The Role of Environmental Indicators in Improving the Quality of Urban Life in the City of Baghdad–A Comparative Study

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Abstract. The growing interest in concepts such as quality of life, environmental quality and indicators of urban life, has become a feature of contemporary urban communities. Quality of life is a concept that has multiple dimensions and components. Sustainable development ultimately aims at achieving a better quality of life, for present and future generations as a supreme goal. Therefore, enhancing the urban quality of life require the integration of the social, economic, physical and environmental domains in order to maintain a healthy and livable environment. Hence, the present research will focus on the role of the environmental indicators in improving the urban quality of life. The research aims at coming up with measuring the indicators -objective and subjective- to assess the level of the quality of urban life in Baghdad city via the indicators of the urban environmental quality. This has been carried out by identifying the contrasted spatial dimensions of the city for the purpose of making a comparison between the two urban models under investigation, namely, Al-Muthana district and Al-Sadr district. The research has required carrying out field surveys that are needed to collect data by adopting a proposed questionnaire for residents, using face-to-face interviews as well as collecting information from second sources. The research has adopted the descriptive analysis approach and comparative quantitative analysis depending on some appropriate methods and tools of statistical analysis. The research has concluded that the urban environmental quality indicators are substantially different in the two areas under study in favor of Al-Muthana district area, and they are associated with the perceived quality of urban life.

1. Introduction:
The concept of the quality of urban life has come as an inevitable result to the urban challenges and the forces driving towards urbanization and the accelerating growth of cities as a consequence of an increase in the population numbers, which has got the cities to face a lot of challenges that are associated with the quality of the urban life and the possibility of its sustainability in a way that guarantees an appropriate living standard and provides job openings without exhausting the ecosystems and the depletion of natural resources. The common challenges and urban environment stresses that are associated with metropolitan large cities include: the problems of the deterioration of the environmental quality, natural resources, health, pollution risks and urban poverty accompanied by quantitative and qualitative shortcoming in infrastructure services (clean water and sanitation), urban amenities (open green spaces, schools and transport) and energy [1]. These problems negatively impact the quality of the urban life and the well-being of the residents of the cities.
Therefore, enhancing the quality of the urban life and ensuring its persistent require adopting sustainable development principles and strategies that are concerned with achieving the environmental equilibrium and maintaining the environment (built or natural) by the efficient use of energy, eliminating pollution and its effect on the human health, and by investing renewable energy systems. 

**The research problem:** the deterioration of the quality indicators of the urban life, as they are affected by the characteristics of the environmental quality.

**The aim of research:** is to measure the indicators -objective and subjective- to assess the quality of urban life in Baghdad city through the indicators of the environmental quality and to identify the environmental problems spatially. This has been carried out by identifying the contrasted spatial dimensions of the city for the purpose of making a comparison between the two regions under investigation.

**The research hypothesis:** the good-quality of the environmental characteristics of an area is often associated with the conceived high quality of urban life.

2. **Main concepts and literature**

2.1 *The concept of Quality of Life QOL:*

Quality of life is a complex concept that includes a number of contributing factors. It considers one of the most comprehensive and a multidimensional concept, its definition is still one of the controversial issues between researchers, which increase the complexity and ambiguity of the concept. Moreover, from the perspective of some researchers, the concept of QOL cannot be defined precisely, it means different things to different people [2], because the quality of life is a concept that is specific to human existence and it incorporates many concepts and terms that are synonymous to it and overlapping with it, such as well-being, welfare, happiness, life satisfaction, and the satisfaction of human needs and aspirations as well as health as it focuses on the individual, other concepts such as the quality of place, livability and environmental quality as it focuses on the variables and characteristics of place or living environment, location, and natural environment, let alone the impact of some of the cultural factors that are related to the system of peoples’ values as cultures differ in perceiving and assessing the quality of life.

Thus, the quality of life can be defined as overall satisfaction with life [3]. In the social sciences, quality of life is defined as the overall well-being of individuals in a broad and a multidimensional sense. According to Lansing and Marans, the quality of life is an environment of high quality that reflects the sense of well-being and satisfaction in the population through those characteristics that might be physical, social or symbolic [4].

2.2 *The Quality of Urban Life QOUL and Sustainability: concepts and relations:*

There is no doubt that we live in an era that can be described under the name ‘Urban Century’, as it is featured by the high rates of rapid urbanization due to the increase in the percentage of world population concentration in the cities and urban areas. This situation has resulted in many environmental problems, manufacturing problems, social statuses, and complicated economic relations that require planning and sound management to ensure the well-being of population, reducing the deterioration of the urban capital and finding out an urban life that is coping with the requirements of the contemporary social life, and consequently, achieving vital cities that are livable, secure, and sustainable. Thus, the quality of the urban life is one of the stepping stones of the planning action and one of its pillars, as it is adequate to say that the quality of the urban life is a reflection of the extent of planning response to control the problems of environment and health degradation on one hand and the deterioration of living and social conditions on the other hand.

The concept of the quality of urban life is associated with interrelated and overlapping concepts and synonyms such as livability, quality of place, perception and residential satisfaction, and urban environmental quality. It also overlaps, in the urban context, with the sustainability concept in spite of the existence of implicit differences between the two concepts [4], as sustainability concentrates on the future dimension, the balance in relationship between human and environment, and the right of the coming generations to enjoy environment and the available natural resources to meet their needs,
whereas livability, the quality of place, and the quality of life focus on the spatial dimension and the current temporary dimension.

The quality of urban life is perceived as the circumstances that governing a habitable space in regard to its validity for living and accommodation in terms of the comfort that is related to the availability of the ecological, biological, economic-productive, socio-cultural, technological and aesthetic elements in its spatial dimensions. Therefore, Urban Environmental Quality is, by extension, a product of the interaction of these variables to create a healthy, comfortable habitat capable of satisfying the basic requirements of the sustainability of human life in social interaction within the urban environment [5].

The quality of urban life refers to the integration and availability of the elements that constitute the basic sectors in the city or the residential area (the urban form elements, the social sector, the basic infrastructure sector, the community services sector, the housing sector and the cultural and recreational services) which provide the psychological comfort and stability to the residents [6], as they impact the conduct of the human as an individual and the economic units such as firms, business organizations and others. In fact, the access to the integrated social facilities and services, urban amenities in terms of public goods, as well as environmental amenities are linked to the city performance and they are core elements for achieving resident’s satisfaction.

There is a direct and indirect relation between the quality of life and the sustainable development which is defined as the development that meets the basic needs of the present without compromising the ability of the future generations to meet their own needs [7], as meeting needs is not a prior condition for sustainable development only, but it is also significant to the individual well-being and consequently to a high quality of urban life.

