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Improving Urban Regulations to Raise the City's Green Area Rates to Achieve Quality of Life Standards

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1 ABSTRACT

Open and green spaces are comfort elements and the necessary essential landscapes to improve the urban tissue and promote the urban environment of the city. This increases the level of welfare and contributes to the economic and aesthetic value of the city to achieve the quality of life standards. The Urban Regulations represent the cornerstone which help in reformation of a distinguished urban environment. The urban environment is planned through two important elements: buildings (residential –services) and spaces (public –streets –green). The Urban Regulations of the city are the mail element of planning buildings and system of public spaces, which determined the green spaces of the city, whether horizontal represented in (gardens and parks, green spaces, and green spaces in roads, routes and spaces) or vertical represented in (green spaces on building roofs, and vertical spaces on building façades). Therefore, it is necessary to evaluate the current Urban Regulations of construction in some Arab countries to plan a green urban as one of the regulations of the regulations of quality of life standards. This is the research objective.

Keywords: Quality of Life Standards, Green Area Rates, Urban regulations, Green Urban Formation, Arab countries

2 QUALITY OF LIFE AND GREEN SPACE

2.1 Quality of life

The green urban design in cities is one of the tools that helps in recognizing the quality of life standards among people, as the quality of life standards represent the full satisfaction of urban. There is a strong relationship between one of the tools, which is considered as the most important one, of green urban planning represented in (buildings and green services, horizontal and vertical green spaces, and green roads) and quality of life standards represented in (satisfaction of urban planning of a city, satisfaction of natural environment, social satisfaction, satisfaction of city economics). Therefore, we get acquainted of the quality of life standards and definition of green urban planning.

2.1.1 Definition of quality of life

Definition of Quality of Life is a wide and complicated definition, which includes various definitions. In brief, the definition of quality of life measures the level of satisfaction in relation with the most important aspects of individual life. In order to reach a specific definition of quality of life, an integrated research program was conducted to determine the most common definition. The initial research defined number of global indicators that define and measure the quality of life from various aspects. Each indicator was tackled in details for determination of the common elements. [1]

We depended on six indicators of the most important comprehensive indicators, which are globally known as main references: [2]

- Global Liveability Ranking: It is an annual indicator issued by the Unit Intelligence Economist, which categorizes cities in 140 countries in accordance with the urban quality of life, settlement evaluation, healthcare, culture, environment, education, sports, infrastructure, public spaces, and green spaces.
- Mercer Quality of Life Survey: It categorizes 231 countries based on the following aspects: transport, political, social and cultural environment, public service, health, economic environment, schools, education, natural environment, housing, and provision of media, theaters, cinemas, sports, commodities, restaurants, recreation, entertainment, and picnicking.
- Monocle Magazine List for Quality of Life: It is an annual list including 25 cities of the best cities for living around the world. The evaluation is based on the following aspects: global

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telecommunication, environmental issues, accessibility of nature and green places, urban quality, quality of urban designing, healthcare, and infrastructure.

- Happy Planet Index 2017: It categorizes 155 countries in accordance with the levels of happiness based on the following aspects: corruption, free choice, average life expectancy, gross domestic product for individual, social support, and granting.
- Organization for Economic Co-operation and Development Quality of Life Index: It is an index, which compares quality of life among countries based on 11 main aspect in accordance with the Organization: security, health, income, jobs, urban balance, life, work, education, level of satisfaction, housing, environment, society, and civil participation.
- ARRP Quality of Life Index: It is a distinguished initiative by the Policy Public Institute (for Measurement of quality of life of American communities based on the following aspects: transport, health, economy, education, housing, urban quality, residential districts, environment, community participation, and equal opportunities. [2]

2.1.2 Urban aspects of quality of life

Urban quality of life is a multidisciplinary and cross-cutting definition between a network of different aspects. The urban quality resulting from the relationship between these combined and compounded aspects consisting of seven aspects –contributes to the achievement of urban quality of life (environmental, urban, mobility and transport, social, psychological, and political). [3]

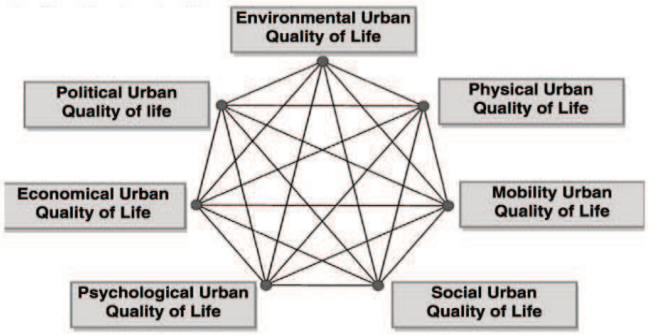

Fig. 1: Urban Quality of Life Aspects.

