

DOI: 10.21625/archive.v3i1.437

Sustainable Neighborhoods in Arab world; a Path Towards Sustainability

The Case of the Sustainable City in Dubai

Samah M. El-khateeb¹¹*Ain Shams University, Faculty of Engineering - Effat University, College of Architecture & Design*

Abstract

In the last years, the world has jumped rapidly towards more urbanisation, and for the first time in the history in 2008 urban population exceeded the rural population. By 2050, it is expected that two-thirds of the world population will live in urban areas. As a result of this rapid urbanisation worldwide, Sustainable Neighbourhoods SN emerged as a significant formation of cities that help in achieving sustainable development. The 2030 Agenda for Sustainable Development included this sustainability aim through the Sustainable Development Goal 11. This goal aims to “make cities and human settlements inclusive, safe, resilient and sustainable.” The Sustainable City in Dubai is located in the United Arab Emirates, the development and construction started in 2014, and 95% of the site was completed in mid of 2016. The development of the Sustainable City shows that the occupation residents will have many incentives to buy a villa and live in the city such as free rooftop solar systems, open landscaped gardens, free Green Star rated home appliances, zero net maintenance fees, and zero net service charges. Additionally, the sustainable city in Dubai is an educational hub for sustainable design. It sponsored many students through its agreements with different universities and research labs. This research aims to understand the case of the sustainable city in Dubai as an Example of SN in the Arab world. The research will start with a literature review that identifies all related terminologies to SN, besides a comprehensive analysis of some fundamental principles of SN design. A case study analysis will be done including; site visit, and applying one of the principles of SN on the sustainable city in Dubai to understand and explore the sustainability principles in it.

© 2019 The Authors. Published by IEREK press. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords

Sustainability; Sustainable Neighbourhood; Arab World

1. Introduction

Neighborhoods are considered residential areas with distinct identity with visible barriers or transition areas. These barriers or transition areas can be railway lines, highways, parks, and the age or character of buildings. The typical size of neighbourhoods is 4,000–5,000 that include a primary school and local shops. In meaning, Sustainability means how to sustain, maintain, support, or endure. In the 1980s, the concept became concerned with how human being can sustain on earth. This concept became the basis of the concept Sustainable Development (Kuhlman and Farrington, 2010). According to Tom Kuhlman and John, Farrington development can be considered as a

multidimensional approach that seeks to achieve for all people a higher quality of life. In 1987, Brundtland Commission Report presented the concept of Sustainable Development. Sustainable Development is: "Development which meets the needs of current generations without compromising the ability of future generations to meet their own needs." The primary goal of Sustainable Development is the long-term stability of the economy and environment, which can achieve through the integration of the three principles of sustainability, throughout the process of decision-making (Emas, 2015).

2. Paper Methodology:

The research methodology is a case study research method that combines qualitative and quantitative techniques. The qualitative approach, by a site visit, site observation and data collection about the site. The quantitative approach through applying one of the SN principles that adopt qualitative and quantitative measurements in it. The research will start with the literature review that illustrates the concept of Sustainability, Neighbourhoods and Sustainable Neighbourhoods Development Principles. Followed by case study analysis and ended with conclusion and results.

3. Literature Review

3.1. Sustainability and Sustainable Development

The world has changed, and many people moved from rural areas to cities as well as transferred from one country to other, depending on the fast economic growth which is connected with the extendable of industrial and commercial regions around the world. This conditions, excessive consumption of material and energy resources, instability in social and cultural values and social separation on a global level. Consequently, these processes of development have directly affected by environmental & economic qualities, and social values, as well as the risks of global environmental and human health conditions, is being increased (Weiland 2006). Traditionally, the preliminary focus of sustainable development has been on the issue of environmental humiliation. Therefore,; environmental concerns have the foundation of sustainable development. While, during the twenty century, the concept of sustainable development has developed and its interconnection to economic and social elements of development increased. Correspondingly, sustainable development is an interaction between environment, economic, and social sustainability. However, there is a reality that if sustainable development wants to have future must be able to attract people and appearance in their feelings and behaviours as well as adjusted their values (Packalén 2010; Nurse 2006; Duxbury 2001). Apparently, fast economic growth and social migration and immigration are combined with lacking housing, and these threaten the concept of sustainable development and raise the needs for future sustainable cities and neighborhoods.

