

# THE REVIEW OF PERSIAN GARDEN CONCEPT IN TERMS OF ACHIEVING SUSTAINABLE CITY: CASE STUDY OF DOLATABAD GARDEN IN YAZD CITY, IRAN

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## Abstract

One of the basic concepts of achieving a sustainable city in the theoretical framework of the sustainable development is the impacts of urban green spaces. Persian garden, arising from the historical thinking, has an eminent and lofty station in traditional urbanization in Iran and it can have a contribution as a key for promoting sustainability of today's cities. Through reviewing Dolatabad Garden as one of the most valuable gardens from historical and architectural standpoints in Iran, through a comparative study, this research has investigated the garden contribution in achieving a sustainable city through today's city in the form of the theory of sustainable urban development. Finally, the paper shows that the role of the garden in increasing the achievement of a sustainable city and permanence of ecological balance in Yazd is very evident and undeniable.

**Keywords:** Dolatabad Garden, Persian Garden, Sustainable City, Sustainable Development, Yazd City.

## 1. INTRODUCTION

With growing increase of population on the earth, the movement and rotation of life balancing system suffered broad challenges in different economic, social and environmental fields. Life balancing system which has been founded for thousands of years in rotation and balanced effective relation in a two-sided framework of production, consumption and finally reproduction, now it has changed in line with the destruction of this biological balance. As an axis of these changes at the center of this imbalance, man felt the danger of disruption of the balancing relations and tried to reduce the destructive effects of this important issue. Meanwhile in the last century, some events appeared in the course of scientific insight development in relation to this problem in order to give birth to and develop the concept of sustainability and consequently the concept of sustainable development.

Sustainability changed to a new concept in the form of the idea of scientific program in order to think about fundamental solutions for life survival and achieving the biological balance. In this respect, theoretical-scientific frameworks of this concept were introduced in all broad dimensions of life in the recent decades.

This caused the formation and development of the key concepts of sustainability in balance between a city and the nature, the need for a fairer society and considering sustainable economy (Wheeler & Beatley, 2004). At this time, the concept of a sustainable city was increasingly considered in contrast to an unsustainable city. In this relation, as physical and nonphysical constructive elements, urban elements also should contribute to sustainability of the city. One of these elements, especially in traditional cities with historical antiquity, in Iran is garden.

The role of garden, architecture and its designing with a deep look at the culture of different countries had been formed in the cities in the past. Nowadays, as an atmosphere with various capabilities and with emphasis on historical heritage of a territory, it has a significant contribution in promoting cities in different dimensions. One of the most central of these roles is increase in the rate of sustainability of a city and achieving a sustainable city in the form of sustainable urban development. Persian garden is the result of constructive cultural interaction between man and nature. In Persian culture, nature is like a platform for man's development and excellence.

With full respect to nature, Iranians have organized them side by side and have created a product called Persian garden. In this view and given the needs of the next generation, the role of the garden is effective as a basic element in Persian urbanization especially a big and outstanding garden like Dolatabad Garden in Yazd as a catalyst in achieving a sustainable city. Therefore, it can be acknowledged that as a possibility in the modern city emerged from history and urban origins of the period, Dolatabad Garden in Yazd has an important contribution in the city's movement in achieving the concept of sustainability. This state can be observed in comparing definitions of sustainability with what is considered from the proposed garden.

A documentary research related to the role of Persian garden in sustainability of cities has not been done so far and the existing studies in this field have been done with an emphasis on the green urban areas.

For this reason, this paper is the first research which investigates the issue with an emphasis on Persian garden and in line with reaching the achieved results; the main question of this research was such stated "What is the position of Dolatabad Garden in Yazd?" Sub-questions such as "How is the

concept of Persian garden in traditional- historical cities in Iran and what is the contribution of Persian garden in achieving a sustainable city?" were also proposed in this direction.

The main assumption of this paper is on the base that as a historical and ecological element of the city, Dolatabad Garden can compare itself with sustainability criteria and have a significant role in the direction of Yazd sustainability.

The method considered by the research to achieve the goal can be stated in two parts: 1- analysis of the content of opinions, understanding historical issues and extraction of components in the field of cities sustainability and the issues related to Persian garden and 2- comparative review of Dolatabad Garden in Yazd with the achieved components and its evaluation.