Sustainable development was defined by the United Kingdom government strategy as ensuring a better quality of life for everyone, now and generations to come. In accordance with this perspective, the quality of life index has often been used as an inclusive concept and as a surrogate indicator of sustainable development indicators as it includes: environmental quality, health, education, recreation, equality, social cohesion, democratic governance system, and economic prosperity [8]. Therefore, Sustainable development ultimately aims at achieving a better quality of life as well as achieving the human well-being as a supreme goal, with the environmental conservation, which requires the integration of the social, economic, physical and environmental domains in order to create a healthy and livable environments.

3. Components (domains) of the Quality of Urban Life

The literature has stated that the quality of the urban life is one the concepts that deals with the different domains of the city life inclusively (materialistic, qualitative and moral aspects) that are related to the individual attributes (such as health, education and life achievements), as well as the conditions of the surrounding environment where people live (such as natural environment and housing conditions), that are considered on different levels (national, city, neighborhood, and the residential unit). It is noteworthy to say that these domains are interrelated by ambiguous and complicated relationships. In other words, the rising of a specific indicator may result in the improvement of a specific domain, which might have a negative impact on another domain. For example, the increase in economic growth rates indicates an increase in productivity and the growth of the Gross Domestic Product GDP, which leads to an inevitable rising in the living standards and the income of the residents. However, this might also be a reason for a decline in social well-being, sustainability, and natural capital reserve due to an increase in the demand of natural resources and energy as well as an increase in environmental pressures and pollution rates, a situation that might require maintaining the ecological processes that life depends on through sustainable development mechanisms and by the integration of the economic, social, and environmental considerations that are considered the pillars of sustainability, based on the assumption that the relationship between sustainability items and the quality of life and treasure is a non-linear relationship [9].

It is always important to understand the relationship between the different characteristics of the urban environment and subjective evaluations and it is also useful to measure and compare the assessment of
the different domains that constitute the quality of urban life and to specify the relative importance of each domain in explaining the quality of life in general [10].

3.1 Objective and subjective indicators of quality of urban life:
Indicators are tools that measure, simplify and communicate important issues and trends, and used to inform policy [11]. Most of the researchers agree that there are two approaches to measure and assess the quality of urban life, based on two types of indicators; these indicators are objective indicators and subjective indicators, as the approach that combines these two types is significant to draw final and useful conclusions [12; 13]. The two approaches are explained as below:

1. The objective indicators of the quality of urban life: They reflect clear objective characteristics that are related to the quality of the urban environment and the population characteristics, that can be identified through a group of related variables and indicators, as they can measure the excellence degree of the urban life and well-being that is achieved in the physical, environmental, economic, and social aspects. They also deal with a wide set of urban environmental issues such as the study of pollution rates (air, water, and land), green space ratios, and urban facilities, in addition to indicators that relate to other domains of life such as housing issues, crowding degrees, and the quality of the residential environment.

2. The subjective indicators of the quality of urban life: They reflect the individual subjective assessment of conditions and the quality of the urban life in different domains through the measures of feelings and satisfaction measures of the quality of the urban environment. The subjective views are linked to cultural and contextual differences, and tend to be related to a smaller scale of research. As an example of these measures is the inquiry about specifying the degree of the individual satisfaction about the nature and efficiency of the basic services and facilities available in the residential environment.

However, the results obtained in such researches differ by the different selected domains and the indicators these domains incorporate and by the difference of the targeted residential groups as well as the spatial level that the research is based upon (i.e. the national, regional, city, residential communities and neighborhoods) [14]. The residential neighborhood is considered the smallest social unit with an appropriate urban level to assess the quality of urban life, so that it can reflect the social, urban and economic aspects that affect daily life in the city.

Generally speaking, by reviewing different studies and cities' programs that are presented in this regard, one can see that they all refer to a number of common domains that can contribute to affecting the improvement of the quality of the urban life in those cities. The environmental features and the environmental indicators are regarded as some of the basic components of the quality of the urban life (see table 1).
Table 1. The urban quality of life domains and environmental indicators adopted in some urban studies and programs of different cities.

| Study / Program | Year | Domains | Environmental indicators |
|-----------------|------|---------|--------------------------|
| The FCM Quality of Life Reporting System – Quality of life in Canadian communities [15] | 2001 | Economic activities – Employment - Quality of housing (affordable housing and housing burden) – Health - Safety - Social stressors - Community participation - Environmental quality. | Number of smog days - Amount of municipal Waste generated per capita - Weight of the collected recyclable goods per resident - Quality of raw water meant for use as drinking water - Percentage of population served by treated water - Percentage of environmentally significant land that is protected. |
| Quality of Life in (12) of New Zealand’s Cities [16] | 2007 | Population – Housing - safety - Knowledge and skills – Health - Social cohesion, civil and Political rights - Living standards - Economic development - Quality of the natural environment - Quality of the built environment. | Local natural environment - Air quality - Biodiversity - Waste management and recycling - Energy use - Drinking water quality - Land use - Ecological footprint - Water consumption - Shape and sense of the city - Traffic and Public transport. |
| Quality of life in Romania [17] | 2004 | Person - Dwellings - Human settlements - Natural environment - Income levels - Social environment - Services - Health care - Working life balance – Levels of consumption Economic resources - Social security and welfare – Education. | Natural environment (air, water quality) - Green areas - Noise pollution - Paved road area - Proportion of people living in polluted areas - Quality of public transport - Population with potable water supply - Thermal comfort in housing - Infrastructure services. |
| London’s Quality of Life Indicators [18] | 2012 | Voting and Volunteering - Health and Child care - Education and training - Creativity and innovation - Physical activity – Poverty - Employment and Income inequality - Decent housing - Waste recycling - Satisfaction and happiness -Environment and access to Nature - Business survival – Transportation – Crime. | Air quality (particulate matter concentration PM$_{10}$) - CO$_2$ emissions - Travel to school - Traffic volumes - Access to nature - Bird populations - Water consumption - Ecological footprint - Recycling of household waste - Quantity of waste generated. |
| Study/Indicator                                                      | In/At                                                                 | Year | Categories                                                                                     |
|--------------------------------------------------------------------|----------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------|
| What Matters in Greater Phoenix - Indicators of Our Quality of Life. (Arizona State University) | 2008                                                                |      | Education - Crimes and Public Security - Health and Health Care Services - Sense of society - Families and Youth - Economy - Arts - Culture and entertainment centers - Transportation and mobility - Environment. |
| Quality of life in European cities 2015 [20]                       | 2015                                                                |      | People’s Satisfaction with their city and neighborhood - public transport - Local economy - Job opportunities and unemployment - Community and Infrastructure services - Arts and sports centers - Culture - Public and green spaces - safety and trust - Quality of housing - Cultural diversity - presence of foreigners - Governance - Self-sufficiency - Quality of the environment. |
| Measuring quality of life in Istanbul [21]                         | 2006                                                                |      | Residential history - Public services and transportation - parks and recreation - Taxes - Schools - Shopping - Safety - Community participation - Housing and residential mobility - Neighborhood and neighboring - Health - Socio-economic characteristics. |
| The Economist Intelligence Unit (EIU), Livability Survey 2017 [22]  | 2017                                                                |      | Political stability and security - Health care - Environment and culture – Education - Infrastructure services. |
| The economist intelligence unit (EIU), Quality of life index 2005 [23] | 2005                                                              |      | Material well-being - Health, Political stability and security, Family life (divorce rates), Community life (relations) - Job security - Climate and geography - Political freedom - Equality. |