3.2. Neighborhoods and Sustainable Neighborhoods:

Neighborhoods are the place for connections of social, economic, physical and environmental factors. The term neighborhood defined from the different point of views; psychological, social, mental, perceiving, architectural (physical) and political aspects. Therefore, there are various methodologies to apply sustainable development to neighborhoods. Thus, from the perspective of sustainable neighborhood design, an overall understanding of the implication of sustainable development is to make a balance between social, economic and environmental requirements and link them with urban development procedures (Blum and Grant, 2006; Al-Hagla, 2008). Environmental, Economic, and Social are the key principles of Sustainable Neighborhoods development (Emas, 2015). Environmental Sustainability is to maintain a stable resource base to avoid over-use of renewable resource systems.

3.3. Sustainable Neighborhood Principles and Approaches

Many approaches have been adopted internationally and locally to achieve sustainable neighborhood design; the next part will illustrate some of these approaches.

3.3.1. LEED for Neighborhood Development

The concept of designing sustainable neighborhoods as a practice is relatively new. The initial rating system to pursue the concept of sustainable neighborhood development is LEED for Neighborhood Development in 2009. Leadership in Energy and Environmental Design (LEED) for Neighborhoods Development, presented by U.S Green Building Council, is considered the first official and internationally spread design approach of sustainable neighborhoods. This rating system is considered a pilot one as its aims to reduce human impacts on the environment by promoting smart growth principles (Fitani, 2016). LEED-ND adapted the principle of Clarence Perry of Neighborhood Unit and the New Urbanism design principles with the consideration of Jane Jacobs's milestone opposition (Congress for the New Urbanism et al., 2009). In brief, LEED for Neighborhood Development concludes its most essential principles as: "LEED for Neighborhood Development highlights the importance of creating a sustainable city which is, compact, walkable, vibrant, mixed-use neighborhood with a reliable connection to nearby communities. (Ioser, 2009). In addition to neighborhood morphology, pedestrian scale, and a mix of uses, the rating system also emphasises the location of the neighborhood and the performance of the infrastructure and buildings within it. (LEED-NB, 2009).

LEED rating systems have faced criticism from experts in the field. One professional opinion on LEED rating systems is the well-known architect Frank Gehry. Frank Gehry found that LEED rating systems are complicated in the eyes of people, and they just don't need it. Further, he claims that each area or country should set its provisions and rules that suits them. LEED-ND rating system believes that: "The rating system should therefore not be considered a one-size-fits-all policy tool" (LEED-ND, 2009). Also, LEED rating systems were accused of being more environmentally oriented abbreviating socio-cultural aspects of designed neighbourhoods. "However, most of the current assessment tools focus on environmental aspects such as energy, landscape, resources, emissions and the indoor environment quality" (Banani, 2011) (Fitani, 2016).

3.3.2. Regional Rating Systems

Recently, responding to the accusations facing LEED rating systems; many attempts to create rating systems and evaluation assessments targeting sustainability have appeared. Two conventional regional approaches are QSAS – Qatar Sustainability Assessment System developed by the University of Pennsylvania in collaboration with the Gulf Organization for Research and Development GORD, as well as, Estidama Pearl Rating System by Abu Dhabi Urban Planning Council (Estidama, 2010). Both Qatar Sustainability Assessment System and Estidama Pearl Rating System are aiming to address sustainability for their countries. QSAS implemented credits targeting local environment and culture of Qatar (QSAS, 2010). Pearl Rating System has added a new principle to sustainability principles which are culture (Estidama, 2010). Both of the regional rating systems have combined the two dimensions culture and climate. In Egypt, the green pyramids rating system initiated last year but till now it is not applied to real projects, and LEED is the rating system that is applied in many Arab countries (Fitani, 2016). Addition to the two mentioned rating system, another rating system which is the Egyptian Green building rating system which was initiated in 2009 in Egypt. This rating system was completed by the end of 2011 but not yet implemented.

3.3.3. Circles of Sustainability

One approach emerged officially in 2014 as a response to the issues of abbreviating socio-cultural aspects in sustainable neighbourhood development and continues change of socio-cultural elements is, Circles of Sustainability.

This approach contains both qualitative and quantitative indicators to achieve sustainability and resilience along different contexts of an organisation, community or city. It investigates community's problems by providing a conceptual, technological framework and guideline tool. This framework and guideline tool is a learning acting device to guide incorporating social aspects in the development process. Circles of sustainability laid four most important principles of sustainability which are; ecological, economic, political and cultural. (James et al., 2015)



Figure 1. principles of circles of sustainability adopted by (James et al., 2015)

3.3.4. A New Strategy of Sustainable Neighborhood Planning by UN-Habitat: the Five Principles

UN-Habitat established a new approach that enhances current sustainable urban planning theories to help develop a viable interrelationship between urban dwellers and urban space and to increase the value of the land. This approach built on five principles that support the three key features of sustainable neighborhoods and cities: compact, integrated, connected.