Through a qualitative approach based on a collection of library and field information, in accordance with descriptive-analytical method, this research tries to offer versatility of Persian garden guidelines with modern cities sustainability.

## 2. DEFINITIONS AND CONCEPTS OF SUSTAINABLE DEVELOPMENT AND SUSTAINABLE CITY

The term "sustainability" has been taken from the Latin word named "sustenerere" which is meant "guarding" and "supporting". Also, in Longman Dictionary, the term "sustainability" is meant ability to survive for a long time (Summers, 1998) and/or leaving a positive impact on community, economy and environmental condition of people in future and/or in other places (Cowan, 2005). Although concept of sustainability is global, it seems that sustainability is obtainable and significant when it is found practical through local initiatives with the global thinking (Cuthbert, 2003). Here, sustainability belongs to the city and urban spaces which can promote cultural continuity and help viability and sustainability of the citizens and can provide preliminary ground or improve their individual growth and can add sense of connection in time and place (Lynch, 1960).

Actually, sustainability seems more to be a process than a series of incorporated ideas, in which, its basic principles is inferred from change of condition, ideas and ideological capabilities (Association, 2006). However, in concept of sustainability, it should be noted that addressing capacities and activities within the framework of time is a requirement which sustainable development takes effective steps to remove it (Fig.1).

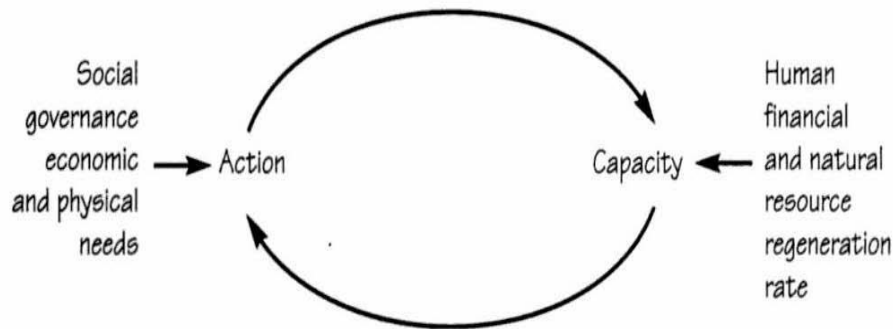


FIGURE 1 - SUSTAINABILITY CYCLE (HALLSMITH, 2003)

So, sustainability cycle includes system relationship of two concepts of activity and capacity within the time framework. Since sustainable development is a multidimensional concept, presenting an accurate definition of it is impossible. World Commission on Environment and Development has presented the simplest definition as follows: sustainable development is a development which meets current needs without marring ability of the next generation to meet its needs. Also, they have defined sustainable development as meeting needs of the current generation through the integration of environmental support, social progress and economic success (Nelson, 2007).

The concept of urban sustainability and urban sustainable development are mostly used instead of each other due to the closeness of their meanings. To differentiate these two concepts, we should bear in mind that the word "sustainable development" actually indicates a process, through which sustainability can be happened but the "sustainability" is a complex of situations which is sustainable during the time (Maclaren, 1996). Hence, in conceptual distinction of the sustainable development, a sustainable city can be defined as follows: "The basic of sustainable city is a general agreement that the city we know today and live in it creates unsustainable environmental tensions and enjoys of different classes in social terms and is not appropriate in terms of performance and administering it will cost dearly" (Frey, 2004). So, "To attain sustainable cities, theoretical approaches of urban sustainable development should be adapted with the practical and executive concepts in the development of cities and local and native patterns of sustainability should be applied for the future development of the city. For example, many studies have thus far been carried out with regard to the urban sustainable forms and major results indicate that there is not a complete pattern of city sustainable form to be applied in all cities and each city requires following up extraction of local sustainability patterns" (Burton, Jenks, & Williams, 2004). Also, it should be considered that adoption of a logical approach in line with planning sustainable city with regard to the "Local Initiatives with the Global Thinking" has been highlighted as an inevitable issue in planning sustainable city. So, we should bear in mind that "a sustainable city is something

beyond a geographical ambience." It is obvious that city includes economic, social, political and environmental space as well and is severely influenced by a wide range of national and international processes" (Pugh, 2000).

