# Viability of utilizing the global methods for assessing the sustainability of urban design projects in Iraq

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**Abstract**

Due to rapid urbanization, cities and urban areas become responsible for about two- thirds of $CO_2$ and the GHG emissions, as well as the depletion of different types of energies and natural resources. The sustainable of urban development may be considered a fundamental solution which can achieve the balance between human needs and nature. Furthermore, it facilitates the dealing with urban design challenges for the long term. It also encourages local community engagement in the design process through different stages, as well as contributing to decision-making to create sustainability of urban design. From this vision, many global assessment tools were emerged and have been used in different countries around the world. This paper aims to clarify the viability of using well-known methods to assess the urban design projects in Iraq and the suitability of local realities. The proper conduct analysis of current situations based on an in-depth critical review and a comprehensive comparison among three well-known urban sustainability assessment methods, namely: BREEAM Communities from the UK, LEED-ND from US, and PEARLS Communities from the UAE (as a neighbouring country to Iraq). The study conducted an in-depth qualitative and quantitative analysis of the main evaluation criteria for the selected tools, such as content use, the weighting system, scoring, certificate rating, and the context. The key findings stressed that the global assessment tools in used, are focusing on the sustainability assessment of the local context and dealt with the local urban

challenges. Therefore, they cannot be generalized to be global tools that can be used anywhere, especially for urban design and development projects in Iraq.

***Keywords***:Global assessment tools, urban sustainability, common indicators, urban challenges, urban design

## Introduction

Cities represent the main player of urban sustainability scope [1,2]. As a result of this admitting, many recent studies and researches confirm that the sustainability assessment of urban design projects through the isolated buildings or their synthesis are not adequate. It will not give accredited and approved results, but requires a thorough review of the city and all miscellaneous and main parts (e.g. A neighbourhood with their components, population, urban spaces, mobility, land use, housing availability, transportation, energy management, precious water, local material use, geographical diversity, air and water quality, etc.) which represent the basis for the evaluation of the player urban sustainability [3].

The assessment tools were widely varied in their types and content such as; assessment projects, indices, life cycle assessment (LCA), assessment frameworks, tools, rating system methods, and certification systems [4,5]. As well as, over the past three decades, most of the global assessment tools worldwide had changed the evaluation scope, by expanding their evaluation of the individual building to includes the urban scope. The tools became a form of families including various tools for assessing sustainability in different sectors [3]. For instance, the BREEAM Co. (developed between 2011-2012), LEED launched LEED-ND for assessing neighbourhood development in 2007, CASBEE–UD for urban development developed in 2007, SBToolPT – UP launched in 2013, PEARL Communities (PCRS) developed in 2010, which refers to the Estidama Pearls community rating system in the UAE, and QSAS/ GSAS (The Qatar/Global assessment system in 2010) [3].

Most of the global standards emphasize that they were designed to the national and international context. But few studies determined that LEED-ND, BREEAM Community, and PEARL Community were used at the international level [3,6]. Hence, this paper aims to clarify the viability of using three global methods to assess the urban design projects in Iraq and the suitability of local context.

## DEFINITION OF THE STUDY AIM

In spite of the short history of the presence, the assessment tools were attracted to the attention of the scientific community through theoretical and empirical analysis [7,8]. As well as, election, quality and quantity, and the type of indicators [2,9]. The identification issue of global and local for sustainability assessment tools is still within the limited studies and did not specify crucially yet [1].

The paper aims to bridge this gap by adopting a methodology of quantitative and qualitative indicators analysis through a comparison of three internationally well-known tools for assessment urban design sustainability. These tools are chosen from the United Kingdom, the United States, and the Middle East because of their concrete experiments, as well as they are from different regions of the east and west. So, they have a variety of social, environmental, and economic dimensions. According to a consensus all assessment tools on the importance of indicators as quality, quantity, or both.

## FUTURE VISION OF STUDY

The paper vision is to develop a future study to form part of a sustainability assessment of urban design for the Iraq cities. So, several assessment tools have been chosen from neighbouring countries that may share in some of the social and environmental concepts.

