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The Impact of Urban Green Spaces on Quality of Life Through the Randomness of Urban Planning

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ABSTRACT

One of the most urgent issues confronting cities in the south of the globe is urban expansion brought on by population increase. Iraq's capital, Baghdad, is a striking example of this change. This study examines how Baghdad's agricultural land was converted into residential areas between 2003 and 2024, with a special emphasis on the neighborhoods of Dura, Al-Buaitha, and Krayat. During this period, Baghdad's population grew from 5.6 million to nearly 9.1 million, and the city's land usage drastically changed. Due to housing needs and infrastructure development, population increase has a direct impact on land consumption, as seen by this geographical expansion. The study illustrates the adverse correlation between urbanization and the accessibility of green and agricultural spaces using previous land use data, demographic estimates, and environmental indicators. The main focus is on the socio-spatial effects of losing agricultural land, the growth of informal housing, and deteriorating environmental quality, even though temperature rise and CO_2 emissions are mentioned. Through trend analysis, maps, and charts, the research emphasizes how urgent it is to combine land preservation tactics with sustainable urban development. Decentralizing expansion to satellite towns, encouraging vertical construction, and enforcing zoning laws are some of the main ideas. The results show that Urban areas grew from 387.0 km^2 to 641.7 km^2, while green areas decreased from 283.5 km^2 to barely 81.9 km^2. As a result, if proactive planning isn't done, the city's long-term resilience and livability may be threatened by permanent land degradation brought on by population growth.

Keywords: Urban growth, Quality of life, Urban planning, Urban green spaces.

1. INTRODUCTION

Urbanization is undoubtedly one of the biggest shifts in human history. The last official census of buildings in Baghdad was in 2009, and the total number was approximately two million buildings, including residential, commercial, and government buildings. Since then, the number of buildings has doubled due to population growth and the shift from the countryside to the capital. Current estimates indicate that the housing stock has approached

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four million buildings or more, including informal settlements (unregistered residents) and slums **(Alobaydi and Rashid, 2024; Moussa and Alwehab, 2022)**. Iraq needs to build about 250,000 housing units annually to meet the growing population demand (with an annual population growth of approximately 1.25 million people). With the increasing demand, it is estimated that the growth rate of demand for housing units in cities will be about 3% annually until 2030. Baghdad is the most affected by the housing shortage, with a deficit rate of ~31% compared to population demand **(Ebraheem et al., 2024)**. Housing and infrastructure need to keep up with this fast expansion.

There is a lot of building activity in many urban areas. Creating cities that are engaging for inhabitants and tourists alike is the goal of urban planners and developers. Residents are given the most crucial place here since they are the ones who inhabit and impact this environment the most **(Hamdi and Abdul-Ameer, 2021)**. The decline in agricultural land and its conversion to residential land in Baghdad over the past two decades is due to a combination of intertwined political, economic, social, and planning factors. Here are the most important of these factors, detailed and based on official and academic reports and studies **(Kadhim and Abaas, 2021)**. Baghdad has experienced rapid population growth due to migration from the provinces (due to displacement, wars, and terrorism), leading to increased demand for housing. The government has been unable to meet this demand with sufficient housing projects, forcing citizens to turn to agricultural land. According to the Ministry of Planning, Baghdad needs more than 200,000 housing units annually to keep up with demand. Agricultural lands have been converted into residential areas without official permits (encroachments), particularly in the outskirts of Baghdad (such as Al-Shu'la, Al-Ma'amel, Abu Ghraib, and Al-Nahrawan). Government agencies are either incapable or lax in enforcing the laws, and these encroachments are often subsequently legalized. The NIRIJ 2024 report indicates that more than 30% of urban growth in Baghdad occurred at the expense of agricultural land **(Habib, 2022; Mahdi and Jasim, 2024)**.

Real estate speculators purchased agricultural land at low prices, then subdivided and sold it as residential land outside of regulatory controls. The lack of oversight and administrative collusion facilitated many of these operations. The decline of agriculture and the migration of farmers due to water scarcity, soil salinization, and declining government support led many farmers to abandon their lands **(Saud et al., 2023; Mohowes and Al-Jiboori, 2023; Tao et al., 2023)**. Over time, agricultural land was left abandoned or sold for residential construction. Ministry of Agriculture reports indicate a loss of more than 60% of agricultural activity in the outskirts of Baghdad between 2003 and 2020. Furthermore, poor urban planning and the lack of a strategic vision have not updated the master plan for the city of Baghdad to keep pace with population growth **(Waleed and Maythm, 2023; Kadhim et al., 2023; Yousef and Jaber, 2023)**. Furthermore, the absence of organized vertical housing projects has made horizontal expansion (at the expense of agriculture) the only option available to citizens. The root cause of the transformation of agricultural land in Baghdad into residential land is the convergence of three elements: rapid population growth, weak planning and oversight, and the decline in agricultural viability **(Salman and Al Ramahi, 2022; Hadeel et al., 2019)**.