Air quality - Number of days exceeding federal air quality standards - Population served by a water system in violation - Water consumption - Type of drinking water - Perceptions of population growth - Measures of population growth and density.

Satisfaction with air quality - Satisfaction with noise level - Satisfaction with cleanliness of the city - Satisfaction with green areas (parks and public gardens) - City’s commitment to reduce climate change (energy efficiency, green transport example).

Access to parks and recreation facilities - Availability of playgrounds – Disposal of hazardous waste disposal - Noise/Air pollution – Trash disposal - Loss of natural places.

Climate conditions (humidity/temperature) – Discomfort climate for travellers – Quality of water provision - Quality of energy provision - Good housing indicators - Quality of public transport - Quality of road networks.

Climate conditions (temperature).
4. **The components and domains of the environmental dimension:**

The environmental quality has always been one of the essential components in the quality of life, and it is often overlooked by policymakers as a key for sustainable growth and poverty alleviation, [24]. It also directly affects the quality of the urban life as it enhances the well-being and health of the human being. In addition, the environment is regarded as the primary source of natural resources (renewable and non-renewable) and as a supplier of many environmental services (recreation, tourism, inspiration, walkability, food security and etc.), and thus can be said it supports the quality of people's life and their growth in a healthy and safe environment that is in harmony with nature and that provides their different basic needs [25].

Furthermore, the ecosystem provides multiple benefits, services and energy in which people depend on for their production of different economic sectors and construction activities. Hence, the environment plays a critical and essential role in the city performance and its development in different sectors which should be cost-effective development.

Also, the domains of environmental dimension deal with the environmental issues and it gives perceptions of the quality or conditions that are related to the environmental attributes (outdoor /indoor environment), which can help to improve the level of quality through the following values:

1. **Health:** environmental health regarding environmental pollution and quality of the environmental system elements (air, water, land and wilderness areas) in macro environments.
2. **Diversity:** diversity or mixed land use and biodiversity.
3. **Comfort:** Performance of interior environment (thermal comfort), annoyance, and climate conditions.
4. **Efficiency:** integrated waste management, energy use, risk management and consumption behavior.
5. **Access:** access to the environmental amenities, as well as urban amenities like museums and cultural facilities.

According to what previous studies have referred to, the most outstanding indicators of the environmental quality (objective and subjective) that the present research will deal with are illustrated in tables 2, 3 below.

**Table 2.** Illustrates the framework of the most important environmental indicators extracted (subjective).

| Environmental dimension indicators | Key environmental quality indicators | Sub-indicators (subjective) | Application level |
|-----------------------------------|-------------------------------------|-----------------------------|-------------------|
| **Environmental Health Index in Urban Context (Environmental Risk)** | Adequate natural ventilation for all spaces | Performance of the internal environment (dwelling) |
|                                   | Adequate natural lighting for all spaces |                                |
|                                   | Thermal insulation requirements        | Urban Environment (Residential environment) |
|                                   | Acoustic insulation requirements        |                                |
| **Natural Environment (Greening, Open Spaces)** | Environmental pollution in general has an impact on the health of the population and is considered an environmental problem. |                                |
|                                   | Pollution due to noise                 |                                |
|                                   | Air pollution due to: (dust storms, proximity to industrial sites, burning of waste, proximity to commercial electricity generators, construction and restoration waste) |                                |
|                                   | Pollution due to traffic congestion    |                                |
|                                   | Sufficiency of green spaces, parks and public gardens to connect with nature. |                                |
|                                   | Offers children’s play grounds and seating areas. |                                |
| Environmental dimension indicators | Energy efficiency | Infrastructure services | Overall QOL indicators (Neighborhood and dwelling level) |
|-----------------------------------|------------------|------------------------|--------------------------------------------------------|
| Easy access to green areas and play grounds within walking distance | Use renewable energy for electricity and other power sources. | Availability and efficiency of rainwater drainage network. | Satisfaction with overall quality of life in the residential environment. |
| Access to green areas and play areas in time | Provision of potable water. | Efficiency of the sewage network | Satisfaction with overall quality of life in dwelling unit. |
| | Efficiency of telecommunications service (Internet connection). | Sufficient power supply | Extent of desire to change residence or place of residence. |
| | Efficiency of waste collection services | Services (paving roads, streets, appropriate lighting, cleanliness), upkeep services of sidewalk and walkways networks. | |
| | Services for upgrading public spaces and green areas, Behavior of the residents in maintaining the cleanliness of the residential environment. | |

Table 3. Illustrates the framework of the urban socio-physical attributes indicators extracted (objective).

| Main urban environment indicators | Sub-indicators (objective) |
|-----------------------------------|----------------------------|
| C1 population                     | Population (neighborhood, city) between two periods. |
| C2 Urban densities                | Total and net population density |
| C3 Land uses                      | Total and net housing density |
| C4 Green spaces and urban recreational facilities | Diversity and land use mix. |
|                                   | Percentage of open spaces and urban recreational facilities (urban amenities). |
|                                   | Per capita green spaces and urban recreational facilities. |

5. Study areas (location, demographic, and urban physical characteristics):
The two areas of the study have been selected apart from the rest of the areas of Baghdad City, because they represent two distinctive and contrasted urban models in their residential characteristics.
based on their residential densities and socio-economic attributes, which are reflected upon the quality of urban life as poor areas versus rich areas. The two areas under investigation are Al-Muthanna district/ neighborhood 714 within Al-Ghadeer municipality and part of Al-Sadr district/ neighborhood 532 within the second Al-Sadr municipality.

