# An Assessment of Villa Garden Quality

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*Abstract*— **The focus of this research is to examine the significance of a domestic gardens (yards) to the house residents. A house landscape is increasingly seen as an important issue in urban areas in controlling the micro-climate, enhancing the quality of the environment, improve the health and well-being, confers many physical and aesthetic benefits in an urban environment, and providing opportunities for urban dwellers to reconnect with nature. These green spaces, which compose a high percentage of urban areas found in private gardens of detached housing units (villa) [1].**
**Therefore, this research focuses on an efficient landscape design applied to domestic garden to provide a sustainable environment. Review some literature shows that scholars concentrated on public parks and their environmental impact with little attention has been given to the domestic garden. The main objective of this research is to explore and analyses the use of domestic gardens in the Juffair area in the kingdom of Bahrain [2], this area was selected because it is a newly developed residential area and inhabited by people from different cultures. The results show the involvement of landscape design in increasing the environmental efficiency for both the existing and the new homes and as a result improve the quality of living for its people.**

*Index Terms*— **landscape, detached house, villa, domestic garden, yard, Juffair area, Bahrain, sustainability, micro-climate, environment, hard-scape, soft-scape**

**Figure 1:** A typical villa in Juffair Area with its fence and surrounding open space (Source: the author)..

Manuscript received March 17, 2017
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**Figure 2:** Bahrain Location in the Arab Gulf (Source:http://www.maplandia.com/bahrain/bahrain/manama ).

## I. INTRODUCTION

Since entering the 21st century, the research on housing unit environment quality has become increasingly important with the environmental deterioration. Therefore, an efficient landscape design becomes an integral part of a safe community environment by creating order and harmony in the relationship between humans and their environment [1]. Moreover, landscaping help in the creation of functional and aesthetically pleasing environment for living, working circulation, and recreation [2]. Though, the space around a villa (a garden) should contain some landscape features such as trees of both type evergreen and deciduous, hedges, and ponds and pools to moderates local climatic conditions and improves mutual privacy. For example, deciduous trees can provide useful summer solar screening and do not obstruct daylight much in winter when their leaves have fallen [3,4]. Though these domestic gardens are small in size unless for those big houses on large lots, but their large number mean that they make a substantial contribution to urban 'green space'. These domestic gardens are rarely assessed, although their vital role in the overall urban landscape such as public parks, street-scape, neighborhood parks, and forests [5].
Furthermore, the main purpose of gardens is not only for beautification aspects, but also to modify the micro-climate of the outdoor spaces' environment [6]. Nowadays, people are concentrated in cities facing an environmental challenges caused by climate and a rapid rate of urbanization accompanied by diminishing of resources, therefore, it is essential to make sustainable interventions represented by the full use of the site design for both new and existing buildings to eliminate what arises from these challenges. Though, the lack of studies on landscaping or residential landscaping areas in Bahrain required further investigations on domestic gardens and presenting ideas for contemporary architectural design practice.

### 1.1 Research Problem

The researcher visited different villas domestic gardens in the Juffair District in Bahrain and he came up with the following observations: The action taken by the owners in their garden without the advice of a specialize person in landscape design cause a problem of their garden of 'how it looks' rather than 'how it works. All of these gardens contain the main elements of the landscape design such as trees, pergolas, lawn, water features, but unfortunately for aesthetic value only without considering enhancing the environment. In addition, a high percentage of these houses had paved gardens for driveways a's a result of increasing car ownership, some villas are converted into flats which required more parking.

1.2 Research Objective

The main aim of this research is to collect some information about the villas' gardens in the study area, to achieve this aim the following research objectives were developed:

- To examine if these gardens are sufficient to support residents' activities and to check if the main elements of landscape design is existed in them.
- To analyze these gardens and their contribution in providing an attractive and useable outdoor environment.

1.3 Research Hypothesis

The main research hypothesis is that: " *The domestic garden provide a better house area quality which creates a sustainable living environment*".

## II. LITRETURE REVIEW

Historically, the word 'garden' derives from the Anglo-Saxon word for 'yard' - geard, of a verb gyrdan which means 'to surround', 'to enclose'. Nowadays, the term garden is a man-made spatially bound composition distinguished from adjacent territories and exposed to the sky. The origin of gardens returned back to the nomadic garden which were not permanent as nomad life. These gardens were arranged in order to reduce the distance between the tent and food source, so the space in front of a tent is dictated by the wind and sun and fenced with dry branches [7] (Gawryszewska & Herman, 2014). The space around the tent contains four basic elements: seating space; fireplace (barbecue); a pond; and a fence to satisfy owner needs (figure 3).