On the other hand, areas such as Dura, Al-Bu'aitha, and Al-Kray'at were originally partially inhabited and had been used for mixed residential and agricultural purposes for decades. Dura, Al-Bu'aitha, and Al-Kray'at have undergone significant urban transformation. Historically, these areas were agricultural areas containing vast palm groves (especially along the banks of the Tigris). After 2003, organized and unorganized residential expansion

began in these areas, and the groves were razed and converted into neighborhoods such as the Siha, Al-Mekanik, Asia, and Al-Mawasalat neighborhoods **(Al-Hedny and Alshujairy, 2022; Hassoon and Ibraheem, 2022; Khalaf and Al-Jibouri, 2020)**. Residential construction often began as "encroachments" and was later legalized by municipalities. Al-Kray'at is one of the oldest areas in northern Baghdad, with an agricultural character, especially near the river. Population expansion and rising land prices have encouraged the demolition of the groves and their conversion into small residential complexes or modern villas. It now features a mix of residential and tourist riverside restaurants, having lost most of its agricultural character **(Hashim et al., 2025; Hasan et al., 2024)**. All of this led to urban chaos that pushed population migration toward agricultural lands, especially on the outskirts of the capital. Loss of green spaces: The percentage of green spaces in Baghdad has decreased from more than 28% to about 12% due to rapid urbanization. Livelihoods and environment: The disappearance of parks and gardens has led to higher urban temperatures and an increased heat island effect, negatively impacting air quality and the health of residents. Irregular planning: Urban distortion results from the lack of robust urban planning, the proliferation of illegal construction, and the frequent division of farms into small plots for construction without regard for infrastructure **(Kadhum, 2024; Majeed et al., 2020)**.

There are more buildings, and the courtyards and open areas are more enclosed, which reduces their greenness. Consequently, the empirical portion of this study concentrates on one area of urban growth in the Lend district, taking a look at the following:

- What qualitative purposes does green space serve, and how does urban greenery impact the physical and mental well-being of city dwellers?
- What benefits can green spaces offer the community, and how do they differ in terms of sustainability, social justice, and the environment?
- What roles do various stakeholders play in creating and enhancing urban green spaces?

2. MATERIALS AND METHODS

The methodological strategy employed to address the aforementioned study topics is covered in this section, along with the project area selection and interview formats. Furthermore, the manner in which the statements from the conducted interviews were assessed was further. Databases were accessed as part of a comprehensive literature search to locate scientific papers pertaining to health, urban greenery, quality of life, and all other connected subjects and fields. Informal conversations, lectures, and walks in front yards were often held with different city residents in order to gather more information about the study location and the circumstances. Photographic documentation was also gathered.

2.1 Study Area

Particularly in regions that were formerly abundant in agricultural resources, Baghdad has seen an unparalleled rate of urban growth over the last 20 years. Districts like Dura 33°15'32.10"N, 44°24’47.01"E, Al-Bu'aitha 33°14'00.01"N, 44°25’42.54"E, and Al-Krayat 33°24'22.86"N, 44°20’38.98"E are among the most notable instances of this change, having gone from being primarily agricultural to becoming densely populated residential areas as shown in **Fig. 1**. Iraq's larger socioeconomic and governance problems are reflected in this tendency, especially those about institutional weakness, land management, housing demand, and environmental deterioration. A mixed-use neighborhood in the past, Dura is

renowned for its extensive agricultural area and date palm plantations, particularly along the Tigris River's western banks.

