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# Prioritizing Requirements for Sustainable Affordable Housing in Iraq

**Dr. Sawsan Rasheed Mohammed**

**Assistant Professor**

**Department of Civil Engineering**

**Engineering College- Baghdad University**

**Ibtisam Abduljabbar Abdulridha**

**Principal Senior Engineer**

**Ministry of Construction and Housing**

## **Abstract**

The aim of this paper is highlighting the crucial issues that should be addressed when it is required to achieve sustainability through affordable housing projects. Thus, it is crucial to investigate the international frameworks for sustainable affordable housing from literature survey in order to understand the practices of sustainability within housing development affordability around the world to derive the criteria required for local priorities. A questionnaire was developed to determine and prioritize requirements for sustainable affordable housing for projects in Iraq. These requirements were categorized according to the three pillars of sustainable triple bottom line: social, environment, and economic. These requirements were prioritized for sustainable housing and found that the highest prioritized requirements are those which achieve balanced social, environment and economic pillars, while requirements with lower priorities were those of social pillar only.

**Keywords:** sustainable housing, affordability, TBL, urban design, performance, MoSCoW

## **1- Introduction**

The world commission on environment and development proposed, through Bruntland commission report developed in 1987, the outstanding and all around acknowledged definition about sustainability [15], through its definition of sustainable development. The definition is "fulfilling the necessities of the

present day without impacting the capacity of coming generations to fulfill their own necessities".

Concerning housing sustainability, The United Nations Conference on environment and development UNCED, 1992, identified a number of program areas to promote sustainable human settlement development, including providing

access to safe and healthy shelter [11].

Iraq now is considered a developing country, aimed towards sustainable development, this will urge various sectors to planning and working towards sustainability, and this requires follow frameworks and technical policies to promote sustainability in deferent sectors such as housing projects. Thus, it is often necessary to experiment with new programs that ought firstly to adopt prioritizing the requirements as per local social, economic and environment needs.

## 2. Definition of Sustainable Affordable Housing

First of all, it is important to define the scope of both affordability and sustainability of housing around the world. Investigations were conducted through literature, international programs for the common definitions of the two aspects of sustainable and affordable housing.

For the meaning of affordable housing, Abdullatif, M. and Alfortieh, S defined it as housing that seeks to provide shelter for a person does not seek for the term of own or rent, and it is not looking for housing and entertainment supplements that are not considered a target demanded for those who cannot find shelter to meet the

necessary requirements [1]. Stone E. described housing affordability as the relationship between people and their living space [10]. In the other side, Mulliner, E. and Maliene, V. urged that affordable housing is about a multi-dimensional issue more than financial aspect but stretches to bigger issues concerning social prosperity and sustainability [8].

Regarding the scope of sustainable housing, it should be in line with the definition of sustainable development acknowledged via Bruntland Commission Report in 1987, mentioned previously, in addition to all next Agendas of UN-HABITAT in years of 1992, 1996, till 2013 [15, 11, 12, 14], and the World Summit in 2002 [4]. One of the common international definitions of sustainable housing is as set by O'Leary, T. who described it as that the house that embraces the principles of lower environmental impacts through greater energy efficiency, lower energy demand, and using renewable energy resources [9].

While Golubchikov, O., and Badyina, A. put a wider scope for sustainable houses as those are executed for the following requirements [13]:

- 1) Affordable, healthy and durable for all levels of household



- incomes with safety and security;
- 2) Well connected to employment places, health and education services and markets;
  - 3) Provide affordable and safe facilities for energy and water with efficient using to reduce energy demand and carbon footprint;
  - 4) Be adapted and protected from climatic impacts and external pollutions, and potential natural disasters with no harm and pollution to the environment

### 3. Integration Frameworks for Criteria of Sustainable Affordable Housing

This section reviews the most relative tools and criteria that link sustainability within affordable housing development. From addressing these tools from literature survey, it is found that these tools can be categorized to three approaches for integration frameworks: indicators of the triple bottom line (TBL), urban design, and performance criteria. They will be illustrated as follows.

