TECHNIUM
SOCIAL SCIENCES JOURNAL

Vol. 38, 2022

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www.techniumscience.com

ISSN 2668-7798

TECHNIUM SOCIAL SCIENCES JOURNAL

Technium Social Sciences Journal
Vol. 38, 895-902, December, 2022
ISSN: 2668-7798
www.techniumscience.com

Urban sustainability assessment of development and urbanization tools Case study of land occupancy plan No. 08 in the city of Ain Khadra, Algeria

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Abstract. Urban sustainability has become a prominent element in the discussion of urban policies and the expression of sustainability policy in planning and urban development decisions, as society has become more aware of the consequences of reckless urban development decisions, as well as the need to protect the environment from deterioration due to economic growth and irrational consumption of resources, as urban sustainability is seen as the main tool for this protection. In this context, this research paper aims to present a vision that leads to an attempt to arrive at an assessment of urban sustainability in development and reconstruction tools in Algeria through a case study of land occupation plan No. 08 in the city of Ain Khadra.. In view of the nature of our research, which is concerned with sustainability and its practices, policies and concepts in the world and at the national level, which by nature contain qualitative and quantitative data, and therefore we will use the integrated (mixed) research method as a method through which to measure. We will use the most famous American system LEED-ND to measure the sustainability of development and development tools, because it contains many mandatory requirements and accreditations. The results of the research will determine the extent to which the latter responds to urban sustainability standards in Algeria, which will help in the future in addressing future urban development.

Keywords. Sustainability, LEED-ND Rating System, Land occupancy plan No. 08

I. Introduction

At the beginning of the 21st century, Algeria began to commit to sustainable development as a global trend, especially after the 1992 Earth Summit, which opened new perspectives and knowledge to improve the quality of life in the city, including ecological, cultural, institutional, social and economic life. (Larouq, 2008)

Where it issued many laws related to the preparation of the region and sustainable development, the most prominent of which was the city's directive law No. (06/06)(Benammar, 2001) (City Law) and it strengthened it with other tools (PNAE-DD, SDAA) and many studies were initiated at the national and local levels (network study The National Cities Plan, the Urban Harmony Plan, the National Urban Social Card for Cities, the Urban Real Estate Card, and

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Vol. 38, 895-902, December, 2022
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others, but the content and scope of these studies have not yet been defined clearly and specifically, which often leads to duplication of powers and the production of conflicting systems and difficulties in management. (Saoudi, 2019)

This article discusses urban sustainability, which has become a prominent element in urban policy discussion and the expression of sustainability policy in urban planning and development decisions, by evaluating it in Land Occupation Plan No. 08 in the city of Messila, using the Leadership in Energy and Environmental Design (LEED) evaluation system for development. Neighborhoods, which is the first standard in evaluating and designing sustainable neighborhoods. (LEED-ND)

Methodology

Indicators are quantitative information that helps explain how phenomena change with time. In order to manage sustainability, sustainability goals have been set in a clear and measurable way, so they should be constantly reviewed and corrected. The level of implementation of these goals can be measured using sustainability indicators, that is, standards that can be measured and determined, as well as Values and trends that show the evolution of the environmental, economic and social stability of a particular area(Ciegis et al. 2009)

There are many evaluation systems in the world such as (**GPI** Real Progress Index, Sustainable Society Index **SSI**, City Development Index **CDI**, Environmental Footprint **EF**, Green City Index **GCI**, and Environmental Performance Index **EPI**), but some of them do not measure all three dimensions of sustainability, i.e. the economic, social and environmental dimensions(Huang et al. 2015)

LEED-ND (Leadership in Energy and Environmental Design for Neighborhood Development) was chosen to evaluate urban sustainability, the American system for measuring neighborhood sustainability. It is the most famous system in the world, and contains many mandatory requirements and accreditations. Points are awarded in it and compared with ratings. The various certificates obtained give a clear picture of the sustainability of the neighborhood and its weaknesses and strengths**Leadership in Energy and Environmental Design (LEED-ND) rating system for neighborhood development**

The LEED system was developed by the US Green Building Authority USGBC and this system is considered the main mechanism in promoting sustainable design and implementation since 1994 until now. and maintenance down to sustainable homes and neighborhoods And LEED is an acronym for Leadership in Energy and Environmental Design, meaning leadership in environmental and energy design. This system is voluntary and non-binding. LEED has been applied as a building evaluation system in more than 135 countries worldwide. This is due to the continuous development of LEED systems and a LEED certificate is awarded to a building Or a dwelling or an urban community that is designed and built according to building systems whose primary objective is to achieve the highest performance efficiency in terms of energy and the environment, through the development of a sustainable building site, the preservation of resources and water, as well as energy efficiency, design efficiency and the internal environment