5.1 Location

Study Area A / (Al-Muthana district):
Al-Muthana district occupies a central location in Baghdad City and it is nearer to the eastern side of the city and it is located to the western south of Al-Ghadeer municipality. It is connected with the surrounding urban areas through high ways and significant arterial roads. It covers an area of (618.43) hectares and it incorporates five residential neighborhoods. (The data was obtained from Baghdad municipality, geographic information division). This location is illustrated in Figure 1.

Study Area B / (Part of Al-Sadr district- the second Al-Sadr municipality):
This selected study area represents part of Al-Sadr district within the second Al-Sadr municipality in Al-Sadr city. It is located to the north-eastern part of the city of Baghdad and to the western south of Al-Sadr municipality. It covers an area of (239.87) hectares. It incorporates five residential neighborhoods [26]. (The data was obtained from Baghdad Municipality, Geographic Information Division). This location is illustrated in Figure 1.

Figure 1. Illustrates the location of the two study areas in relation to the city of Baghdad and the boarders of the municipal units 2018. Source: (The researchers depending on the data obtained from Municipality of Baghdad, Design Department, Geographical Information Division GIS).

5.2 Population and Urban Density

The urban size and urban density impact the indicators of quality of urban life. According to the optimal centrality theory, postulates that there is an optimum urban scale which maximizes trade-offs between the urban benefits and costs. As the urban size and urban density are positively relating to increase the access to the opportunities, services, facilities and reduction of energy consumption. At the same time, the urban size and urban density might lead to a rising in the urban overload and the urban stresses accompanying it such as environmental pollution, traffic jam, and loss of natural and green spaces as well as overcrowding [10]. Previous studies have stated that those cities with medium size of the population achieve better results in regard of indicators of livability and the indicators of quality of urban life. According to previous research has shown that residents prefer lower-density urban environments.
Study Area A/ Population & Urban Density: The total population of Al-Muthanna district is (38842) inhabitants according to 2009 official statistics [26] and their number, according to population estimate of 2017, is (46050) inhabitants. The total population density of Al-Muthanna district is (74 person per hectare), and it covers about (16 dwelling units per hectare). Hence, Al-Muthanna district is considered as a low density area (population and residential density) due to the large area housing and low household size.

Study area B/ Population & Urban Density: The total population of the study area (part of Al-Sadr District) is (90322) inhabitants according to 2009 official statistics [26] and their number, according to population estimate of 2017 is (103850) inhabitants. The total population density of the study area is (432 inhabitants per hectare), and it covers about (43 dwelling units per hectare). In general, this area is classified as the most densely populated in Baghdad city with a high rate of residential density due to the small area dwellings and high occupancy rate, a situation that has led to increasing overcrowding rates.

5.3 Diversity Indicator or Land Use Mix

Land use reflects the features and nature of the different functions that the populations perform in order to satisfy their different needs. It is a critical factor for environmental sustainability; it affects CO₂ emissions and biodiversity. Land use also has consequences for public health.

Nowadays, several planning concepts such as New Urbanism, Smart Growth and compact cities proposed to reduce urban sprawl and to promote spatial and environmental quality. One of the solutions emphasized in these approaches is mixed or diversity of uses and compact land use. The diversity of uses or land use mix is essential to promote community livability, transportation efficiency (cycling and walking), reduce energy use and provide a good access to different activities [27]. There is also a clear relationship between the rising in walking and the well-being indicators and health, as all of that support the possibility of achieving the good quality of the urban life and sustainability [28, 29].

The entropy index is the most widely accepted and commonly used index by urban experts for representing the land use mix within geographic area. The entropy equation (1) was used to measure the diversity index or land use mix horizontally: [29]

\[ Entropy \ index \ H = \frac{-\sum_{i=1}^{N} (p_i) \ln(p_i)}{\ln(N)} \] (1)

Where, H: Diversity or land use mix as entropy index level,
P: Proportion of each land use type,
\( \ln(p_i) \): Natural logarithm of proportion of each land use type,
N: Number of all land uses types.

The Entropy index (H) varies between zero and one [0-1], where zero indicates complete non land use mix, whilst the value of one indicates the maximum land use mix or diversity, according to that, the value of (0.5) is considered as a threshold to achieve the diversity or mixed uses, and then to achieve urban sustainability and good quality of urban environment characteristics (or a place).

By applying the equation (1) for the study area (A), the diversity or land use mix index equals (0.6) approximately; this is a medium value that indicates an acceptable diversity or mixed land use. While the diversity index in the study area (B) equals (0.42) approximately; this value is a little bit less than the threshold value, and in the same time is lower than the diversity index value of Al-Muthanna District. This index value indicates, to an extent, the dominance of residential function and as a result it is a value that falls within non-diversity range with the percentage (84%), to diversity with (16%).

In summary, (Table 4.) illustrates the results of the comparative objective indicators based on urban residential characteristics (populations, density, land use and greening) between the two neighborhoods with their evaluations.
**Table 4.** A comparative summary of some of the Objective indicators of urban physical dimension (population, density, land use, Greening) of the two study areas.

| Main urban environment indicators | Sub-indicators (objective) | Muthanna district/ Neighborhood 714 | Sadr district/ Neighborhood 532 |
|-----------------------------------|----------------------------|-----------------------------------|-------------------------------|
| C1 population                     | Population /2009           | 7331                              | 20163                         |
|                                  | Population /2017           | 8691                              | 23183                         |
|                                  | Gross pop. density         | low                               | low                           |
|                                  | Net pop. density           | high                              | high                          |
| C2 Urban densities               | 68 person/hect.            | 480 person/hect.                  | 58 dwelling/hect.             |
|                                  | 131 person/hect.           | 704 person/hect.                  | 86 dwelling/hect.             |
| C3 Land uses                     | Diversity and land use mix.| 0.6 medium                        | 0.42                          |
|                                  | Percentage of open spaces  | medium                            | Very low                      |
|                                  | and urban recreational     | low                               | % low                         |
|                                  | facilities (urban amenities)| 7.4 % medium                      | 1.14 %                       |
| C4 Green spaces and urban        | Per capita green           | Lower than criteria               | Very low                      |
| recreational facilities          | 10.9 m²/capita             | 0.23 m² per capita                |                               |
|                                  |                            |                                   |                               |

*Evaluations where based on common residential standards used by urban experts in Iraq and some criteria by other organizations*  
b*The criteria used for open green spaces.*

6. **The Procedures of the Study**

6.1 **Methodology:**

The study has adopted two methods of collecting data and analyzing the quality of the urban life. An objective approach (top-down) by relying on second sources of the spatial data (statistics and the information obtained from official entities and satellite images), and a subjective approach (down-top) through the methods of community participation that required a field survey to measure the residents' perceptions and their subjective assessments about their living neighborhoods via the satisfaction indicators that reflect the subjective experiences and their interaction with the living environment. The researchers have also used suitable statistical methods for analyzing and conducting tests as well as for obtaining all the results of the study by using SPSS program.