#### 3.1 TBL Framework

Arman, M. et al. suggested broad characteristics to reflect criteria for affordability under environmental, economic and social sustainability [2], as shown in **Table 1**.

**Table 1 Characteristics for affordability under TBL indicators. [2]**

TBL pillars	Characteristic of housing affordability
Social Sustainability	Improving the social integration, interaction and acceptance
Economical sustainability	Meeting financial obligations of both individuals and government on an ongoing basis
Environmental Sustainability	<ul style="list-style-type: none"> <li>- Selecting a site for maximizing low-energy transportation, and for minimizing the biodiversity losses</li> <li>- Energy efficiency through sun shading and passive solar design;</li> <li>- Water using efficiency;</li> <li>- Waste management through all stages of construction, occupation and demolition</li> </ul>

Ibem Eziyi O. and Azuh Dominic E. also adopted key criteria for affordable and sustainable housing grouped under economical, social and

1. Energy efficiency;
2. Construction materials and methods;
3. Affordability and safety;
4. Quality of place and life;
5. Health

environmental sustainability [5]. These key criteria are:

### 3.2 Sustainable Urban Design Approach

Johnson, M. and Heinz, H. argued that to improve access to affordable housing and sustainable communities, modeling has to be incorporated for decision methods through the following aspects [6]:

1. Space and opportunity: addressing housing location and its nearness to required public services;
2. Design: setting the development priorities for deferent housing types and land uses;
3. Choices: promoting alternative housing choices that balance deferent necessities and priorities.

This model can be noticed in United Kingdom (UK) which set a policy based around three themes: delivering wide choices of affordable housings to fulfill households' needs within sustainable communities, expanding choices for ownership with price ranges, and finally, providing higher quality and choices to those who rent [3].

Furthermore, Golubchikov, O., and Badyina, A. argued that spatial planning promotes energy efficiency and social interaction within housing developments in addition to climate attenuation [13]. For those goals, UN-Habitat put a Global Housing Strategy

Framework Document to integrate housing within planned sustainable city extensions or urban in-fills through the following actions [14]:

1. Identifying buildings density and organizing public transport, pedestrian routs and cycling facilities in order to limit urban sprawl and car-dependency;
2. Enhancing social inclusion and socio-spatial integration;
3. Enhancing the availability of social public services required for deferent social groups of people needs;
4. Providing green public spaces as a determined percentage of the total site area of housing development;
5. Establishing recycling stations and factories, and using design options for enhancing building materials recycling and reusing;
6. Providing infrastructure for energy renewable resources such as waste-to-energy technologies.