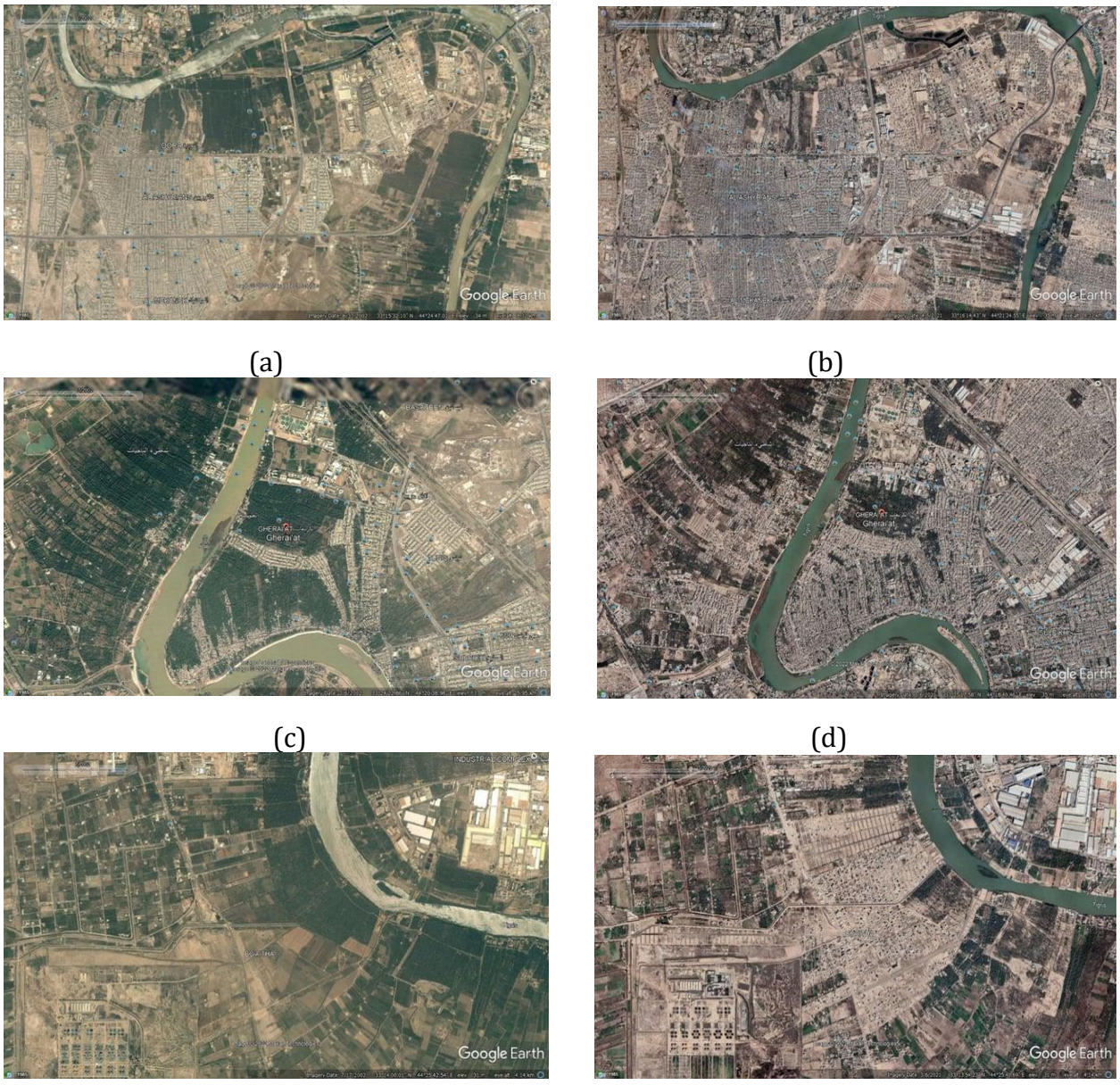

Figure 1. An aerial photo showing how most of the agricultural areas have been transformed into residential areas in the areas of (a), (b) Al-Dura, (c), (d)Al-Krayat, and (e), (f) Al-Buaitha **(Waleed and Maythm, 2024)**

Figs. 1 a, c, and e show the agricultural areas of Al-Dura, Al-Krayat, and Al-Buaitha, respectively, before the transformation, while **Figs. 1 b, d, and f** show the same agricultural areas after their transformation into residential areas. The region's proximity to oil refineries and Baghdad International Airport added to its strategic significance. In Dura, agriculture accounted for a large portion of land usage until the early 2000s, despite urbanization in some areas. In the southern portions of the Dura district, the more rural sub-region known as Al-Bu'aitha was mostly defined by agricultural land, palm orchards, and

irrigation-based agriculture. It was essential to the local food production and functioned as a greenbelt for Baghdad. It was a profitable outskirt of the city because of the river's vicinity and the lush soil. Known for its semi-rural aspect, Al-Krayat was situated along the eastern banks of the Tigris in northern Baghdad. Although it was not as agriculturally active as Al-Bu'aitha, it did have a lot of open plains, orchards, and green spaces that the people of Baghdad could use for both farming and enjoyment. Its proximity to the river and relative peace made it an attractive location. The main reason for choosing these sectors over others is that they are the most prominent and most demographically transformed areas, from agricultural land to residential areas.

2.2 Principal Historical Eras of Baghdad Residential Areas

The areas of Dura, Krayat, and Al-Buaitha in Baghdad have rapidly become more urbanized during the last 20 years. These regions, which were formerly abundant in farms, orchards, and green infrastructure, have been transformed into crowded residential and commercial districts, creating social and environmental problems. **Table 1** shows the Changes in Land Use throughout History.