2.1.3 Quality of life standerds

A group of standards and principles, which achieve the quality of life, were derived by the European Union through a survey about (quality of life in European countries) in 2013. This group included all capital cities in the European countries, which reached to 79 cities. It was approved by the EU General Directorate of Regional and Urban Policy. It concluded to the following urban results, which achieve the quality of life as follows: [4]

Satisfaction of Urban Planning through:	
Sustainable Public Transport	Healthcare Services
Sport Facilities	Cultural Facilities
Educational Facilities	Availability of Shopping and entertainment stores
Administrative Services	Streets and Green Roads
Pedestrian Sidewalks	Public Parks
Public Green Spaces	Complementary Green Spaces
Security and Safety	
Satisfaction of Nature Environment through:	
Quality of Air	Quality of Hygiene
Quality of Water	Combating Climate Changes
Social Satisfaction:	
Feel of Happiness	Participation and Influence
Community Bonding	Living Place
Satisfaction of City Economics:	
Prices of Lands	Job Opportunities
Family Income	Housing Capabilities

Table 1: quality of life standerds

2.2 Green spaces

2.2.1 Benefits of green spaces. [5]

- Improvement of Environmental Conditions in Cities
    - Some of the problems which face cities are air pollution, urban heat island, and severe temperature in summer and winter. The foundation of urban biodiversity is the solution for these problems, as it largely contributes to improvement of environmental conditions in cities in several methods:
    - Green spaces work as CO2 absorbents. It is the gas, which is responsible for climate change. For each 100 m2 of green roofs, the gas, which is responsible for global warming, reduces to be 1.8 ton annually. In addition, installation of 100 m2 of green roofs above buildings results in producing oxygen for 100 persons annually.
    - Pollution resulting from 15 cars annually can be removed by 100 m2 of green roofs, as the leaves of the green space can keep these harmful particles on their surface.
    - Green spaces can reduce the surrounding temperature of cities of 1° C, which reduces the phenomenon of urban heat island and harmful smog in the city. In the same manner, it prevents the urban environments, which are more cold of 1° C, the harmful ozone layer, which happens during the emergence of severe temperature cycles.
    - One of the other features of green spaces that it keeps 40% of rain water too, and can delay disposal of water for 18 minutes in cycles of heavy rains. In addition, it prevents the collapse of sewage network in urban areas.
    - Green spaces work as filters for many harmful air pollutions; for example, 1 meter of green space can keep up to 200g of small health-harmful polluting particles annually.