The Five Principles are;

Principle one is; create adequate space for streets and an efficient street network. The street network should occupy at least 30 percent of the land and at least 18 km of street length per km². The aim of the principle one is to; develop an adequate level of the street network that works for vehicles and public transport and also seeks to attract pedestrians and cyclists. It includes a street hierarchy, arterial routes and local streets serving the different traffic speed. The street network shapes the urban structure which, in turn, sets the pattern of development blocks, roads, buildings, open spaces, and landscape. Principle 1 presents the material basis for sustainable urban development

Principle two is; High density; at least 15,000 people per km², that is 150 people/ha or 61 people/acre. The aim of the principle two is; Principle 2 presents the growth of population and response directly to the explosion of global population and rapid urbanisation to avoid urban sprawl and promote sustainable urban extension, it is necessary to reach high density, which is the base of a sustainable neighborhood. High density means a people and their activities concentration.

Principle three is; Mixed land-use, at least 40 percent of floor space should be allocated for economical use in any neighborhood. The aim of the principle three is; Principle 3 aimed to develop a compatible activities range, and land uses close together in proper locations and more flexible to adapt changing market over the time. The purpose of mixed land-use is to provide local jobs, encourage the local economy, minimise car dependency, encourage pedestrian and cyclist traffic, decrease landscape fragmentation, and provide closer public services and support mixed communities. Mixed land-use could be applied at various spatial levels: city, neighborhoods, blocks, and buildings. Principle 3 focuses on the neighborhood and block level.

Principle Four is; Social mix; provide houses in a different range of prices to accommodate various levels of income. Almost 20% to 50% of the total residential floor area should be low-cost housing. Additionally, each tenure type should not exceed 50% of the total. The aim of the principle Four is; Principle 4 seeks to promote the cohesion of an interaction between a variety of social classes in the same community and to ensure accessibility to the fair urban opportunities by providing various types of housing. The social mix provides the basis for social

networks to be healthy, which, in turn, is the driving force of city life.

Principle Five is; Limited land-use specialisation, the aim is to limit the single use of blocks or neighbourhoods, this single blocks should not exceed 10% of any neighbourhood. The aim of the principle Five is; Principle 5 seeks to adjust/limit the use of functional zoning to implement the policies of mixed land-use. Zoning is a land use planning appliance used by governments and urban planners in several countries. Zoning may be use-based (regulating the uses to which land may be used), or it may adjust building height, lot coverage and similar property or a combination of these. This principle focuses on the land-use aspect. (UN-Habitat –, 2014)

Areas of Application:

- Fast-growing cities: this principle can be applied to cities that are suffering from fast-growing and it Cn helps it in providing infrastructure, lands and public services. This fast growth in population can be due to natural growth, rural immigration seeking for a job or other reasons.
- New urban settlements and urban extensions: the Five Principles can be applied in new urban areas to avoid repeating past mistakes.
- Urban renewal and renaissance: declining cities can implement the Five Principles for revitalisation and urban transformation initiatives.
- Urban densification: growing cities that have no land for further extension can use the Five Principles to achieve a smoother densification process (UN-Habitat, 2014).

Objectives of the Five Principles;

In supporting sustainable neighbourhoods, the Five Principles aim to:

- Promote high-density urban growth, mitigate urban sprawl and increase land efficiency.
- Promote sustainable, differentiated, socially equal and thriving communities in economically viable ways.
- Encourage walkable/cycling neighbourhoods and minimise car dependency.
- Efficiency use of land and provide an interconnected network of streets which facilitate safe, efficient and pleasant walking, and cycling and driving.
- Encourage local employment, local production, and domestic consumption.
- Provide a diversity of lot sizes and housing types to cater for the diverse housing needs of the community, at densities which can ultimately support the provision of local services.

This principle is presenting a set of quantitative measurements which can be used to analyse a neighbourhood. The following figure represents those measurements in green. Neighbourhood data can be illustrated on this chart, so the sustainable development of it can be measured and visualised. (UN-Habitat –, 2014).