Sustainable city enjoys features in line with attaining sustainability concept which thinkers of planning science have studied it within the framework of sustainable development. However, comprehensive sustainability conditions in a sustainable city can be observed in direct relationship with three components (Fig. 2) as follows:

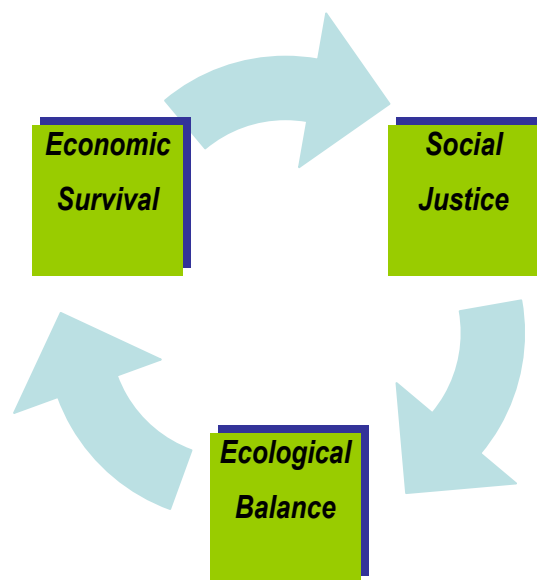


FIGURE 2 - RELATIONSHIP BETWEEN COMPONENTS OF SUSTAINABLE CITY (HALLSMITH, 2003)

However, the general strategies of attaining each of them can be posed according to Table 1.

TABLE 1 - MACRO OBJECTIVES OF ATTAINING SUSTAINABLE CITY WITH RELATION TO THE COMPONENTS OF SUSTAINABLE CITY (CURWELL, DEAKIN, VREEKER, & SYMES, 2009)

<b>Environmental and environment</b>	Protecting and facilitating accessibility to the heritage and preserving resources to improve quality of local environment
<b>Economic</b>	Supplying diversity (in manmade artifacts) Increasing integration of components
<b>Social</b>	Strengthening social life Improving social justice

Also, specifications of sustainable city particularly in the field of environment include as follows: reducing energy consumption and improving energy management, revising quality and management of water resources, preventing from land use and revising land management, reducing goods consumption and materials and modifying their management, preserving, protecting and adding natural and manufactured heritage which are taken into consideration by the urban planners in the field of new planning.

So, sustainability in cities can be used through the development of changes of human settlements, “so that a city can be found more sustainable with reducing consumption of resources such as land, energy, water and materials, and reducing pollutions and simultaneously with the increase and improve of its environmental conditions such as health, work, income, building construction, recreational activities, accessibility, public spaces and community” (Cuthbert, 2003).

So, sustainable city is established by the specialty of urban planner in line with planning within the framework of concept of sustainable development in different dimensions and with a systematic approach. Hence, it has always been tried to maintain its sustainability in different aspects and dimensions within specific time and place.

### 3. THE ROLE OF GARDEN IN ACCESSING SUSTAINABLE CITY

The concept of sustainable development and following sustainable city was first put into the realm of theory thanks to the environment and future generations. However, after several years, the discussion on the environment and focusing it in accessing sustainable city is of paramount importance. Also, existence of gardens and green areas has value and heritage aspects in national or international arenas.

In ecological sustainability, “environment” is the expected subject. An ecosystem is a system that enjoys physical resources such as skeleton, climate, land form, soil property, stones, etc. and biological resources such as including animals, microorganisms, etc. and complex of the processes between these two which lead to the continuation of the system (Table 2). Yet, a sample of sustainability criteria in the environmental sector can be put forward as follows:

TABLE 2 - SUSTAINABILITY CRITERIA IN THE ENVIRONMENTAL SECTOR (BURTON ET AL., 2004)

Objectives of Sustainable Development	Sustainability Criteria
Healthy environment	<ul style="list-style-type: none"> <li>- Protecting natural habitats,</li> <li>- Protecting existing green belt,</li> <li>- Reusing land</li> <li>- Reducing light and sound pollution</li> <li>- Protecting quality agricultural land areas</li> <li>- Protecting water and its quality</li> <li>- Protecting landscape and view</li> <li>- Protecting cultural heritage</li> <li>- Protecting and promoting specifications of settlements</li> </ul>