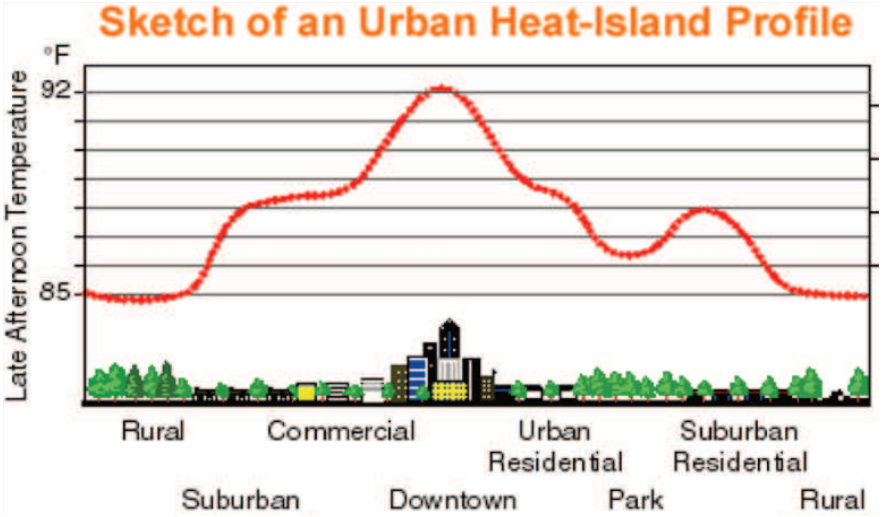

Fig. 2: Urban Heat Island Profile

- Green Space Ratios are one of the Most Important Urban Regulations in Cities

Recently, cities management witnessed the need for ensuring the availability of green spaces in cities to improve the environmental conditions and citizens' health and welfare. In addition, the green infrastructure, promotion of the nature capital of Europe (2013), is one of the EU initiatives to promote designing and establishing of more nature areas for sustainable development. Since 2013, Member States work on implementation of these guidelines through development of new policies aiming at achievement of environmental, economic and social benefits through natural solutions. Thereupon, the urban green spaces indicator allows the measurement of green space for each person in the urban areas, in addition to the green space in the city. In accordance with the World Health Organization, there is a need for 10 to 15 m2 of green space for each person to ensure healthy urban environmental system through various methods to merge green spaces and plan green architecture; for example, vertical gardens on building façades, green roofs, green roads, and urban parks.

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- Improvement of Cities Attractiveness

Beauty can change our view of life in the city. Decoration of building with green spaces does not enrich its architecture only, but also provides an attractive area for people who spend most of their time at the building. This promotes creativity and encourages innovation. Therefore, green cities have many psychological benefits; for example, vertical garden, green roofs and gardens increase city attractiveness, as people believe that it has better quality of life and more healthy and sustainable spaces. In addition, direct communication of green spaces promotes using of renewable energy and greener quality of life. In addition, modern studies show that more travelers choose sustainable destinations and visit cities that are committing to environment and nature, which is characterized by its environmental attractiveness, as it includes many green spaces, high quality of air and huge biodiversity.

- Improvement of Thermal Isolation of Buildings

Installation of green roofs on buildings and private houses provides more isolation resulting in cooler temperature in summer and warmer weather in months that are supposed to be the coldest. In addition, this reduces consumption of energy by 25% in summer and 10% in winter.

- Social Cohesion

In accordance with recent studies, cities with green spaces promote social cohesion and relationships. Who do not like to walk in a green park, or ride a bike or read a book under a tree? It provides points for sharing and establishing bonds between city people. In addition, green spaces positively affect people behavior, as urban garden build and develop relationship between neighbors and promote community bonds and feeling of identity.

- Improvement of People Welfare

In accordance with the World Health Organization, urban green spaces are necessary for people welfare, physically and emotionally. This means that people who live in cities with more gardens and parks have better quality of life that those who live in a high volume of pollution. The allocation of a part of the day for walking or relaxation in green space can make us feel comfort and think well. It reduces life pressures in the city. London is one of the most crowded and fastest growing cities around the world. Few years ago, London has changed some of its urban areas into green spaces to improve life of citizens and their relationship with nature.

Fig. 3: improvement of people welfare through green spaces

2.2.2 Considerations of green spaces desining[6]

- Distribution of green spaces near people.
- Diversity in green spaces.
- Simple design of components of green space.
- Maintenance of green spaces.
- Application of plan principles and ratios.

2.2.3 Green spaces impacts[6]

Green Space Criteria			
accessibility	Aesthetic	Amenities	Management
Location-distance -size - quantity-quality - security	Landscape - quality - perception	Infrastructure - service	Frequency- pesticides- watering

Table 2: Green Space Criteria

Green Space Impacts		
Use and function	Setting features	Environmental regulation service
Active mobility - Food production – Gardening - Physical - activity and sports - Relaxation and leisure - Social exchange	Impact on land price and rent levels - Medications of living environment and residential quality	Biodiversity support - Carbon storage - Pollution regulation - Soil protection - Temperature regulation - Water regulation

Table 3: Green Space Impacts

Pathways to Health		
Individual status	Physical environment	Social environment
Healthy lifestyle - Immune system function - Mental state - Physical fitness	Air quality - Climate change adaption - Neighborhood quality -traffic emissions - Water quality	Living expenses - Safety issues Social cohesion interaction and participation

Table 4: Pathways to Health through Green Space

3 URBAN REGULATIONS AND GREEN SPACES RATIOS

3.1 Definition of urban regulations

The urban regulations is a group of legislations, general regulations, decisions, and practices that control the urban environment in order to improve the Livelihoods and living conditions. However, the urban legislations failed in many developing countries in guiding and supporting sustainable urban development and modern urban orientations in addition to implementation of urban regulations and legislations efficiently. There is a gap between the urban legislations and regulations and objectives and tools of sustainable development, which must be improved and developed to get the urban quality ratios to the highest levels

3.2 Green spaces in Egypt

Green spaces is one of an important and essential element in modern cities planning, as it contributes to development of cities and districts development from the environmental aspect. Lack of green spaces or its low availability results in environmental imbalance of this area, which lacks of trees and gardens. In accordance with the global ratios, which is different from one country to another in accordance with the site and geographical nature of the country, each 5000 people “who are living for example in one district or neighborhood” shall have 3000 m2 of green spaces. These are the average ratios, which apply to the geographical nature in Egypt. By applying the mentioned ratio to the number of people in Egypt, which is 96 million people currently inside the Country, we need to provide 85 million square meters of gardens and parks. However, the existing spaces as mentioned by the Central Agency for Public Mobilization and Statistics are shocking and totally far from the space that should be available across the Country.