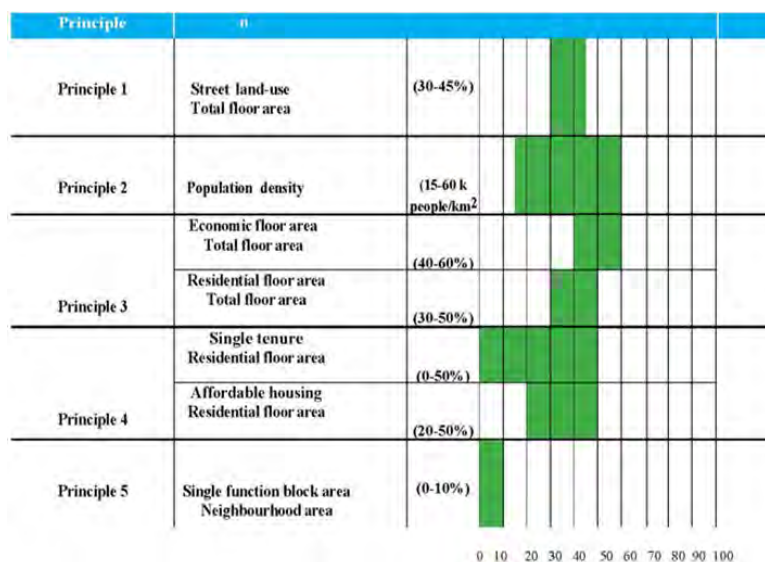


Chart 1: Sustainability analysis of Neighborhood based on UN habitat five principles: (UN-Habitat –, 2014)

3.4. Comparison between the four principles for sustainable neighborhoods

LEED is the first rating system for SN, and it is considered the first principle that many other SN principle initiated after it. QSAS, Estidama and green pyramid rating system are a regional rating system that initiated by countries to customise the LEED SN to the context of their countries regarding social aspect and arid climate as well. The following table is a comparison between previous sustainable neighbourhoods principles.

Table 1. comparison between sustainable neighbourhoods principles (Author,2017)

| | LEED for Neighborhood Development | Regional Rating Systems | Circles of Sustainability | Sustainable Neighbourhood Planning by UN-Habitat: the Five Principles |
|-------------|--|---|---|---|
| Description | LEED for Neighborhood Development concludes its most important principles as:” LEED for Neighborhood Development highlights the importance of creating a sustainable city which is, compact, walkable, vibrant, mixed-use neighbourhood with a solid connection to nearby communities. | Both Qatar Sustainability Assessment System and Estidama Pearl Rating System are aiming to address sustainability for their countries. QSAS implemented credits targeting local environment and culture of Qatar (QSAS, 2010). Pearl Rating System has added a new principle to sustainability principles which are culture (Estidama, 2010). Both of the regional rating systems have added the two aspects; culture and climate. The green pyramid rating system is the rating system related to Egyptian environment and also focused on socio-cultural and microclimate aspects in Egypt. | Circles of sustainability laid four most important principles of sustainability which are; ecological, economic, political and cultural. This approach contains both qualitative and quantitative indicators to achieve sustainability and resilience along different contexts of an organisation, community or city. | UN-Habitat established a new approach that enhances current sustainable urban planning theories to help establish a sustainable interrelationship between urban dwellers and urban space and to increase the value of the land. This approach built on five principles that support the three key features of sustainable neighbourhoods and cities: compact, integrated, connected. Principle one is; create adequate space for streets and an efficient street network. Principle two is; High density Principle three is; Mixed land-use Principle Four is; Social mix; Principle Five is; Limited land-use specialisation. |

Continued on next page

Table 1 continued

| | | | | |
|-------|--|--|--|---|
| Focus | More environmental oriented | Added socio-cultural aspect to the environmental approach, besides customise it to fit the arid climate in Qatar, Egypt and Abu Dhabi. | More emphasis on political & economic approaches | Focus on urban design (city should be compact, integrated, connected) |
| Year | The first rating system and SN principle in the world, initiated in 2009 | Created based on LEED and another rating system | Initiated in 2014 | Initiated in 2014 |
| Level | Issued initially in the USA, and can be implemented worldwide | Local in certain country | International | International |

4. Sustainability in the Arab World:

Since Rio de Janeiro Summit, Sustainable development in the Arab countries has been made some formal in the Arab region towards achieving sustainable development, particularly in the areas of education, health and improving standards of living. Arab countries have several legal foundations for SD-initiatives:

- Declaration of the UN summit on Human Environment (1971).
- The Arab Declaration on Environment and Development (Tunisia, 1986).
- The Arab Statement on Environment and Development and the Future Outlook (1991).
- The Barbados Declaration on Sustainable Development of Small Island Developing States (1994).
- The Jeddah Declaration concerning the Islamic Perspective on the Environment (2000).
- The Tehran Declaration concerning Religions, Cultures and Environment (2001).
- The Abu Dhabi Declaration: Perspective of Arab Environmental Action (2001).