#### 4. PERSIAN GARDEN, A FRAMEWORK TO ACCESS SUSTAINABLE CITY, DOLATABAD GARDEN:

##### 4.1. Persian Garden:

Before the Industrial Revolution and rapid growth of cities in the Muslim cities and even before it, relationship between human with natural environment and built environment was establishing consciously. Since ancient times, Iranian rites and rituals have established a very intimate relationship with sanctifying “trees” and “greenness”, in which, sanctity is experienced as an objective and scientific issue in skeleton. Paying attention to each of classical four elements in Persian Garden has old deep rooted: Soil, Water, Wind and Fire, each of which is used according to their feature in structure of the garden” (Bahreyni & Taghadosi, 2003). The Persian garden, as a perfect structure, demonstrates a close relationship between cultural and natural backgrounds and indicates an adaptation and alignment between human needs and the nature. In the past, the Persian garden would help reveal latent potentiality of the environment and perceive its intricacies. The creator of the garden would rely upon his own experimental knowledge to create a place, which brought about the survival and dynamism of the natural background (Irani Behbahani & Khosravi, 2006). In the meantime, Persian Garden design has been influenced by the other nations without paying attention to the transposition and/or vice versa, “Persian Garden design in the after advent of the Islam has been designed based on square shape. This shape is mostly in complete square or rectangular shape. It can be confessed that structure of Persian Garden is designed based on Mandalay shapes with the distribution of water circulation in gutters. Also, in geological aspect, Persian Garden was also constructed at the places which enjoyed potential talent of garden construction in terms of environmental capabilities” (Irani Behbahani & Khosravi, 2006). Paying due attention to the “vastness, landscape and respect” can be observed as salient architectural components of the Persian Garden. For this reason, interpretations such as "Rozat-e Jannat", "Jannat", "Rozat al-Sefat" and "Ferdows, meaning Paradise", etc. have been used for it in different times (Moradi et al., 2012). The picture of Dolatabad Garden is demonstrated in Fig. 3.



FIGURE 3 - DOLATABAD GARDEN OF YAZD, SIMILAR TO THE PARADISE

Generally, two knowledge attitudes, special of Persian Garden, can be observed in contemplation of design, construction and preservation of the Garden (Fig.4):

1. Climate Ecology
2. Commitment ecology

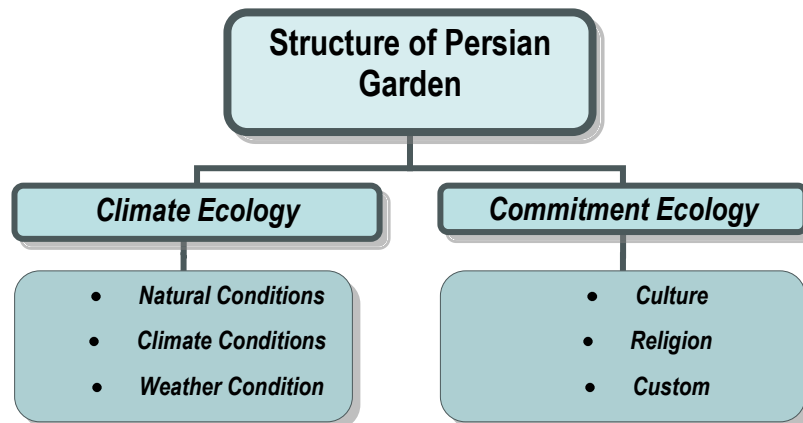


FIGURE 4 - MAIN COMPONENTS OF PERSIAN GARDEN STRUCTURE

Finally, it can be said that Persian Garden can be known as wise relationship of human and the heavenly nature. Recognizing secrets and mysteries of this relationship is possible in a systematic approach through the identification of Iranian traditional culture (Pourjafar & Taghvaei, 2006). Hence, with due observance to the concept of sustainability theoretically and practically and considering human need in all physical and metaphysical dimensions, Persian Garden is seeking to meet the human needs.

#### 4.2. Dolatabad Garden

As a sample of great Persian gardens, Dolatabad Garden is categorized with Fin Garden in Kashan and Shahzadeh Mahan Garden which has been constructed in 1160 (Hejira).

