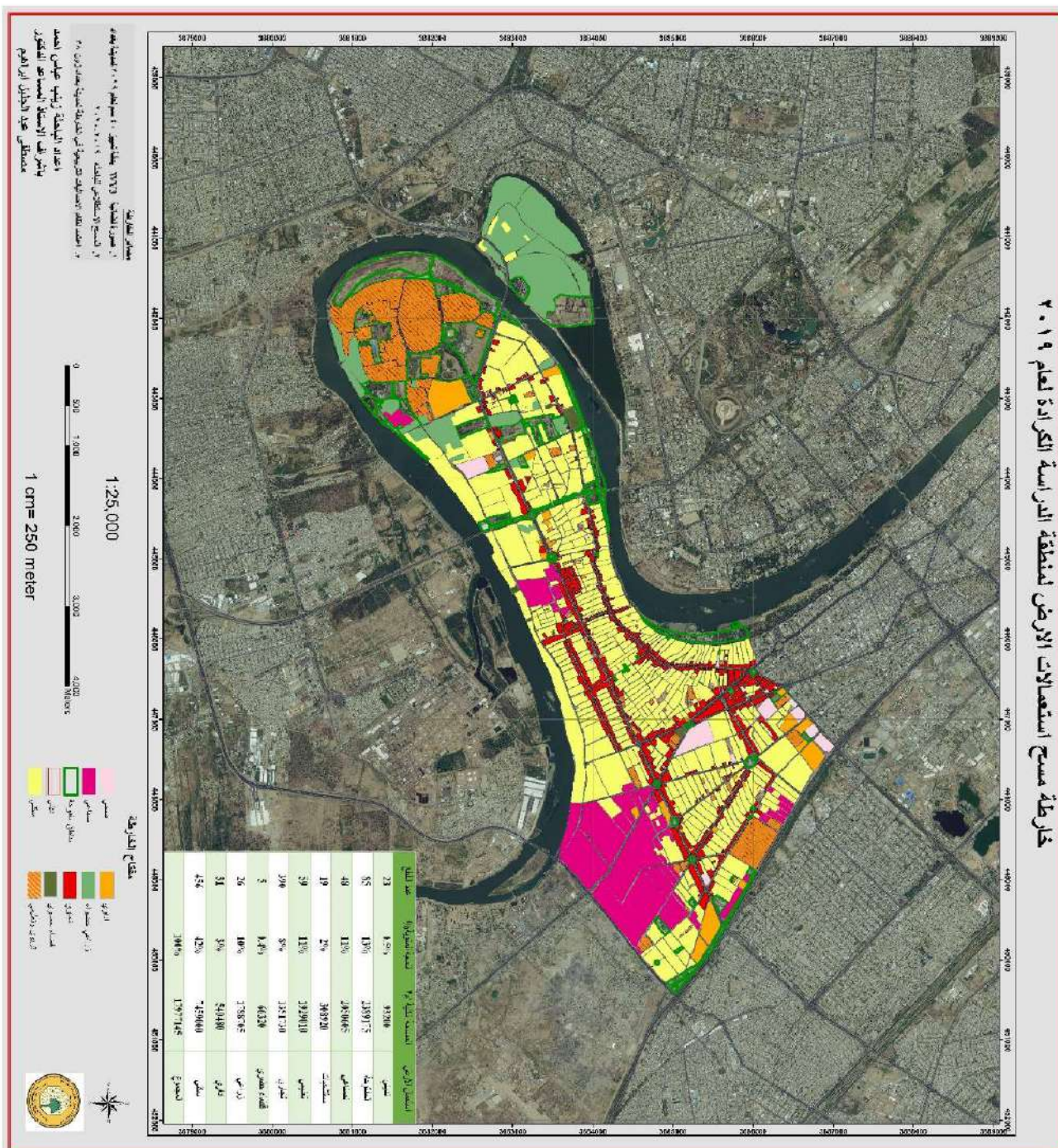
Map (2) Land Uses of the Al-Karrada East Study Area for the Year 2000 Source: The study based on satellite imagery and the Geographic Information Systems (GIS) database prepared for the study area, and the survey of land uses in the study area.





Map (3) Land Uses of the Al-Karrada East Study Area for the Year 2007 Source: The study based on satellite imagery and the Geographic Information Systems (GIS) database prepared for the study area, and the survey of land uses in the study area.