Table 1. Changes in Land Use throughout History **(Abed et al., 2024)**

Area	Land use2003	Land use 2025
Dura	mostly agricultural, including palm plantations	mostly commercial and residential
Krayat	Gardens and orchards beside the river	Apartments, restaurants, and urban houses
Al-Buaitha	Irrigation canals on agricultural land	Housing in the suburbs and unofficial communities

2.3 Geographical Modeling Obtaining Data on Surface Cover

The methodological approach is summarized in **Fig. 2**. The raw input data are shown in the top row, and the spatial-statistical analyses that were performed to get the results that are detailed in the third row are shown in the second row. The last row describes how these outputs are used in regression studies to look at how the impact categories under study (dependent variables) are impacted by the independent variables of gross floor area and construction year. In order to determine residential clusters and measure or forecast the pertinent variables within these regions, the study employed statistical and geographical analysis. Surface cover metrics are extracted. Measurements of the related surface cover quantities (in m^2) and percentage per property were made by spatially clipping the surface cover data. This was carried out using the R package exact extract, and the proportions and surface areas of each surface cover class were computed. Following that, a geographical clustering analysis was conducted using the surface cover metrics that were produced, the mean year of construction of the related structures, and the spatial position of each property. Each grid cell's surface cover, CO_2 flux, and summer temperature were also examined similarly. Buildings within each individual property were combined, and the mean construction year was computed to get the average construction year of buildings per property.

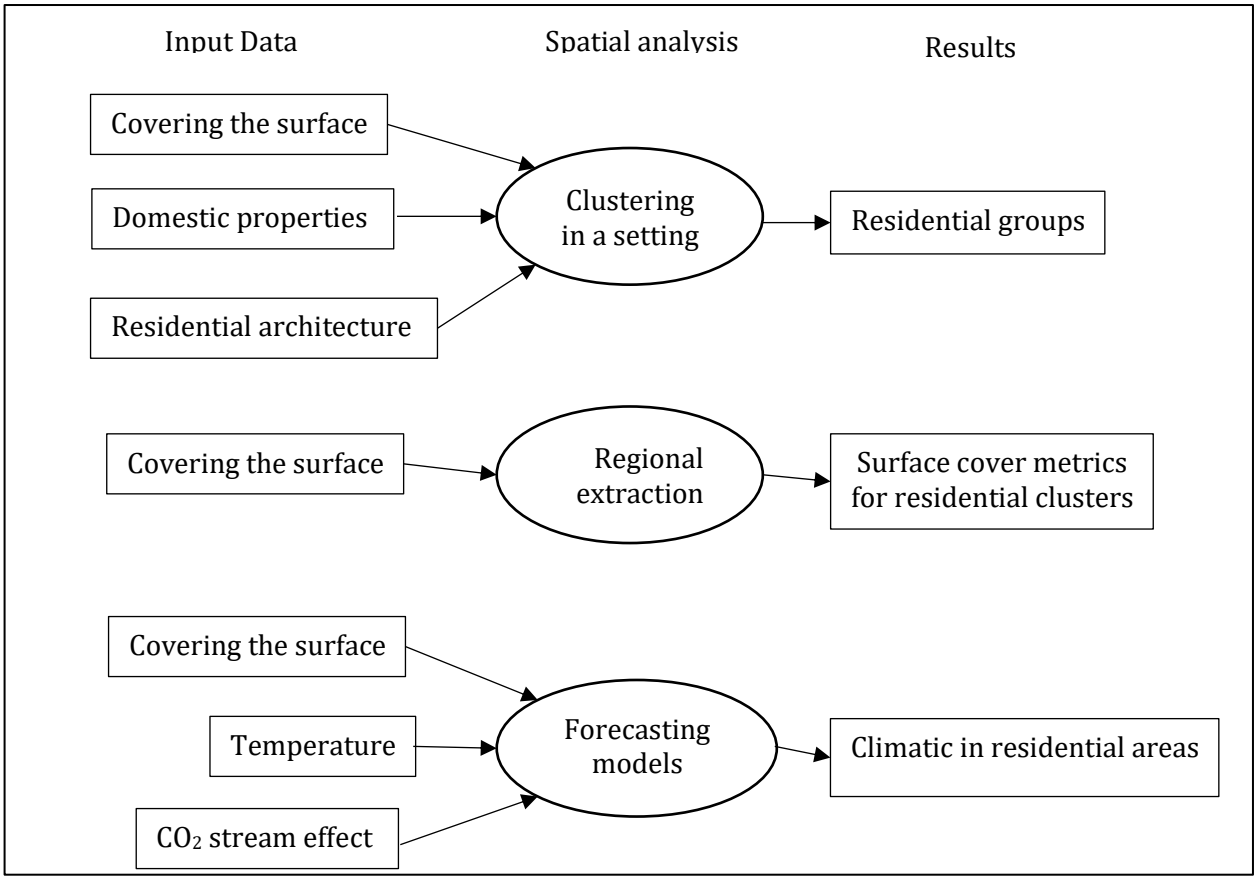

Figure 2. An illustration of the study's methodology **(Seto et al., 2012)**

If the closest relevant cluster could not be located, the associated characteristic was not included in the study. Following the achievement of an acceptable clustering solution, the ratios of various surface cover classes, the average building construction year, and the gross floor area per cluster have been revised using the exterior cover metrics of each individual property inside the clusters.