The existing green spaces in Egypt are less than 10% of the spaces that should be available to the current population of Egypt, as it is supposed to be “75 million square meters, while the Country, in accordance with the official statistics issued by the Central Agency for Public Mobilization and Statistics, has only 5,370 million square meters only”.[7]

3.2.1 Problems

- Change of cities into cement forests destructing its nature and green spaces: the sole lung and breath for the people.
- Poor distribution of green areas.
- Controlling the mechanics on the urban planning in unfair infringement of pedestrians rights and needs.
- Non-availability of human dimension and scale in designing the existing open spaces.
- Domination of constructed elements on natural landscapes on open spaces.

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- Poor utilization of the existing open spaces

3.2.2 Reasons

- Lack of thinking including planning strategies of green spaces at national, regional and local levels.
- Lack of comprehensive definition for open spaces network, which results in poor distribution of choosing sites and lack of linking to each other.
- Lack of financial resources that allow provision and maintenance of open spaces.
- Increase of population and construction density and increase of construction value of lands, which result in poor utilization of open spaces.
- Neglect and deterioration of the little existing open spaces, and non-maintenance of them periodically.
- Lack of environmental awareness of visitors and users of open spaces and non-application of urban regulations for standards.

3.3 Current Urban Regulations and requirements to the Ratios of Green Spaces

The green spaces are in all planning levels (neighborhood –district –city) and include different spaces for children playing in accordance with different ages, which is necessary for health aspects. However, they are used in cultural and social aspects, as they are used for festivals and public events in different occasions. [8]

3.3.1 City Park (Planning Ratios of Green Spaces)

- Serviced population: (40) thousand population and more.
- Green space around (0.3 -0.4) m2 per capita.
- Total proposed space (20000) m2 and more.
- Provision of car parking; one parking for (2) garden workers, one parking lot for (4) visitors.
- Provision of more waiting areas in the park to serve a specific part. Such parking shall be linked to entrances and exits of the park and internal roads to distribute the motion well

3.3.2 Residential District Park (Planning Ratios of Green Spaces)

- To be available at residential districts in big cities and at small capitals.
- Serviced population: between (15-25) thousand population.
- Green space around (0.4 -0.5) m2 per capita.
- Total proposed space (0.6-1.2) Hectare.
- Provision of car parking; one parking for (4) visitors.

3.3.3 Residential Neighborhood Park (Planning Ratios of Green Spaces)

- To be available at residential neighborhoods.
- Serviced population: between (3-5) thousand population.
- Green space around (0.9 -1.2) m2 per capita.
- Total proposed space (2700-6000) m2.
- Provision of car parking; one parking for (4) visitors.

3.3.4 Children Play Yards (Planning Ratios of Green Spaces)

- To be available at residential neighborhoods or residential groups in all cities.
- Serviced population: between (1500-4000) population.
- Play yards around (0.22-0.33) m2 per capita.
- Space of play yards: (500-900) m2.
- Provision of car parking; one parking for (4) visitors.

3.3.5 Big Gardens and Specialized Quality Gardens (Planning Ratios of Green Spaces)

- To be available at national and big regional centers, in addition to big cities and capitals.
- Serviced population: (100) thousand population and more.
- Big gardens around (0.6-0.8) m2 per capita.
- Space of play yards: (60000) m2 and more.
- Provision of car parking; one parking for (2) park workers and one parking for (4) visitors.

Green Spaces	Population (Thousand)	Per Capita (m^2)	Total Space (m^2)
City Park	40 and more	0.30 -0.40	20000
District Park	15-25	0.40 -0.50	6000 -12000
Neighborhood Park	3-5	0.90 -1.20	2700 -6000
Children Play Yards	1.5 -4	0.22 -0.33	500 -900
Big Gardens	100 and more	0.60 -0.80	60000

Table 5: All Proposed Levels of Green Space Standards

3.3.6 The current per capita green area according to the current urban regulations in some Arab countries

Indicator	Damascus Syria	Manama Bahrain	Dubai Emirates
Area (km)	105	30	4.12
Per Capita Green Space (m^2 per inh.)	0.70	2.5	13.18

Table 6: the current per capita green area in some Arab countries

3.4 Global Ratios of Green Space Distribution

3.4.1 percentage of Green Space Distribution in the City .[9]

It is a simple and clear indicator, but its negatives can be distracting in case of high densities of residents, high building ratios, and high ratios of heights, but the minimum level usually between 10% to 20% of the space of the city. For example, in Germany, the percentage is 40% to 50% for most of the German cities.

