

Planting plan playing, the role of Garden's Landscape

The Evolution of Planting Plan in Tabas Golshan Garden

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Abstract | In Iranian culture and art, a garden is an integral part of Iran's identity reflecting how human beings have interacted with nature. Planting and vegetation designs are an important part of a garden. Since vegetation is a decaying element of a garden, its replacement and restoration as an architectural monument is not quite easy. Therefore, examining the history of the garden and the study of its initial patterns are of particular importance. Therefore, this study is an attempt to investigate vegetation and changes in the initial patterns of planting in the Golshan garden in Tabas. In order to investigate the evolution of the planting design, we gathered the data through field observations by a gardening specialist and interviews with elderly people, local historians, and experts. The primary data were collected from available sources. During the field observations, the type of trees and its location in the garden were examined. The observation was carried out to the extent that their cultivation patterns emerged. Through this historical study, the original garden pattern and its vegetation were discovered. The emerged patterns can help us identify plants not aligned with the original garden landscape and restore and preserve the originality of the garden.

Keywords | Desert Garden; Vegetation; Planting Pattern; the Golshan Garden; Tabas.

Introduction | The Golshan Garden, the most important government garden in Tabas, has only a transom. Inside the garden, there are not any other monuments. The garden was built by Mir Hossein Khan, appointed by Nader Shah as the third governor of Tabas. Mir Hossein Khan donated this garden and many properties to charity in the letter prepared in 1218 AH (Moravej Torbati & Hosseini, 2013: 92). This work was recognized as a national monument of Iran on December 20, 1976 (registration number 1310). This garden is designed based on the pattern of Chaharbagh (four sections) where two streams meet each other. The primary architect of the garden has designed its Green Nature in form of a chessboard by using the different type of trees. This garden is almost square

about seven acres. Based on the geometric information of the garden and its characterizations, The Golshan garden is categorized as Persian garden. Mirfandresaki defines Persian garden as follows: "Persian garden is enclosed by a rectangular fence with vertical axes which are parallel to the sides of the fence". An important feature of this garden is the water running through this arid and rainless area

In Persian tradition, a tree is the symbol of freshness, tranquility, and beauty (Sedigh, 2012: 33). Plant, the earth and the water, and the architectural components are four elements forming the body of the garden (Khan-Mohammadi, 2015: 58). Available studies have focused on the architectural components (construction materials) and water, and the subject of the plants has been poorly understood. Even less has been documented on Tabas garden. As some trees of this garden have vanished over time, our knowledge about this garden is scanty.

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History always holds natural and political events, etc. These events can bring changes to various places, including gardens. Understanding the elements of gardens, such as trees, which can not easily be replaced, is of necessity. The degradability of this living element which can cause changes in the pattern and the main form of the garden over the years doubles the importance of documenting the information related to plants. Of fifty historic gardens in Tabas (Before the devastating earthquake of 1978), only the Golshan Garden left.

In addition to what has been discussed, gardens in the desert of Iran have been threatened by successive droughts. Having a better knowledge of the desert gardens in terms of plant species, their location, and protection can help us better design the garden. Therefore, this study attempts to seek and offer a method for recording the information related to the vegetation of the historic gardens. The suggested method can also be used for determining the initial planting pattern of the garden, or the important components of its development. To this end, The Golshan Garden in Tabas, one of the most important Persian desert-historical gardens, was selected as a case study. The purpose of this article is two-fold: a) investigating the vegetation of The Golshan historic gardens and b) understanding how the vegetation in the Golshan Gardens has been and what was the initial planting pattern in this garden.

Research Methodology and Data Collection Procedure

The research is descriptive-historical and the data were analyzed based on available sources and field study of the planting pattern of the garden. Library databases were extensively searched and field data were gathered through field observations and interviews with competent experts then the planting pattern of this historic garden from its construction time till now were examined. To this end, all the sources related to the plants in the Golshan Garden were reviewed and in the field observations, the locations of the plants in the garden were examined. Moreover, the interviews were conducted with expert people in this area and elderly people as well as local historians.