4.1. Sustainable Cities in the Arab World:

Since Rio de Janeiro Summit, the concept of sustainability started to be a hot issue in Arab architecture and urban design; it also became a significant part of architectural education. Lately the sustainable compounds, gated communities and neighbourhood started to emerge in the Arab world. Many attempts happened to design and create a real sustainable neighbourhood, although this considered a late response to Rio de Janeiro Summit, the last ten days witnessed lots of development in the clean energy sector, recycling, and environmental materials .etc.

One of the most famous examples of sustainable neighbourhoods is the new sustainable city in Dubai which established in 2014 to implement the concept of sustainability in real residential compounds. This research paper will focus on this example as a pioneering example in sustainable cities in the Arab world.

5. Case Study Analysis:

Sustainable City in Dubai is the first sustainable city in Dubai and UAE as well; it is designed to be the first net-zero services and maintenance fees city in Dubai. The design aims to meet the international sustainability standards, besides applying Dubai Municipality green building code, Dubai Road and transport authority and Dubai electricity and water authority. The objective of the city is to become an international model of the sustainable neighbourhood,

regarding sustainable living, work, entertainment and education. The residents in this city are not only owners, but they are partners in financial returns of the community centre.

The sustainable city represents a unique example in green transportation in the Arab world; it features horse track, bicycle track, electric cars and car-free neighbourhood. Additionally, the city is integrating urban agriculture locally to produce organic food. The production of electricity in the city is done through on-site photovoltaic generation, on the top of houses and parking shades. Additionally, the wastewater is recycled and classified into grey water and black water, to be used in the landscape and urban farm. (Diamond, 2017)

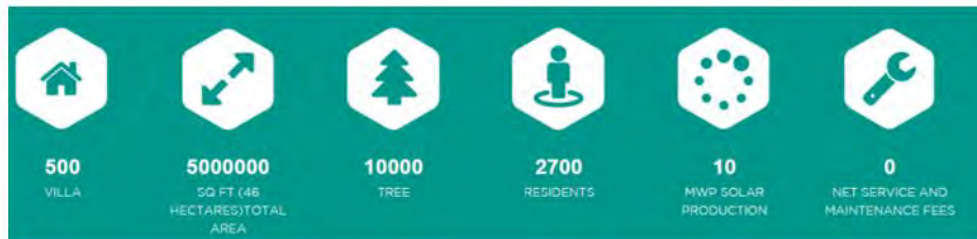


Figure 2. Facts about the City (Diamond, 2017)

5.1. The Master Plan of the Sustainable City in Dubai:

The master plan as shown in figure (3) designed to accommodate five different residential clusters with the main pedestrian spine in the middle of the city. This spine considering the urban lunge of the city, as it contains urban farms and biodome to produce organic food for the residents. This spine also includes the open space; swimming pools recycled water lakes. The master plan is surrounded as well by a buffer zone which acts as an environmental belt that reduces pollutants from entering the city. The following are the major components of the master plan;

Residential Area:

500 townhouse and courtyard villas designed in five residential clusters divided by the urban farm in the middle of the neighbourhood. The design of the villa is inspired from old 'Bastakya' district.

Buffer zone:

The city is surrounded by a buffer zone of 1000 tree in different layers to act as a natural buffer zone from air pollutants.

Education & Research:

The city pays great attention to research & innovation; it has a Sustainable Engineering and Research Institute and Training Centre for sustainable practices, and nature-inspired 'Green School' from Kindergarten to Grade 12. This research centre has many partnerships with universities, and it is sponsoring research and PhD students.

Urban Farm:

The city is planned to have five clusters divided by an urban farm in the middle, and in this vital heart, the biodomes are located s well. This urban farm and biodomes, besides the local gardens, are the source of organic food in the city.

Services & facilities:

There are a Variety of sport and leisure facilities such as Community Centres, bikes trail, shaded pedestrian walkways and Equestrian Club. In addition to, essential services like; clinics, banks, Juma Mosque and traditional Souq.

Solar Car Park:

The sustainable city provides shade car parks throughout the city. Each villa has two parking spaces shaded with solar panels plus additional areas for communal electric buggies. The distance between the car parking to the villas range from 10 meters to 85 meters, which is the maximum walking.

The sustainable plaza:

The plaza is a 15000 square meter mixed-use located near the entrance of the sustainable city. It comprised of five low-rises (ground plus three floors) blocks with shops, restaurants, cafes and offices.