Moreover, the researchers have designed a proposed questionnaire directed to stakeholders (residents) who are living in the area in order to obtain their assessments and perceptions about the quality of life in their place of living in general, and to assess the reality of the environmental quality indicators in their residential areas precisely, (Table 2). Also, the researchers have carried out the questionnaire by adopting face-to-face interviews with the residents. Hence, the questionnaire incorporates a set of questions with closed answers, which were formulated based on suitable scales (5 points Likert scale and binary scale) according to the variables or indicators.

6.2 **The Research Sample:**

A residential neighborhood has been selected from each area of the areas under investigation in a simple random manner for the purpose of carrying out a field survey. The selected neighborhoods are locality 714/ Al-Muthanna District, and locality 532/ part of Al-Sadr District. The procedure for
selecting the sample size is important since the study depends on data surveyed. The sample size \( n \) is calculated by applying the Richard Gager equation (2) [30]. The results have indicated that the required size of population is \((74, 77)\) for each of the study areas respectively. However, a sample of 100 items (questionnaire per household) was withdrawn from the original population of each of the study areas, a number that matches the required number according to the equation. Implementing the field survey lasted from 1st of April to 1st of May of the year 2018. The total sample investigated comprised \((75\%)\) of males, \((25\%)\) of females; their average age ranged between \((25-70)\) years.

\[
Sample \ size \ n = \frac{z^2 P(1-P)}{e^2} \frac{1}{1 + \left( \frac{z^2 P(1-P)}{N e^2} \right)} \tag{2}
\]

Where, 
- \( Z \): Standardized score, which is usually equals 1.96, with a Confidence Level usually is taken 0.95.
- \( P \): Sample proportion, which is between zero and one, usually takes the value 0.5.
- \( e \): Margin of error, usually is 0.05.
- \( N \): population size.

6.3 Verify the Validity of the Research Tool (the Questionnaire):

The validity of the research tool (i.e. the questionnaire) can be verified by applying validity and reliability tests on the questionnaire responses as below:

1- **Content Validity**: To validate the research tool, the researchers have consulted \((11)\) academic professors with expertise in the field to get their opinions about the content.

2- **Reliability**: Reliability in regard to scientific researches is one of the features that should be available in the tool of collecting data. One of the most famous methods and most common one to measure the reliability of the scientific research is calculated (Cronbach’s alpha) coefficient of internal consistency. The results are summarized in (Table 5) and showed the rising levels of reliability above the allowed minimum limit.

| Table 5. Estimates of (Cronbach’s \(\alpha\)) coefficients for the observed responses to all variables investigated |
|---------------------------------------------------------------|
| Regions | Minimum value | Estimated value | Decision |
|------------------|--------------|----------------|----------|
| Al - Muthanna District-locality 714 | 70% | 79.94% | Verified |
| Al - Sadr District-locality 532 | 70% | 84.84% | Verified |

7. **Analysis and Results of the Questionnaire**

7.1 **Environmental dimension-Environmental quality indicators**

This section will present a respondents assessment of the QOUL through environmental quality indicators summarized in six domains or main indicators that will be analyzed and compared between the two study areas according to the measurement scale of each one. These main indicators are the following:

1. The indicator of environmental comfort in accommodation;
2. The indicator of environmental health in the urban context;
3. The indicator of the natural environment;
4. The indicator of energy efficiency;
5. The indicator of infrastructure;
6. The indicator of upgrading services (maintenance and upkeep).
7.1.1 First: Environmental comfort in accommodation (interior)

(Table 6) demonstrates the observed frequencies and their cumulative percentages represented by the sub-indicators (4 items) of environmental comfort index for the tow samples, which are measured according to a binary response scale (yes/no), in addition to the significant comparisons.

Table 6. Descriptive statistics for availability of environmental comfort conditions (interior)

| Are the following environmental comfort requirements available in your home? | Neighborhood Categories | Sadr district/ Neighborhood 532 | Muthanna district/ Neighborhood 714 | C.S.\(^a\) P-value |
|---|---|---|---|---|
| Natural ventilation for all rooms. | Yes | 90 | 90 | CC=0.000 |
| | No | 100 | 10 | P=1.000 NS |
| Natural lighting for all rooms | Yes | 77 | 77 | CC=0.188 |
| | No | 100 | 23 | P=0.007 HS |
| Provision of thermal insulation | Yes | 10 | 10 | CC=0.482 |
| | No | 100 | 90 | P=0.000 HS |
| Provision of acoustic insulation | Yes | 0 | 0 | CC=0.412 |
| | No | 100 | 100 | P=0.000 HS |

\(^a\) HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on a Contingency Coefficient (C.C.) test.

7.1.2 Second: Environmental health in the urban context

(Table 7) illustrates the observed frequencies and their cumulative percentages for the sub-indicators (5 items) of the environmental health index in an urban context, which include verifying exposure to environmental risks (pollution) that affect public health, and are measured according to a binary response scale (yes/no), in addition to the significant comparisons.

Table 7. Descriptive statistics for verifying exposure to environmental risks (pollution as a problem) in the urban context.

| Do you suffer any of the following risks or difficulties in your neighborhood or place of residence? | Neighborhood Categories | Sadr district/ Neighborhood 532 | Muthanna district/ Neighborhood 714 | C.S.\(^a\) P-value |
|---|---|---|---|---|
| Environmental pollution in the residential area affects the health of the residents | Yes | 75 | 75 | CC=0.523 |
| | No | 100 | 25 | P=0.000 HS |
| Annoyance due to noise (Noise pollution) | Yes | 72 | 72 | CC=0.426 |
| | No | 100 | 28 | P=0.000 HS |
| The accumulation of solid waste in the streets, squares and empty pieces. | Yes | 59 | 59 | CC=0.168 |
| | No | 100 | 41 | P=0.016 S |
| Air pollution due to (dust storms, proximity to industrial sites, burning of waste, proximity to generators, construction and restoration waste) | Yes | 78 | 78 | CC=0.420 |
| | No | 100 | 22 | P=0.000 HS |
| Pollution due to congestion | Yes | 78 | 78 | CC=0.037 |
| | No | 100 | 22 | P=0.599 NS |

\(^a\) HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; S: Sig. at P<0.05; Testing based on a Contingency Coefficient (C.C.) test.
7.1.3 Third: Natural environment indicator (Greening and Open Spaces)

It is one of the essential indicators for assessing the quality of the urban life, as the physical characteristics of neighborhood, in relation to greening and open spaces, the extent of enjoying landscapes, the efficiency of public open spaces, parks and public gardens affect indicators of psychological and physical health of residents and the extent of their well-being feelings. These characteristics also impact the social cohesion, social interaction in addition to their impact on the urban image, identity, the aesthetic values of neighborhood, and its role in supporting the ecological balance and mitigation the microclimate. In addition to that, they have an effect on feelings and satisfaction with quality of neighborhood, quality of housing, and hence they are impacting the feeling of satisfaction about the quality of life in general [31, 32].

