

## Field Monitoring and the Impact of Green Space on the Local Climate of Summer and Winter for the Duration (2023-2024)

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### Abstract

The researcher divided the study area into seven key sectors, and identified in each sector two field monitoring sites for climate components: (temperature, humidity, wind speed and building temperature) using monitoring devices, and a field monitoring team was formed, and identified (14) monitoring field sites (7) within the green area and (7) Locations outside the green area, measured by the first two observations were the observation of the minimum temperature that began before sunrise, The second balances recorded in the afternoon for the great temperature, and the researcher chose the summer and winter seasons to see the differences in local climate elements, The study found out the differences between the elements of the local climate in the sectors of the study area, Edani recorded a degree of heat within the green area in the eastern Shamia sector in the inside and outside the green area and a difference between them (0.3 m °) The balances representing the maximum temperature were recorded by a difference between them. (2.1 m °) While the sector recorded the highest temperature for the first micro-temperature balances inside and outside the area in the central sector by a difference (0.2 m °) The monitoring of the great temperature was recorded in and out of the green area by a difference (0.6 m °).

**Keywords:** Field Monitoring, Impact of Green Space, Local Climate.

### Introduction

Climate plays a crucial role in shaping unique civilizations of nations and cultures. It affects the nature of everyday life and habits of peoples. It is a major source of stimulation. It is a challenge for humans to adapt and overcome difficulties. A bad climate and harsh conditions can cause people to leave their regions and seek a better level of life in areas with a more palliative climate and directly affect the activity of nations. Climate conditions reflect their impact on the identification of the city's residential and industrial areas and street trends.

*First: Research Problem*

- Are green spaces having an impact on the local climate in the study area?
- What are the differences between the elements of the local climate in and out of green space?

*Second: Research Hypothesis*

The division of the study area into sectors shows that there are differences in temperatures between sectors. The impact of green areas varies in the characteristics of the local climate, depending on the presence, density and quality of these green areas. However, these areas have not achieved sufficient space in the study area. Differences in temperature, humidity, wind speed and building temperature have been recorded.

Green space has an important role to play in the local climate in any region or region through its role as an influential factor and is influenced by the region's climate factors. Its presence has an impact on the atmosphere, such as temperature mitigation, moderate humidity and wind ratios, in contrast to the bare areas that contribute to wind activation, greater solar radiation and higher temperature.

*Third: Limits of the Study Area*

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- *Time Limits*

The study's time limits for green spaces and elements of the local climate observed on the ground in the period (2023-2024). The researcher used the Nasiriyah Climate Station data for the period (2012-2023) as a microclimate course, represented by elements and phenomena of the overall climate of the study area.

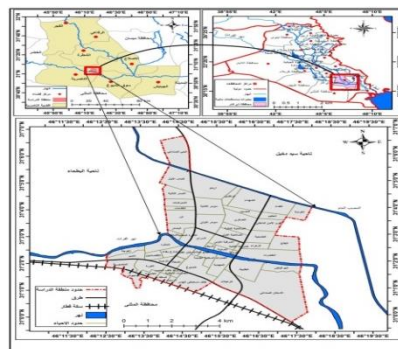
*Spatial Limits*

The study of the geographical location of any region of the world is at the forefront of geographical studies, as it defines the status of the region, and the geographical location is more than significant as it is intended to be the astrological location and location for the seas and land. Iraq is located in the southern part of the northern temperate region, which means that it is located between the dry tropical climate and the Mediterranean climate., the study was in the city of Nasiriyah, which is located between the two exhibition circles (30.5 - 31.10) North and arc length (46.10 - 48) East, as for its administrative boundaries, limiting it from the North to the Grave, from the West to the Batha and from the South to the Fadliyah, and from the North East to Syed Dakhil, and its area is approximately 4,954 hectares.

*First Axis: Summer Monitoring*

The summer solstice occurs on 21 June in the northern hemisphere, where the sun is vertical over the orbit of cancer, the day is longer than the night and the Arctic Circle is (66.5-90 N) luminous 24 hours, while Antarctic Circle (66.5 south), at these times the northern half of Earth receives the largest amount of solar radiation. and hence a change in the apparent movement of the Sun as it heads south towards the orbit of cancer, However, the sun still falls vertically or close to vertical, meaning that the number of daylight hours is still greater than the number of night hours. Thus, the Earth continues to gain heat, continues the process of heat acquisition and accumulation, and reaches its peak in July. In each of the city's sectors, instruments have been installed in the study area to measure the elements of the local climate to show the impact of green space on the local climate, and to identify differences in each element of the local climate measured on the ground through the data of the tables.(1)

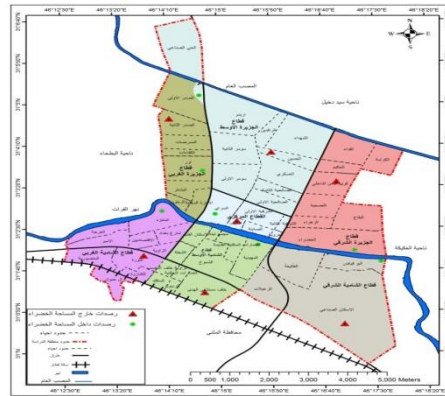
**Map (1) The location of the city of Nasiriyah from Dhi Qar governorate and Iraq for 2023.**



Source: Researcher's work based on ARC MAP GIS 10.8

Republic of Iraq, Ministry of Municipalities and Public Works, Dhu Qar Urban Planning Service, Basic Plan of Nasiriyah City 2011. Republic of Iraq, Ministry of Municipalities, Nasiriyah Municipal Directorate, City Organization Division, Gis Unit.

**Map (2) Field monitoring in the sectors of the study area for the period 2023-2024.**



Source: Research based on the field study (Climate Monitoring Group) and ARC MAP GIS10.8 outputs. 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Temperature*

Areas with vegetation surfaces are characterized by climatic conditions different from those close to the bare areas. Climatic conditions vary from one plant surface to another depending on the quality, density and height of existing plants. The climate in areas covered by large trees differs from the central regions with regard to temperatures and rainfall, With regard to the city of Nasiriyah, it has a dry desert climate, with a relatively cold winter and a long and hot summer.