3. RESULTS AND DISCUSSION

Over the past two decades, Baghdad has witnessed a widespread transformation in land use, particularly in its outskirts, such as Dura, Al-Buaitha, and Al-Krayat. Large agricultural areas have been replaced by informal or semi-formal residential areas. This transformation impacts not only residential and urban areas, but also the urban environment and local climate, causing temperatures to rise and carbon dioxide (CO_2) emissions to increase, a major greenhouse gas, causing global warming. Agricultural land, trees, and green spaces are among the most important tools for balancing the climate in cities. They contribute to lowering temperatures through evaporative cooling and absorbing some of the sun's rays instead of reflecting them, as concrete surfaces do. Trees and plants also absorb carbon dioxide from the atmosphere and convert it into oxygen during photosynthesis, reducing the accumulation of this gas in the atmosphere **(Mohammed and Salman, 2018)**. However, when vegetation is removed, and agricultural land is converted into concrete residential buildings or paved roads, what is known as the "urban heat island effect" occurs. This means that built-up areas become hotter than their surrounding areas, due to concrete surfaces and roads absorbing and trapping solar radiation. Thermal satellite images of Baghdad have

shown a clear increase in temperatures in areas that have experienced this shift, such as Al-Buaitha and Al-Dura, where surface temperatures have exceeded 50°C in some summer periods, compared to less than 40°C in areas with remaining vegetation **(Khazaal and Dhumad, 2018).**

On the other hand, this shift leads to increased carbon dioxide emissions, both directly and indirectly. Directly, quantities of CO_2 are emitted during construction and building processes due to the use of cement, bricks, and generators, which rely heavily on fossil fuels. Indirectly, the removal of trees means the loss of the natural ability to absorb carbon, which subsequently accumulates in the atmosphere. New residential areas that emerge on agricultural land often lack basic infrastructure such as national electricity grids, forcing residents to use private generators, which release large amounts of carbon dioxide and other pollutants into the air. Due to the poor availability of public transportation, reliance on private cars increases in these neighborhoods, exacerbating greenhouse gas emissions. The conversion of agricultural land to residential areas in Baghdad is not simply an issue of urban planning or housing needs; it is an environmental and climate issue that affects the health of residents and the sustainability of life in the city **(Yusra and Abdelwehab, 2022)**. Without clear state interventions to regulate this transformation, revitalize green spaces, and encourage vertical construction rather than horizontal expansion, temperatures and carbon dioxide emissions will continue to rise, threatening Baghdad's urban environment in the coming decades. **Table 2** shows the impact of the conversion from agricultural land to residential areas in Baghdad over the years from 2003 to 2024, focusing on changes in surface temperatures and carbon dioxide (CO_2) emission rates resulting from urban activity. The examination of farmlands and vegetation in satellite data serves as the foundation for Green Area Coverage. Roads, paved surfaces, and residential structures are all included in the urban area coverage. The term "surface temperature" describes the typical summertime land surface temperature. The estimate of CO_2 emissions is based on the depletion of carbon sources (vegetation) and urban activities **(Al-Hameedi, 2022; Waleed and Maythm, 2023)**.

Table 2. Baghdad's Environmental Effects of Converting Agricultural Land into Residential Areas (2003–2024) **(Hashim et al., 2025)**

Year	Green Area Coverage (%)	Urban Area Coverage (%)	Avg. Surface Temp (°C)	CO_2 Emissions Estimate (kt/year)
2003	31.5	43.0	27.8	580
2005	28.2	48.7	28.4	620
2008	24.0	53.2	29.1	670
2011	20.5	57.9	30.2	720
2014	17.3	61.5	31.0	770
2017	14.1	65.0	32.3	810
2020	11.5	68.4	33.5	860
2022	10.2	69.9	34.2	900
2024	9.1	71.3	35.1	940

The "Avg. Surface Temp (°C)" column in **Table 2** represents the land (or city) surface temperature in Baghdad during the summer months (June–August), as measured from satellite data (such as MODIS or Landsat). This average includes the effects of urbanization and the disappearance of green spaces, and demonstrates the rise of the "urban heat island"

phenomenon, where cities become hotter than surrounding rural areas due to concrete, glass, and population sprawl. The column "CO_2 Emissions Estimate (kt/year)" in **Table 2** represents the estimated amount of carbon dioxide (CO_2) emissions emitted by the Baghdad area annually due to the conversion from agricultural land to residential areas, measured in thousand tons per year (kiloton/year or kt/year). 1 kt = 1,000 tons of CO_2. CO_2 increases with urbanization because Agricultural land is used to absorb CO_2 (acting as "carbon sinks"). After its conversion to residential areas, there are increases in: Vehicle traffic; Electricity consumption from fossil fuels; Construction and cement use, which releases huge amounts of CO_2 during its production. **Table 3** shows that the fewer green spaces there are and the more they are converted into residential areas, the more they contribute to higher temperatures and the fewer plants there are to absorb carbon dioxide, thus increasing its levels in the atmosphere.