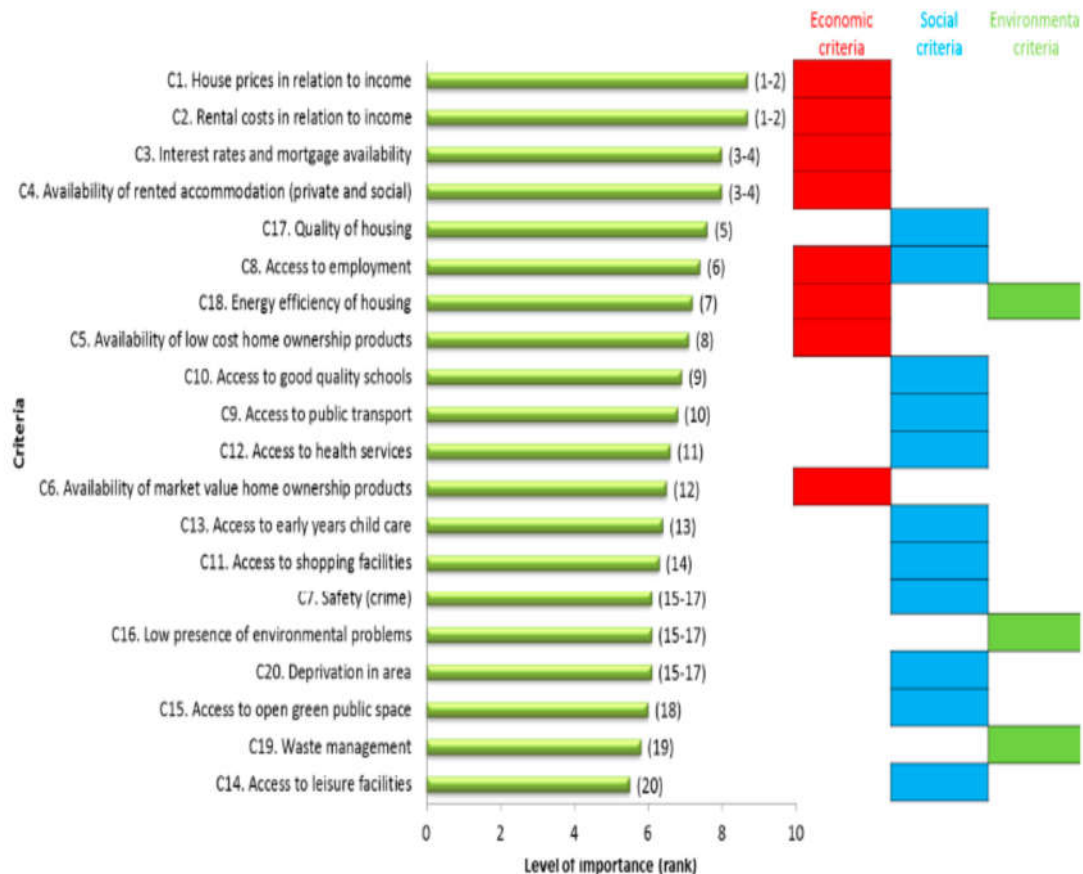
### 3.3 Performance Criteria Approach

Md Sani, N., and Munaaim, M. indicated the following six principles related to performance for sustainability to be applied to achieve housing affordability [7]:

1. Site selection to be nearby public transport and community services;
2. Indoor air quality with thermal comfort and sound prevention;

3. Energy Efficiency achieved by the optimum solutions for building ventilation, orientation and natural lighting, in addition to using renewable energy and promoting programs for effective maintenance;
4. Water efficiency achieved by water saving appliances, water recycling equipment and rainwater harvesting;
5. Efficient using of building materials and resources;
6. Innovative design

Also Mulliner, E. and Maliene, V. determined the importance of twenty criteria for sustainable housing affordability. **Figure 1** shows the most important criteria are the economic once related to home own prices and rental costs as related to households' income, in addition to availability of mortgage and interest rates and accommodation for renting [8].



**Fig. 1 Ranking of sustainable affordable housing criteria. [8]**

#### 4. Prioritizing the Housing Requirements for Iraqi Projects

Housing projects planning authorities and developers should have a whole recognition of the

right method for delivering and managing sustainable affordable housing preceding the planning process taken many considerations in advance. This would necessitate that housing requirements (HR) to be determined for local projects. And those were determined from investigating the most important and common requirements internationally, and locally through discussion with housing experts in Iraq, and these requirements will be tested through the questionnaire.

#### 4.1 Developing the Questionnaire

In this paper, a questionnaire was used as an instrument considers the experience of professionals to examine the themes of this paper in order to recognize the priorities of housing requirement in Iraq, and to find the highest pillar of sustainability that is focused on locally. These requirements were asked to be rated by respondents using the fifth scale to scoring the priority degree for them.

The questionnaire was delivered to professionals across all Iraq by using the technique of Google Drive to prepare and distribute the questionnaire and to receive the replied responses. Those professionals were choosing according to their sector of work, experience in housing sector, qualifications, and various disciplines ranging from planners, designers, managers, consultants, academics, legal and economists in addition to private investors. The questionnaire was distributed to 47 professionals, but only 41 responses were replied, this is considered the sample size. Initially the questionnaire asked for the background profile of the professionals as shown in **Figure 2**, which illustrates the working sectors ranging between public and private, and No. of experience years ranging from 16 years to more than 30 years which account for more than 52% of the total sample size of responses. While the qualifications ranged from PhD which accounts 35.50% of the sample size, in addition to MSc. accounts 24.85% and BSc. of 39.64%.