Weather is usually dry, and rainfall is low, as it can reduce the effect of solar heat and improve the atmosphere's humidity and reduce wind speeds.

*Temperature Within the Green Area:*

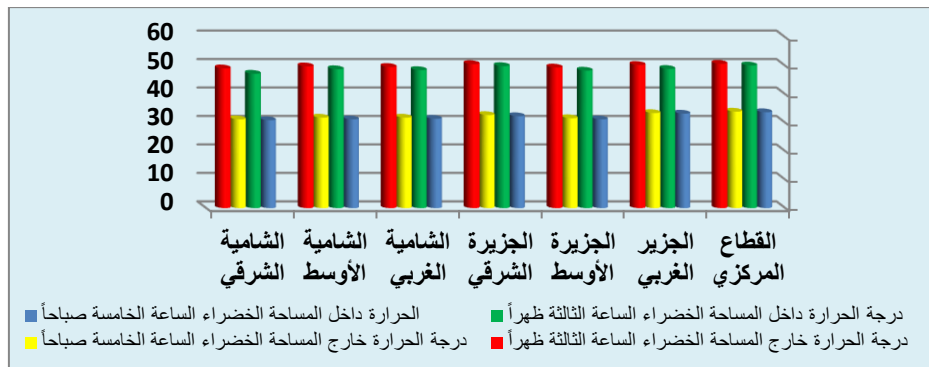
It is evident through table (1) and form (1) in the field monitoring of the summer in the sectors of the study area, the lowest degree of warfare was recorded in the Al-Shamia Al-Sharqiya at 5 a.m. and reached 30.9, while the highest temperature was recorded in the (Central Sector) at the same time, reached (33.7), and the difference was between them (2.8) due to the wide area of green area (436,729 m<sup>2</sup>) in Eastern Shamia, while the lowest temperature score was recorded in The East Shamia reached 47.2 at 3 p.m., and the thermal difference was 2.9. See the map 3.

**Table (1) Field temperature balances for the summer in and out of the green area of the sectors of the study area for the period 2023-2024.**

Eastern shameia	Middle shameia	Western shameia	Eastern island	Middle island	Western island	Central sector	Time	Place of balance	Climate item
30.9	31.2	31.4	32.3	31.2	33.2	33.7	5.am	Inside the space	Temperature (%)
47.2	48.8	48.5	49.9	48.3	48.9	50.1	3.pm		
31.2	31.8	31.8	32.7	31.6	33.4	33.9	5.am	Out of space	
49.1	49.8	49.6	50.6	49.4	50.3	50.7	3.pm		

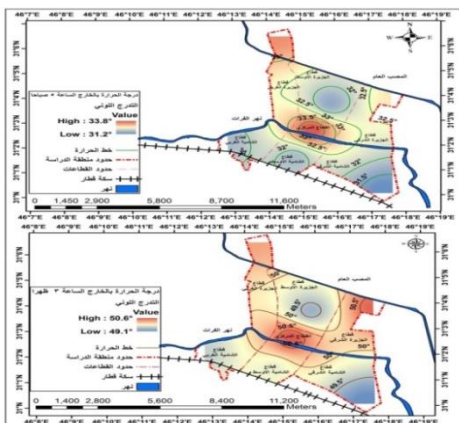
Source: Researcher based on field climate monitoring in sectors of the study area.

Form (1) Temperatures in the sectors of the study area inside and outside the green area of morning and evening balances for the summer period 2023-2024 m.



Source: Researcher based on table (1)

Map (3) Temperatures in the sectors of the study area within the green area of morning and evening balances for the summer period 2023-2024.



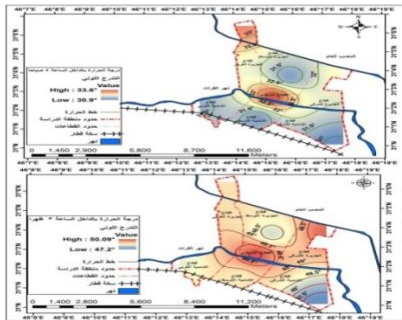
Source: Researcher's work based on: 1 table (1)

Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Temperature Outside the Green Area*

through table data (1) and shape (1) the lowest temperature was recorded in (Eastern Shamiya) reached (31.2) at 5 am, while the highest temperature was recorded in (Central Sector) was 33.9 at the same time, the difference between them (2.7), and the lowest temperature was recorded in The East Shamiya reached 49.1 at 3 p.m., while it was Record the highest temperature in (central sector) and reached (50.7) at the same time and the difference between (1.6), In the summer the temperature rises in the city centre, and in turn it draws cold air and the places shaded by trees become colder than the bare areas of green space, This rise in temperatures in the desert climate region at noon hours in the summer of the Earth's surface is due to the tyranny of solar radiation reaching a surface , covering the soil surface with plants affects the radiation reversal coefficient but the severity of the effect depends on a number of factors associated with vegetation , see map (4)

**Map (4) Temperatures in the sectors of the study area outside the green area of morning and evening balances for the summer period 2023-2024**



Source: Researcher's work based on: 1 table (1)2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Relative Humidity*

The relationship between air temperature and relative humidity is inverse, so when the temperature rises, the relative humidity drops, because the air's ability to absorb water vapour increases, and when the temperature drops, the relative humidity increases, because the air's ability to absorb water vapour decreases,

The warm air of the city absorbs a greater amount of water vapor, and as the temperature increases the relative humidity of the city, the air becomes drier, Air humidity is further reduced in cities where green spaces and water bodies are less, But the humidity in the city was found to increase in winter and at night as a result of its decline, The temperature makes it even greater than in the summer and during the day.