The LEED-ND rating system for Leadership in Energy and Environmental Design for Neighborhood Development is the premier standard in evaluating and designing sustainable neighborhoods. LEED-ND projects encourage the protection and promotion of public health, the natural environment, resource conservation and the quality of life of local communities, and encourage Designing neighborhoods that reduce car dependence and provide jobs and services that are accessible on foot, on bicycles, or by using public transportation

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1. Types of LEED rating systems:

The LEED rating systems are flexible and specialized, and the accredited systems are nine types as in (Figure 02)

Figure 1: Types of LEED systems
Source: LEED-ND 2009

2.LEED-ND Rating System Criteria: (LEED-ND 2009)

The LEED-ND system contains five basic standards, and each standard has requirements that must be met and credits for which points are earned

3-1- Smart Location and Linkage (SLL) 27 points:

Encourages development within and near existing communities and public transportation infrastructure, improvement and redevelopment of existing cities, and suburbs, while limiting expansion and minimizing vehicle trips and miles traveled

3-2- Neighborhood Pattern and Design (NPD) 44 points:

Encourages optimal strategies for commuting in communities such as easy access to streets, neighborhoods, and public spaces, reduced reliance on cars, and community participation in design

3-3-Green Infrastructure and Buildings (GIB)29 points

Environmental performance will not be excellent without a thoughtful and innovative plan for green design, including strategies such as integrating energy and water, efficient use of old buildings, recycling materials and eliminating sources of pollution

3-4-Innovation In Design (ID) 06 points

It aims to encourage the implementation and exemplary performance of LEED requirements, innovative performance in green building design and smart growth

3-5-Regional Priority (RP) 04 points

Promote geographically specific environmental strategies, social justice, and public health priorities

4-Structuring the LEED ND Rating System:

For each category, classification criteria (domain), prerequisites, and Credits are as follows

4-1-prerequisites: Achieving the mandatory conditions does not give points to the project, but achieving them is a mandatory condition for obtaining the classification and

Technium Social Sciences Journal
Vol. 38, 895-902, December, 2022
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www.techniumscience.com

certification by LEED, and failure to meet the mandatory conditions deprives the project of classification

4-2-Credits: Each sustainable category contains a set of accreditation points that define in detail the sustainable goals. The project is not supposed to achieve all accreditation points, but must achieve sufficient accreditation points to obtain the required arrangement (certified, silver, gold and platinum). Each accreditation point or mandatory requirement within the assessment system contains the following information

4-3-Intents:

Explains the sustainable goals behind the mandatory requirements or accreditation point

4-4-Requirements: Describes the requirements that a team must meet in order to obtain the required points or meet the mandatory requirement (LEED-ND 2009; US Green Building Council 2014)

5-Obtaining a LEED-ND certificate:

The LEED-ND evaluation system is based on a scale of 100 points plus ten additional points. LEED-ND certificates are divided into four levels:

- LEED-ND certified: **40 - 49** points
- LEED-ND Silver: **50 - 59** points
- LEED-ND Gold: **60 - 79** points.
- LEED-ND Platinum: **80 - 100** points.

To obtain the LEED-ND certification, the project must fulfil the following conditions:

- Achieving the minimum requirements of the evaluation program
- Fulfilment of all mandatory conditions.
- Achieving the total points required for the certificate level by achieving accreditation points (LEED-ND 2009; US Green Building Council 2014)

After collecting the necessary data on the neighborhood of 400 dwellings, which were collected from the field through the assistance of the students of the Institute for the Management of Urban Technologies at the University of M'sila, we tried to provide the maximum amount of information so that the results would be accurate and by using the Excel program, fill in the fields with the points obtained, while first making sure that the mandatory conditions are met. (The program is available on the website)

http://www.usgbc.org/ShowFile.aspx?DocumentID=6407

5-Evaluation method:

The system is an Excel program, where information about the name of the neighborhood or urban complex is initially entered, and then the neighborhood is evaluated by giving scores to the existing indicators, which change according to the program. To obtain LEED-ND, you must first ensure that the project or neighborhood meets the 11 mandatory conditions. The neighborhood is then evaluated according to the credits, which are estimated at 50 credits. Points are awarded according to the percentage of achieving accreditation in the district, and usually range from half a point to three points for each indicator. Then the program calculates for you the number of points and certificate you obtained or the neighborhood is out of the classification

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II. Study area

The study area is located in the middle of the city of Ain Al-Khadra, and it is considered the urban center of the city, as it includes most of the public and private facilities. It is bordered to the north by the village of Al-Sawaleh, to the south by the village of Awlad Othman, to the east by Land Occupation Plan No. 04, and to the west by Land Occupation Plan No. 09, occupying an area of 23.8 square meters per square meter.