3.4.2 Ratios of Green Space Distribution in the City. [10]

Indicator in Europe	Western	Southern	Eastern	Northern
Area (ha)	29625.04	25595.24	18958.96	48816.15
Residential Area	4936.69	2489.48	2665.92	5661.93
Green urban areas	853.24	399.2	462.06	1288.32
Per Capita Green Space (m^2 per inh.)	27.25	10.97	13.71	32.95

Table 7: Ratios of Green Spaces in Europe

Northern Europe (Highest Ratios)	**32.95** Per capita green space
	
	

Table 8:shows the way of distribution of green spaces in the Northern Europe

Southern Europe (Lowest Ratios)	**10.97** Per capita green space
	
	

Table 9:shows the way of distribution of green spaces in the Southern Europe

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3.5 Leading Models of Green Urban Planning to achieve Quality of Life Standards: Malmö [11] and Nantes Metropole [12]

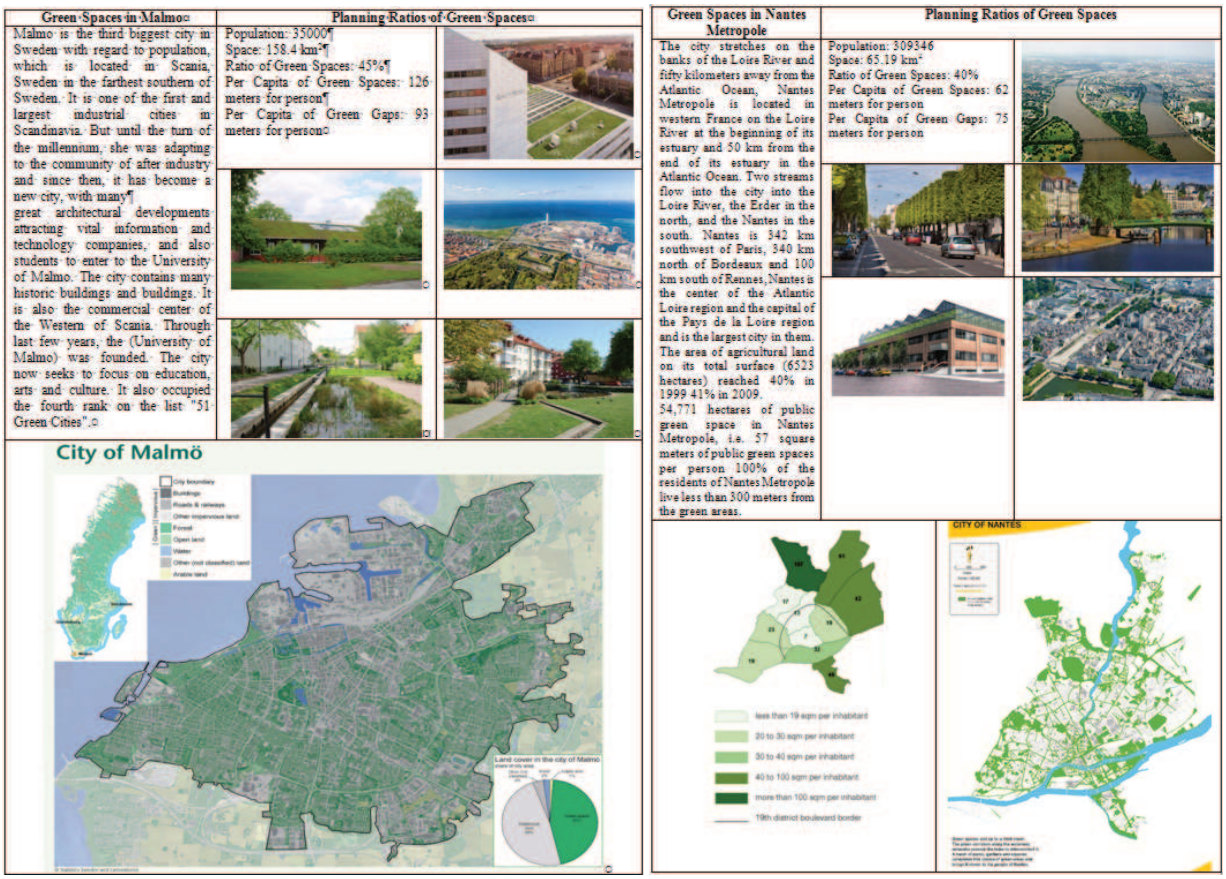


Table 10 (left): shows the Regulations and requirements of Green Spaces in Malmo, Sweden. Table 11 (right): shows the Regulations and requirements of Green Spaces in Nantes Metropole, France

4 EVALUATION AND DEVELOPMENT OF URBAN REGULATIONS OF GREEN SPACES IN ARAB COUNTRIES

4.1 Evaluation of Current Urban Regulations

By comparing the global ratios of green spaces to ratios in our Arab and Egyptian cities, we can find that there is a huge difference between the urban ratios and regulations, which results in an urban construction unqualified to achieve quality of life standards. Therefore, it is necessary to amend regulations and requirements regulating the green spaces system planning and using of new and different approaches and suggestions to raise the ratios of green spaces to achieve quality of life standards. The following table shows the gap between ratios of green spaces:

City	Cairo, Egypt	Nantes Metropole, France	Malmo, Sweden
Per capita (m^2/ person)	1.5	75	93

Table 12:shows comparison between global and local ratios

4.2 Urban Regulation Suggestions to raise Green Space Ratios

4.2.1 Residential Buildings

- Modification of urban construction ratio to the residential volume applicable in the Arab countries from 60% to 45% of the total lands. It is necessary to allocate 50% of the remaining space as a green space.