Relative humidity within the green area:

In field monitoring of the sectors of the study area, and through the table data (2) Shape (2) The lowest relative humidity value was recorded in (Central Sector) reached (14.5) at 5 am, due to the lack of green space in this sector and the type of construction existing from the concrete and asphalt used in paving the streets and its role in raising temperature and low humidity, while the highest value of humidity was recorded for the same time in (Eastern Shamia) was 18.4 and the difference was between relative humidity values (3.9), due to the wide green area in this sector, differences in relative humidity level may appear between sectors, as areas near water may be wetter than the interior, while the lowest moisture value has been recorded in (East Island) reached (7.5) at 3 p.m., while the highest relative humidity value was recorded in (Eastern Shamia) was 8.7, the difference between them was 1.2, see map (5)

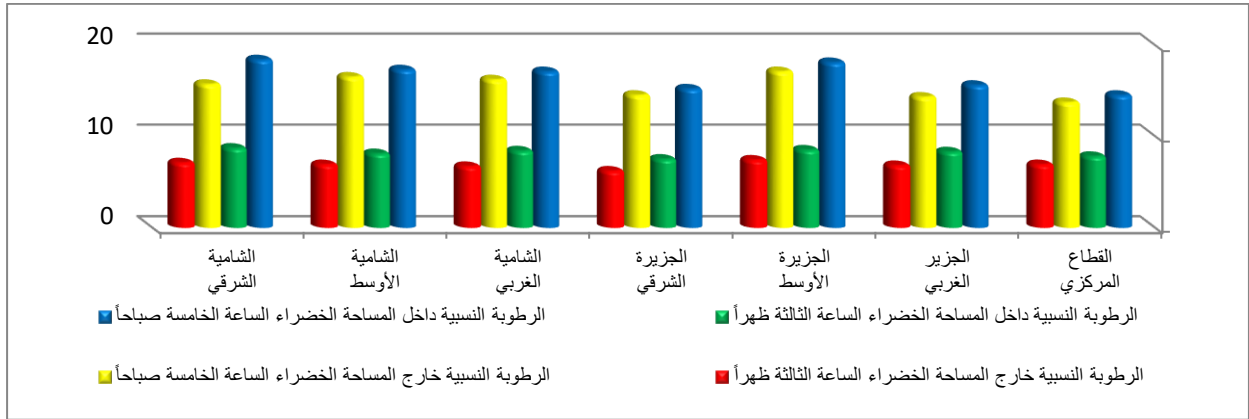
**Table (2) Field balances of relative humidity for the summer in and out of the green area of the study area sectors for the period 2023-2024.**

Eastern shameia	Middle shameia	Western shameia	Eastern island	Middle island	Western island	Central sector	Time	Place of balance	of	Climat item
18.4	17.3	17.1	15.2	18.1	15.6	14.5	5.am	Insid the space	the	Relativ moisture (%)
8.7	8.1	8.4	7.5	8.5	8.3	7.8	3.pm			
15.7	16.5	16.2	14.5	17.1	14.3	13.7	5.am	Out of space		

7.1	6.9	6.7	6.2	7.4	6.8	6.9	3.p.m		
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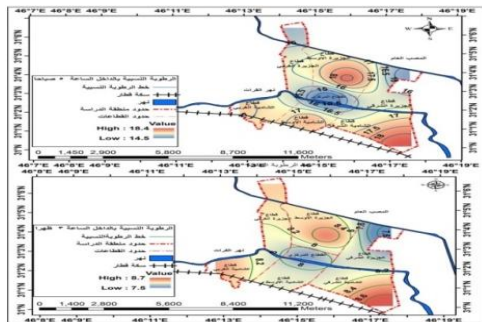
Source: Researcher based on field climate monitoring in sectors of the study area.

Form (2) Relative humidity in the sectors of the study area inside and outside the green area of morning and evening balances for summer 2023-2024



Source: Researcher based on table (2)

Map (5) relative humidity in the sectors of the study area within the green area of morning and evening balances for the summer period 2023-2024.



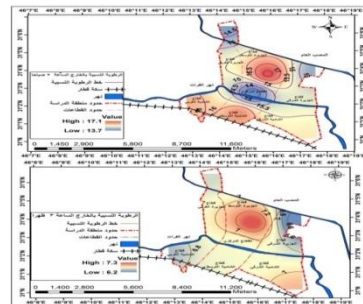
Source: Researcher's work based on: 1 table (2) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Relative Humidity Outside the Green Area*

through the data of table (2) and shape (2) the lowest moisture value was recorded in the central sector and reached (13.7) at 5 am, while the highest humidity value was recorded in the Middle Island and reached (17.1)

At the same time, the difference was (3.4), while the lowest moisture value was recorded on the East Island and reached (6.2) at 3 p.m., while the highest moisture value was recorded on the Middle Island and reached (7.4). The difference was (1.2), and green spaces played a key role in reducing temperature by raising humidity and by providing shade, see map (6).

**Map (6) Relative humidity in the sectors of the study area outside the green area of morning and evening balances for the summer period 2023-2024.**



Source: Researcher's work based on: 1 table (2) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Wind Speed*

Iraq becomes in hot separation under the influence of the suborbital high pressure range, in addition to being affected by the seasonal Indian low centred on northwestern India, its impact extends to the Arabian Gulf and the southern part of Iraq, and atmospheric pressure and values range between) 1010 millibars (above the Anatolian Plateau, the mountains of Turkey and Iran, and 1002 millibars) Over the Arabian Peninsula Plateau, while reaching 1998 Milibar Over the Arabian Gulf, air pressure values in Iraq range from July to July. (1002 millibars) in the mountainous region and 999 millibars (in the Sahelian sedimentary area), helping to control the northwestern wind in the summer. For the wind in Iraq, it is generally low throughout the year, because of its location within the suborbital belt under the influence of winter high pressure and summer low heat.