Literature Review

Different articles and books have referred to the Golshan Garden. For instance, Deserts of Iran by Sven Hedin, MacGregor's Travelogue, Tabas Geography, and a reflection from Paradise and Tabas Gardens (Hedin, 1976; MacGregor, 1879; Amini, 2005; Khansari, Moghtader & Yavari, 2004; Daneshdoust, 1990). However, in all sources except Tabas gardens, there is no comprehensive explanation for the gardens, especially its cultivation. These studies have mainly focused on plant species or mentioned the current water and its transpiration. Most of these researchers in one way or another have stated that the original foundation of the garden was an irregular palm grove.

The Vegetation Diversity of the Golshan Gardens in Historical Documents

Examining the documents showed that the types of plants used in each garden were primarily tied up with the function of the garden, the geographical location, the climate and the area where the garden was located. In gardens where the issue of economic productivity was a concern, more fruit trees and different types of vegetables were raised. Shady and decorative trees were planted in ceremonial or government orchards. The plants in the Golshan Garden can be divided into the following groups.

Productive Trees in the Golshan Garden

- Productive trees are typically part of a Persian garden.
- In some references, it is written that the fruit trees are more planted in the side paths than the main ones. Daneshdoust says that, except for the main axis, the rest of the garden consists of small gardens full of fruit trees which have been planted regularly (Daneshdoust, 1995: 91-95) In addition, some various references randomly and briefly have explained fruit trees in the Golshan Gardens as follows:
 - Inside the plots created by garden divisions, pomegranates and orange trees are planted alternatively. These trees are suitable for local climates, but shady trees have been sporadically planted (Durighello, 2010).
 - Hedin states: "The very long and straight streets end in the city square, and there are streams on each side of the street. The berry and orange trees grown in several rows create the necessary moisture" (Hedin, 1976: 433). Confirming Hedin, in a similar vein, Daneshdoust also states: on the two sides of the street, the entrance axes of two other streets which are paralleled separated by the rows of trees. On their outer edges, there are rows of orange and pomegranate trees, and these rows of the tree are somehow orderly (Daneshdoust, 1990: 91-95)
 - In his travelogue, MacGregor refers to the Golshan garden in Tabas, and highlights the cultivation of different fruit trees: "There are plenty of palm trees here and there, and oranges, pomegranates, and peaches grow here." (Macgregor, 1879)
 - A systematic review of Garden in a book titled Tabas Garden shows that fruit trees are planted in the side garden. These gardens are called Madoon¹. In Madoons, there are pomegranate and citrus trees, and other fruits such as plum, apricot, green plum and a few apple trees (Daneshdoust, 1990: 91-95)
 - In his article, Godard describes Hasan Khan Sheibani and states that: He built a wide street ending a very beautiful garden called the Golshan Garden; the garden held a variety of trees, especially dates and citrus.
 - Daneshdoust also refers to the rows of palm trees and oranges in the outer edges of several streams (Ibid: 96). He also adds that in a slope caused by the difference in height between two upper and lower levels of the garden, the grapevine

used to be planted and in the last half-century these sloping surfaces have been decorated with colored rocks for saving water (Ibid: 91-97).

Within Daneshdoust's book, there is an image of a tree branch with some hanging yellow leaves on which there are red spots. These remaining leaves signify the end of the autumn. Based on the branch type, the tree must have been "quince"; the tree which is usually resistant to leaf shedding (Ibid: 113).

Nonproductive Trees in the Golshan Garden

Reviewing historical studies and documents from various travelogues show that not much exists on non-productive trees in the Golshan Gardens. This is because shady and unproductive trees are planted on the main routes of Persian gardens for their shadow.

Like a palm grove, in Golshan Garden the tree seeds are sparsely sowed. The main designing lines of the garden include two main paths, one on the entrance axis and one inside the garden in a vertical position (Durighello, 2010).