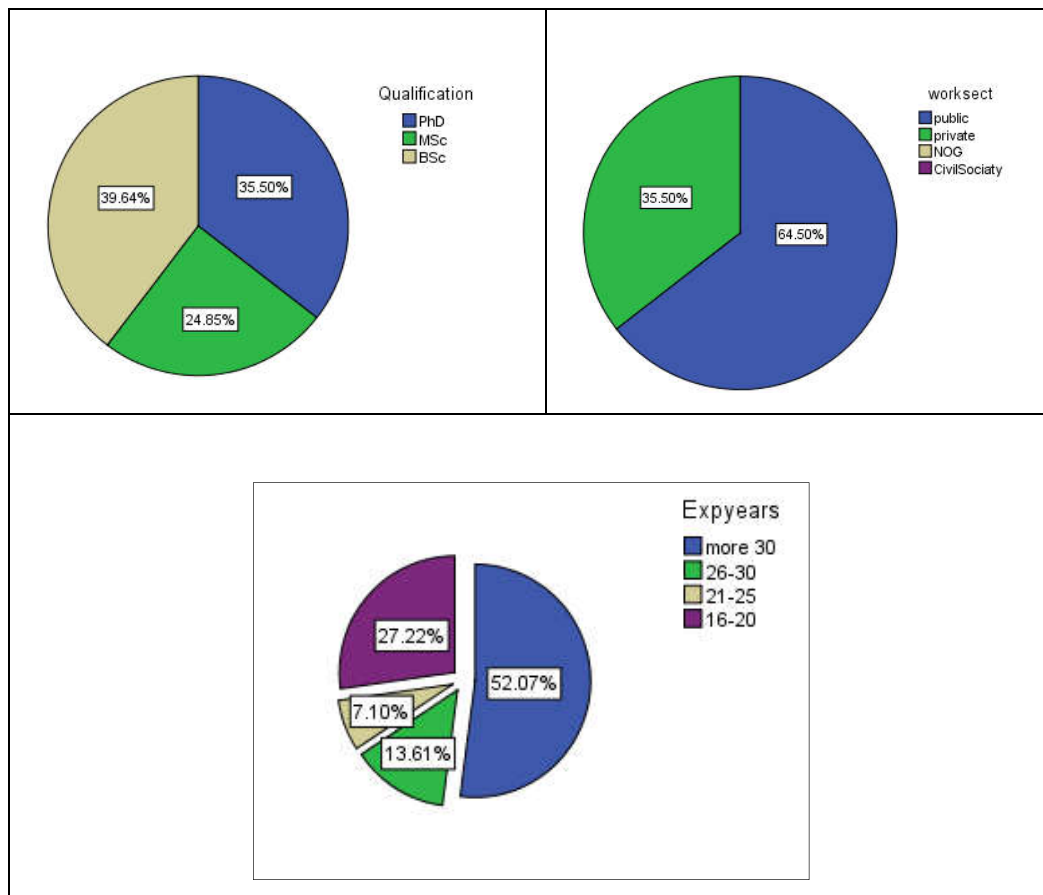


Fig. 2 Qualifications and work places of the respondents.

#### 4.2 Discussion the Results

Final set of HR were identified and categorized, as shown in **Table 2**, according to their impact on fulfilling the three main pillars of TBL: social, environment and

economic. The priorities stand on the calculation of the Arithmetic Mean (AM) and Standard Deviation (SD) for the scores which were indicated by the respondents.