The beautiful and height wind catcher of the Dolatabad Garden is the tallest ever known type and its octagonal mansion has been constructed with unique feature. Dolatabad Garden in Yazd is located in a region which many gardens can be observed in its surrounding, except east part of the garden which is connected to some residential houses (Figs. 5 and 6). There is a street in its west part which leads to the alleys.

The design of Dolatabad Garden is one of the most unique and innovative of official Iranian gardens. It has an area of 6.7 hectares and its plan is divided into two rectangular sections measuring 116\*274 meters and 104\*278 meters, laid out perpendicular to each other. The symmetrical axis of the larger



rectangle, now commonly known as Dolatabad Garden, makes up the andaruni or interior garden that served as the private garden and residence of the governor and his family. The smaller rectangle, located on the northern side of the andaruni, indicates the exterior boundary of the biruni, of exterior garden. This garden, known as Behesht A'in like Paradise was the exterior part of the garden and served as the venue for holding official government ceremonies and sporting events.



FIGURE 5 - LOCATION OF DOLATABAD GARDEN (GOOGLE EARTH)



FIGURE 6 - LOCATION OF DOLATABAD GARDEN (AGOI, 2012)

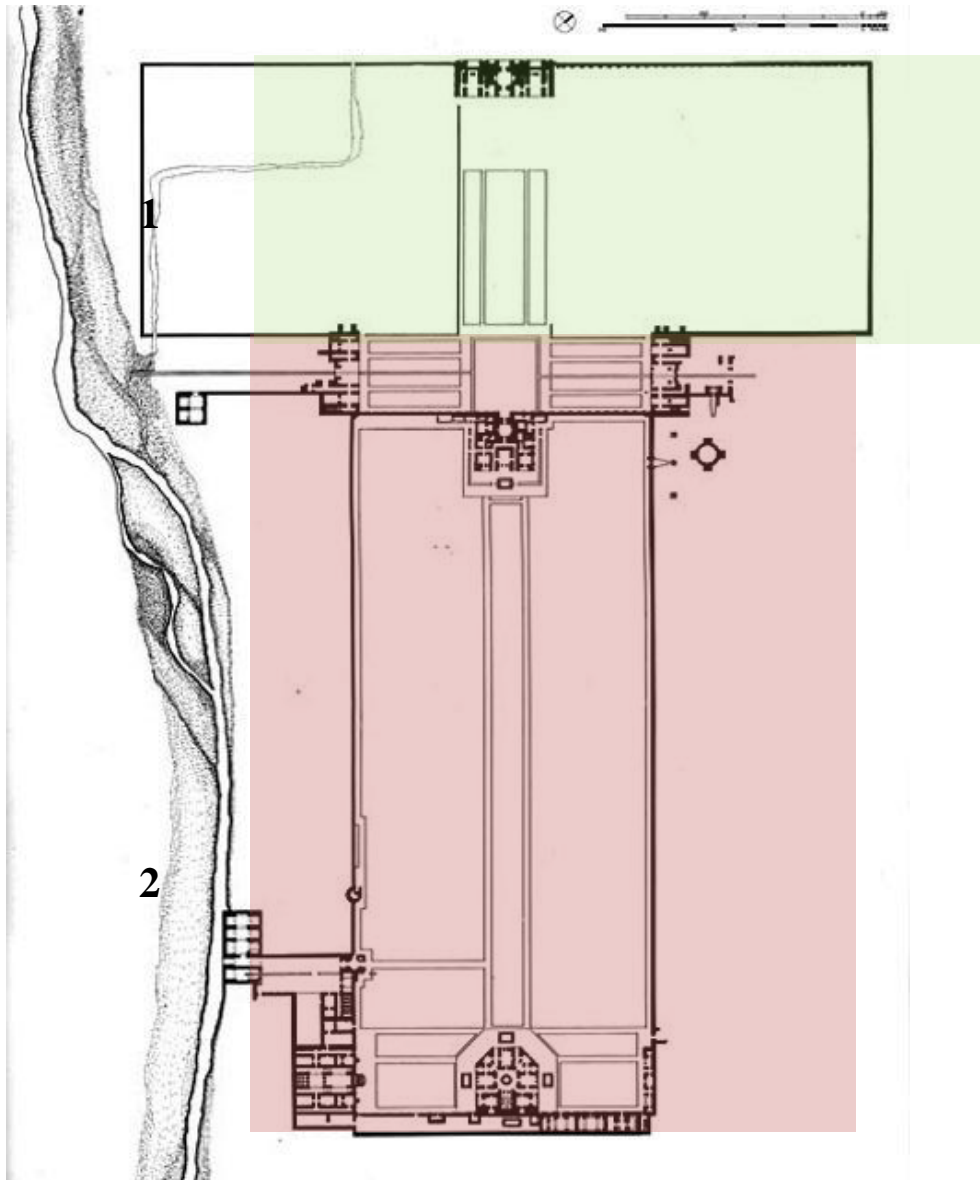


FIGURE 7 - SITE PLAN OF DOLATABAD GARDEN; 1. EXTERIOR GARDEN AND 2. INTERIOR GARDEN (HERDEG, 1990)

Dolatabad Garden enjoys Iranian-Islamic architecture. Focusing on structure and environment, the Garden has managed to establish sustainability with relation to the current city of Yazd.

With due observance to the abovementioned subjects on the concepts of sustainable city and urban sustainable development and also introduction of Dolatabad Garden, the components, posed in case study of Dolatabad Garden, can be studied, details of which have been mentioned in Table 3.

TABLE 3 - STUDYING ROLE OF DOLATABAD GARDEN IN SUSTAINABILITY OF YAZD CITY

