

## **PERSIAN GARDENS ARE SUSTAINABLE GARDENS: SCRUTINIZE THE SUSTAINABILITY FEATURES IN PERSIAN GARDENS**

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### **Abstract:**

Nowadays sustainability is well known ethic that influenced all of our life aspects. Landscape has powerful connection with environment therefore it may have more influence on it. Sustainability is one of main concepts that formed Persian gardens. One of the reasons that makes Persian garden's concept followed in more than 2000 years is sustainability. Therefore, Persian garden concept even in contemporary Persian life and passing through different periods of times does not change comprehensively.

Diverse collection of Persian gardens is inherited. This pattern of garden designing is determining especial cultural and historical background. One of the important principles of the historical landscape designs, which affected many regions through the Silk Road was Persian garden. This makes better understanding of Persian garden very important. These especial places contain their own identity and social behavior. Hence, understanding the sustainability factors in the Persian gardens by modeling in accordance with contemporary paradigms can be beneficial to achieve sustainable development. First, the principles and aspects of sustainability in landscapes will be mentioned for better understanding of Persian gardens, and then some evidence of it in traditional Persian gardens will be described.

### **Research Methodology:**

This research has been performed based on a descriptive – analytical method using articles, studies, reports and related documents (the library documents). Three main orders which shape the Persian garden is described according to previous researches. Then in four gardens in arid climate this three orders will be analyzed and evaluated with two evaluation systems in sustainability, BREEM and LEED.

### **Goals:**

The purpose of this paper is to recognize the Persian garden, from the viewpoint of ecological sustainability to understand advantage of that legacy and to reach the desired patterns in modern design.

### **Introduction:**

The concept of sustainability in the Persian garden is a multifaceted concept. This issue is alive and has a powerful presence in the Persian gardens. We can determine three main *Orders* each including different aspects of sustainability:

- 1- Cultural and society acceptance by concerning today and future generations.
- 2- Respect ecosystem and environment by preserving and improving them.

3- Improving human life aspects by producing food, desirable climate and optimum energy usage.

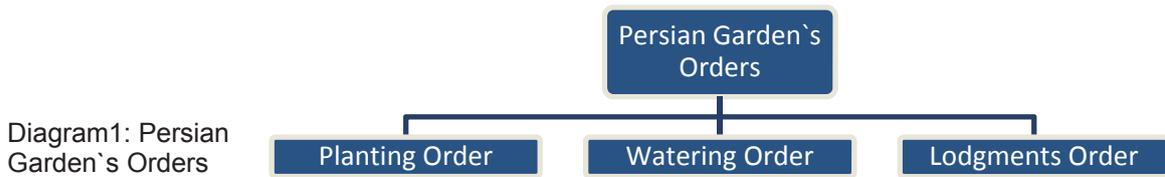
The first item mentioned above is based on cultural and social manners which formed Persian gardens. Sustainability in the Persian Garden is involved with myth, philosophical, cultural, social and religious backgrounds of this region. It will be mentioned but since it has lots of interactions with other Persian life aspects we will not get deep in to it.

The second one is somehow related to the first one in Persian life, because of zarousterian beliefs based on Persian gardens and from another point of view, this kind of manner is expected because of limited sources..

The third one also called ecological sustainability is the main part of this article. One of the most important sustainability factors in gardens is manner of providing desirable micro clime by ecological consideration. In Persian gardens, there is a fundamental difference between the garden and surrounding environment. The difference between inside and outside of garden formed the whole garden aspects and concepts. Third classification may have some sub classification determined to study Persian gardens.

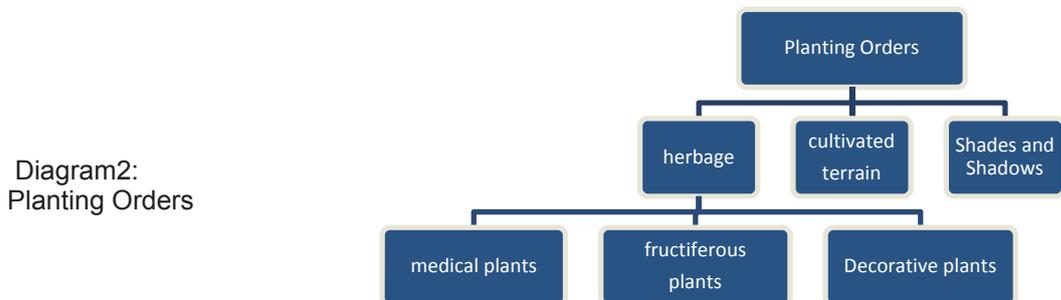
**Persian gardens paradigms and orders:**

There are three main orders in designing gardens: planting principles, constructions and lodgments principle and water principle.