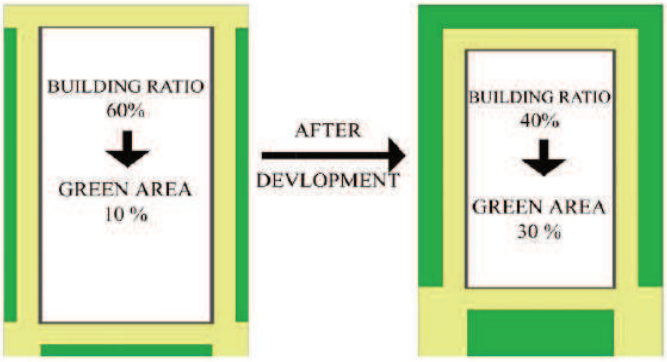
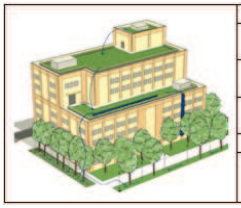


Fig. 4: Modification of Residential Requirements to raise Ratios of Green Space

- Modification and development of urban regulations of residential buildings and change them from nature-destructing cement buildings to green buildings through the reformation of buildings and using the building factor, Floor Area Ratio (F.A.R). The Floor Area Ratio is total space of the building (total land space) to volume of the land on which buildings were built. This factor is usually used as one of the regulations of cities planning in addition to the ratio of building to land) in order to change the residential building from a residential block into a form and height changing block.

Fig. 5: Modification of Residential Requirements through the Building Factor (Floor Area Ratio)

- Using green roof systems, which is represented in live plants fixed on roofs that positively contribute to mitigate urban area impacts and promote thermal and environmental performance. There are three main types of green roofs; each of them has its own characteristics in accordance with table (10),(11) which shows the types of green roofs system. [13]



Characteristics	Extensive	Semi-intensive	Intensive
Depth of material	150 mm or less	Above and below 150 mm	More than 150 mm
Accessibility	Often inaccessible	May be partially accessible	Usually accessible
Fully saturated weight	Low (70-170 kg/m2)	Varies (170-290 kg/m2)	High (290-970 kg/m2)
Cost	Low	Varies	Highest
Maintenance	Minimal	Varies	Highest

Table 13:shows types of green roofs system

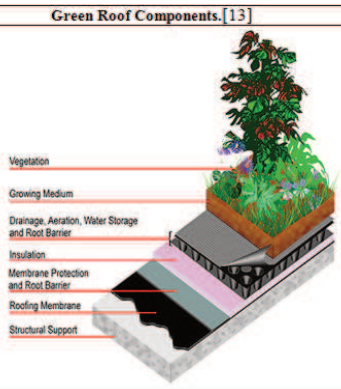
Green Roof Components.[13]	Benefits
	**Ecology** Wildlife habitat Air Quality Biodiversity **Social** less stressed Increased productivity Reduced sick days **Noise Reduction** **Energy and Heat** energy consumption Moderate roof temperature Improve solar efficiency **Economy** Reduce size of HVAC equipment Higher productivity Extend roof membrane life **Rain water** Utilization of rain water