**Table 2** HR with their three sustainability pillars.

Housing Requirements (HR)	AM score	Soc.	Env.	Econ.
<b>HR1:</b> House own or rent price in relation to income (i.e. do not exceed a percentage of incomes)	4.22			•
<b>HR2:</b> Availability of market affordable house for own or rent	4.37			•
<b>HR3:</b> Availability of choices for households (Tenure, size and type);	4.12	•		•

<b>HR4:</b> Legal security of tenure including rules and procedures for stability of rent value	<b>4.22</b>			•
<b>HR5:</b> Availability of services, and quality of infrastructures	<b>4.56</b>	•		•
<b>HR6:</b> Energy efficiency of home	<b>3.8</b>		•	•
<b>HR7:</b> Quality and habitability of home	<b>4.24</b>	•		
<b>HR8:</b> Availability of waste management facilities	<b>3.95</b>		•	
<b>HR9:</b> Low presence of environmental problems	<b>3.73</b>		•	
<b>HR10:</b> Natural resources consciousness, and usage efficiency of these resources	<b>3.61</b>		•	
<b>HR11:</b> Housing size, design and gender	<b>3.85</b>		•	
<b>HR12:</b> Resilience and flexibility into the future for varying and multiple needs	<b>3.61</b>	•		•
<b>HR13:</b> Social acceptance and sense of community	<b>3.54</b>	•		
<b>HR14:</b> Neighborhood Safety (non or very low crime levels)	<b>4.46</b>	•		
<b>HR15:</b> Access to employment places	<b>3.93</b>	•		•
<b>HR16:</b> Access to health services	<b>3.63</b>	•		
<b>HR17:</b> Access to and quality of schools	<b>3.78</b>	•		
<b>HR18:</b> Access to shopping facilities	<b>3.56</b>	•		
<b>HR19:</b> Access to child care	<b>3.59</b>	•		
<b>HR20:</b> Access to leisure facilities	<b>3.02</b>	•		
<b>HR21:</b> Access to public transport services	<b>3.95</b>	•		
<b>HR22:</b> Access to open green public space	<b>3.51</b>	•		

Prioritizing technique was used depending on four levels of Must, Should, Could and Would (MoSCoW). Thus, values of the four categories of this technique have to be determined. As shown in Table 3, the calculation depends on the highest and lowest values of the fifth scale that allocated for rating the responses of the questionnaire excluding the two lowest values of

the fifth scale which are (1 to 1.80 and 1.81 to 2.60) because the lowest score by respondents was with AM (3.02) which located within the third interval value. Calculations for MoSCoW prioritizing is ranging from lowest depended value of (2.60) to highest value of (5) divided into four classes of MoSCoW.



**Table 3 Calculating the values for MoSCoW categories.**

MoSCoW prioritizing	Range of value	HR
<b>Must</b>	<b>4.41-5.00</b>	HR5; HR14
<b>Should</b>	<b>3.81 - 4.40</b>	HR2; HR7; HR1; HR4; HR3; HR21; HR8; HR15; HR6; HR11
<b>Could</b>	<b>3.21 – 3.80</b>	HR17; HR9; HR16; HR12; HR10; HR19; HR18; HR13; HR22
<b>Would</b>	<b>2.60 – 3.20</b>	HR20