**1-Planting Order:**

The concept of planting in Persian garden is based on agricultural fruit gardens. Therefore, it is mostly filled with fruit trees and is formed in geometrical separation. As Persian esthetic in main axis the ever green trees and long acarpous trees are planted. All part of the garden, even tree planting, has square patterns. The plants are placed in gardens in the way that they can adopt with their context and needs. Selection of the trees is referred to provide medicine, food or any product that can be useful for them, not only esthetic aspects of them are concerned.[3] The plants are coordinated with water resources that they can use in order to make shadows and shades as much as they can.



**2-Lodgment Orders:**

Lodgment orders are about human artificial additions to his environments. By a primary classification, the outside and inside world of garden can be distinguished. The outside world is involved with the placement of a garden in its context in accordance to its needs

and possibilities. However, the inside world of garden is mostly focuses on lodgment of kiosk or pavilion and other structures of garden.

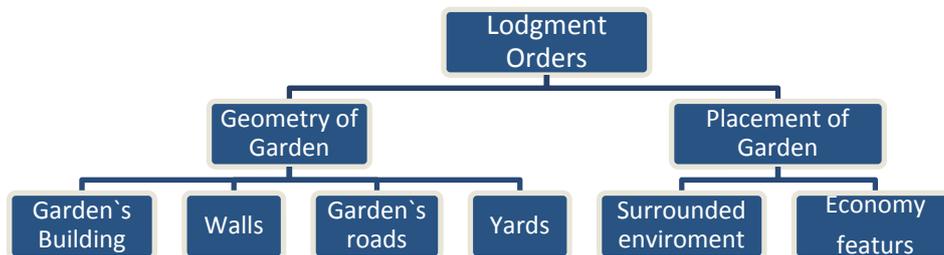


Diagram3: Lodgment Orders

### 3-Watering Orders:

One of the main features of Persian gardens is having great appetite for showing and performing water [6]. In all parts of Persian gardens, it is tried to use the optimum of site, environment and recourses. Since Iran is in arid region, one of the goals of Persian gardens is to reach a better microclimate for habitants. Therefore, water streams seem to be necessary in those gardens [2]. By strait canalling; the water wastages will be reduced dividing the garden in geometrical shapes. This geometrical design principle has continued in all periods [5].

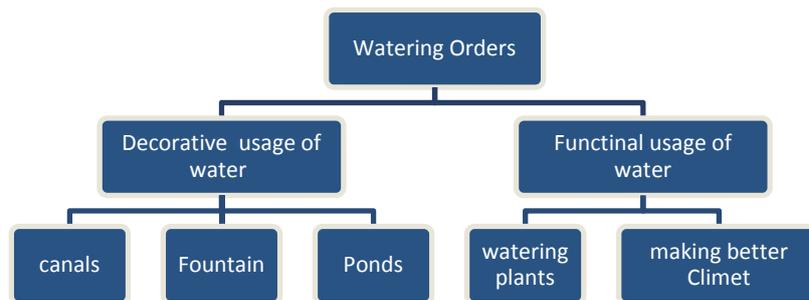


Diagram4: Watering Orders

### Sustainability in landscape

After the report of the United Nations World Commission on Environment and Development, titled "Our Common Future" to the UN General Assembly, sustainable development was defined as; "A development that meets the needs of the present without compromising the ability of future generations to meet their own needs."<sup>1</sup>

Sustainability is the interaction of three general aspects and will not be obtained without considering social, environmental, and economic feasibility.

Designing, construction, operations and maintenance sustainability should be considered.

Another criterion of sustainability in landscapes is supporting natural ecological functions by protecting existing ecosystems and regenerating ecological .

*Sustainable Sites Initiative<sup>2</sup> partnership of the American Society of Landscape Architects* determines some principles and paradigms for sustainable landscape which they used as criteria for probing them in Persian gardens:

**1-Do not harm**

**2-Precautionary principle**

**3-Design with nature and culture**

**4-Use a decision-making hierarchy of preservation, conservation, and regeneration**

**5-Provide regenerative systems as intergenerational equity**

- 6-Support a living process**
- 7-Use a systems thinking approach**
- 8-Use a collaborative and ethical approach**
- 9-Foster environmental stewardship [10]**

### **Ecological Sustainability in Persian Gardens:**

Supporting a living process, not harming and using a decision-making hierarchy of preservation, conservation, and regeneration are covered in this term. The gardens were usually built as the outlet of kareez that been dug for that, before then that part had low water sources. By this new source of water and garden design, beneath fields may reach lots of benefit, using the extra water of garden which will prevent them from wind and sandstorms and environment moisture will excise. Therefore, the new situation will attract many animals especially birds and insects. In those places where water resources exist, by reducing the evaporation huge amount of water source will be saved and by covering streams with stone or ceramics it will not sink into the ground so it can irrigate larger areas.