Sustainability Dimensions	Sustainability Feature in Dolatabad Garden
Social Sustainability	<ul style="list-style-type: none"> <li>- Separation of spaces such as public, semi-private and private. (Fig. 7)</li> <li>- Relationship of religion and structure</li> <li>- Observing respect particularly in exterior garden which has been planned as cemetery.</li> <li>- Establishing relationship with the current city (time sustainability)</li> <li>- Paying due attention to the individual personality of Garden and establishing relationship with internal and external parts (Figs. 8 and 9)</li> <li>- Boosting joyfulness and freshness among citizens,</li> <li>- Using Iranian –Islamic design and architecture</li> </ul>
Ecologic Sustainability	<ul style="list-style-type: none"> <li>- Focusing on irrigational system with appropriate positioning such as water of underground channel (Ghanat) and river (Fig. 10)</li> <li>- Increasing environmental greenness and pleasure</li> <li>- Using local and aboriginal construction materials (Fig. 11)</li> <li>- Focusing on role of Garden to improve environmental conditions especially in city</li> <li>- Creating respiration place in city</li> <li>- Boosting health of citizens</li> <li>- Improving urban landscape</li> <li>- Following gardens from land topography</li> </ul>
Economic-Structural Sustainability	<ul style="list-style-type: none"> <li>- Establishing structural relationship with surrounding environment</li> <li>- Positioning in consistency with the elements of Garden (water, trees and main structure)</li> <li>- Promoting international tourism and ecotourism in Yazd city</li> <li>- Observing sustainable architectural principles</li> <li>-centrality, symmetry, hierarchy and repetition in monument</li> <li>- Land use amalgamation in gardens (residential, trade, recreational and tourism)</li> <li>- Formation of garden in consistent with the surrounding environment</li> </ul>

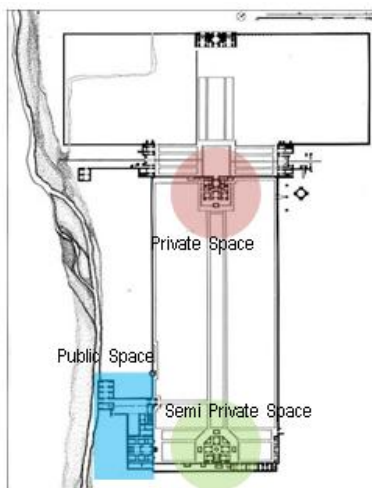


FIGURE 8 - SEPARATION OF SPACES IN DOLATABAD GARDEN (HERDEG, 1990)