Figure 3. Master plan of the sustainable city in Dubai (Diamond, 2017)

5.2. Case Study Analysis:

The site visit aimed to gather as much as qualitative (interview and observation) from residents, employees and engineers that are working in the city. The tour happened in one day, and organised by Diamond the developer of the sustainable city; the tour included visiting two types of villas and townhouses with a specialised from the company who gave a comprehensive brief about the two villas, the design, the sustainable approach and techniques. Attending a seminar with the head designer of the city, where he presented vital facts about the city and explained its design and its sustainable approach.

5.3. Observations from the site visit:

- Many recycling stations located in each cluster to assure sorting and recycling of the solid waste.
- There is an Encouraging user to apply waste segregation method, in keeping with Dubai’s eco-friendly the of waste management policies.
- The Courtyard villas are being reached on foot or by electric buggies – through narrow, and shaded streets which connect the city; as clusters are car-free zones.
- The design of open spaces in public & private garden significantly reduces noise, pollution, public hazards and provides a whimsical environment for safely play for children.
- In dealing with The Sustainable City’s ethos of a family-friendly environment, each residential cluster includes four amenity plazas addition to one central plaza housing a cooling tower to increase the outdoor space.
- Other clusters offer shaded communal gardens with seating and playgrounds for children.
- All villas are close and accessible walking distance of the Central Green Spine, further supporting a dynamic, vibrant and cohesive community atmosphere.
- The Biodomes are working, and many organic fruits and vegetables already planned inside.

- The sustainable city is a car-free city, a group parking is located near to residential clusters, and electric vehicles are available all the day.



Residential clusters (semi-attached villas), source (Author, 2016)



Parking shades covered with photovoltaic, and waste recycle bins are distributed among the city. Source (Author, 2016)

Bicycle track, urban farm and biodome in the middle of the city. Source (Author, 2016)



Villa's courtyard. Source (Author, 2016)

Electric cars, the internal transportation in the city. Source (Author, 2016)



Biodomes and urban farming in the city source (Author, 2016)

5.4. Sustainable Approach in the Sustainable city in Dubai:

The sustainable approach in the sustainable city in Dubai built on three main pillars; social, environment and economy as illustrated in below figure. The city is following same pillars of sustainable development which also are sociocultural, environmental and economic aspects. For the economic pillar, the city is focusing on being the first net-zero maintenance city in Dubai, which means achieving green growth, sustainability saving on the long run cost and supply number of employment to people. For the environment pillar, the focus was on different items starting from generating organic food in urban farms, producing energy and reducing energy consumption as well, recycling of water and wastes, green mobility and controlling emissions. From the social pillar, the city is focusing on creating a high-quality living environment for the residents by supplying different open spaces. In addition to supplying sports areas, art and culture activities, besides paying particular attention to safety and security of the residents and create a vibrant and active society by providing open spaces and plazas, public market and mosque plaza to encourage socialization among residents.

The city was designed to be the first sustainable city in Dubai and first net-zero maintenance city, from the website of the city and the site visit as well, the city is not following the LEED or Estidama guidelines. It is a unique design that aims to achieve the concept of sustainability through all its building, services, amenities and infrastructure.



Figure 4. Sustainable principles in the sustainable city in Dubai (Diamond, 2017)

5.5. Applying the UN-Habitat Five Principles of Sustainability on the Case Study

As this principle is a combined qualitative and quantitative method, besides it can be implemented on new cities and existing cities as well, the research will apply the UN-Habitat Five Principles of Sustainability on this Case Study as below;

Principle one is; create adequate space for streets and an efficient street network. The street network occupies 45 percent of the land.

Principle two is; low density; at least 6000 people per km². Which is not achieving the aim of principle two to have a high density, but the city aims to create many open spaces for public and private use, and this impacted on the population density to be less than the principle states.

Principle three is; Mixed land-use, 45 percent of floor space is allocated for economical use in the sustainable. This

includes offices, shopping mall, hospital, school and the Ecolodge and hotel.

Principle Four is; Social mix; provide houses in a different range of prices to accommodate various levels of income. Almost 10% of the total residential floor area should be low-cost housing. Additionally, residential tenure type is 50% of the total. The design of the city support a social mix but covering only three different types of residential units (private villas, attached villas and studios)

Principle Five is; Limited land-use specialisation, the aim is to limit the single use of blocks or neighbourhoods, the single blocks are about 40 %of any neighbourhood.

