The city's ecological applications and standards in ALAMARA city

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Abstract. In the last period there have been rapid developments and increased interest in the integration of the environment into urban planning. It has occupied a large part of the world's most economically and economically important concerns, emphasizing the need to adopt the concepts of green urban construction as a basis for future cities. Both human and nature to continue and stay. Hence, the importance of research in building a base on the planning and design principles of the eco-friendly city as a basis for future cities. Both human and nature to continue and stay. Hence, the importance of research in building a base on the planning and design principles of the eco-friendly city for the purpose of local adoption", thus facing the problem of" lack of application of knowledge on the basis of planning and design eco-friendly city. The hypothesis that "the development of urban societies towards eco-friendly societies depends on the creation of an integrated urban city is based on a number of foundations and criteria that are primarily inspired by the characteristics of ecosystems in that natural environment". Based on these indicators, these principles and criteria were applied through indicators to assess the city's urban and natural performance in part of the city of Amara to assess the proximity of the study area to these criteria in order to achieve its urban ecological sustainability. The research concludes with the most important conclusion that the ecological approach is the closest approach to the environment, which depends on the idea of comprehensiveness and real values of systems and natural varieties, and the most important research findings the need for a planning entity, Especially those with certain ecological components (such as Iraq), to follow up on the world's ecological developments, and to anticipate events in which they attempt to trace their effects in line with their general development policy on the one hand and in accordance with cultural heritage on the other.

1. Introduction:
The study of the environment and its elements opens to the researcher a group of doors related to different aspects of the subject reflect the capacity of research and the multiplicity of references and opinions that dealt with the formation and formation of the general framework of the concept, and so became the basis of research is the intellectual correlation of the elements of the environment in the city planning and integration with the ocean according to the application of urban orientation (The ecological orientation as a model) adopted by the institutions concerned and developed and crystallized over time in response to the need of the people and society and the surrounding circumstances, and urban planning the largest role in the crystallization of this trend. This study seeks to study the application of the city's ecological indicators in the study area of Maysan Governorate, and aims to achieve ecological sustainability in the selected part of the city of Amara by collecting the necessary data and data, field survey of the situation and applying the necessary measurements to reach an assessment of the approach Part of the city to achieve the planning and design foundations of the ecological city, as well as "to focus on the weaknesses and barriers to be considered contrary to” sustainable ecological conditions and criteria, and seek to address them in order to prove the
possibility of achieving that evil I standards across indicators and benchmarks derived from the local environment.

2. Identification and definition of the study area:
The province of Maysan is located in the south-eastern part of Iraq, bordered by the State of Iran from the north-east, Wasit province from the north-west, the province of DhiQar from the south-west, and the province of Basra from the south, as shown in figure 1. The point of contact between Iran and other governorates [1], and the city of Amara, "the center of the province" is the same as all cities in the world are undergoing stages of development and transformation over time, where the city has undergone rapid changes in the internal structure and the breadth of urban, especially "in the last decade, Many designs and designs The center of the city since 1979 was revised in 1988, 1990, 1992, and 1999, and the basic design for the year 2007, which seeks to reorganize the city until 2030, ending with the "2010 conservation plan in force so far.

![Figure 1. Map of Maysan state in Iraq](image)

3. The planning and design foundations of the ecological city in the study area
The city's ecological structure has a number of basic elements that must be worked within and according to them, dealing with the ecological environment and the built environment, transport, energy and material flow. Most of the studies and research on the city's ecological planning have been agreed upon. The research finds that there are five basic elements of the city's ecological structure and its application in the study area.

3.1 The natural and urban context of the site:
This component aims to protect the ecological natural environment from the effects of urban development processes. The natural environment is characterized by its ecological systems, habitats and species from one location to another, which necessitates preservation or strengthening [2]. The natural and urban context factor is one of the most important reasons for choosing the area of study as an ecological city. The researcher found that the site is characterized by several urban and natural characteristics. Among the most important urban characteristics that distinguish the city center from the rest of the city is the many activities and urban activities. And the activities of education and health with the markets, in terms of natural context, the city are confined between two distinct rivers as well as "the nature of fertile soil, which is a natural component of this region.
3.2 Green building structures: are represented by several indicators in the ecological city, which were classified according to local and international standards, according to the following two active indicators:

3.2.1 Natural Greening: One of the most important elements that it consists of are:

- Parks: The researcher examined the national standards for easy access to the parks, as mentioned in the Urban Housing Standards Book 2010, issued by the Ministry of Construction and Housing / Public Housing Authority and the Municipality of the Capital. These criteria were adopted according to the classification of parks within residential communities, the criteria for the parks are 0.8 km. And the standards for the parks of the sector are 0.8 km. The green space survey criteria are those of the United Nations (UN) which is the acceptable limit = 20 m² per person, the minimum acceptable = 10 m² per person. The proportion of these areas is determined from one city to another. Therefore, international standards have been set to standardize this area, which stipulates that its percentage, as well as "vegetation cover" is: the acceptable limit = 30% of the total area of the city. While the minimum acceptable = 15% of the total area of the city. After analyzing these elements in the study area by studying the reality of the situation, and analyzing the existing standards with the reinforcement of spatial distribution maps of the program of

The GIS of the work of the researcher, we notice that some parks give some kind of identity to each place, but there is no communication or connection between them in any way, and there is no integration or consistency between those spaces and around the gray infrastructure.

First: Parks: The researcher dealt with the national standards for easy access to the parks, as stated in the Urban Housing Standards Book 2010, issued by the Ministry of Construction and Housing / Public Housing and the Municipality of the Capital. These criteria were adopted according to the classification of parks within residential communities, the criteria for the area parks are 0.8 km., And the standards for the parks of the sector are 0.8 km. The green space survey criteria are those of the United Nations (UN) which is the accepted limit = 20 m² per person, the minimum acceptable = 10 m² per person [3]. As for the standards of vegetation cover, the studies differed in determining the proportion of these areas from one city to another. Therefore, international standards have been set to standardize this area, which stipulates that its percentage, as well as "vegetation cover" is: the acceptable limit = 30% of the total area of the city. While the minimum acceptable = 15% of the total area of the city After the analysis of these elements in the study area by studying the reality of the situation, and the analysis of existing standards with the reinforcement of spatial distribution maps of the software of the GIS of the work of the researcher, we note that some parks give a kind What is the identity of each place, and despite the convergence of places of distribution, but there is no communication or connection between them in any way, and there is no integration or consistency between those spaces and around the gray infrastructure.

In terms of versatility, there are no multiple uses of land, while national standards of accessibility are reasonably applicable within the areas served. This indicates the efficiency of these areas, while they do not achieve vegetation coverage rates. In terms of standards of coverage, they vary considerably from one region to another; we observe Figure 2 and Figure 3. The results are as follows:
Figure 2. Portion of capita from the Green Zone

Second: The Blue Line Corridors. These are the corridors, streams and river banks. The criteria of the blue linear pathways depend on the nature of the geographic composition of the area and the development plans of the competent departments in those areas [4]. The study area is characterized by the area between the Tigris and Al-Kahla rivers. The linear pathways are the only outlet for the urban fabric in the study area. These banks generally contributed to a distinctive identity for the area. As for communication, depending on the length of the linear pathway, it has high communication being surrounded by the bulk of the urban fabric, hand standards do not rely on specific criteria in their design and creation, which lacks the right design.

3.2.2 Greening the plant is the supporting element of green networks, without which the work of the green infrastructure is not completed:

First: "Green Streets and Streets": A type of road that focuses on the sustainable management of rainwater through the use of its own techniques with street designs, which reduce the amount of water directly in the drainage pipes, as well as the effect of reducing the degree of Local heat, improve air quality [5].

Through our analysis of the main streets and field survey it was noted that there is no obvious interest in the fact that the streets are green.

These streets are a distinctive identity and good communication, but not integrated with the uses around, and for the standards there are many abuses on the sidewalks, and use for several purposes, as a parking lot, as well as "non-compliance with the laws of recoil for some uses because of the absence of strict law to prevent such anomalies.

Second: manufactured water channels: Used as pedestrian and bicycle tracks in cities, as they are free of traffic called "towpaths." The criteria of these channels vary according to their geographic configuration and design. The width of the track ranges between 2.5-5 meters [6]. During the field survey and the study of the data in the study area, it was found that there is no such element in it.

3.3 Built Environment in the Study Area: This indicator is concerned with clarifying the method of planning buildings and public spaces in the ecological city by clarifying the most important planning and design foundations that it requires [7].