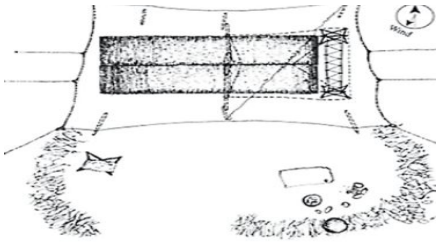


Figure 3: Arrangement in front of a tent (Source: [7, P: 90] Gawryszewska B.J. & Herman K. (2014), P:90).

With the superimposition of modern technology and a rapid urbanization as a result of the improved economy, old practices and building forms of courtyard houses are rejected and substituted by a Western building styles which include detached dwellings (villa), semi-detached units (duplexes), and flats in high-rise buildings.

The villa has become a new residential type that symbolize prosperity and status adopted in most of the developing cultures (figure 4). Unlike the traditional courtyard house, the villa is a detached house vary in size, height and area determined by a setback regulation imposed by municipalities are surrounded by walls. The open spaces surrounded a villa which resulted from a setback regulation (front, sides, and back) lacking privacy as neighbors often can see over it varies according to the proportion between the sizes of the house and the lot [8,9]. In this regard, when designing residential projects, careful consideration must be given to how housing is placed on the land and the relationship of the units to each other, such as access, parking, and amenities [3]. It has been argued recently that the process of building are seen today as a vehicle for improving the environment as planted areas around buildings influence the quality of the urban environment and affect the housing climatic characteristics [3]. She added, The use of indigenous plants in residential landscaping is a very important because they are well adapted to the local climate, easy to grow, cheaper and easier to suit the surroundings than exotic ones. Therefore, residential landscape consists of three main elements: Softscape by using plants that add aesthetic, climatic, ecological and social value; the Hardscape like gazebo, benches, pergola, pots, and water features like fountains, ponds, and swimming pools [10]. Besides, the use of these elements in landscape design and planning normally based on the demographic factors of residents such as age and group of people using landscape facilities.

**Figure 4:** A typical example of villa & a courtyard house (Source: the author).

In addition, the entertainment activities in a house landscape for elderly people and children should be comfortable, safety and enjoyment by using ramps, walkway, and railings [11]. Other scholars discussed these spaces and concluded that, these spaces are climatic discomfort all the day, hence, they are empty and unused by tenants. The villa as a building type was criticized for unused outdoor areas [9]. Many scholars criticized the open space resulted from a setback regulation like Eben Saleh [12] who addresses that these open spaces are unusable for its dimension and visual privacy. On the contrary, landscape design and planning can improve the residential outdoor environment [4]. Besides, the fully utilized for these gardens is impossible for the intense heat [13]. Moreover, due to the poor building design in Gulf Cooperation Council (GCC) countries, about 80% of domestic electricity is used for air conditioning and refrigeration [14]. In addition, climate has an influence on the

shape of the villa's garden and its use [15]. Moreover, an effective landscape is composed of both plant material and hard-scape that complement the plants, which control the micro-climate through a well-configured combination of soft and hard materials of the outdoor space to reach a comfort zone [4]. Hence, the range of comfort zone lies between 20.5°- 30°C with relative humidity of 20-80% [16]. There are many methods for improving the outdoor climate in order to practice different activities in the garden and at the same time improve the indoor environment. The most effective methods include the use of trees, ground cover, shading devices, and water feature. Therefore, landscape design must maximize shading around the house and minimize the reflected load of solar radiation by using shade trees such as Palm trees and aqueous plants that consume less water and contribute to variations in urban climate [17,18]. Furthermore, The existence of vegetation in these gardens helps in reducing the temperature by creating shaded areas, reducing air pollution, purifying the environment, and improve the health and well-being for residents [19]. Some researchers have pointed out that putting greenery on roofs and elevations could considerably enhance the surrounding building environment and people's impression [3]. Moreover, apart from the decorative function of vegetation in the garden, the vegetation also modifies the micro-climate by preventing the direct heat gain [20,21]. In addition, the distribution of trees in outdoor spaces accompanied by planting on a house facade and green roof will reduce the energy load on buildings [22,6]. On the contrary, the poor quality of a villa open space deprives people from spending time outdoors, walking, and gardening and influences the residents well being [23].