Table 3. The relationship between the change in areas with temperature and the emission change. (**Waleed and Maythm, 2024)**

Year	Green Area (%)	Urban Area (%)	Temp (°C)	Temp Change (%)	CO_2 Emissions (kt/year)	CO_2 Change (%)
2003	31.5	43.0	27.8	–	580	–
2005	28.2	48.7	28.4	+2.2%	620	+6.9%
2008	24.0	53.2	29.1	+2.5%	670	+8.1%
2011	20.5	57.9	30.2	+3.8%	720	+7.5%
2014	17.3	61.5	31.0	+2.6%	770	+6.9%
2017	14.1	65.0	32.3	+4.2%	810	+5.2%
2020	11.5	68.4	33.5	+3.7%	860	+6.2%
2022	10.2	69.9	34.2	+2.1%	900	+4.7%
2024	9.1	71.3	35.1	+2.6%	940	+4.4%

Table 3 also shows that green space decreased from 31.5% to 9.1% (a 71% decrease). Residential areas increased from 43% to 71.3% (a 66% increase). Temperature increased by 7.3°C (a 26.2% increase). Furthermore, CO_2 emissions increased from 580 to 940 kt/year (a 62.1% increase). This confirms that the less green space there is, the hotter it is, and the more CO_2 is emitted, both directly and indirectly. Impact on the environment and climate: rise in surface temperature. These areas had notable increases in surface temperatures, with Baghdad as a whole experiencing a +7.3°C rise since 2003. CO_2 emission due to increased vehicle usage, energy needs, and industrial activity, together with urban expansion, caused CO2 emissions to rise by +62% (from 580 kt/yr to 940 kt/yr). Ecosystem services are lost when vegetation is lost, which worsens heat and air quality by decreasing CO_2 absorption, limiting shade, and increasing dust. Greenland conversion is an indirect factor; it does not produce CO_2, but it reduces natural CO_2 uptake (photosynthesis), raises temperatures, and thus increases demand for cooling and electricity → increases CO_2, as Greenland decreased by 71%. Over the same period, CO_2 emissions increased by 62%. However, not all of the increase in emissions is due to agricultural land. It can be estimated (roughly, but not precisely) that 20–30% of the increase in emissions would have been absorbed had Greenland not been lost. The 62% increase in CO_2 is a composite of several sources. Greenland is indirectly responsible for a portion (e.g., 20–25% of that 62%) **(Mohammed and Salman, 2018; Mahal et al., 2022; Al-Hameedi et al., 2022)**. However, its warming effect is direct and clear, with a 26.2% temperature increase **(Rodrigues et al., 2023;**

Hashim et al., 2022). **Table 4** shows how the area of green areas has decreased and been transformed into residential areas, and the impact Table 4 shows how the area of green areas has decreased and been transformed into residential areas, and the impact of this on desertification and the shrinkage of agricultural lands. **Table 4** shows that between 2003 and 2024, Baghdad lost more than 201.6 km^2 of green space. Conversely, urban areas increased by approximately +254.7 km^2. The most dramatic changes occurred between (2005–2011) and (2014–2020), when the greatest losses occurred in agricultural land. In all, green areas decreased by 71%, or 201.6 km^2, from 31.5% (283.5 km^2) to 9.1% (81.9 km^2). From 43.0% (387.0 km^2) to 71.3% (641.7 km^2), urban areas increased by a total of 254.7 km^2, or 66%. There was a particularly quick change from 2005 to 2011 and from 2014 to 2020.

Table 4. The relationship between the changes in agriculture and urban areas (**Mahdi and Jasim, 2024)**

Year	Green Area (km^2)	% Change (Green)	Urban Area (km^2)	% Change (Urban)
2003	283.5	–	387.0	–
2005	253.8	–10.5%	438.3	+13.3%
2008	216.0	–14.9%	478.8	+9.3%
2011	184.5	–14.6%	521.1	+8.8%
2014	155.7	–15.6%	553.5	+6.2%
2017	126.9	–18.5%	585.0	+5.7%
2020	103.5	–18.4%	615.6	+5.2%
2022	91.8	–11.3%	629.1	+2.2%
2024	81.9	–10.8%	641.7	+2.0%