1 - Building density: The number of housing units in the unit area for the density of housing, for example, measured in the number of residential units per hectare, the greater the density of ownership of private cars and the proportion of mobility depending on the means of motor engines, while increased rates of use of public transport and other Of environmentally friendly means [8]

2 - density of units / population: the relationship between units or the number of users to the area used by them measured in hectares, and there are a large number of sub-metrics that can be adopted in the study of density, but the research was based on the measurement of two distinct types of densities [9]
• Net residential density: means the number of dwellings divided by the area allocated for housing without counting the public services and streets in the residential area.

• General housing density: The number of houses divided by the total area of the residential neighborhood, including public services and streets surrounding and surrounding the residential neighborhood.

In this regard, research was based on national standards and as mentioned in the 2010 Urban Housing Standards Book issued by the Ministry of Construction and Housing / Public Housing and the Municipality of the Capital. The standard of population density is about 170-290 persons per hectare, Housing is approaching 28-24 housing units per hectare).

The census of the city was based on the design of the foundation for the city of Amara for the year 2007, which was adopted by the Department of Municipal Population Studies later. Where the population was calculated for each residential locality in the sector. The researcher relied on the equation of population prediction for 2018 based on 2007 as the base year and according to the following equation:

\[ P_t = P_0 (1 + r)^n \]  

Whereas:
- \( P_t \): Population in Target Year, \( P_0 \): Population for the Base Year
- \( r \): Growth factor (3\% depending on MESAN).
- \( n \): The number of years between the base year and the target year

According to the above equation, the total population of the study area (130021) is different. The number of residents and families varies from one region to another. Therefore, the population density of the study area is calculated by dividing the population of each residential sector (which contains a number of residential stores) In general, the study area is within the required standard according to the approved criteria, figure 4.

![Figure 4. Population density in the study area](image)

3- **Housing density measures**: The number of residential units of different types was (15914) housing units for the whole area. The net housing density was calculated from the total number of residential units within each sector divided by the area of the sector. By analyzing the results in housing density, Figure 5.
Figure 5. Housing density in the study area

From the above figure we notice that the density of the population varies from region to region, and that the highest population density is located within the neighborhood of Hay ALAMIL, and the lowest housing density in the university district. According to the standard (28-48 housing units / ha), the study area generally suffers from a significant reduction in housing density.

Second: The Diversity Index: It includes a set of measures to achieve a sustainable eco-city:

1. Land use mix: This measure relates to the area of the separated pieces as a mixed use of land relative to the area of the study area, and includes another aspect related to the coefficient of land use diversity in an area, which is called "Simpson coefficient". Which is expressed in the following statistical equation:

\[ D = 1 - \sum \left( \frac{n}{N} \right)^2 \]  

Where:
D = diversity index
n = The area of each category of mixed land use in the study area measured in hectares
The area of the study area is measured in hectares.
The value of D is between 1-0, zero for one type of use in the region, and one for full diversity of activities and activities in the study area. This measure aims to provide the largest proportion of mixed land use area relative to area of study zone. As well as the extent of the diversity of activities in the region. The good criterion in this area which supports the realization of an ecological city with a value of Simpson's coefficient is not less than 0.5 [10].

2 - The diversity of housing options and densities: This measure reflects the number of any type of housing to the total number of housing in the study area, and can be applied to the statistical formula of the Simpson, where the zero in this case that the specific area consists of one type of housing. While one refers to a high diversity of housing options in the study area. In this area, the studies identified the appropriate number of Simpson coefficient for the variety of housing options with a value of 0.5 for the minimum limits and 0.7 (11) for the optimal situation, through the field survey by the researcher and interviews with The owners of the relationship in the Directorate of the Municipality of Indicating that all the plots of land inside the old neighborhoods in particular "do not have regular geometric shapes, and their area ranges approximately (100,200,300,400) m².