*Wind Speed Within the Green Area*

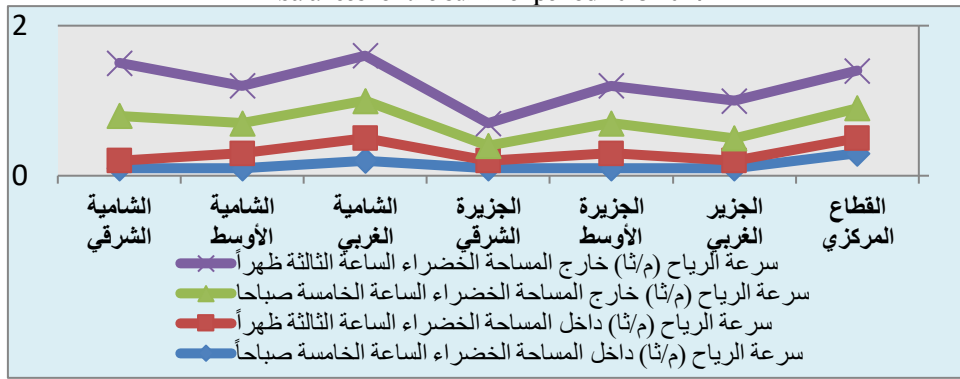
Through the data of table (3) and figure (3), the lowest wind speed was recorded in all sectors of the study area and reached (0.1) Except for the sectors (Central Sector, West Shamia) and reached (0.3. 0.2) at 5 am, which recorded the highest wind speed, at the same time, the difference between them was (0.2), while the lowest wind speed was recorded in Shamia West It reached (0.3) while the highest speed was recorded at 3 p.m. (Central Sector) (0.3) Because of the presence of green spaces that reduce wind speed, see map (7)

**Table (3) Wind Speed Field Balances for Summer in and out of Green Area of Study Area Sectors for 2023-2024**

Eastern shameia	Middle shameia	Western shameia	Eastern island	Middle island	Western island	Centra sector	Time	Place of balance	Climat item
0.1	0.1	0.2	0.1	0.1	0.1	0.3	5.am	Inside the space	Wind speed (m/s)
0.1	0.2	0.3	0.1	0.2	0.1	0.2	3.pm		
0.6	0.4	0.5	0.2	0.4	0.3	0.4	5.am	Out of space	
0.7	0.5	0.6	0.3	0.5	0.5	0.5	3.pm		

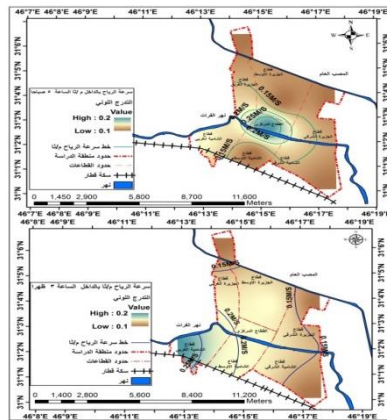
Source: Researcher based on field climate monitoring in sectors of the study area.

Form (3) Wind speed in the sectors of the study area inside and outside the green area of morning and evening balances for the summer period 2023-2024



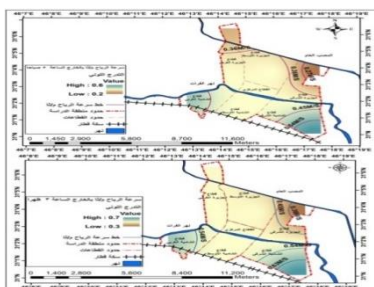
Source: Researcher's Table 3

Map (7) Wind speed in the sectors of the study area within the green area of morning and evening balances for summer for 2023-2024



Source: Researcher's work based on: 1 table (3) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS2023 Unit.

Map (8) Wind speed in sectors of the study area outside the green area of morning and evening balances for summer for 2023-2024



Source: Researcher's work based on: 1 table (3).

Republic Of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, Gis Unit.

Building Temperature



Green spaces and gardens can play a role in reducing the thermal island effect of buildings, adjusting the site temperature and reducing the energy consumption needed to operate the building, The effects of urban thermal islands are defined as an increase in temperature between urban and surrounding rural areas, increasing demand for industrial refrigeration during the summer and thus increasing greenhouse gas emission. Source: Researcher's work based on: 1 table (3).

Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit

#### *The Temperature of Buildings Within the Green Area*

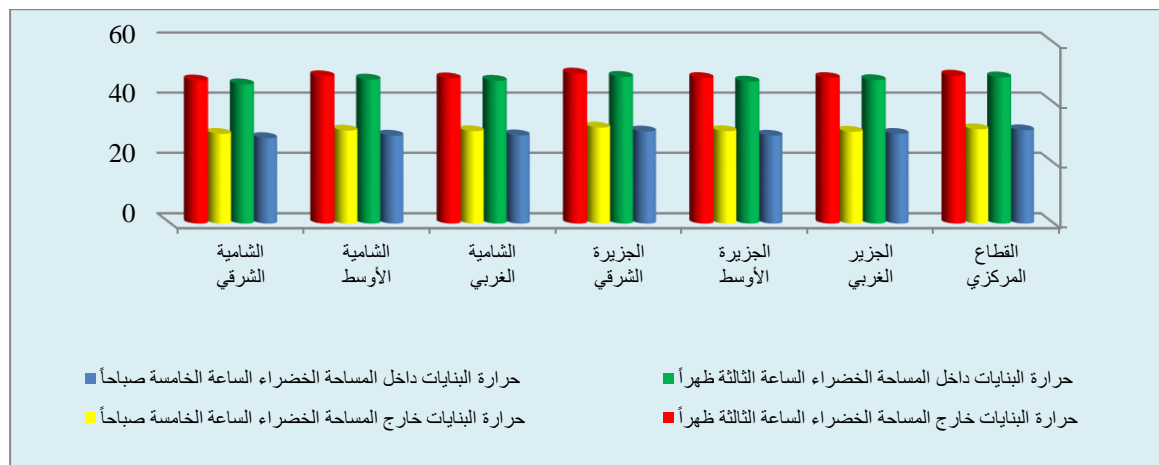
Through the data of table (4) and figure (4), the lowest temperature of buildings was recorded in (Eastern Shamia) reached (m28.3) at 5 am, while the highest temperature was recorded at (Central Sector) was 30.9m at the same time and the difference was between them (2.6m), while the lowest temperature grade of buildings was recorded in The East Shamia reached 46 p.m. at 3 p.m., while the highest temperature was recorded at the same time in (East Island) was 48.7 and the thermal difference was 2.5 m.) See map (9).