**2.1 Configuration of Dometic Garden**

Each country has devised a set of building controls that governs the layout and the maximum allowable percentage of lot coverage [9]. Setback regulations are building restrictions imposed on property owners in relation to the front, side and rear boundaries (figure 5).

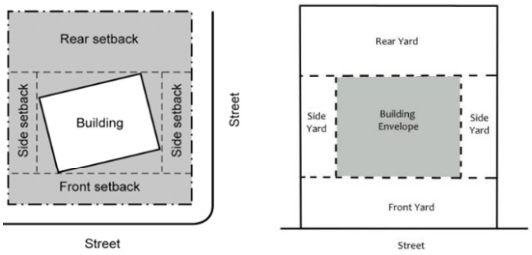



**Figure 5:** Show Building Setting & Front, side, and rear setback requirements (Source: the author)

Therefore, as a result of these legislations the domestic garden usually consists of: front garden (front setback); rear garden (rear setback) -the main garden for family relationships; and side garden (side setback). As a result, an outdoor space has three major areas: the public area, the private area, and the service area, these three areas are related to each other and connected together with the use of a continuous lawn,

The same way the indoor house spaces are related [24] (figure 6).

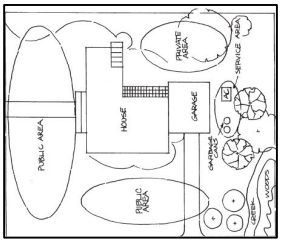


**Figure 6:** A general layout for outdoor house space (Source: Smith et al. (2013, P:5)

They added, The public area is usually in front of the house, visible to the public, and should be kept simple and uncluttered. In addition, the private area is an area used for the family and their guests for rest, relaxation, and recreation includes a patio, pool, lawn, shade trees, a play area for children and gardening. Furthermore, the service area usually located near the kitchen or garage includes garbage cans, utility building its size depends on the family needs. On the contrary, it is argued that landscape planning should respect people's needs since they are the living part in the community. Thus, landscaping should be treated as an intrinsic part of the site design during the housing projects [3]. In addition, the size and shape of the garden is as a result of the dimension for these setbacks. Hence, in the same neighborhood you can find a different garden size and shape as a result of lot size and architect design concept for the building orientation. In this regard, two points regarding a house garden. The first one the size of the garden which should be sufficient in order to accommodate different activities like sitting area, barbecue, children play area, and swimming pool. The second one is a regulation which imposes the shape of the garden [9]. He added these regulations are flexible to change and adjustment when it is needed. In addition, a front garden often differs in character from back and side gardens, where front garden is characterized by its visual impact by vegetation and aesthetic character, on the other hand back garden is used for functional purposes [25]. Furthermore, the designing procedures for a landscape which start by analyzing the site and the environmental factors influence the site rather than drawing the outline of the house depending on the setback regulations as most of the architects do and then fill these interior spaces with functions and them distribute spaces in the garden [24]. For example, the path of the sun from East to West in relation to the north direction of the site is very important to observe sunny areas and shaded areas in the garden to use trees for shading. Also, by checking the winter and the summer wind in the site and the characteristics of the soil wet or dry, fertile or infertile will enable the designer to check which plants to use in the site figure 7).

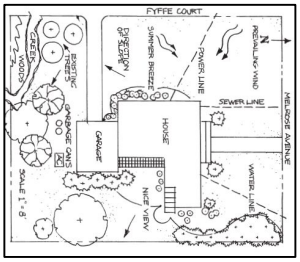



**Figure 7: Site analysis (Source: Smith et al. (2013, P:3)**

Furthermore, the area was planned as a low density area, hence, most of its residential buildings is detached housing units (villas). In addition, the development plan in figure 5 shows different lots with different sizes which means different villas size, as well as different house garden size and shape table 1.

2.2 Juffair Area

The kingdom of Bahrain is witnessing an economic growth over the past few years dominated by construction activity as a

result of good improvement and development in infrastructure. The Juffair area which is a suburban neighborhood of Manama witnessed these developments as large parts of its area reclaimed from the sea. As a result, the Juffair area development includes the construction of new roads, bridges and new access roads. In addition to providing the Juffair area with community services including schools, playgrounds, health center, community center, mosques and gardens, the emphasis was intended for low density development not for high rise multi storied apartment (figure 8).