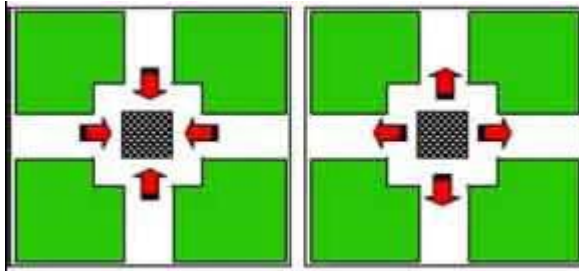


FIGURE 9 - RELATIONSHIP WITH INTERNAL AND EXTERNAL PARTS OF DOLATABAD GARDEN



FIGURE 10 - GHANAT PATH AND APPROPRIATE POSITIONING FROM DOLATABAD GARDEN (GOOGLE EARTH)

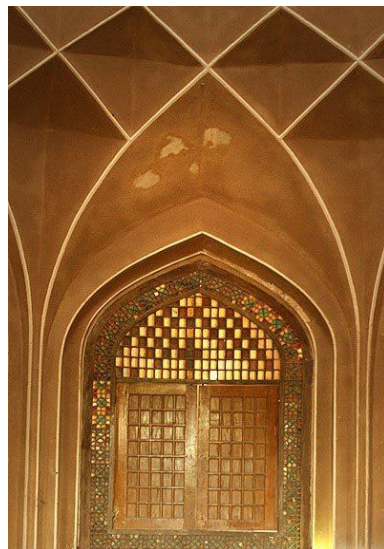


FIGURE 11 - USING LOCAL BUILDING MATERIALS IN DOLATABAD GARDEN

## 5. CONCLUSIONS

Studying various presented definitions and concepts clarified different components of the sustainable development in various dimensions and was specified that sustainable development is a comprehensive and multidimensional concept. To achieve comprehensive urban sustainability, all dimensions should be studied and analyzed in interaction with each other. The sustainable development and urban sustainability has a process concept which is running at the end of city as a result of a systematic approach and with considering various capacities of the city. Hence, city sustainability requires sustainable elements in different dimensions to ensure its sustainability in addition to establishing relationship with the elements in urban system.

In the present study, principles and components of sustainable development and sustainable city were studied with relation to the Persian Garden. The research hypothesis was based on this contemplation that Dolatabad Garden in the contemporary city has managed to pose itself as a sustainable element. In this line and based on logical system, partial to whole and whole to partial has played a key role in sustainability of its cities. Findings and results of this study confirmed this hypothesis to some extent, the most important of which are as follows:

- Realization of high percentage of social sustainability, ecological sustainability and economic sustainability due to the passage of time as of initial construction of the assumed gardens which indicates realization of sustainability based on the initial definitions of concept of sustainable development.
- Focusing on the cultural and religious principles as basis of accessing sustainability at the bed of environment and time with observing mutual respect on bio elements which architectural design of Dolatabad Garden has been formed based on it. However, focusing on components of Islamic architecture such as symmetry, centrality, hierarchy, repetition and diversity, which has managed to assist works in line with sustainability of the monument.
- Observing environmental principles in monument and creating diversity for the city and face of the city as well as increasing balanced relationship with the ecosystem in today city which indicates city sustainability in environmental dimensions.
- Focusing on cultural heritage and increasing tourism for the city and country in line with the concept of sustainable development, in which, Dolatabad Garden has managed to add role of Yazd city.

- Increasing structural role of respiration for the residents of the city by the Persian gardens in contemporary urban planning with the principled approach to the participation of Dolatabad Garden in the city of Yazd. Hence, residents have managed to take advantage of this place with this objective.
- In contemporary city of Yazd with the land use amalgamation, Dolatabad Garden has managed to take giant stride in the current time in line with the sustainability of the city and monument.

Based on the findings of the research, it can be said that Dolatabad Garden, as a historical element, has managed to adapt itself with the sustainability criteria and has played a key role in line with the sustainability of Yazd city in such a way that new urban planning movements in the city have not managed to reduce effective role of the garden in line with increasing urban sustainability. Hence, we should consider that vastness of cities and following more isolation of civilized human beings from the natural environments, increasing environmental pollutions, growth of modern life, necessity of requirement to the nature and natural elements in the life engulf human being more every day. In this line, in contemporary era, creating green space within the framework of parklands in Yazd city, which is formed rarely based on the principles governing Islamic and Iranian garden construction, has not managed to fill location of the garden in Iranian urban planning. So, role of Dolatabad Garden seems much more important and effective in increasing urban sustainability.

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