**Table (4) Construction temperature field balances for summer in and out of the green area of the study area sectors for 2023-2024**

Eastern shameia	Middle shameia	Western shameia	Eastern island	Middle island	Western island	Central sector	Time	Place of balance	Climat item
46.2	47.8	47.4	48.7	47.1	47.6	48.5	3.pm		Buildings heat degree
29.7	30.8	30.6	31.8	30.6	30.4	31.2	5.am	Out of space	
47.5	48.9	48.2	49.8	48.3	48.3	49.1	3.pm		

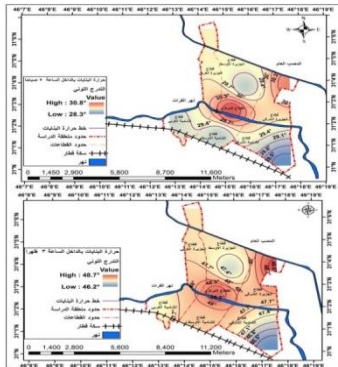
Source: Researcher based on field climate monitoring in sectors of the study area.

#### (4) The temperature of buildings in the sectors of the study area inside and outside the green area of morning and evening balances for the summer period 2023-2024



Source: Researcher based on table (4)

**Map (9) The temperature of buildings in the sectors of the study area within the green area of morning and evening balances for the summer period 2023-2024.**



Source: Researcher's work based on: 1 Table (4) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

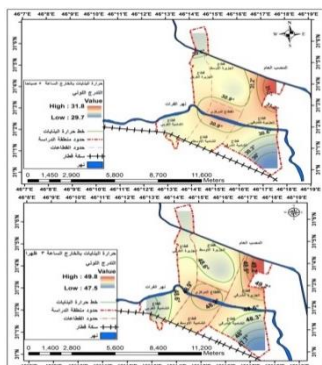
#### *Building Temperature Outside the Green Area*

Through the data of table (4) and figure (4), the lowest temperature of buildings was recorded in the East Shamia and reached 29.7m at 5 am, while the highest temperature was recorded in the East Island.

Source: Researcher's work based on: 1 Table (4) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

It was 31.8m at the same time the difference was 2.1m, while the lowest temperature of the buildings was recorded in (Eastern Shamia) reached (5.5 m) at 3 p.m., while the highest temperature was recorded at the same time in (East Island) amounted to (49.8m) and the difference was (2.3m) and the density of vegetation and green space in the city around buildings reduces the reflection of solar rays within residential buildings, see map (10).

**Map (10) The temperature of buildings in the sectors of the study area outside the green area of morning and evening balances for the summer period 2023-2024.**



Source: Researcher's work based on: 1 table (4).

Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Second: Winter Monitoring*

The winter solstice occurs in the northern hemisphere on December 22, on this day the southern half is more inclined towards the sun and its radiation is vertical throughout Capricorn at noon, the opposite of what happens in the summer solstice, and the whole time becomes at night in the Arctic circle, and so the year is divided into two halves for both the North and South Poles are six months of summer, and six months of winter, during which the polar circle will be sunk in a permanent night,

Thus, the difference of night and day by geographical presentation has a significant impact on the difference in solar radiation. The longer the day in summer, the further we move north from the equator in the northern hemisphere, and the sun's tendency to toxicity increases. The winter observation date is 9/1/2024.

*Temperature*

Climatologically, large cities are called thermal islands, because the city is surrounded from all sides by areas of lower degree, and the temperature is usually higher in the busy city center with different activities, and less towards the suburbs and open areas, as the temperature decreases away from the city center, and temperatures drop as the green space in the city increases with the spread of green space varieties. (Parks, Gardens, Nurseries, Orchards, Central Carrots) These green spaces are decreasing and the areas of asphalt and asphalt are increasing the absorption coefficient of solar energy, raising the temperature in the day and increasing the impact of the thermal island at night, and the temperature of the day has increased (Great) About 1 ° C the night temperature (small) increases by about (3-4) This results in lower daily heat range in the city compared to open and adjacent areas.

*Temperature Within the Green Area*

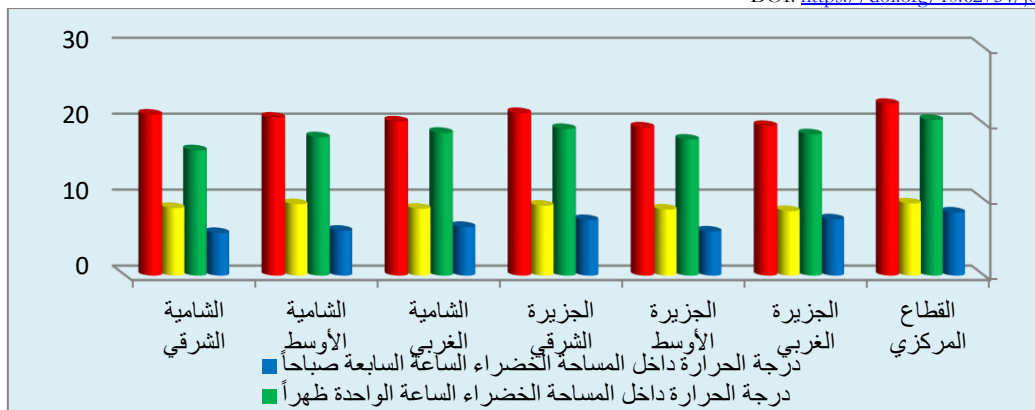
By the data of table (5) and figure (5) the lowest temperature score was recorded in The East Shamia reached 5.6 at 7 a.m., while the highest temperature was recorded. (Central Sector) was 8.3 at the same time and the difference was between them (2.7), while the lowest temperature score was recorded in (Eastern Shamia) It reached (16.5) at 1 p.m., while the highest temperature was recorded at (Central Sector) and (20.5) at the same time the difference was (4), see map (11).

**Form (5) Temperature in the sectors of the study area inside and outside the green area of the morning and evening balances for the winter period 2023-2024**

Eastern shameia	Middle shameia	Western shameia	Eastern island	Middle island	Western island	Central sector	Time	Monitoring site	Climat item
5.6	5.9	6.4	7.3	5.8	7.4	8.3	7.00 am	Inside the space	Temperatu (%)
16.5	18.2	18.8	19.3	17.9	18.6	20.5	1.00 pm		
8.9	9.4	8.8	9.2	8.7	8.5	9.5	7.00 am	Out of space	
21.2	20.8	20.3	21.4	19.5	19.7	22.6	1.00 pm		

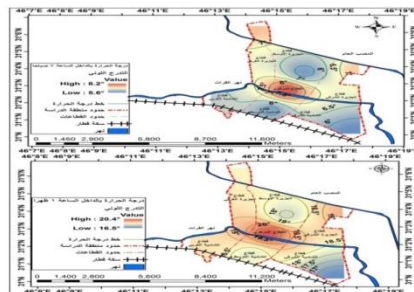
Source: Researcher based on field climate monitoring in sectors of the study area.