**Figure 8:** The Juffair district land use (Source: [26] [3]

| | Max. Built Area in the Land area | Total floor area of the buildings not more the Area of the Land | Allowable Amenities 10% of lot area | Min. Setbacks | | | |
|---|---|---|---|---|---|---|---|
| | | | | Front | Sides | Back | Height |
| Private Residential Area (A) | 60% | 120% | - Max. 2 car parking<br>- Servant area 30m2 | 3 m. | 3 m. | 3 m. | Max. 3 storeys (10.0 m) |
| Private Residential Area (B) | 60% | 120% | - Max. 2 car parking<br>- Servant area 30m2 | 3 m. | 2 m. | 2 m. | Max. 3 storeys (10.0 m) |
| High-rise Residential Building | 50% | 800% | - Provide One (1) car parking /150m2 on the ground floor or in the Basement floor. | 6m. | 6 m. | 6 m. | Max. 20 storeys (60.0 m) |

**Table 1: Regulations governing built areas and minimum setbacks in the Juffair District (Source: The Author).**

## III. RESEARCH METHODS

To achieve the objectives of the research, several techniques were employed including:

- A review of some related literature to gather information regarding theoretical aspects of landscape design and understanding the relation and the factors between landscape designs that can influence the house garden.
- A study of different villas types was conducted in the Juffair district in the Kingdom of Bahrain to understand the influence of the building regulations on the shaping and sizing of the villa's outdoor space (See figure 1).
- All data obtained were analyzed to gain a meaningful finding that helps to answer the objectives that had been outlined in the first section of this paper.

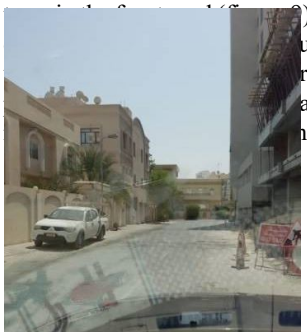
### 3.1 Data Analysis and Results

Based on the observation of the Juffair area I would like to address the followings:

The size of house garden depends on the lot size area and to which zone related as table 1 shows that the garden in the Area (A) equal the one in (B) as both zones have same built area in relation to land area. It should be noticed that if the land in the area (A) is bigger in size, it will still have the same garden size as its setbacks are bigger than (B). However, the building of the Area (B) has a higher size of residents as the total floor area is more than that in the Area (A), this means more people will use the garden in (B) than that of (A) which has less size of residents.

The observation for different villas in the area shows that all the gardens lack the use of trees for shading to enhance the micro-climate, they rather use them as an aesthetic symbol (figure 1). In addition, most of the gardens have a higher percentage of hard-scape in relation to soft-scape. This is because, hard-scape is cheaper than soft-scape. Besides that, soft-scape such as plants and water feature need more maintenance.

Most of the villas share the same character of having high ). This is mostly used as a result uildings in the area as it is clear rey residential building, though acy from the neighbors who live e impact of noise from traffic



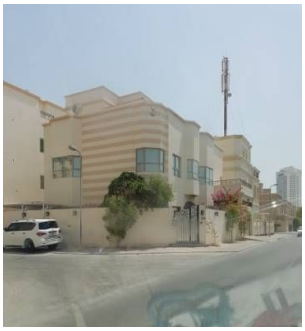


**Figure 9:** The exterior view of houses in Juffair District (Source: The Author).

Working with the numbers, for example a lot of 500 $m^2$, the built-up area according to enforced setbacks equals (25-(5+3)) X (20-(3+3)) = (25-8) X (20-6) = (17.00 m. X 14.00 m.) = 238 $m^2$ open area around the house, so the built up area = 500 $m^2$ - 238 $m^2$ = 262 $m^2$, which is less than 60% of the lot area which equal 300 $m^2$; but with the + 10% (allowable amenities) the total build up area = 262+ 50 ~ 300 $m^2$ (figure 10). According to calculations, as area of lot available for building based on a given setbacks (262 m2) is smaller than the maximum built-up area (300 $m^2$), thus, the only available area as a garden is that designated by setbacks

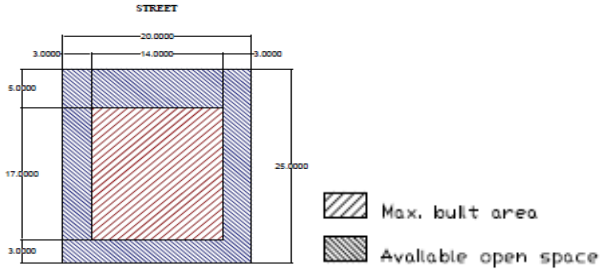


**Figure 10:** Area available as open space in villas of Juffair (Source: The Author).

Regarding the size of available front garden in relation to setbacks which is 5 X 20 meter, this area can easily form usable area for different activities if it is planned well for both hard-scape and soft-scape. Moreover, if we compare this area with the area of traditional courtyards in traditional houses which usually vary between 3 X 4 to 4 X 6 meters [9]. Nowadays, the recent trend of paving the front garden surfaces for car parking is clear from theincreasing number of

car ownership (figure 11). Furthermore, building regulations, which shape these gardens are not supposed to be permanent, they are bound to be flexible as other countries like USA and UK, building codes are reissued in three year intervals [9]. Bahrani regulations are supposed to be flexible also.