By implementing the UN habitat five principles on the sustainable city of Dubai, the following chart is the result.

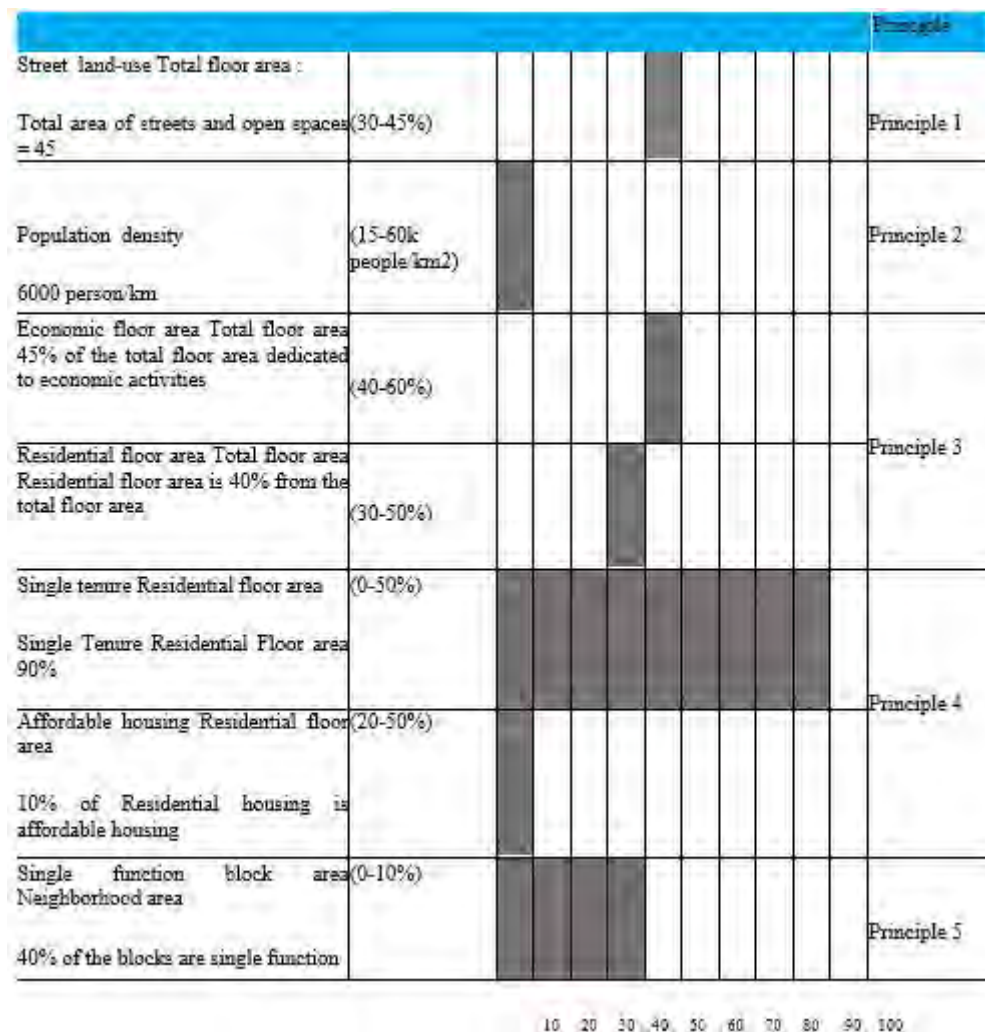


Chart 2: Application of the UN five principles on the sustainable city in Dubai (Author, 2017)

6. Conclusion:

This research paper aimed to understand the concept of sustainable neighborhoods and the different principles of designing and evaluating a sustainable neighborhood. The sustainable neighborhood is a neighborhood that achieves the idea of sustainable development regarding social, environmental and economic aspects. One of the latest principles in the sustainable neighborhood design is the UN habitat five principles; this principle can be used while designing the sustainable neighborhood and to evaluating existing cities and neighborhood as well. Although the concept of sustainability and sustainable cities emerged in the Arab world in last decade, the number of the sustainable neighborhoods in it is still so limited. This paper discussed one of the most famous sustainable cities in