### 1. Urban design sustainability assessment tools analysis

It is extremely complex to determine a common definition of sustainability within the diverse knowledge fields [1,10,11]. Most of the definitions consider urban sustainability a multi-interpretations concept, it cannot be restricted within a specific domain of knowledge [12]. However, Brundtland's definition of urban sustainability remains, describing it as "the development that meets the needs of the present without compromising the ability of future generations to meet their requirements and needs." [13]. This description has been received wide international attention and the admissibility of the majority, it is being the core centre for other sustainability definitions [1,10].

Many projects and frameworks for urban sustainability assessment have been developed which highlights the importance at present where the goal is to guide the decision-making

processes to take serious steps towards achieving sustainability of urban design [8,12].

The unique and special needs of the cities prevent and determine the existence of ready recipes that fit all countries [2]. As has been mentioned, the paper focuses on the three well- known globally urban design assessment methods, and these tools will be presented by seniority in the incorporation.

### 1.1 BREEAM Communities

BREEAM (the Building Research Establishment's Environmental Assessment Method), represents the first well-known tool of sustainability assessment in general [1]. BREEAM was launched in 1990 by UK specialist in Built Environment domain [8]. The tool started as an environmental assessment of buildings [14]. Then, the domain expanded toward assessing the sustainability of the urban community and urban development in 2009, it always focuses on the sustainable element's importance [15]. In 2011, BREEAM Co. Technical manual introduced nine indicators and 39 secondary indicators, while the number was reduced to 5 indicators in the technical manual of 2012, and it increased the number of secondary indicators to be 40 indicators [3,15,16].

### 1.2. LEEN – ND (for neighbourhood development)

The abbreviation of LEED refers to (Leadership in Energy and Environment). The tool was emerged for the first time in 1993. It represents a special assessment tool for defining green buildings and construction. USGBC (United State Green Building Council) established the 1st version of LEED [3]. This tool deals with the overall elements of the urban areas commenced from smart growth principles for the city, principle of site selection, single building and clusters of buildings, land used and main infrastructure, and the interest and importance of the landscape for all neighbourhood units [17]. LEED-ND has five indicators divided into fifty-five secondary indicators, twelve are mandatory and forty-three are optional within assessment points. The tool has been used to assess the sustainability of many urban projects in the US, as well as, it used as a

global well-known assessment tool outside the US [8]. It works as a guide for the development plans by developers and urban planners in both England and Germany [1].

### 1.3. Pearls Communities Rating System (PCRS)- UAE

PCRS was developed from LEED and BREEAM tools as an attempt to know the shortcomings and differences between the two methods. It works on the development of a suitable rating system for the spatial and cultural dimensions of the UAE. PCRS is a unified document for three different standards varying with rating size, which includes a guide for assessing the sustainability of villas, buildings and community [3, 18].

## 2. Sustainability assessment tools comparison

The three selected sustainability assessment tools of urban design (BREEAM Co., LEED-ND and PEARLS Communities) were compared according to three main levels:

### 2.1 First level: The characteristics and criteria

The characteristics and criteria for the urban assessment tools are presented in aims to highlight on the organizational structure of each assessment tool and the scope of the assessment (local or global), as well as, the certification patterns. They were organized by seven categories, namely: the issuance date, volumetric assessment range, national and local usage, global usage scope, international version, pattern rating system in addition to certificate levels.

### 2.2 Second level: The spatial correlation

The three selected tools are designed mainly for assessing the sustainability of the local context. Whereas, the Urban indicators and challenges are varying in their importance according to the strength of spatial correlation and the multiple influencing elements, such as population growth, the nature of geography, economic wealth, cultural heritage. In addition to the local regulation's laws, and constructional and structural determinants of the country.

The limits of sustainability assessment of all standards out of limiters, while minimums ranged between a group of buildings, as in LEED-ND, to the smallest size of a city as in BREEAM Community and PEARL Community (PCRS).

### 2.3 Third level: indicators of urban design and development

As a result of the absence of a unified definition of urban development sustainability [2,19], many difficulties have arisen in determining the types of urban indicators, priorities, and their application possibilities. However, urban indicators have great importance as contributing to the stakeholders, urban planners and designers, who can manage the decision-making process for urban projects, starting from the design concept and during the multiple stages until the completion [20]. It is important to the urban indicators to be policy-relevant, clear, reflect reality, scientifically proper, easy to achieve, practical, qualitative, quantitative and measurable to display the local and national priorities, objectives and local operations of the urban environment context [21].