**Figure 11:** Car Parking in the front garden (Source: The Author).

It is clear from several visits to different gardens in the area that some residents take on the task of the design and installation of the landscape by themselves rather than hiring a professional designer to prepare a comprehensive landscape plan, this is the least expensive option in the short term. This action offers a risk of poor design and poor plant selection and will cost more in the long run (figure 1&9).

- Regarding the shape of houses (figure 1& 10) most of the houses take the shape of the lot shape, as the house outline is parallel to the lot borders with no consideration of organizing the outdoor area to meet people needs or desires. For example, we know that climate has a strong influence on the building and garden shape, therefore, architects and landscape designer need to study the climate and the site of the building more deeply to select the appropriate area of the site for a main outdoor space. This result supported by [24] Smith et al. (2013) who identified the shape and size of garden is influenced by site analysis, climate, and environmental surroundings rather than a simple parallel line to the site boundary. It will be argued that this will reduce the area of the building, but a good design will utilize the spaces to the utmost and as we discussed these regulations must be modified depending on the findings of this research that landscape planning is very important in order to cushion the effects of environmental hazards and risks.
- Most of the gardens in the area lack the main elements of the landscape: the hard-scape and soft-scape of outdoor space like the use of trees, ground cover, shading devices, water elements. As a well-configured combination of these two elements can control the micro-climate for additional comfort for outdoor activities most of the year (see figure 1).

-Through the visit of some villas in the Juffair area I noticed the following two points:

1-The women of higher-income families spend more time in their gardens than those of low income families, this because higher income families have a large house and garden.

2-The children of low income families spend more time in their garden than those of high income. This is linked to the fact that higher income houses have more indoor spaces for children's activities

-Also, this result supported by a study by [1] Shahli et al., (2015) who identified the importance of landscape to add a value in terms of aesthetics, function, and environmentally for housing. The aesthetic value of landscape can be valued through an attractive landscape design and its surrounding environment. The function used of landscape design can be valued when it can cater the need of all users. In addition, the suitable selection of landscape elements helps in creating a sustainable living environment for residents.

-It was noticed as a result of building regulations people forced into building their houses according to setback from all sides (figure 1&10). All the rooms have windows to allow sun, light and ventilation, these windows exposed to the neighbors' garden. In addition, some villas happened to be adjacent or close to other types of residential dwellings such as high-rise residential buildings. Therefore, residents' activities in these gardens are influenced by neighbors overlooking (figure 9).

## CONCLUSION

The argument of this research is supported by the key insight for the house landscape of the modern villa in Bahrain. The main negative aspects of the villa's garden are its small size, lack of privacy, and uncomfortable weather. Planners, designers, and landscape professionals should focus on sustaining landscape development plans to be responsive to the environment. At the Municipal level, the need to incorporate landscape planning in the building regulations. Besides, these building regulations should be reviewed in order to increase land parcels for detached housing units which as a result increase the garden area to accommodate new activities. At educational level universities should prepare a program in landscape design in order to produce a professional and qualified people to deal and sole the previously mentioned problems.

### 3.1 Recommendations

- This study recommends that domestic gardens should be transformed into beautiful landscapes while taking the full advantage of the culture, climate and the environment.
- Need to separate low rise building from high rise buildings.
- Municipalities need to review and modify the regulations of setbacks, maximum allowable built-up, and lot dimensions to achieve an acceptable size of garden. Besides, new legislation concerning Landscape design for each new building.

- The privacy between houses should be maintained by the regulations in order to encourage residents to spend more time in their outdoor spaces.
- Adopt green roofs and elevations policy by the government to guarantee the their implementation.

3.2 Future Research

Although traditional courtyard houses built in harmony with the environment, people nowadays adopted the modern residential type that symbolizes prosperity and status. Therefore, it is essential to review and modernize the traditional principles to come up with a new residential style blend both the traditional and modern styles and meet peoples' needs both the internal and external living environments.

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