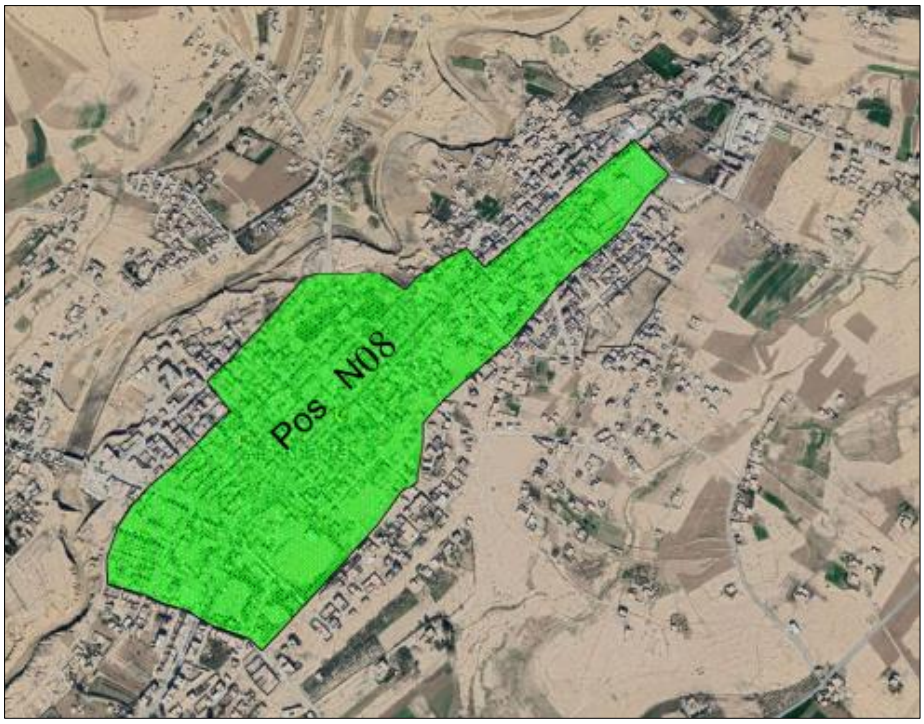

Figure 1 - Location of the study area
Source: Authors, 2022.

III. Land plan evaluation results No. 08

Table No. 1 shows the results of implementing the LEED-ND standards system in the neighborhood of 400 dwellings in the city of M'sila

Table 1- Evaluation of land occupancy plan No. 08 according to LEED-ND standards

LEED-ND Rating Standards	LEED-ND standards score	land occupancy plan No. 08 in the city of Ain Al-Khadra
Smart Location and Linkage**(SLL)**	27	9
Neighborhood Pattern and Design**(NPD)**	44	5
Green Infrastructure and Buildings **(GIB)**	29	17
Innovation In Design**(ID)**	6	0
Regional Priority**(RP)**	4	0

Technium Social Sciences Journal
Vol. 38, 895-902, December, 2022
ISSN: 2668-7798
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Total	**110**	**31**