## 3. Common and individual indicators

After an in-depth review of the main and sub-urban indicators for each well-known assessment tools, it has been discovered that some of them were contained and included in all other assessment tools. Despite they do not have the same weighting score or rating. These indicators have been determined depending on local urban challenges and conditions in different percentage of importance and priority. Hence, these types of urban indicators can be named and categorised under the common indicators group depending on significance resulting from repeated in all the tools; Examples include (ecology, energy, water, pollution reduction, waste, transit, transport, sustainable buildings, etc.). Even though these urban indicators could represent main indicators as in examples (In BREEAM Community: resources and energy, land use and ecology, and transport and movement. In LEED-ND: green infrastructure and buildings. In PEARLS Community: liveable buildings, precious water, resourceful energy, stewarding materials. And in GSAS/ QSAS: energy,

water, and materials). Otherwise, it could be a sub-indication as in examples (In BREEAM Community: green infrastructure under social well- being and water strategy under resources and energy. And in LEED-ND: transportation demand management under the neighbourhood pattern and design, building energy efficiency under green infrastructure and buildings, and so on). The comparison refers to the disparity of the local issues among different countries and they are not equal for all.

## 4. Discussion

To conduct quantitative and qualitative analysis, urban indicators and issues have been identified, as shown in Table: 1, which covers the scope of the three assessment tools for the comparison among them. The indicators' importance varies in multiple assessment tools, some of them received high attention with the absolute possession of the highest rates and points weighting in the evaluation of urban sustainability. Others occupy low attention according to their importance in urban design [22]. However, all indicators depending on their importance as the main factor to formulate the sustainability assessment framework in urban design, which requires comprehensiveness of all the kinds of indicators.

The analysis of quantitative and qualitative indicators has great importance by giving more precise information about the importance of indicators and the extent of their success in the assessment. In addition to the possibility of determining compliance with the specified scope through analysis of their sub-indices, which reflect the total content of the indicator [11]. The indicators may not match the quality and quantity as it was designed in theory and in particular whether the number of main indicators has been reduced, which requires increasing the number of sub-indices to accommodate all aspects of indicators. Besides, to stand on the importance of quantitative and qualitative indicators, and not descriptive that could be shown in the technical manuals and user guide for each tool. Moreover, that will confirm the credibility of the linkage and the health of the relationship between the main and sub-indicators. Thus, this will contribute to the

delivery of the correct information to the public and those responsible for decision-making (Wedding and Crawford-Brown 2007). Hence, the results of the analysis may be volatile or sometimes contradictory. In general, for the sustainability assessment tools of urban design, this will give a different sequence of the importance of indicators. Furthermore, that what will be discovered when subduing the three tools for analysis depending on the three indicators for each tool in terms of its importance as a model for measurement. Moreover, according to the quantitative and qualitative indicators analysis the results are shown in Figures 1 and 2. Table: 1, contains 21 common urban indicators among the three global tools, depending on the three-dimensional core of sustainability (environment, society, and economy). As an attempt to reduce the overlap among dimensions, the new list of elected indicators identified by clarity, pluralism, and inclusiveness. Also, with an endeavour to introduce new indicators like community involvement, innovation, flexibility, and periodic review of the sustainability assessment during the various stages of urban design projects. The comparison as shown in Figures 1 and 2 indicate that the inconstancy is illustrated between indicators after the quantitative and qualitative analysis and as follows:

The first assessment tool BREAM Community (2012) is designed depending on the six main indicators, with a focus on three important indicators according to the order (social and economic wellbeing, resources and energy, and land use and ecology), while the quantitative analysis showed different results by focusing on the importance of (transportation /mobility, ecology, and community involvement) according to precedence, as well as qualitative analysis, which showed the first three indicators which topped the significance (ecology, transportation /mobility, and community involvement). This illustrates the disparity and inconstancy in the importance of indicators.

LEED-ND was composed of six indicators, with a focus on three most important (neighbourhood pattern and design, green infrastructure and buildings, and smart location and linkage), but the quantitative analysis showed three main indicators (transportation /mobility,

recourses and energy, and land used, land remediation and infrastructure) and qualitative analysis nominated (transportation /mobility, environmentally compatible design, and recourses and energy), which topped the importance of quality.