As for the variety of housing options in the study area, it is noted that the region generally "has a high diversity of housing options," according to the statistical scale. However, we can observe that there is a clear imbalance regarding the arrangement of built-up areas in some neighborhoods within the study area, Eco-sustainable in this area Figure 6.
3.4. The transportation system in the study area:
Emphasizes the need to return to human standards and avoid mechanical and mechanical measures, i.e., adopting the standard 10-minute walk "instead of 10 minutes" by car. Based on the Ease of Access Index, a set of metrics is summarized as follows:
1. Distribution of public transport stations: This indicator examines the distribution of sustainable transport stations (pedestrian traffic, bicycle and public transport), which is important in achieving the lowest access between any city and stop stations of public transport, and most studies made clear that the optimum distance between any two stop stations is between 200-600 meters in urban areas, but the number of stations shall not exceed 4.3 stations per mile (12). In the field survey and information from the statistics department of the Municipality of Amara, it was found that the study area contains two main stops for the public transport modes (the old garage and ALKORNISH garage). The researcher adopted the criterion of accessibility 600 meters from the center of the station according to the above criteria. The accurate analysis of the above stations shows that the average distance between public transport stations outside the standard limits, in addition to the absence of stop stations in public buses on a regular basis, within the planning criteria, as well as limited public transport stations, as there are several residential neighborhoods not serviced by the two existing stations, Figure 7.
2-The quality of the traffic network: It includes a set of statistical measures and statistics that reflect the accessibility of users in the urban environment, summarizing the following measures [13]:

Measure of network communication: expressed by the number of intersections divided by the area of the area in hectares, a measure of the extent of communication network and facilitate mobility to move from place to place, studies have identified the minimum threshold level of 1.2 intersection per hectare, while the good standard, which achieves the highest It was found that the area diagram has a positive effect in this area, Figure 8, where it is shown that the area diagram has a positive effect in this area, Network planning in the study area achieves an insignificant degree of plains

- Access, and provides sufficient freedom in the favorite tracks choices with regard to users.

Figure 8. Network connectivity measure in the study area

Network access measure: The number of network points of contact with the public network of the city along the perimeter of the area, a measure of the extent of network communication facilities with their perimeter of the city's total traffic network, and studies identified the good value of the scale at one point of contact per 0.12 km of Length of area boundaries, and analysis of results in the study area noted that the region suffers from weak internal network connection to the residential area with the public network in general.

Figure 9. Network access meter in the study area

The distance of access to various activities and services: Through the field survey of the study area and based on the data of the municipality of Amara, the centers of services (commercial, educational, health and security) were identified for different sectors and according to the standard of distance of access (600) meters from the service center The study revealed that the study area suffers from a
general weakness in access to the public network of the movement and in most neighborhoods, by relying on the value of the scale used in the area of access distances. The distances of access to education, health and security are different from the logic. In addition, in the case of commercial services; there is a clear problem in the access distances, which indicates that there is a defect in the distribution of these services, which requires special treatments in this area. On the level of security services, some neighborhoods need to provide security centers for lack of them.

![Figure 10. Access distances for services in the study area](image-url)

3.5 Energy flow and resource management:

First: Energy: Ecological cities seek to achieve three main objectives. The first is to reduce energy demand in general. The second is to increase the efficiency of energy use methods that must be used. The third is to increase the efficiency of energy production and activate its renewable sources. The study area suffers from a major problem in the electricity sector, in addition to the city does not contain any urban system provider of renewable energy, such as solar cells and green surfaces.

Second: In the field of water management: For the water sector in the city of Amara, surface water is the main source of drinking water in the city. On the other hand, the water of this source is heavily contaminated with organic and vital materials. The amount of water consumption per capita is 400 liters / person / day (Water Department / Municipality Municipality Directorate). The amount of consumption per neighborhood is calculated and the area does not suffer from water scarcity, especially since all neighborhoods are equipped with a water network. On the water management side, the city does not contain any model of ecological cycle in terms of rain water or sewage.

Third: Yellow waste production: The eco-city of the waste management system looks at it completely differently from its traditional view of changing it from a mere solution to a problem to a resource provider. Accordingly, solid waste has become a resource rather than a problem. Policy to reduce the quantity and toxicity of waste at their point of origin by redesigning products or changing patterns of production and consumption, policy emphasizes the need to count waste management and recycling as an important and complementary part of the management of urban resources in the city, Wyatt and processors and transfer neutral ways that do not cause the issuance of any contaminated environment surrounding emissions [14].