Sven Hedin, a Swedish traveler, have referred to the street in the Golshan Garden in his travelogue and written: on the sides of the streets, there were weeping willows and on each entrance axis, there was a water stream. On the inner edges of the streams, there were short willows known as Mashhadi or foregin Willows. He also mentions acacia trees on the outer edges of the stream (Daneshdoust, 1990: 91-100).

In the geographic book of Tabas, Amini refers to weeping willow and tall cypress trees (Amini, 2005: 185). However, according to Daneshoust, the two cypress trees that did not use to be in the old photographs of 1317 can be seen in the photos taken in recent years. Without these two, the garden looks longer. Planting these two trees, which after a while one of them became withered, has shortened the axial landscape of the garden and faded its beauty. Unfortunately, in other areas of the gardens, some cypress trees have been planted. The selected places for trees are not appropriate for Iranian gardens (Daneshdoust, 1990: 136).

- Some trees and shrubs can be seen in the picture taken from the poch at the rear transom. A small collection of leaves in the upper right corner of the picture must have been related to a tall plant. This tree has already dried up, and nothing but a dry body of which has been left (Ibid). In another picture of the garden, the passageways between the two plots, some parts of the tree trunks and the leaves of the pine trees behind the bench are visible and in the right part of the picture, there are the rows of the cyress trees (Ibid).

Decorative Shrubs and Ivies in the Golshan Garden

In the book titled Tabas gardens, there are references to the roses among the willow rows in the past: "... in the past there were roses in this row ", which, of course, based on the images has been published, these flowers must be Mohammadi roses which is commonly popular in our country nowadays (Ibid:

322). In recent years (Daneshoust refers to the 1971), some of the roses have been planted in the middle of the garden near the building, and they are not suitable for this historic garden. Dashoust describes the flowers of Tabas: Nastaran flower is white and pink and used to cover the wooden gardens in the past. It also refers to a flower from the family of roses.

Today, because of the emphasis on green space by municipality, new shrubs and ivies have been added to the garden. However, the changes have been done without considering the design and landscape of the garden. Examples of these trees are glycine and jacaranda.

Seasonal Flowers in the Golshan Garden

Not much has been documented on seasonal flowers in the garden. However, the available images from the past are of great help in characterizing the seasonal flowers. The absence of documents on seasonal- ornamental plants could be associated with the authors' lack of information.

In the book of Tabas, the city was: "... The difference in the level of the garden by the sloping surface between the two waterfalls and staircase planting of petunia flowers have made the design and color of the garden special (Ibid). This could be a reason for planting ornamental and seasonal flowers.

Wallflower, marigold and petunia flowers have been planted on both sides of the main street, and on both sides of the big garden lying in the middle and in the parts of the large garden. According to elderly in Tabas, there used to be other flowers like tumbleweed in the Golshan garden.

Ground Cover Plants in the Golshan Garden

Generally speaking, the science of using ground cover plants such as grass in Iran is still in its fancy. In different books, not much exists on this type of plants. Most of available sources have mentioned alfalfa as a cover plant in the garden of Tabas. In travelogue and historical documents, it is written that alfalfa has been used as a cover plant. In his travelogue, Hiden said: "My tent was set on meadow in the midst of two streams ... the tent was set up in a way that whole the day, there was a cool shade of palm trees" (Hedin, 1976: 434).

Hedges

In this paper, the term "hedge" refers to a living hedge, or the living wall, which is widely used in gardening and landscape design. However, in the old books, there is no direct reference to its pruning method and the information is mainly gathered from the images of this art.

According to a picture taken from the main axis of the garden in 1938, the walls in the front of the corridor are visible. The walls are a complete reference to Topiary science that has been part of the past in this garden. Most likely, the wall-mounted plants are privet. It is because this plant has been grown on walls in various parts of the garden since decades ago (Daneshdoust, 1990: 134). In the picture taken

from the center of the garden towards the western door, on the right of the right corridor and the left of the left corridor, regular and grouped shrubs can be seen. The outer parts of shrubs have been pruned. These plants are wall-mounted plants, which are regularly pruned owing to the pruning mechanization (Ibid).