(Table 8) illustrates the observed frequencies and their cumulative percentages for the sub-indicators (3 items) of the natural environment (i.e. greening and open spaces) that are based on a question asking respondents how much they satisfied or dissatisfied with the efficiency of natural environment attributes and their easy accessibility within the neighborhood area. These indicators are measured according to Likert 5-point satisfaction Scale where 1 represents “Extremely dissatisfied” and 5 represents “Extremely satisfied”.

The results of (Table 8) refer to a significant divergence between the two areas of the study in the entire subsidiary indicators of the natural environment (greening and open spaces), as there is a great extent of lowering in the satisfaction indicators in Al-Sadr district, a situation which indicates the population's deprivation of green and recreation areas, which has affected their assessment of the quality of urban life in general.

Table 8. Percentages of residents satisfied with each subsidiary indicator of natural environment and their significant comparisons.

| How satisfied are you with the efficiency of green spaces, landscapes, parks and public gardens in the vicinity of your residence? | Neighborhood | Sadr district/ Neighborhood 532 | Muthanna district/ Neighborhood 714 | C.S. a | P-value |
| --- | --- | --- | --- | --- | --- |
| Categories | Cum. % | No. | Cum. % | No. | |
| In terms of the adequacy of green spaces, parks and gardens to connect with nature. | | | | | |
| Extremely dissatisfied | 50 | 50 | 28 | 28 | CC=0.266 |
| Dissatisfied | 92 | 42 | 75 | 47 | P=0.002 |
| Neutral | 99 | 7 | 97 | 22 | HS |
| Satisfied | 100 | 1 | 100 | 3 | |
| Extremely satisfied | 100 | 0 | 100 | 0 | |
| In terms of availability of children’s playgrounds and seating areas. | | | | | |
| Extremely dissatisfied | 56 | 56 | 16 | 16 | CC=0.453 |
| Dissatisfied | 94 | 38 | 56 | 40 | P=0.000 |
| Neutral | 98 | 4 | 93 | 37 | HS |
| Satisfied | 100 | 2 | 100 | 7 | |
| Extremely satisfied | 100 | 0 | 100 | 0 | |
| In terms of accessibility within walking distance | | | | | |
| Extremely dissatisfied | 50 | 50 | 16 | 16 | CC=0.453 |
| Dissatisfied | 96 | 46 | 56 | 40 | P=0.000 |
| Neutral | 98 | 2 | 83 | 27 | HS |
| Satisfied | 50 | 50 | 28 | 28 | |
| Extremely satisfied | 92 | 42 | 75 | 47 | |

* aHS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on a Contingency Coefficient (C.C.) test.

7.1.4 Fourth: Energy efficiency indicator

The way energy is consumed affects many aspects of environmental quality, and the whole world efforts are going with the increasing interest in environmental issues to preserve the environmental
resources and to eliminate the pollution rates in the cities by using clean and renewable energy sources for generating electricity. The strategy of the efficient use of energy in cities is one of the ways to achieve sustainability and a better quality of life.

(Table 9) illustrates the observed frequencies and their cumulative percentages for the sub-indicators (4 items) of energy efficiency indicator by inquiring about the choices of the source of electricity provision that are available for living, and these are measured according to a binary response scale (available/not available), in addition to the significant comparisons.

The results in (Table 9) refer to the existence of a core divergence in providing energy sources (own generator, private sector generators), whereas no difference has appeared when the source of energy is a public service and no difference has shown in regard to renewable energy sources because the two areas did not rely on renewable clean energy sources.

Table 9. Descriptive statistics for the availability of energy sources alternatives including clean energy.

| Power supply source (electricity) available for dwelling? | Neighborhood | Sadr district/ Neighborhood 532 | Muthanna district/ Neighborhood 714 | C.S. | P-value |
|---------------------------------------------------------|--------------|---------------------------------|---------------------------------|------|---------|
| National Network                                       |              |                                 |                                 |      |         |
| Not available                                          |              | 0                               | 0                               | 0    | 0       |
| Available                                              |              | 100                             | 100                             | 100  | 100     |
| Own generator                                          |              |                                 |                                 |      |         |
| Not available                                          |              | 81                              | 100                             | 100  | 100     |
| Available                                              |              | 100                             | 19                              | 0    | 0       |
| Private sector generators                               |              |                                 |                                 |      |         |
| Not available                                          |              | 0                               | 0                               | 0    | 0       |
| Available                                              |              | 100                             | 100                             | 100  | 100     |
| Renewable energy sources (solar energy)                |              |                                 |                                 |      |         |
| Not available                                          |              | 100                             | 100                             | 100  | 100     |
| Available                                              |              | 0                               | 0                               | 0    | 0       |

*HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on a Contingency Coefficient (C.C.) test.

7.1.5 Fifth: The infrastructure services

In order for any neighborhood or an urban area to have a high quality in livability, the needs of its population should be met by providing highly efficient basic infrastructure. (Table 10) illustrates degrees of satisfaction with the good quality of infrastructure services that measured according to a 5-point Likert scale graduated between "extremely dissatisfied - extremely satisfied", in addition to the significant comparisons. As it is shown in Table (10), there are core differences on all subsidiary indicators (5 items) of the quality of the infrastructure services between the two study areas.