the Arab world, the sustainable city in Dubai. It is an example of a real attempt to create net zero maintenance city. The city is designed to accommodate 6000 people in the area of 5000000 square feet. The site visit proved that this newly emerged city would change the future of sustainable neighborhood in the Arab world. The city adopted many sustainable approaches regarding mobility, clean transportation, waste recycling, water recycling, and clean energy, the passive design of the villas, sustainable materials, an urban farm and mixed-use neighborhood. The on-site experience gave different image from the theoretical application, as after applying the UN-Habitat five principles on the Sustainable neighborhood it did not meet the target in some of the principles. However, the UN-Habitat five principles targeted a mixed high-density sustainable city, which is not the case in the sustainable city in Dubai, where the density is very low comparing to the UN-Habitat five principles. Additionally, the sustainable city in Dubai didn't achieve the expected social mix as in the UN-Habitat five principles, but the location of the city outside the midtown of the city, and the public transportation network made the expected residents from a social standard that own private car. Additionally, the cost of renting a house there is more expensive 20% than renting in other compounds, but the longtime saving is happened from zero maintenance and saving from producing electricity inside. However, the sustainable city of Dubai can be considered a new approach in the sustainable neighborhood in the Arab world, that opens the door for future sustainable neighborhoods that produce, recycle and present an active, healthy community. Additionally, following one principle in SN is not the only success key, but creating a sustainable neighborhood that taking into consideration the three pillars of sustainable development economic, socio-culture and environmental pillar is the success key.

7. Acknowledgments:

The researcher would like to acknowledge Effat University, College of Architecture and Design, Architecture department for preparing an educational trip for more than 55 students from Architecture department to visit the sustainable city in Dubai and attend a valuable lecture there in summer 2016.

8. References

1. Al Hagla, K. (2008), Towards A Sustainable Neighborhood: The Role of Open Spaces. International Journal of Architectural Research
2. Banani, R., (2011), A sustainable assessment method for non-residential buildings in Saudi Arabia: Development of Criteria, PhD the school of construction, management and Engineering, University of Reading.
3. Blum, A. and Grant, M., (2006), Sustainable neighbourhoods: Assessment tools for renovation and development, Journal of International Research Publications, Present Online, Issue Ecology, Vol 1, p35- 52 ISBN/ISSN: 1311-8978.
4. Congress for the New Urbanism, (2014), Natural Resources Defense Council, and the U.S. Green Building Council, LEED 2009 for Neighborhood Development, Green Building Council, USA
5. Diamond, (2017), [online], retrieved from; <http://www.thesustainablecity.ae/assets/pdf/factsheet.pdf>
6. Duxbury, N. (2001), Exploring the role of arts and culture in sustainable urban development, [online], Table d'Hôte on Building Sustainable Communities: Culture and Social Cohesion, Retrieved from; <http://www.cultureandcommunities.ca/downloads/Duxbury-urban-sustainability-2001.pdf>
7. Emas, R. (2015), The Concept of Sustainable Development: Definition and Defining Principles, Global Sustainable Development Report, Edition Advance Unedited Version.
8. Fitani, K., (2016), Sustainable Socio-Cultural Guidelines for Neighborhood Design in Jeddah, MSC, Effat University

9. James, P Magee. L., Scerri, A., and Steger, M., (2015), Urban Sustainability in theory and practice, Circles of Sustainability, Routledge. [online], retrieved from; <http://www.circlesofsustainability.org/wp-content/uploads/2014/10/Ch-08-Circles-Questionnaire-2015.pdf>
10. Kuhlman. T, Farrington, J. (2010), What is Sustainability?, Sustainable Future, issue 2, page 2, 3436-3448.
11. LEED-ND. (2009), Leadership in Energy and Environmental Design for Neighbourhood Development. U.S. Green Building Council.
12. Loser, C. (2013), Leadership in Environmental and Energy Design: A True Sustainable Development Model, B.S., University of Maryland.
13. Packalen, S. (2010), "Culture and sustainability, Corporate Social Responsibility and Environmental Management Corp. Soc. Responsib. Environ. Mgmt", Vol. 17, pp 118–121.
14. Nurse, K. (2006), Culture as the Fourth Pillar of Sustainable Development, [online], Commonwealth Secretariat Malborough House Pall Mall London, <http://www.fao.org/sard/common/ecg/2785/en/Cultureas4thPillarSD.pdf>
15. QSAS. (2010), Qatar Sustainability Assessment System. Qatar, Gulf Organizatio
16. UN-Habitat. (2014), A new strategy of sustainable neighbourhood planning: Five Principles, Discussion Note 3, Urban Planning. [online], Retrieved from; https://unhabitat.org/wp-content/uploads/2014/05/5-Principles_web.pdf
17. Weiland, U. (2006), Sustainability Indicators and Sustainable Development, Global Change: Urbanization and Health pp 241-250, China Meteorological Press, Beijing.