Source: Authors based on available LEED-ND program at www.usgbc.org

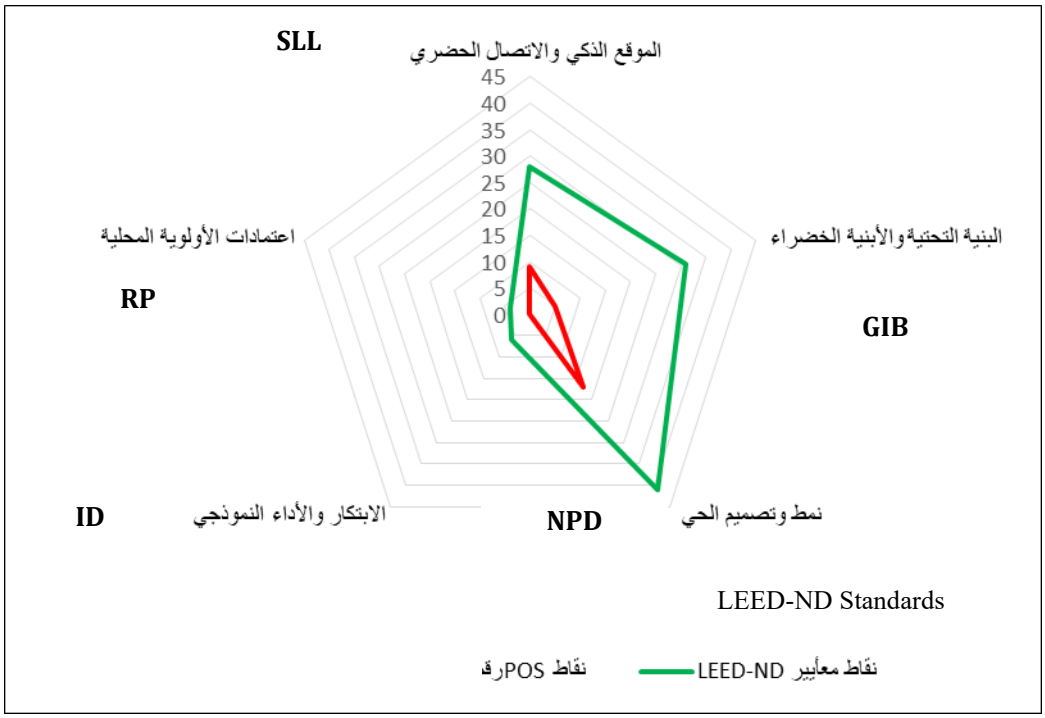

Figure 2: Evaluation of land occupancy plan No. 08 according to LEED-ND standards

IV. Discussion

From the results obtained in Table 1, we note that the occupation plan for land No. 08 lacks sustainability standards and does not meet most of the mandatory conditions. As for the points, it gets 31 points and is therefore out of the classification. We also note that the best performance was in the style and design of the urban complex, as well as an average performance in the availability of pedestrian paths and encouraging optimal strategies for movement in societies, such as the ease of walking in various streets and small neighborhoods. public spaces, reduced reliance on cars, and community participation in design As for the weak performance, it was in the green structure and green building, which focuses on the use of renewable energies, energy efficiency, pollution protection, waste management, and the efficient use of old buildings. As for innovation, It is innovative performance in green building design, smart growth, and exemplary performance of the requirements of the LEED-ND system. We find that the occupancy plan for land No. 08, which includes it, lacks such innovations, and even in terms of completion, there are no environmental performance or innovation standards. As for the local priority, which means encouraging geographically specific environmental strategies and priorities of social justice and public health, it does not exist for all regions of the country, as there are no local strategies or policies

Conclusion

Based on what was previously discussed in the attempt to reconcile urban policy in Algeria with indicators of sustainable development, especially in its urban aspect, and through this study, which dealt with the evaluation of the occupation plan for land No. 08 in the city of

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Ain El Khadra using the LEED-ND system, the study concluded that the Algerian city suffers from a defect Functional and administrative, a large part of which is due to the absence of a coordinating policy for urban development (especially in mass production). The amount of group housing in response to the large demand). This imbalance includes all procedures in the urban field in terms of aspects of planning, implementation, management and control. At all spatial and temporal levels The absence of a local policy for urban development in the social, economic and environmental fields, which defines stakes and development goals in the medium and long term, in addition to the absence of an approach to strategic programming that responds to stakes and specific goals, with the absence of a holistic vision of the environmental system in the urban centre in the planning projects

- Despite the issuance of many laws in the field of sustainability and the establishment of many institutions, as we have seen, the urban sector is still the largest absentee from sustainability, as the plans have not been replaced or modified to respond to the goals of sustainability. Thus, we find that the laws of sustainability have not been activated because the mechanisms and executive tools at the urban level are still operating according to the old plans. Although all cities in the world have adopted policies for sustainable, smart, ecological and green cities, these initiatives are few if not non-existent in Algeria at the city level.
- When evaluating the plan to occupy land No. 08 in the city of Ain Khadra in Algeria using the LEED-ND sustainability assessment system, we found that the plan did not achieve the minimum requirements for sustainability, especially economic and environmental, the use of renewable energies and energy efficiency, sustainable water management, the use of sustainable and local materials, and waste recycling. The availability of public transportation, pedestrian and bicycle paths, the availability of green spaces, sufficient afforestation and entertainment venues, innovation and creativity in building design and neighborhood planning Citizen participation in the design and planning process of the neighborhood and also in its management, modern and smart management and neighborhoods (the use of modern technologies in the management and administration). Therefore, it is necessary to think about other tools that achieve sustainability by all standards, even if gradually. This means that the overall performance is almost weak in all indicators that cover most of the sustainability standards in neighborhoods. Therefore, it is necessary to reconsider planning and construction tools, whether at the level of planning, design, or implementation. So that our neighborhoods are sustainable, healthy, and safe, and that residents feel a sense of belonging while enhancing their participation in urban decision-making related to their environment, in addition to protecting our natural resources and preserving the environment. Urban plans in their current form do not respond at all to sustainability standards, and therefore we must rethink new methods that respond to environmental goals and achieve sustainability.y for neighborhoods in Algeria

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