As for the waste sector in the city of Amara, there are three waste collection stations in the area. The amount of waste produced per day is 1.25 tons / day (Municipality Municipality Directorate / Environment Department). The total quantity of waste produced for the study area was calculated. The design capacity of the diversion stations is determined to absorb the waste in all its forms. In addition, the landfill sites are located outside the design limits. However, the city lacks a system for collecting waste. It lacks regular collection points. The assembly points in the city are irregular. The city does not contain an ecological model for waste management. It is placed in sanitary landfill sites without the benefit of heat energy resulting from incineration, and the gaseous energy resulting from landfill operations.
4. Conclusion:
1. Ecological orientation is defined as the closest approach to the environment, which depends on the concept of total and real perception of the values of systems and natural varieties.
2. Density, diversity, accessibility, green building structures, energy and materials management are indicators for eco-cities with sub-indicators and metrics to measure the ecological sustainability of the city.
3. Ecological awareness and policies of governments and urban policies have a "fundamental" role in their adoption of ecological urban planning as a basis for their future cities and to improve the performance of their existing cities. The developed cities have made great strides in the creation of eco-friendly cities, while others whose urban policies are far from realizing the importance of adopting an ecological approach to urban planning and design. This variation in ecological awareness has created a large proportion of the inequalities in the actual achievement of ecological cities, making them concentrated in certain parts of the world and disappearing in other parts.
4. The eco-city model provides a number of planning and design bases that are important in the realization of the city's ecological structure, which achieves its general objectives, Commitment to achieve them regardless of the ecological nature of the site. (Natural and urban context, green infrastructure, built environment, transport, energy and material flow).

5. Recommendations
1- To expand the study of sustainable ecological thinking in various scales and to provide the possible support and facilities for the development of the basic idea and to introduce it as a general framework for all plans and projects of different sizes.
2. Starting from the idea of indicators of density, diversity, energy, materials management, green infrastructure and roads, and developing them to include other aspects and indicators to arrive at a more detailed assessment "of the finer and deeper parts of the urban environment of the existing city (level of buildings).
3. It is necessary to have a planning authority in each country, in particular those with ecological components (such as Iraq) to follow up on global urban ecological developments.
4 - Activation of technology of modern technology for energy investment, especially the study area has strong resources and rare alternative energy (renewable).
5 - Sustainable management of water resources consumed within the study area, and this can be achieved by reducing the initial consumption rates and initiate awareness campaigns rationalized audio and visual methods and emphasize the importance of the individual.
6. To achieve the low production of carbon and waste by reducing its production in the first place and setting production conditions that reduce the official amount of local waste at the points generated, as well as adopting the policy of (reclamation, reuse and recycling).

References
[1] Ministry of Municipalities and Public Works 2008 Page 5.
[2] Gaffron P, Huismans G and Skala F 2005 Ecocity Book I A Better Place to Live, Hamburg, Utrecht, Vienna,p19,p4
[3] Barker G 1997A Framework for the Future : Green Networks With Multiple Uses in and Around Towns and Cities English Nature,UK.,p.7-p2
[4] Sullivan Elaine 2008 Architectural Features: On Digital Karnak Los Angeles – USA, p.73
[5] SEMCOG 2014 ( Southeast Michigan Council of Governments), “Green Infrastructure Vision for Southeast Michigan p.44.
[6] Guidance for towpath Design, 2012 p.1.
[7] Kenworthy J 1991 From urban consolidation to urban village Urban Policy and Research 9, USA.
[8] Jabareen Y R 2006 Sustainable Urban Forms Their Typologies Models, and Concepts Journal of Planning Education and Research 3-41.
[9] Forsyth A 2003 *Measuring Density: Working Definitions for Residential Density and Building Intensity*, University of Minnesota, Design Center for American Urban Landscape, Minneapolis, USA p:5.

[10] Kellett, Ronald, Fryer, Sara and Budke 2009 *Specification Of Indicators And Selection Methodology For A Potential Community Demonstration Project*, the Design Centre for Sustainability, the University of British Colombia, Vancouver, Canada p25.

[11] Kellett, Ronald, Fryer, Sara and Budke, Isabel 2009 *Specification of Indicators and Selection Methodology for A Potential Community Demonstration Project*, the Design Centre for Sustainability, the University of British Colombia, Vancouver, Canada p33.

[12] KFH Group, Guide Lines for the Design and Placement of Transit Stops 2009, *Washington Metropolitan Area Transit Authority*, Maryland, USA p58.

[13] Kellett, Ronald, Fryer, Sara and Budke, Isabel 2009, *Specification of Indicators and Selection Methodology for A Potential Community Demonstration Project*, the Design Centre for Sustainability, the University of British Colombia, Vancouver, Canada p30.

[14] Mroueh U M 2007 *Waste is a Resource in Ecocity*, *VTT Technical Research Centre of Finland* Finland pp3-4.