It was expected to occupy the fourth dimension (i.e., The Culture), who assumed utmost importance to the PEARL Community [18] whether by points weighting or at the level of quantitative and qualitative analysis. Unfortunately, this dimension has not been given gained adequate attention, while topped all of (resourceful energy, precious water, and liveable buildings) in the importance of indicators. , And in the quantitative analysis was (recourses and energy & water quality, waste management & materials management & transportation /mobility, and environmentally compatible design), while qualitative analysis has emerged from (water quality, recourses & and energy, and sustainable buildings) that are important indicators.

**Table 1:** The issues that have been covered with global sustainability assessment tools

| Urban development issues | The code |
|---|---|
| Ecology | I1 |
| Recourses and Energy | I2 |
| Water Quality | I3 |
| Air Quality and emissions | I4 |
| Waste Management | I5 |
| Natural Hazards | I6 |
| Land Used, Land Remediation & Infrastructure | I7 |
| Environmentally compatible design | I8 |
| Materials management | I9 |
| Transportation /Mobility | I10 |
| Sustainable Buildings | I11 |
| Urban Space | I12 |
| Services | I13 |
| Safety | I14 |
| Local community, Culture and Heritage | I15 |
| Comfort outdoor areas | I16 |
| Economic Impact | I17 |
| Business, Investment and Employment | I18 |
| Operation and Conservation for Long term | I19 |
| Community involvement | I20 |
| Flexibility and Innovation | I21 |