Growing Vegetables in the Golshan Garden

Based on the literature, there were some vegetables in the Golshan garden years ago. In the book Gardens of Tabas, it is written: As the elderly remember, vegetables used to be grown in the two squares at the end of the garden (Daneshdouost, 1990). Since Tabas is a large vegetable area, especially in autumn and winter, it is likely that vegetable farming used to be practiced for earning money. Therefore, the presence of flowing and permanent water for vegetable farming in this arid area justifies why the garden is in the eastern part of the city.

The Structure of the Desert Gardens and the Golshan Garden in Tabas

It seems that the Golshan garden has been designed in an old palm grove because the palm trees are scattered in the garden and do not follow any significant pattern. The length of the garden from the entrance to the end of the entrance axis is 266 meters and length on the two sides of the square in front of garden is 292 meters and its width is 260 meters. The

garden is close to 74438 square meters (Daneshdouost, 1990). The design of the square flower-shaped garden has geometric divisions aligned with the edges of the fence (Fig. 1).

This work is based on the four- garden pattern. This area is in the form of a square or rectangle between the walls of the garden. The surface of the area is divided into four equal parts by two cross-linked vertical axes of water and is located in the center of the water fountain (Shahcheraghi, 2015: 7). However, the use of the term "Chahar- Bagh Gardens" instead of "Charbagh" dates back to the Safavid period and based on academic reports, the term includes The Golshan Garden in Tabas (Ibid).

In many desert gardens, shady trees are planted on four main paths while the fruit trees are planted in the side gardens. Examples of such gardens are Dowlatabad Yazd and the Eight Shafts Garden of Isfahan (GholiPour, Aminpour & Bahramian, 2012, Pourjafar & Rostami, 2013; Soltanzadeh, 2003).

Results and Discussion

For identifying and recording the information of each tree, consulting gardening experts is necessary. To identify trees, we recruited a gardening specialist and local personnel of green space in the garden. Initially, the main paths (four main paths) and side plots were investigated. The result of observations and analysis are categorized and detailed in Tables 1 and 2.

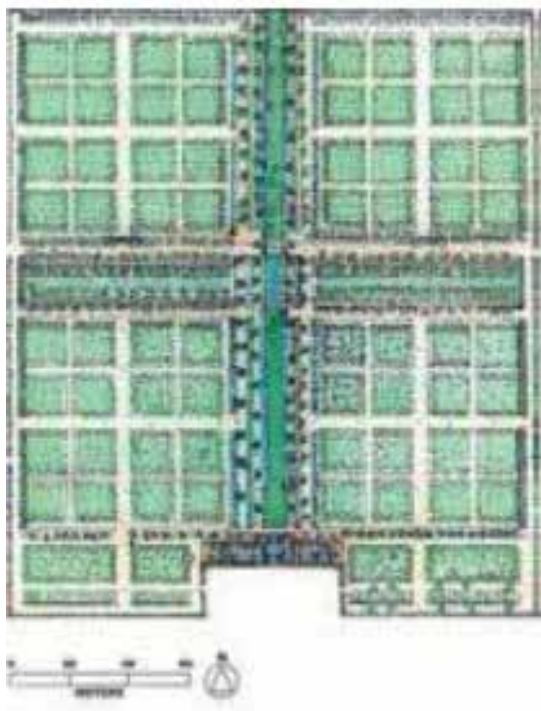


Fig. 1: Design of the Golshan Garden as Chaharbagh. Source: Tarbati & Hosseini: 1392: 94-96.