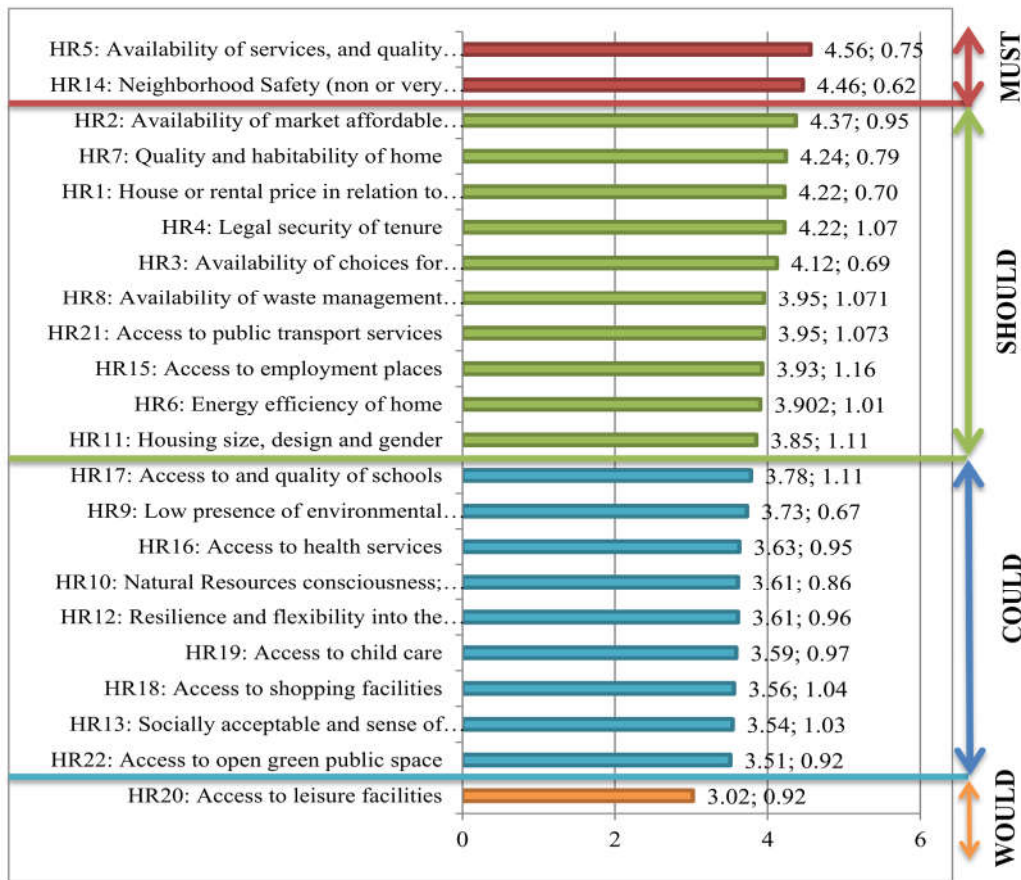
**Figure 3** shows the final results ordering the HRs according to their statistical values shown in Table 2 with identifying and categorizing them to "Must", "Should", "Could" and "Would" levels of MoSCoW technique are illustrated as follow:

1. **MUST** be achieved: means the basic HRs must be provided to people, that its presence does not have positive impact on people satisfaction, and the absence of them cause dissatisfaction.
2. **SHOULD** if possible: people are satisfied if the HR is provided. These HRs means the higher quality level of housing and higher degree of satisfaction.
3. **COULD**: that means providing attractive HR which makes the housing project as excitement.

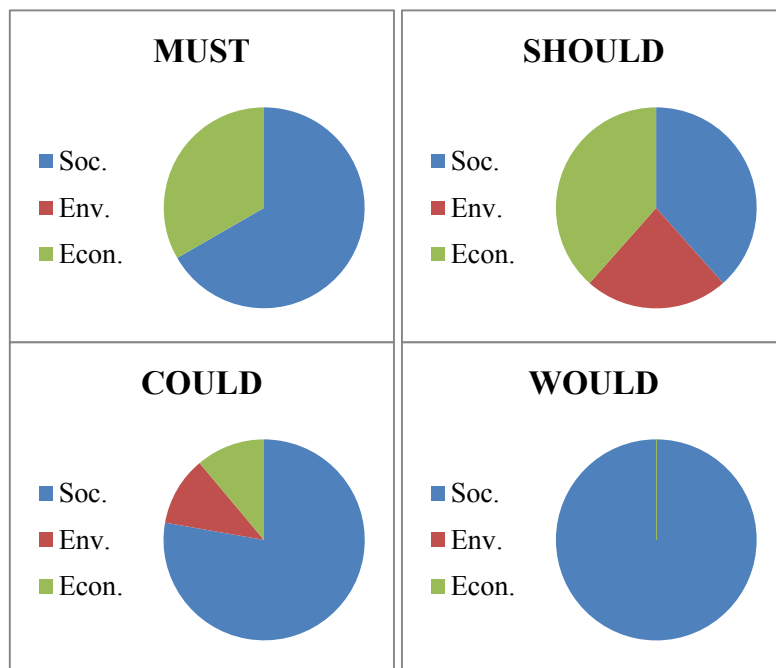
The presence of these HRs result in people satisfaction while deficiency does not lead to dissatisfaction since people have not usually demand these HR.