**Table (5) Winter Temperature Field Balances Inside and Outside the Green Area of the Study Area Sectors for 2023-2024**



Source: Researcher based on table (5) Source: Researcher based on table (5)

**Map (11) of the field temperature balances within the green area of the morning and evening winter balances in the sectors of the study area for 2023-2024**



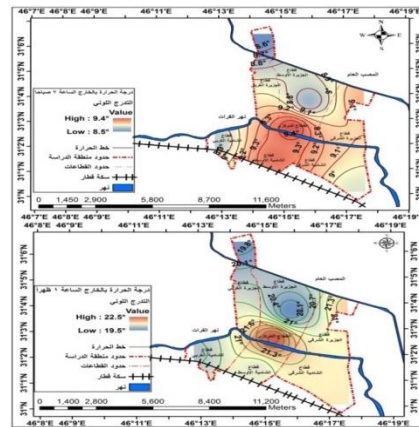
Source: Researcher's work based on: 1 table (5)

2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit

### *Temperature Outside the Green Area*

By the data of table (5) and figure (5) the lowest temperature score was recorded in West Island reached 8.5 at 7 a.m., while the highest temperature was recorded in the (Central sector) was 9.5 at the same time and the difference was 1m, while the lowest temperature score was recorded in (Middle Island) reached (19.5) at 1 p.m., while the highest temperature was recorded in (Central sector) and reached (22.6) at the same time the difference between (3.1) see map (12).

**Map (12) Field Temperature Balances Outside Green Area for Morning and Evening Winter Balances in Study Area Sectors for 2023-2024**



Source: Researcher's work based on: 1 Table (5) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit

*Relative Humidity*

It is a measure that expresses the degree to which the air approaches saturation with water vapour, and it is referred to as a percentage between the amount of water vapor stuck in a certain volume of air and the other amount it needs to reach saturation at the same temperature, for example when the humidity is (80%) This means that there is (20%) a lack of saturation status, "said the researcher (Olgyay) A person feels comfortable in the summer between two temperatures (21-27 m).

*Relative Humidity Within the Green Area*

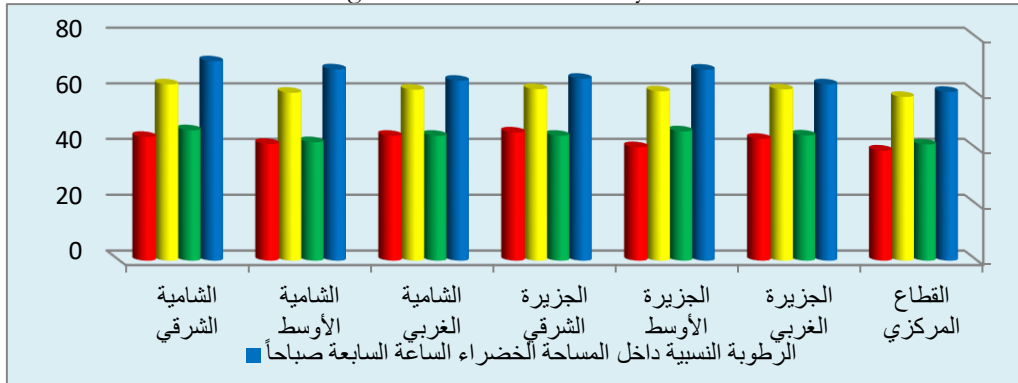
Through table (6) and figure (6) data the lowest moisture value was recorded in (Central Sector) at 7 am and reached (60.5), the highest moisture value was recorded in (Eastern Shamia) was 71.5, at the same time the difference was 11, and the lowest moisture value was recorded in (Central Sector) reached (41.6), at 1pm, due to the lack of green space, and recorded the highest moisture value in (Eastern Shamia) at the same time reached (46.7) and the difference between them (5.1) see map (13).

**Table (6) Field balances of relative humidity for winter in and out of the green area of the study area sectors for 2023-2024**

Western shamecia	Middle shamecia	Western shamecia	Eastern island	Middle island	Western island	Central sector	Time	Monitoring site	Climat item
71.5	68.6	64.5	65.2	68.5	63.2	60.5	7.00am	Insid the space	Relativ moisture %
46.7	42.4	44.7	44.7	46.3	44.8	41.6	1.00pm		
63.2	60.2	61.3	61.5	60.7	61.4	58.7	7.00am	Ou of space	
44.3	41.8	44.7	45.9	40.6	43.6	39.4	1.00 pm		

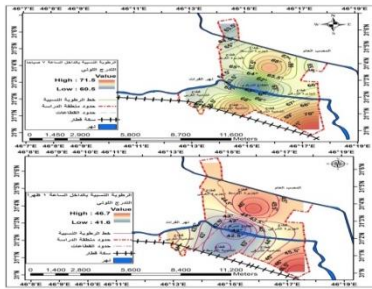
Source: Researcher based on field climate monitoring in sectors of the study area.

Form (6) relative humidity in the sectors of the study area inside and outside the green area of morning and evening balances for the winter year 2023-2024.



Source: Researcher based on table (6)

Map (13) Field balances of relative humidity within the green area of morning and evening winter balances in the sectors of the study area for 2023-2024



Source: Researcher's work based on: 1 table (6)

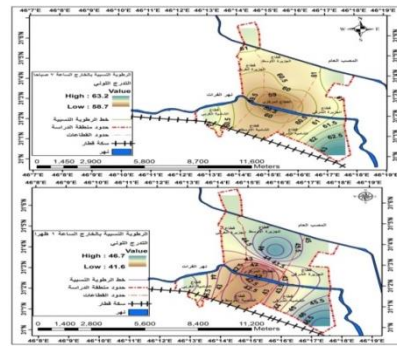
2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Relative Humidity Outside Green Space*

Through table (6) and figure (6) data, the lowest moisture value was recorded in (central sector) at 7 am and reached (58.7), the highest humidity value was recorded in (eastern shamia) and (63.2), the difference was (4.5), the lowest moisture value was recorded in (central sector) and (39.4), at 1 pm,

While the highest moisture value was recorded on the East Island (45.9) and the difference was 6.5, see map (14).