4. POPULATION GROWTH AND AGRICULTURAL LAND LOSS

Significant urban and demographic changes have occurred in Baghdad during the last 20 years. Natural rise, rural-to-urban migration, and the concentration of opportunities and services have all contributed to Baghdad's fast population expansion as the capital and biggest city in Iraq. Due to the tremendous strain this population growth has placed on housing, infrastructure, and land, agricultural lands are increasingly being turned into residential areas, particularly in peri-urban and formerly green areas like Dura, Al-Buaitha, and Krayat. A large portion of Baghdad's outskirts in the early 2000s covered in palm groves, orchards, and small-scale farmlands. These areas not only helped the local food supply but also significantly improved the air quality, absorbed carbon dioxide, and cooled the microclimate. But the need for housing, utilities, roads, and services has skyrocketed as the population of Baghdad has increased from over 5.6 million in 2003 to over 9 million in 2024. The main method of meeting this demand has been to encroach, frequently in an unplanned or informal manner, on agricultural lands. It is clear from both statistical and visual evidence that population expansion and the loss of agricultural land are related. Baghdad's green spaces have decreased from 31.5% to 9.1% of the city's total land area over the last 22 years, which is a loss of more than 200 Km^2. At the same time, urban land coverage increased from 43.0% to 71.3%, demonstrating how rapidly horizontal growth is occurring. Districts like Dura saw a particularly dramatic change, with thick residential complexes replacing palm plantations and irrigation canals—often without following urban planning guidelines. This tendency reflects worldwide trends seen in emerging cities and is not exclusive to Baghdad.

But in Baghdad, the issue is made worse by low investment in vertical housing options, post-conflict rebuilding, lax land-use regulations, and a lack of enforcement of regulations. The city has grown outward rather than rebuilding central urban centers or constructing higher, sometimes at the sacrifice of important agricultural fields and natural green buffers. There are significant repercussions from this change in land usage brought on by population growth. First, as produce grown locally becomes scarcer, and the city grows more dependent on imports, it poses a threat to food security. Second, it worsens the climate: research indicates that the impact of urban heat islands is exacerbated by the proliferation of asphalt and concrete as well as the loss of vegetation, which has caused the mean surface temperature in Baghdad to rise by over 7.3°C since 2003. Thirdly, it speeds up CO_2 emissions as a result of increased transportation and power use brought on by dispersed communities and ineffective infrastructure. Furthermore, the societal effects are too great to overlook. Once self-sufficient, agricultural families are now marginalized and frequently compelled to sell or convert their holdings due to financial pressures. The experience of Baghdad highlights the urgent need for sustainable urban planning that takes into consideration population dynamics while protecting agricultural and environmental resources. Creating vertical housing developments, encouraging population dispersal to neighboring cities, enforcing green zone restrictions, and supporting urban agriculture are some potential solutions. If left uncontrolled, Baghdad's green spaces will continue to be transformed into residential sprawl, endangering long-term urban resilience and ecological balance. **Fig. 3** shows the relationship between green spaces, residential areas, and population growth over the years. The graph shows the changing land usage and population growth in Baghdad during the last 20 years. **(Hussein et al., 2025; Sota et al., 2019)** An obvious negative relationship between green spaces and urban growth is shown as the population grew gradually from 5.6 million in 2003 to over 9.1 million in 2024. Once occupying a sizable amount of the city, green spaces drastically shrank from 283.5 km^2 to 81.9 km^2. Urban land grew from 387.0 km^2 to 641.7 km^2 over the same time **(Mohammed and Salman, 2018; Mahal et al., 2022; Hashim et al., 2022)**.

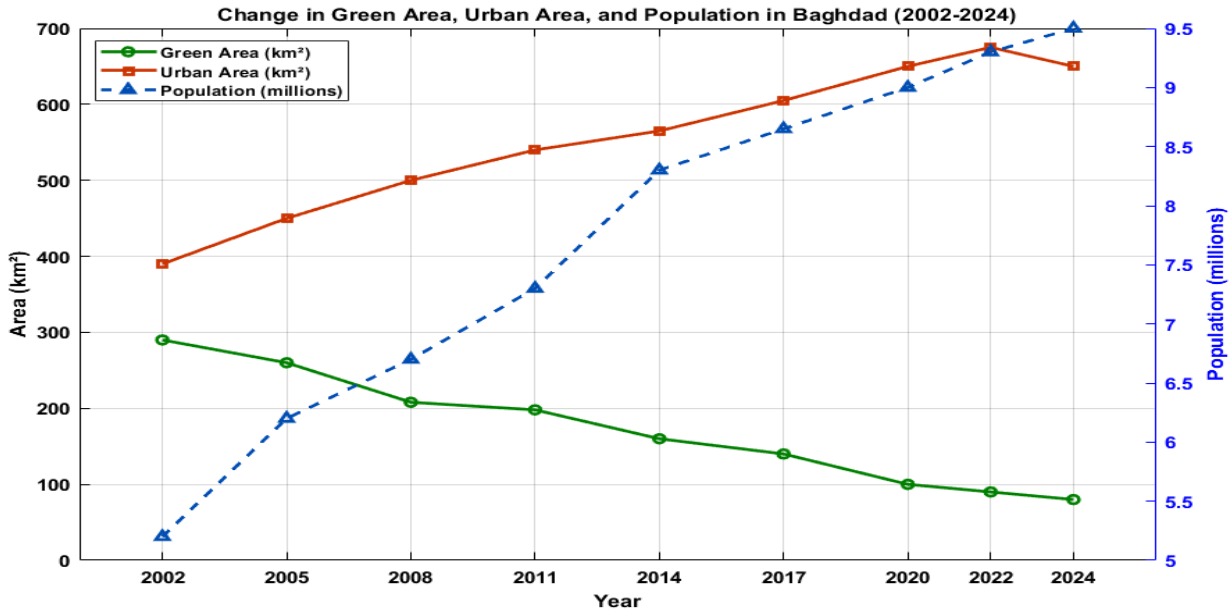

Figure 3. Land usages vs population growth in Baghdad (2003-2024)

This pattern demonstrates the growing strain that population expansion puts on available land. Natural areas and agriculture are being lost to accommodate the growing urban population. Rising temperatures, a decline in biodiversity, and an increase in environmental stress are the results of this imbalance. The graphic highlights how urgently sustainable urban planning techniques that preserve green infrastructure while accommodating population expansion are needed.