4. **WOULD**: Regardless of providing this HR or not, it does not lead to satisfaction or dissatisfaction of people with the housing project.

Furthermore, **Figure 4** shows the MoSCoW priorities according to TBL pillars. As it is noted, the "Must" HRs were of social and economic priorities, while HRs with "Should" priority are of balanced social, environment and economic requirements. In the other side, both "Could" and "Would" are for preferring social requirements.



**Fig.3 Prioritizing HR according to MoSCoW technique. [Res.]**  
**Note: values as presented indicate AM; SD.**



**Fig.4 MoSCoW priorities according to TBL of social, environment and economic.**



## 5. Conclusions

This paper pointed out a wide range of criteria and benefits ought to be used to realize and assess the affordability and sustainability of housings that would lead to deeper and faster solutions for housing problems. This requires a deferent way of envisioning housing affordability and sustainability, as more than just the price of a house and land.

Although there are no universal solutions, this paper reviewed the common strategies and integration frameworks to promote the affordability of sustainable housing while the issue of affordability and sustainable housing construction is still a complicated. In general, the concept of sustainable housing commonly is approaching to be equivalent to just an environment issue, but this would make sustainability almost a framework, dealing with not more than achieving performance of environment and precisely a matter of energy efficiency. But prioritizing the housing requirements locally showed that three pillars: social, economic and environment must and should be fulfilling firstly such as providing the infrastructure and quality of services and waste management as well as energy efficiency inside the home. While the rest of social

requirements such as access to the social services such as schools, shopping facilities and leisure facilities could and would be fulfilling later.

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## تحديد اولويات متطلبات الاسكان المستدام الميسر في العراق

د. سوسن رشيد محمد

استاذ مساعد

قسم الهندسة المدنية

كلية الهندسة-جامعة بغداد

ابتسام عبد الجبار عبد الرضا

رئيس مهندسين اقدم

وزارة الاعمار والاسكان

### الخلاصة

يهدف البحث الى تسليط الضوء على القضايا الحرجة التي ينبغي معالجتها عندما تكون مطلوبة لتحقيق الاستدامة من خلال مشاريع الإسكان الميسر. وبالتالي، من الأهمية بمكان التحري في الأطر الدولية للإسكان المستدام الميسر من خلال تقصي الدراسات والبحوث من أجل فهم ممارسات الاستدامة ضمن مشاريع تطوير السكن الميسر في جميع أنحاء العالم لاستخلاص المعايير المطلوبة حسب أولويات المتطلبات المحلية. وقد طور البحث استبياناً لتحديد الاحتياجات للإسكان المستدام الميسر للمشاريع في العراق وتحديد أولوياتها، كما تم تصنيفها تبعاً للقاعدة الثلاثية للاستدامة: الاجتماعية والبيئية والاقتصادية. هذه المتطلبات تم تحديد أولوياتها ووجد أن المتطلبات الاعلى اولوية هي التي تحقق توازن المحاور الثلاث للاستدامة الاجتماعية والاقتصادية والبيئية، في حين كانت المتطلبات الاقل اولوية هي متطلبات تقع ضمن المحور الاجتماعية فقط.

الكلمات المفتاحية: السكن المستدام، القدرة على تحمل التكاليف، الخط القاعدي الثلاثي للاستدامة، التصميم الحضري، الأداء، تقنية MoSCoW