Map (4) Land Uses of the Al-Karrada East Study Area for the Year 2019 Source: The study based on satellite imagery and the Geographic Information Systems (GIS) database prepared for the study area, and the survey of land uses in the study area.

**Change in Land Uses in the Al-Karrada Area:**

1. In 2000, the residential use area was 7,812,790 m<sup>2</sup>, accounting for 44.4% of the total area. It slightly decreased in 2007 to 7,840,890 m<sup>2</sup>, making up 44% of the total. By 2019, the total residential area decreased to 7,476,415 m<sup>2</sup>, or 42% of the total, indicating a higher decrease. This decrease is due to 2.5% of the residential area being converted to commercial and industrial uses compared to 2000, primarily due to rising land prices in the study area, as shown in the previous figures.
2. As for religious use, its area in 2000 was about 77,059 m<sup>2</sup>, forming 0.4% of the total area of Al-Karrada. In 2007, it increased to 130,770 m<sup>2</sup>, or 0.7%, nearly doubling the 2000 area. By 2019, it reduced to 91,970 m<sup>2</sup>, or 0.5%. This trend indicates a shift towards utilizing green spaces and religious facility gardens for investment and resource maximization, as recently seen around Al-Firdous Square in the northeast of the study area. This is due to the scarcity and high value of land in the area, where the number of plots for religious use was around 24 units.
3. Agricultural lands were also transformed into urban spaces by cutting down palm trees and clearing the land for conversion to other uses, as well as the transformation of agricultural use to residential in 2019. Agricultural lands were also converted for religious use, a hospital, and the German Medical College.
4. The previous table shows the decrease in the area of open green and agricultural uses. In 2000, the total open area was 5,510,251 m<sup>2</sup>, representing 30.6%. By 2007, it reduced to 4,986,245 m<sup>2</sup>, or 27.7%, a decrease of approximately 3%, due to its conversion to residential and educational buildings in the study area. This reduction continued until 2019, where the area was 4,176,090 m<sup>2</sup>, or 23.2%.



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Figure (8) Transformation of Agricultural Lands to Other Uses in 2000, 2007, 2019 Respectively  
Source: The study based on satellite imagery and the Geographic Information Systems (GIS)

database prepared for the study area, and the survey of land uses in the study area.



Figure (9) Transformation of Agricultural Lands to Religious Use, Hospital, and German Medical College for the Period (2000, 2007, 2019). Source: The study based on satellite imagery and the



Geographic Information Systems (GIS) database prepared for the study area, and the survey of land uses in the study area.