Table 14: components of green roof systems and benefits from using them

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4.2.2 Services

- Modification of building ratio of residential block applicable in the Arab countries from 50% to 30% of the total space of the land, and it is necessary to allocate 50% of the space as a green space, and the remaining spaces as parking and service facilities.
- It is necessary to treat service facilities with the F.A.R system.
- Using green roofs

Fig. 5: University of Miami Lakeside Village Student Community Housing

- Using of green façades in the service facilities, which is a type of green wall systems, as plants climbs and form a plants cover. The green façades can be installed on the existing walls or built as stand-alone. [14]

Fig. 6: Green wall, Semiahmoo Library in South Surrey (http://www.vancouversun.com 2013)

4.2.3 Green Spaces

Modification of urban regulations of green space ratios inside the city reaching between 10 50 15 square meters of green spaces for each person to ensure the existing of healthy urban environmental system in accordance with the World Health Organization. In addition, modification of green space ratios (children play yards –district parks –district parks –city parks –big parks) in accordance with the following table.

Green Spaces	Population (Thousand)	Per Capita (m^2)
City Park	40 and more	1.5 -2.0
District Park	15-25	1.5 -2.5
Neighborhood Park		3.5 -5.0
Children Play Yards	1.5 -4	1.0 -1.5
Big Parks	100 and more	2.5 -4.0
Total		10.0 -15.0

Table 15: Modified Green Space Ratios to reach 10-15 meters for person

4.2.4 Roads

Development and improvement of ratios relating to green spaces on roads and streets, and increase the ratio of trees and green spaces on both sides of roads and traffic islands to raise ratios of green spaces in the city. Figures (8) and (9) show the way of distribution of trees on both sides of roads and traffic islands:

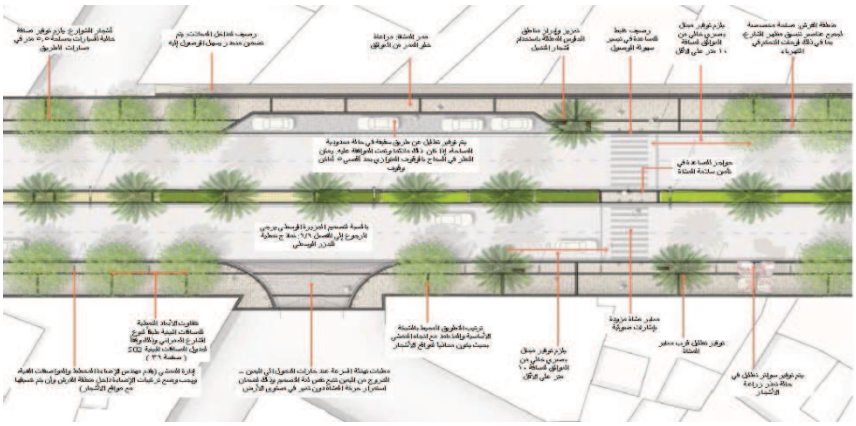

Fig.7: Distribution of Tree Ratios on Both Sides of Roads and Traffic Island

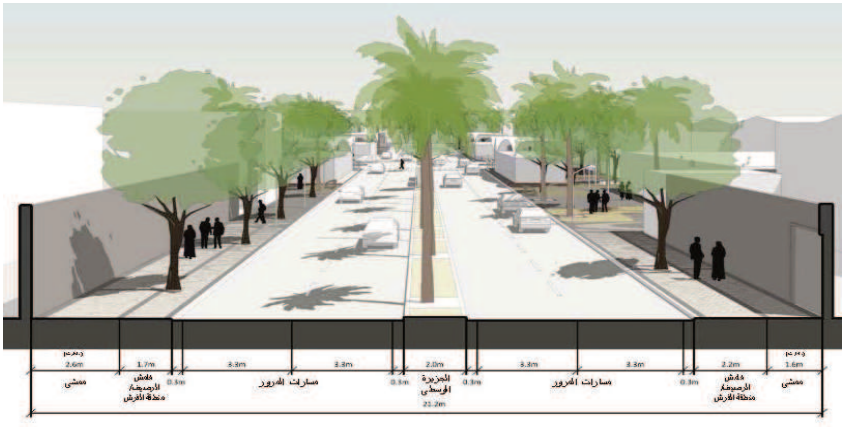

Fig.8: Sector shows distribution of Tree Ratios on Both Sides of Roads and Traffic Island