Table 10. Percentages of residents satisfied with the quality of each subsidiary indicators of infrastructure Services in terms of their availability and efficiency, and their significant comparisons

| How satisfied are you with the availability and efficiency of infrastructure services? | Neighborhood | Sadr district/ Neighborhood 532 | Muthanna district/ Neighborhood 714 | C.S. | P-value |
|-------------------------------------------------------------------------------------|--------------|---------------------------------|---------------------------------|------|---------|
| Availability and efficiency of rainwater drainage network.                           |              |                                 |                                 |      |         |
| Extremely dissatisfied                                                              |              | 20                              | 20                              | 3    | 3       |
| Dissatisfied                                                                         |              | 71                              | 51                              | 25   | 22      |
| Neutral                                                                             |              | 98                              | 27                              | 50   | 25      |
| Satisfied                                                                           |              | 100                             | 2                               | 92   | 42      |
| Extremely satisfied                                                                 |              | 100                             | 0                               | 100  | 8       |
| Provision of potable water (clean water).                                            |              |                                 |                                 |      |         |
| Extremely dissatisfied                                                              |              | 8                               | 8                               | 2    | 2       |
| Dissatisfied                                                                         |              | 61                              | 53                              | 42   | 40      |
| Neutral                                                                             |              | 88                              | 27                              | 85   | 43      |

*HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on a Contingency Coefficient (C.C.) test.
Sixth: Upgrading services (maintenance and upkeep or sustain)

(Table 11) indicates residents levels of satisfaction with the efficiency of upgrading services for (maintenance and upkeep), that measured according to a 5-point Likert scale graduated between “extremely dissatisfied - extremely satisfied”, in addition to the significant comparisons. The results of (Table 11) shows that there are core differences on all the subsidiary indicators of upgrading services between the two areas of the study, except the indicator of the upgrading public parks and green areas.

Table 11. Percentages of residents satisfied with the quality of each subsidiary indicators of upgrading services in terms of their availability and efficiency, and their significant comparisons

| How satisfied are you with the efficiency of maintenance and upkeep services? | Neighborhood | Sadr district/ Neighborhood 532 | Muthanna district/ Neighborhood 714 | C.S.              |
|-----------------------------------------------------------------------------|--------------|---------------------------------|-------------------------------------|-------------------|
| Efficiency of waste collection services                                     |              |                                 |                                     |                   |
| Extremely dissatisfied                                                      | 9            | 9                               | 2                                   | CC=0.589          |
| Dissatisfied                                                                | 59           | 50                              | 5                                   | P=0.000 HS        |
| Neutral                                                                    | 88           | 29                              | 18                                  |                   |
| Satisfied                                                                  | 100          | 12                              | 77                                  |                   |
| Extremely satisfied                                                        | 100          | 0                               | 100                                 |                   |
| Services (road and street good paving, Appropriate lighting, cleaning services) |              |                                 |                                     |                   |
| Extremely dissatisfied                                                      | 17           | 17                              | 4                                   | CC=0.263          |
| Dissatisfied                                                                | 77           | 60                              | 58                                  | P=0.002 HS        |
| Neutral                                                                    | 99           | 22                              | 95                                  |                   |
| Satisfied                                                                  | 100          | 1                               | 100                                 |                   |
| Extremely satisfied                                                        | 100          | 0                               | 100                                 |                   |

*a HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on a Contingency Coefficient (C.C.) test.
Extremely dissatisfied 28 28 9 9  CC=0.325  
P=0.000  
HS
Dissatisfied 83 55 55 46
Neutral 98 15 91 36
Satisfied 100 2 100 9
Extremely satisfied 100 0 100 0

Extremely dissatisfied 12 12 9 9  CC=0.064  
P=0.846  
NS
Dissatisfied 64 52 59 50
Neutral 96 32 95 36
Satisfied 100 4 100 5
Extremely satisfied 100 0 100 0

Extremely dissatisfied 20 20 15 15
Dissatisfied 40 20 32 17  CC=0.247  
P=0.012  
S
Neutral 79 39 61 29
Satisfied 98 19 85 24
Extremely satisfied 100 2 100 15

*HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on a Contingency Coefficient (C.C.) test.

7.2 Indicators of satisfaction with the quality of urban life in general-(neighborhood/dwelling)
(Table 12) displays the subjective assessment of the quality of urban life as whole, throughout the degree of satisfaction with the quality of life in general in the residential neighborhood (living place), the degree of satisfaction with the quality of life in the dwelling unit, and the extent of willingness to change the dwelling unit or the accommodation place by moving out to another place. These indicators are measured according to the linear numeric version of a likert-type scale with equal intervals from (1 to 10), where 1 represents the lowest degree of satisfaction, and 10 represents the highest, for the first and second questions. However, the third item is measured according to a 5-point traditional Likert scale graduating between "strongly don't want – strongly want", in addition to the significant comparisons. The results of (Table 12) demonstrate a core difference in all of the indicators of satisfaction about the quality of life in general between the two areas of the study.

Table 12. Percentages of residents satisfied with the quality of urban life as whole, and their significant comparisons

| Indicators of satisfaction with the quality of urban life in general - (neighborhood / dwelling) | Neighborhood Categories | Sadr district/ Neighborhood 532 | Muthanna district/ Neighborhood 714 | C.S.a  | P-value  |
|---|---|---|---|---|---|
| How satisfied are you with the quality of urban life in your neighborhood or residential area? | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 1 | 1 | 0 | 0 |
| | 3 | 16 | 15 | 0 | 0 |
| | 4 | 45 | 29 | 5 | 5 |
| | 5 | 63 | 18 | 15 | 10 |
| | 6 | 81 | 18 | 26 | 11 |
| | 7 | 98 | 17 | 53 | 27 |
| | 8 | 100 | 2 | 74 | 21 |
| | 9 | 100 | 0 | 99 | 25 |
| | 10 | 100 | 0 | 100 | 1 |
| How satisfied are you with the quality of life in your dwelling? | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 | 0 |

a: HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on a Contingency Coefficient (C.C.) test.
To what extend do you want to change your residence and move elsewhere?

|                | To what extent do you want to change your residence and move elsewhere? |
|----------------|------------------------------------------------------------------------|
| Strongly don’t |  3  6  6  0  0  | HS |
| Don’t want     |  4  23  17  0  0  |  |  |
| Neutral        |  5  39  16  8  8  |  |  |
| Want           |  6  66  27  12  4  |  |  |
| Strongly want  |  7  89  23  21  9  |  |  |
|                |  8  99  10  44  23 |  |  |
|                |  9  100  1  82  38 |  |  |
|                | 10  100  0  100  18 |  |  |

|                | CC=0.485 | P=0.000 |
|----------------|----------|---------|
|                | HS       | HS      |

*HS: Highly Sig. at P<0.01; Testing based on a Contingency Coefficient (C.C.) test.