Map (14) Field balances of relative humidity outside the green area of morning and evening winter balances in the study area sectors for 2023-2024



Source: Researcher's work based on: 1 Table (6) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Wind Speed*

Wind speeds are subject to many factors, extremes and distances from normal rates and are affected by different pressure systems. High wind speeds are recorded and low levels are also recorded due to the impact of certain systems. The airlifts control the wind speeds and the Siberian altitude leads all air highlands in Iraq's iterations.

*Wind Speed Within the Green Area*

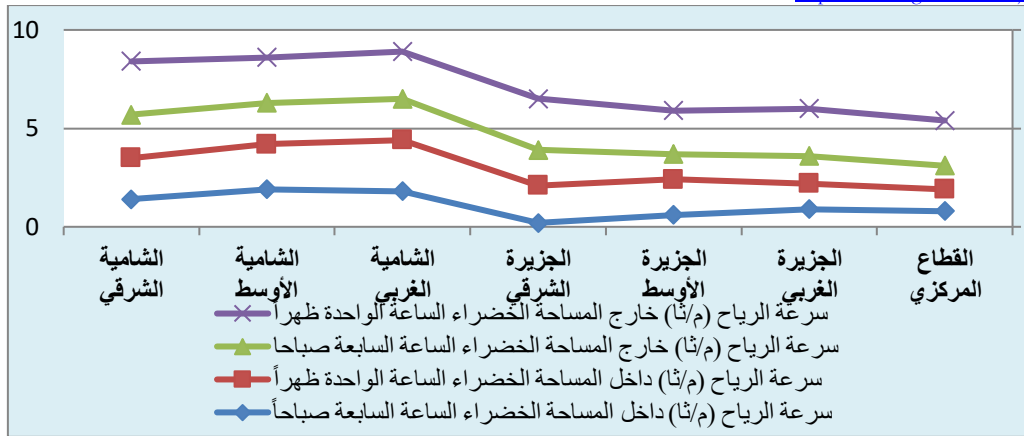
Through the data of Table (7) and Figure (7) the lowest wind speed was recorded in East Island at 7 a.m. and reached 0.2. The highest wind speed was recorded at (Middle Shamia) at the same time reached (1.9), and the difference was between them (1.7) Because of the presence of green spaces that reduce wind speed, while the highest wind speed was recorded in West Shamia at 1pm and reached 2.6 while he recorded (Central Sector) At the same time as 1.1, the difference was (1.5). See Map (15).

**Table (7) Wind Speed Field Balances for Winter in and out of Green Area of Study Area Sectors for 2023-2024**

Eastern shameia	Middle shameia	Western shameia	Eastern island	Middle island	Western island	Central sector	Time	Monitoring site	Climat item
1.4	1.9	1.8	0.2	0.6	0.9	0.8	7.00am	Inside the space	Win speed (m/s)
2.1	2.3	2.6	1.9	1.8	1.3	1.1	1.00 pm		
2.2	2.1	2.1	1.8	1.3	1.4	1.2	7.00am	Out of space	
2.7	2.3	2.4	2.6	2.2	2.4	2.3	1.00pm		

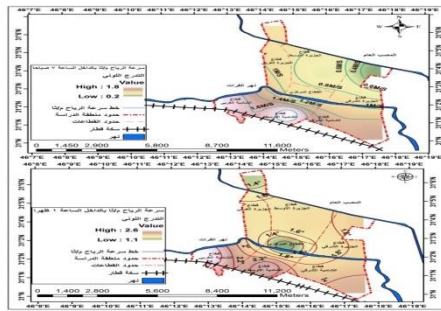
Source: Researcher based on field climate monitoring in sectors of the study area.

**Form (7) Wind speed in sectors of the study area inside and outside the green area of morning and evening balances for the winter year 2023-2024.**



Source: Researcher's Table 7

Map (15) Field balances of relative wind speed within the green area of morning and evening winter balances in the sectors of the study area for the period 2023-2024.

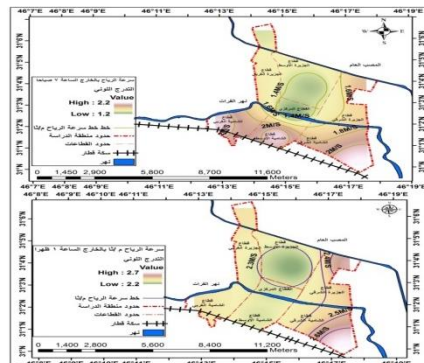


Source: Researcher's work based on: 1 Table (7) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

*Wind Speed Outside Green Space*

Through table data (7) and figure (7) the lowest wind speed was recorded in (Central Sector) at 7:00 am and reached (1.2) The highest wind speed was recorded at (Eastern Shamiya) at the same time reached (2.2), and the difference was between them (1) Because of the presence of green spaces that reduce wind speed, while the highest wind speed was recorded in Al-Shamia Al-Sharqiya at 1 p.m. and reached (2.7) while recording (Middle Island) At the same time I reached (2.2) the difference was (1.5) see map (16).

Map (16) Wind Speed Field Balances Outside the Green Area of Morning and Evening Winter Balances in Study Area Sectors for 2023-2024





Source: Researcher's work based on: 1 Table (7) 2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit

### Building Temperature

That the heat energy lost from the Earth's surface by long-wave radiation goes a section of it towards outer space and a large portion of it is absorbed by the gas casing and the gas elements with triple composition in their atoms may play a major role in absorbing long-wave radiation from the Earth's surface towards outer space. So the loss and loss of energy from the Earth's surface is constantly done during the hours of the day. It can be compensated by direct solar current and the result is the warming of the earth's surface, During the night when the direct solar current stops, loss occurs continuously and causes the Earth's surface temperature to drop and is the most radiant night when clouds do not exist. When there is little water vapour in the atmosphere and the atmosphere is dust-free.