### **Improving human life aspects by producing food, desirable climate and optimum energy usage in order of Persian garden:**

For reaching sustainability, concerning societies and environment having the benefits for human life is necessary. The improving of human life in sustain manner does not mean omitting any life access but it means finding best answers for nowadays problem in a way that does not cause further problems. As it mentioned above, the aspect of this term is divided and they will be explained:

#### **1-Select a place for Persian Garden**

The place of the garden depends on its environment. They work together although they have great paradox to each other, but this is not in order to conquest the nature, it just changes an isolate part of it and makes environment durable for human kind.

#### **2-Access to water resources:**

Water sources usually are built in the arid region so it may bring life to new places. These new courses are usually sustainable bequest they not extra pressure to reach to the limited sub sources.

#### **3-Patterns of water used in Persian Garden:**

In Persian garden, it is tried to show water in different ways and also increase the volume of it virtually to increase the desirability of it feeling water. This will be feasible by different accessories such as Partridge Chest Stone or wide falls and narrow fountains.

Water pound and streams started from pavilion to the gate to increase moisture and reduce the temperature [3].

#### **4-Select the geometry and shape garden:**

The geometrical shape of garden is based on agriculture rout of it which makes it optimized. Therefore, watering and cultivation of it is easier and has more benefits [2].

#### **5-How the components of garden work together:**

In these gardens, different elements of gardening support each other. For , in the corner of the wall which is safer than other parts of from the wind the sensitive tree were planted. In Bonegah<sup>3</sup> the plants wear planted to make the bugs get away.

#### **6 - In case of selecting plants and planting:**

In selecting the plants and trees, the esthetical aspects are not the reason for choosing a plant. In this case, each of them should have another benefits such as medical, commercial and providing food for human or animals.

The order of planting affects the depth of the plants root. Thus, they can gain the moist in all of earth levels preventing water wastage.

### **7- How to create micro-climates in a manner consistent with the needs of the Iran region.**

Inside of walls of Persian garden the new climate created to reduce the harmless of environment. This appeal is obtained by increasing shadows, air moister and preventing dry winds.

### **BREEAM and LEED**

BREEAM is the world's foremost environmental assessment method and rating system for buildings. BREEAM sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognized measures of a building's environmental performance [9].

LEED, or Leadership in Energy and Environmental Design, is redefining the way we think about the places where we live, work and learn. As an internationally recognized mark of excellence, LEED provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions [8].

Issus and parameters that are mentioned in this to evaluation system (BREEAM,LEED),were ordered in a table. Six main title chosen from those titles:

#### 1. Land Use and Ecology

1.1 Site selection 1.2 Ecological value of site and protection of ecological features 1.3 Mitigating ecological impact 1.4 Enhancing site ecology 1.5 Sustainable procurement 1.6 Construction site impacts

#### 2. Energy & Atmosphere

2.1 On-Site Renewable Energy 2.2 Low and zero carbon technologies

#### 3. Water Efficiency

3.1 Water monitoring 3.2 Water leak detection and prevention 3.3 Water efficient equipment 3.4 Storm water Design: Quantity and Quality Control

#### 4. Pollution

4.1 Reduction of night time light pollution 4.2 Noise attenuation

#### 5. Health and Wellbeing

5.1 Visual comfort 5.2 Indoor air quality & Thermal comfort 5.3 Water quality 5.4 Acoustic performance 5.5 Increased Ventilation 5.6 Low-Emitting Materials

#### 6. Materials & Resources

6.1 Storage & Collection of Recyclables 6.2 Regional Materials: Extracted, Processed & Manufactured Regionally 6.3 Rapidly Renewable Materials 6.4 Recycled Materials 6.5 Heat Island Effect

After that, in separated columns general manners of these issues in Persian Gardens are surveyed. In last columns, four examples of Persian Gardens in arid places are analyzed.

## Conclusion:

As mentioned above, sustainability concern is about the development that meets the needs of the present. Studying the succeeded principles that act sustainable in long terms, may lead us to the nowadays principles. Persian garden is sustainable if used in its own contexts. Copying it to another region with different climate and manner is not sustainable any more as was experienced in India and South Europe. Although Persian garden has paradigms and principles, its remarkable flexibility has given it an opportunity to be followed in contemporary. There are some problems such as the user which is changed. However, it doesn't mean it is useless.

## Notes:

1. UN General Assembly, Our Common Future: Report of the World Commission on Environment and Development, 1987, chap. 2, "Towards Sustainable Development,"
2. The Sustainable Sites Initiative is a partnership of the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center, and the United States Botanic Garden in conjunction with a diverse group of stakeholder organizations to establish and encourage sustainable practices in landscape design, construction, operations, and maintenance.
3. one of the most significant ruling dynasties of Iran in 16th and 17th centuries.
4. Garden with lattice walls
5. kareez (Persian: کاریز) (also spelt kareez / karez / kariz and later called qanat in Arabic). Kariz was an ancient water pipe system laid from the source of spring water in the mountain valleys to places where it could be used. (www.wikipedia.com)

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