7.3 *Indicators of the environmental quality that are impacting the quality of urban life in cities*

(Table 13) illustrates the descriptive statistics of the main indicators of the quality of urban life in cities in regard of the urban environmental quality of the two study area samples. These statistics are represented by the Percentile Gross mean of score (PGMS), Percentile Gross Standard Deviation (PGSD), and the difference between the Percentile Gross mean of score (DPGMS) for each of the study areas, in addition to the results of the statistical tests (t-test) and their significant comparisons.

Table 13. Descriptive statistics of the main indicators of urban quality of life that affected with the environmental quality indicators of the two research sample, and their significant comparisons

| Key environmental quality indicators | Al-Muthanna district/neighborhood | Al-Sadr district/neighborhood | DPGMS | t-test | P-value | C.S* |
|--------------------------------------|----------------------------------|--------------------------------|-------|--------|---------|------|
| No.                                  | PGSD    | PGMS   | PGSD   | PGMS   |         |      |
| Index of environmental comfort in housing | 100  27.4  69.5 | 17.7  44.3 | 25.3  7.733 | 0.000 | HS      |
| Environmental Health Index in Urban Context | 100  21.6  38.8 | 23.2  72.4 | -33.6 -10.589 | 0.000 | HS      |
| Satisfaction with the natural environment | 100  14.5  31.7 | 13.2  13.9 | 17.7  9.069 | 0.000 | HS      |
| Energy efficiency index | 100  0.0  100.0 | 19.7  59.5 | 40.5  30.182 | 0.000 | HS      |
| Infrastructure services | 100  11.0  61.1 | 12.0  37.4 | 23.7  14.54 | 0.000 | HS      |
| Upgrading Services | 100  13.2  46.5 | 12.8  31.7 | 14.9  8.075 | 0.000 | HS      |
| Indicators of satisfaction with the QOUL in general (neighborhood /dwelling) | 100  17.7  73.3 | 12.5  43.2 | 30.1  13.903 | 0.000 | HS      |
The research has found the following:

1. The results of (Table 13) shows a wide variance in the indicators of QOUL in general, and in regard to the environmental quality indicators between the two areas of the study, as the results of the statistical tests have shown that all the indicators achieve high significance values, at the level of (p<0.01).

2. The indicators: (energy efficiency indicator, environmental health in the urban context “pollution” indicator, and the indicators of satisfaction with the quality of life in general) come in the first rank respectively in relation to the values of the difference between the Percentile Gross Mean of Score, as it is between (30.1-40.5).

3. The indicators of environmental comfort in housing and the infrastructure services come in the second rank respectively. Their values of the difference between the Percentile Gross Mean of Score are between (23.7-25.3).

4. The third group of indicators is the indicator of the natural environment- greening and open spaces and the indicator of upgrading services (maintenance and upkeep) respectively. Their values of the difference between the Percentile Gross Mean of Score are between (17.7 and 14.9).

8. Conclusions

In light of the results drawn from this study concerning the two areas under study, which represent contrasted models for the purpose of comparing the two areas of the study in light of the indicators of environmental quality to diagnose and identify the environmental problems spatially. The conclusions are summarized in the following points:

1. There is a decline in the indicators of satisfaction of the quality of the urban life in general in Al-Sadr district with a higher significant preference than it is the case in Al-Muthanna district. In addition, there is a decline in the environmental conditions which affect the satisfaction indicators of quality of life in general. This situation indicates a necessity to take care of the environmental factors to improve the quality of the urban life.

2. There is a decline in the satisfaction indicators of the quality of the green and open spaces in the two areas, in spite of the existence of a core difference between the two areas in favor of Al-Muthanna district.

3. There is a decline in the satisfaction indicators of the quality of infrastructure services in Al-Sadr district with a higher significance preference than it is the case in Al-Muthanna district and with a widening gap between the two areas. This result indicates the deprivation state that is present in Al-Sadr district in comparison to Al-Muthanna district, in spite of the fact that the latter area does not get a complete satisfaction of these services with the exception of the indicator of power supply efficiency.

4. There is a decline in the indicators of satisfaction of the quality of the upgrading services (maintenance and upkeep) in Al-Sadr district with a higher significance preference in comparison to Al-Muthanna district. This reflects the deprivation state that is present in Al-Sadr district in comparison to Al-Muthanna district in spite of the fact that the latter area does not get a complete satisfaction of these services.

5. There is a retreat in the performance of the local authorities that are responsible for urban management as they do not show commitment to their responsibilities regarding environmental indicators in general. Hence, the results of the present study can be Guidelines for planners and policy makers by encouraging them to put action plans that call for improving the efficiency of the indicators of the environmental quality domestically and to achieve sustainability.

6. There is a decline in the indicators of satisfaction of the community' conduct in keeping the environmental aspects clean and safe in Al-Sadr district with a higher significance preference than it is the case in Al-Muthanna district.
9. Recommendations
1. The study recommends filling in the gap between those areas that are degraded in regard to the quality of the urban life, represented by Al-Sadr district via directed the future strategies and plans towards upgrading the indicators of the environmental quality.
2. Reconsidering the system of land-uses planning in a way that copes with the orientations of sustainability. Develop a strategy based on diversity principals, land use mix and increasing the rate of green and open spaces and recreation facilities and all urban amenities in the city and ensuring their efficient distribution on the urban areas. In addition, it is essential to ensure the continuation and sustainability of these facilities by following motivating policies and increasing the awareness of their importance and the urgency to maintain them by calling for the participation of the civil community and the residents to sustain these areas.
3. Putting a strategy for the gradual transformation into systems of generating electricity by relying on the renewable (clean) energy sources to compensate for the shortage in producing energy from traditional sources with the necessity for providing the legislative and institutional framework to implement this strategy.
4. Adopting policies that aim at rational electric power consumption by the citizens in order to minimize the demand for it by changing the consumption patterns during specific times. This can also be achieved by raising the level of awareness about this issue.
5. The urgency to review and adapt the terms and building regulations, particularly those that are related to criteria of interior environment quality, the requirements for keeping the good quality of air and water and land, as well as adopting strategies of green buildings and developments.
6. Ensuring the high quality of the basic services with giving priority to the provision of drinkable water for the areas of the study, improving the network of rain drainage, raising the amount of energy supply, improving the sewage system, improving the internet service respectively for Al-Sadr city, and improving the internet service with improving the efficiency of the network of rainwater drainage respectively for Al-Muthanna district.
7. Lifting the violations, taking care of the pavements, particularly the wide ones to shade them with trees, and developing the network of pedestrian sidewalks that are separable from the passages of the vehicles by making them connected with open and green spaces in neighborhood planning.

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