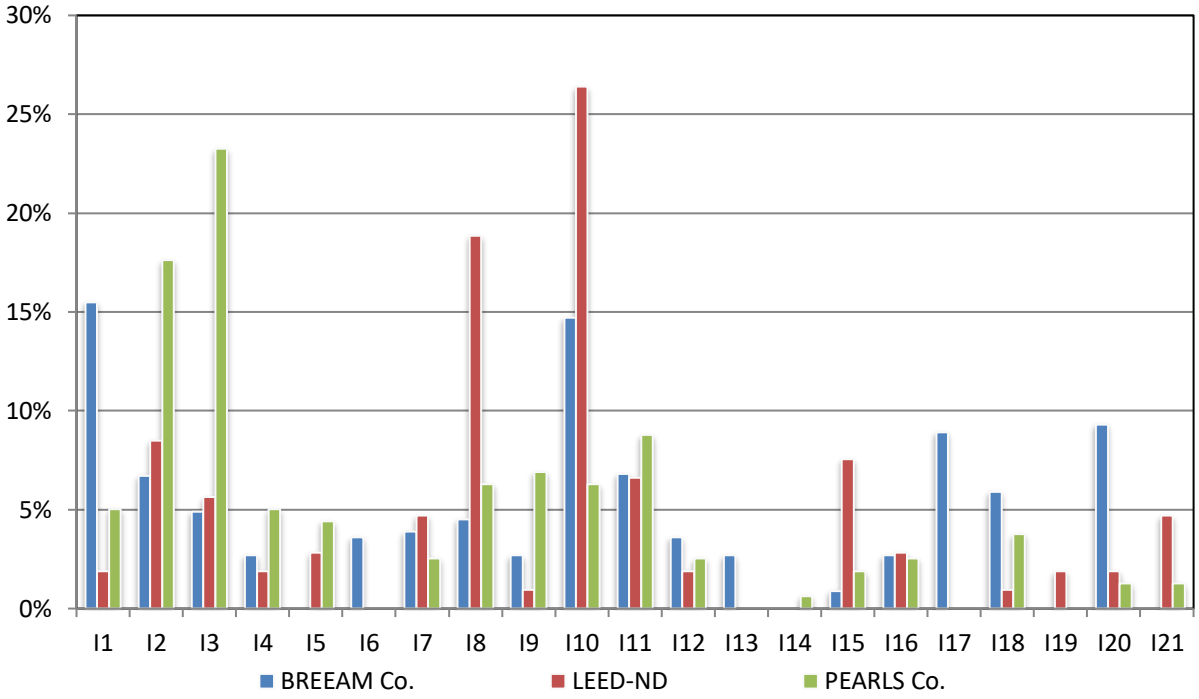


Figure 1: Qualitative comparison of indicators

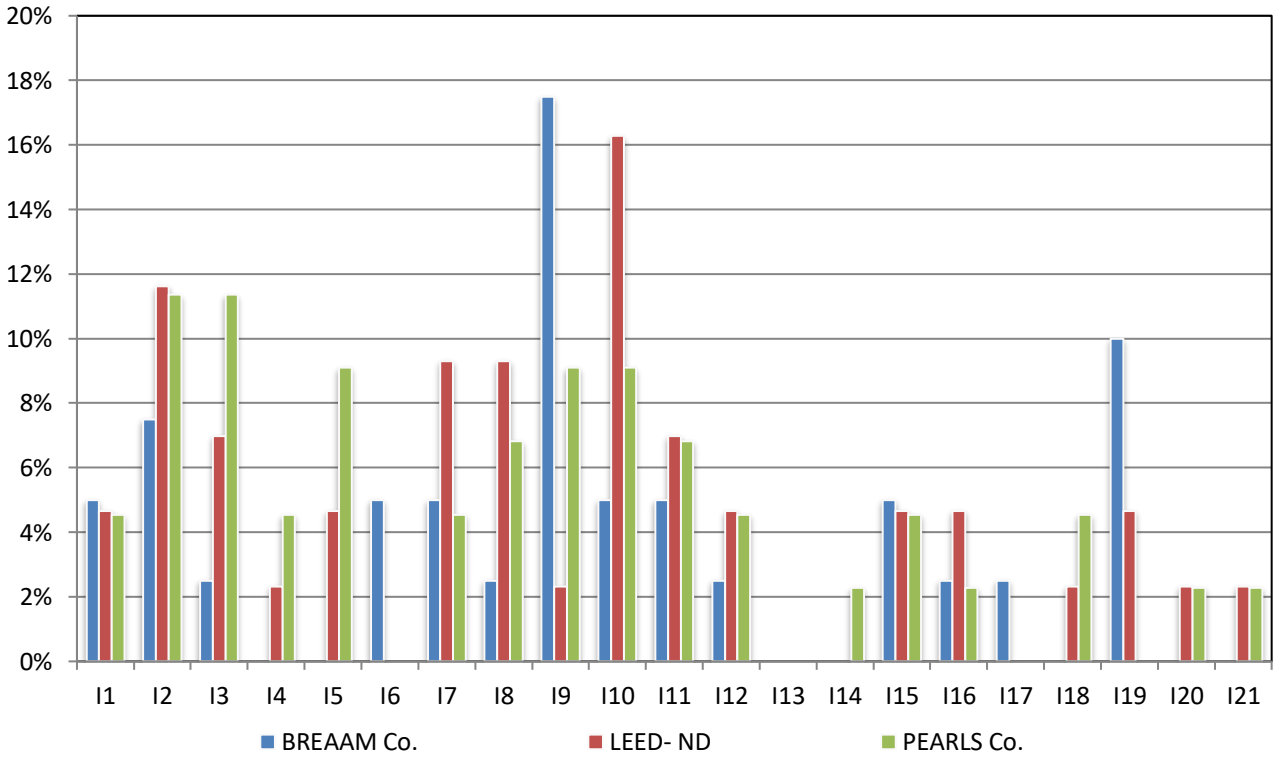


Figure 2: Quantitative comparison of indicators

## CONCLUSIONS

Many of the assessment tools are based on urban indicators as a basis in their work despite the different names sometimes (categories, aggregates or Neutral). Although there is no consensus of the ideal number about urban indicators, sub-indicators and types, as well as disparities in their priorities and importance within the different urban assessment tools. The main dimensions of sustainable represent the environment, society, and economy, as well as they consider the foundation line to define the indicators for an assessment tool. The indicators of international experiences that have widespread and highly experienced in sustainability assessment of urban planning, especially on a local context.

In addition to clarifying sorts, variety, importance and priorities of the urban indicators are clearly shown through the weighting ratios or the rating points depending on the type tool. At the same time, focusing on some indicators that present the main urban problems in these regions are in high demand. So, it can be concluded that the assessment tools of sustainability are specialized in local determinants without a global context. As well as, there is no viability to apply the global tools to assess the sustainability in urban design projects and the urban development in Iraq, because of the local urban problems are widely different and should be solved by using another tool or method. Hence, it can achieve a national/ local project to develop a local sustainability assessment tool of urban design in Iraq.

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