5 RESULTS

- Definition of quality of life is a wide and complicated definition including several definition. In brief, the quality of life measures the level of satisfaction relating to the most important aspects in person's life. It can be said that judging quality of life standards is represented in one important element, which is green spaces.
- Green spaces are an important and essential element in planning modern cities, as it contributes to development of cities and districts from the environmental aspect. The non-availability or lack of green spaces may result in environmental imbalance in areas that lacks the availability of trees and gardens.
- Green spaces has many benefits to human-beings in improvement of environmental conditions of cities and cities attractiveness in addition to the thermal isolation of cities, social cohesion and human welfare.
- It is necessary to consider many consideration in designing green spaces (distribution of green spaces near people –diversity of types of green spaces –simple design for green spaces –maintenance of green spaces –application of planning principles and ratios).
- Urban regulations are group of legislations, general regulations, decisions, and practices that control the urban environment development to improve livelihoods and living conditions. However, the urban legislations failed in many developing countries to guide and support sustainable urban development and modern construction orientations, and implement urban regulations and legislations efficiently.
- In accordance with the World Health Organization, there is a need for 10 to 15 m2 of green space for each person to ensure healthy urban environmental system.
- Green space ratios in the European countries are between 10 meters to 35 meters, and it increases in some cities to be 93 square meters as in Malmo, Sweden.

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- The existing green spaces in Egypt are less than 10% of the spaces that should be available to the current population of Egypt, as it is supposed to be "75 million square meters, while the Country, in accordance with the official statistics issued by the Central Agency for Public Mobilization and Statistics, has only 5,370 million square meters only". The per capita of green spaces in Cairo is 1.5 square meters.
- By comparing the global ratios of green spaces to ratios in our Arab and Egyptian cities, we can find that there is a huge difference between the urban ratios and regulations, which results in an urban construction unqualified to achieve quality of life standards.
- It is necessary to amend regulations and requirements regulating the green spaces system planning and using of new and different approaches and suggestions to raise the ratios of green spaces to achieve quality of life standards.
- Modification of urban construction ratio of the residential volume to the total space of land, and it is necessary to allocate 50% of the remaining land to be green spaces and allocate the remaining spaces as parking and service facilities.
- It is necessary to treat service facilities using F.A.R system.
- Using green roofs.
- Using green facades.

6 REFERENCES

1. HAMAM SERAG ELDIN, Ahmed Shalaby, Hend Elsayed Farouh, Sarah A. Elariane, Principles of urban quality of life for a neighborhood, HBRC Journal (2013) 9, 86–92.
2. QUALITY OF LIFE PROGRAM, Quality of Life Program 2020 Document, Kingdom of Saudi Arabia, Implementation Plan, 2017.
3. SARAH ELARIANE, Neighbourhood Urban Quality of Life, faculty of engineering, Cairo university, PhD, 2012
4. EUROPEAN COMMISSION, Quality of life in cities, Perception survey in 79 European cities, Regional and Urban Policy,2013
5. ESPORA,the-8-benefits-of-spreading-green-spaces-in-cities,www.urbanespora.com, Apr 30, 2019
6. WORLD HEALTH ORGANIZATION, Urban green spaces:a brief for action,2017
7. THE NATIONAL ORGANIZATION FOR CIVILIZATION COORDINATION, The Basis and standards of cultural coordination for open areas and green spaces, first edition,2010
8. MIMISTRY OF MUNICIPAL AND RURAL AFFAIRS, Guide to Planning Standards for Green Areas – Saudi Arabia, 2005
9. AISHA ABDEALLAH, General Recreational Greenland Planning Standards,PhD, Sudan University of Science and Technology - College of Architecture and Planning,2019
10. GREEN SURGE, A typology of urban green spaces, eco-system services provisioning service and demands, part of the EU FP7 (ENV.2013.6.2-5- 603567) green surge project (2013-2017)
11. MALMÖ, SWEDEN, part of a GREEN SURGE study on urban green in 20 European cities,2015
12. EUROPEAN COMMISSION, European green capital, European Green Capital Award Nantes 2012- 2013.
13. www.roofscapes.com .
14. LIVING ROOFS AND WALLS, Technical Report: Supporting London Plan Policy,2008