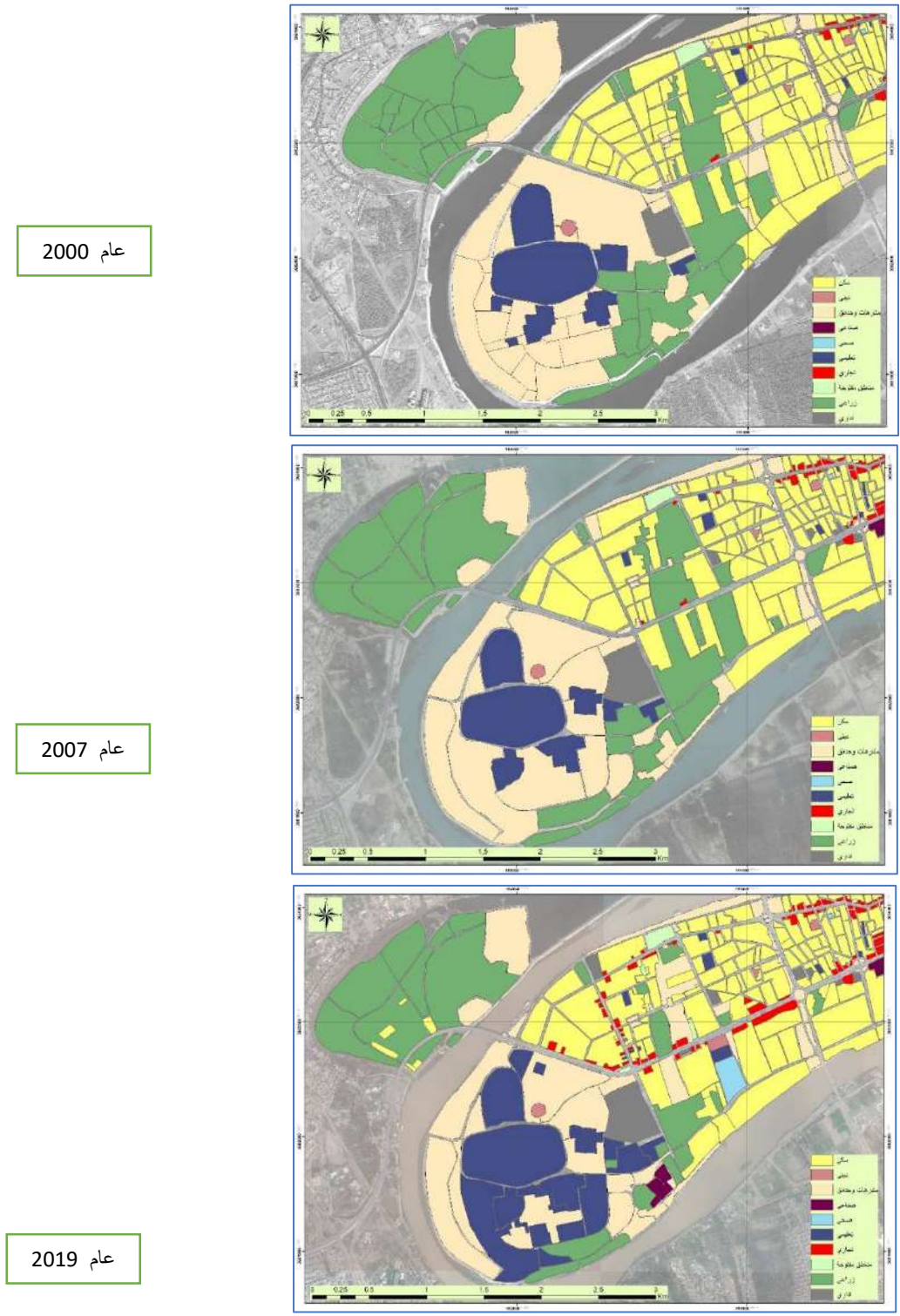


Figure (10) Decrease in Agricultural and Open Areas Surrounding the Tigris River in the Al-Karrada Area for the Period (2000, 2007, 2019). Source: The study based on satellite imagery

and the Geographic Information Systems (GIS) database prepared for the study area, and the survey of land uses in the study area.

### **Conclusions:**

1. The Al-Karrada East area is an ancient historical region that was predominantly agricultural, filled with orchards. It played an important role in the region's makeup, focusing on agriculture and trade. The nature of the soil in the area and its proximity to the Tigris River made it one of the most fertile soils. Additionally, the density of activities in the area creates a market for any agricultural products produced there.
2. Through the analysis of land use maps and the calculation of the areas of primary uses in the Al-Karrada area, it becomes evident that residential use predominates significantly. This is logical, as it is the primary use in the city. This is followed by open and agricultural areas and industrial zones during the three years in which residential uses were monitored. This is also logical, given that the predominant characteristic of the Al-Karrada area is the widespread presence of orchards and agricultural lands.
3. There was a clear decrease in residential use, open space use, and agricultural use during the period from 2000-2019. This was countered by a significant increase in commercial use, reaching around 87% from 2000 to 2019.
4. The presence of orchards and agricultural lands has created cumulative expertise in agricultural production, making it easy to transform these into an important local urban economy for the area.
5. There was a significant increase in residential density and population over the study period in the area, accompanied by a decrease in the areas of home gardens and open spaces.

### **Recommendations:**

1. Preserve the remaining agricultural areas and orchards in the study area by preventing their conversion to other land uses.
2. Maintain the existing home gardens in residential areas by enacting laws that prohibit building if such laws are not already in place. If they exist, their enforcement and penalization of violators is crucial.
3. Work towards increasing the spread of urban agriculture and employing effective spatial analysis of the urban potential of each area, which facilitates the process of selecting suitable locations for urban agriculture according to the capabilities of the designated area.
4. Encourage urban agriculture in the area.
5. Foster awareness about supporting and spreading urban agriculture in the city.

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