### The Temperature of Buildings Within the Green Area

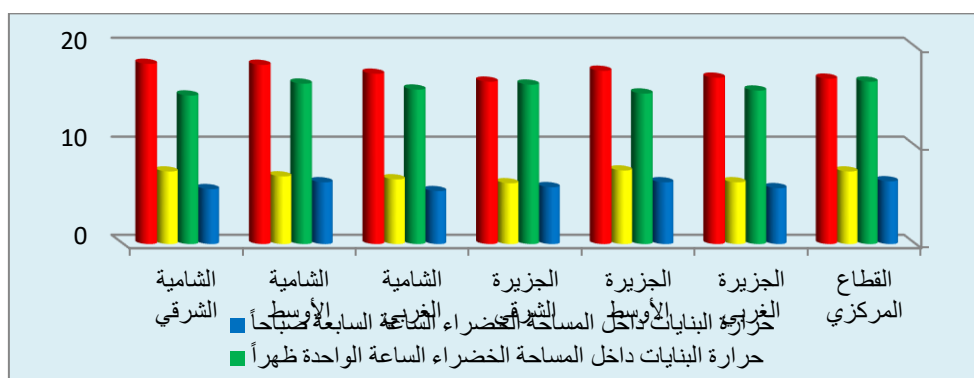
Through the data of Table (8) and Figure (8) the lowest degree of building temperature was recorded in Al-Shamia Al-Gharbi at 7 a.m. and reached (5.4), while the highest temperature of buildings was recorded in (Central sector) reached (6.4m), the difference was (1) ° C, while the lowest degree of building heat was recorded in Al-Shamia Al-Sharqiya at 1 p.m. and reached (15.1), while the highest temperature of the buildings was recorded at the same time in (Central sector) reached (16.5) and the difference was (1.4), see map (17).

**Table (8) Construction temperature field balances for winter in and out of the green area of the study area sectors for 2023-2024**

Eastern shameia	Middle shameia	Western shameia	Eastern island	Middle island	Western island	Central sector	Time	Monitoring site	Climat item
5.6	6.3	5.4	5.8	6.3	5.7	6.4	7.00am	Insid the space	Building temperatur
15.1	16.3	15.7	16.2	15.3	15.6	16.5	1.00pm		
7.4	6.9	6.6	6.2	7.5	6.3	7.4	7.00am	Ou of space	
18.3	18.2	17.3	16.5	17.6	16.9	16.8	1.00 pm		

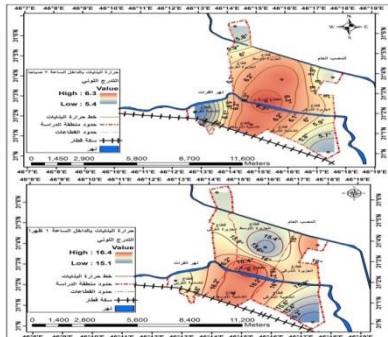
Source: Researcher based on field climate monitoring in sectors of the study area.

**Form (8) Construction temperature in the sectors of the study area inside and outside the green area of morning and evening balances for the winter period 2023-2024**



Source: Researcher's work based on table (8)

### Map (17) Construction temperature in sectors of the study area within the green area of morning and evening balances for winter 2023-2024



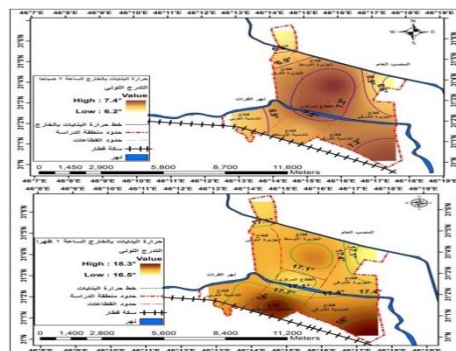
Source of the researcher's work based on: Table 1 (8) 2-Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

### *Building Temperature Outside Green Space*

Through the data of table (8) and figure (8), the lowest temperature of buildings on East Island was recorded at 7 am and reached (6.2) while the highest temperature of buildings on Middle Island was recorded at the same time reached (7.5), the difference was (1.3).

The lowest temperature of the buildings was recorded on the East Island at 1 p.m. and reached 16.5. The highest temperature of the buildings was recorded simultaneously in the East Shamia at 18.3 and the difference was 1.8.

### Map (18) The temperature of buildings in the sectors of the study area outside the green area of morning and evening balances for the winter period 2023-2024.



Source: Researcher's work based on: 1 table (8)

2. Republic of Iraq, Ministry of Municipalities and Public Works, Nasiriyah Municipal Directorate, City Organization Division, GIS Unit.

## Conclusions

- Through field monitoring of local climate elements, the highest degree of heat within the green space was recorded in the summer at 5 a.m. (Central Sector) (33.7 m) while (Eastern Shamia Sector) (30.9 m) The lowest temperature was the difference between them (2.8 m), while the highest temperature was recorded in the summer at 3 p.m. (Central sector) outside the green area reached

(50.7) while inside the green area reached (50.1) due to the wide area of green space in this sector, and the difference between them (0.6).

- Winter temperatures varied between green land and land outside green area. The lowest winter temperature was recorded in the East Shamia Sector and reached 5.6 at 5 am, while the highest temperature was recorded for the same time in the Central Sector within the green area and reached 8.3.
- The relative humidity values varied between inside and outside the green space, with the highest high humidity values recorded in the winter green space, while the lowest values in areas without green space reflected the impact of green space on water retention.
- Air movement weakens and is stagnant and stagnant in some areas, making it characterize the surface in contact with it. The highest wind speeds have been recorded in green land.

### Proposals

- To legislate strict laws involving financial penalties that limit the encroachment on the city's green spaces.
- Growing green belts, especially from all parts of the study area, especially from the north of the city, due to the presence of dunes so as to reduce dust storms.
- Create new parks and gardens that are spread across the sectors of the study area according to the population density of each sector.