5. CONCLUSIONS

Baghdad's land use has rapidly and drastically changed over the past 20 years, mostly due to the city's constant and frequently unchecked population growth. This change has been particularly noticeable in areas like Dura, Al-Buaitha, and Krayat, where growing residential communities have progressively supplanted once-thriving agricultural regions and open spaces. This shift is a reflection of a profound and expanding problem that many metropolitan areas are facing: how to house an expanding population without compromising the very environments that formerly supported them. A significant and direct correlation between population growth and the loss of agricultural land is evident from the statistics and visual analysis provided. The population of Baghdad increased by more over 60% between 2003 and 2024, from about 5.6 million to over 9.1 million. Urban land expanded by more than 250 km^2 during the same time period, with the area covered by means expanded from from 43.0% to 71.3% (an increase by 66%), while the city's green spaces decreased by more than 200 km^2, with means declining from 31.5% to 9.1% (a decrease by 71%).

One of the consequences of this shift in the type of land from agricultural to residential is the increase in temperatures by about 7.3 C^0, i.e., an increase of about 26.2% over the past two decades, as well as an increase in CO_2 emissions by about 62.1%. This shift's long-term effects on food availability, land value fairness, and urban sustainability, as well as the permanent loss of productive land, continue to be the key problems. Compared to the short-term benefits of unrestrained expansion, the cost of recovering such land or recovering agricultural capability is far higher.

Credit Authorship Contribution Statement

Shireen I. Khazaal: Software, Writing – original draft, Validation. Israa H Karam Ali: Writing – review & editing, Methodology.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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تأثير المساحات الخضراء الحضرية على جودة الحياة من خلال عشوائية التخطيط الحضري

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الخلاصة

يُعد التوسع الحضري الناجم عن الزيادة السكانية أحد أكثر القضايا إلحاحًا التي تواجه المدن في جنوب العالم. وتُعد العاصمة العراقية بغداد مثالًا صارخًا على هذا التغيير. تبحث هذه الدراسة في كيفية تحويل الأراضي الزراعية في بغداد إلى مناطق سكنية بين عامي 2003 و2024، مع التركيز بشكل خاص على أحياء الدورة والبوعيثة والكريات. خلال هذه الفترة، نما عدد سكان بغداد من 5.6 مليون إلى ما يقرب من 9.1 مليون، وتغير استخدام الأراضي في المدينة بشكل كبير. ونظرًا لاحتياجات الإسكان وتطوير البنية التحتية، فإن الزيادة السكانية لها تأثير مباشر على استهلاك الأراضي، كما يتضح من هذا التوسع الجغرافي. توضح الدراسة العلاقة السلبية بين التحضر وإمكانية الوصول إلى المساحات الخضراء والزراعية باستخدام بيانات استخدام الأراضي السابقة والتقديرات الديموغرافية والمؤشرات البيئية. وينصب التركيز الرئيسي على الآثار الاجتماعية والمكانية لفقدان الأراضي الزراعية ونمو المساكن غير الرسمية وتدهور جودة البيئة، على الرغم من ذكر ارتفاع درجة الحرارة وانبعاثات ثاني أكسيد الكربون. من خلال تحليل الاتجاهات والخرائط والرسوم البيانية، يُؤكد البحث على أهمية دمج أساليب الحفاظ على الأراضي مع التنمية الحضرية المستدامة. ومن أهم الأفكار المطروحة: لامركزية التوسع نحو المدن التابعة، وتشجيع البناء الرأسي، وتطبيق قوانين تقسيم المناطق. تُظهر النتائج أن المناطق الحضرية نمت من 387.0 كيلومترًا مربعًا إلى 641.7 كيلومترًا مربعًا، بينما انخفضت المساحات الخضراء من 283.5 كيلومترًا مربعًا إلى 81.9 كيلومترًا مربعًا فقط. ونتيجةً لذلك، إذا لم يُعتمد تخطيط استباقي، فقد تُهدد مرونة المدينة وقابليتها للعيش على المدى الطويل بالتدهور الدائم للأراضي الناجم عن النمو السكاني.

الكلمات المفتاحية: النمو الحضري، جودة الحياة، التخطيط الحضري، المساحات الخضراء الحضرية.