Analysis and Comparison of the Golshan Gardens in the Past with the Present

To understand the historical status of the garden, we can refer to the points of The Golshan garden described by Seven-Hedin and compare their past status with the present in terms of changes. For example, he talks about women outside the garden. At the same time, it's hardly possible to see some part of the garden wall. This indicates a very low density of trees in the eastern part of the garden. This change can be seen by comparing the ...image of the garden in some decades ago with the ones taken in recent years (Fig. 2). In the image (a) the eastern part of the garden (including images A and B), except for the main road, rarely can we see any trees. However, in image b, which is extracted from Google earth, Eastern parts are almost covered with trees and plants. Also, the part C in the old image is completely empty whereas nowadays this part includes green spots showing trees and plants.

In 1875, Meg Gregor wrote: there were many palm trees here and there, and added that palm trees were scattered in the Golshan Garden. Most likely, the scattered trees of the eastern part of the garden (see Fig. 2), sections A and B, are the same as the palm trees. He also reported his other observations as such: "Oranges, pomegranates, and peaches are here." About 15 years after these observations, Hedin did not explain about garden plants in details. The French author, Andre Gedar and his wife who visited Tabas years ago, described garden and praised the palm trees, citrus trees, the cool shade of palm trees, the meadow between the two streams, the whispers of

wind among the trees as well as numerous fountains that give water as a gift to the heaven (Daneshoust, 1990: 93; Godard, 1965). The increase in vegetation (Fig 2) could be associated with the annual donation of the trees and plants in the garden. In part of the letter prepared on June 26, 1182 by Mir Hossein Khan (governor of Tabas),it is written: "... a religious trustee in any centuries or ages has not been exempted from the development, growth of estates, farms and other donations, Every year, he has to plant trees and seedlings, and refine and restore the buildings, and this obligation is more important any other things and praying for the donator and their parents is necessary"(Daneshdoust, 1990).

Variety of factors has contributed to Gradual changes in vegetation and in its diversity: Donation made by the governor and his emphasis in executing his will, and the establishment of Tabas municipality in 1310. Danshoust also has referred to changes in trees, shrubs, ornaments, roses, and seasonal flowers in the garden of Tabas. He has highlighted that some trees are added to the garden regardless of its basic planting principles. According to him, two cypress trees in Figure 3, did not use to be in the old photograph of 1938! This change in the main garden pattern has occurred later and continued (Fig. 3). In some of the main paths of the gardens, the productive trees have been added to the garden. Such changes have not been in agreement with the main pattern of the gardens even some unproductive trees such as Eucalyptus has planted alongside and some of the side-routes do not abide by the principles of the garden. One of these cypresses was removed

Table 1: Productive and non-productive trees in the Golshan Gardens. reviewed by authors in 2016.

Unproductive trees	Productive trees
<i>Robinia Pseudoacacia</i>	<i>Punica granatum</i>
<i>Albizia julibrissin</i>	<i>Ficus carica</i>
<i>Eucalyptus sp.</i>	<i>Vinifera sp.</i>
<i>Morus alba pendula</i>	<i>Amygdalus sp.</i>
<i>Betula sp.</i>	<i>Prunus armeniaca</i>
<i>Platanus orientalis</i>	<i>Prunus subg. Prunus</i>
<i>Catalpa bignonioides</i>	<i>Cydonia oblonga</i>
<i>Celtis australis</i>	<i>Pistacia vera</i>
<i>Fraxinus excelsior</i>	<i>Morus alba</i>
<i>Cupressus sempervirens</i>	<i>Olea europaea</i>
<i>Platyclusus orientalis</i>	<i>Ziziphus zizyphus</i>
<i>Cupressus arizonica</i>	<i>Zizyphus mauritiana</i>
<i>Ailanthus altissima</i>	<i>Malus domestica</i>
<i>Pinus eldarica</i>	<i>Citrus aurantium</i>
<i>pinus Mugo</i>	<i>Citrus sinensis</i>
<i>Chamaerops humilis</i>	<i>Phoenix dactylifera</i>

Table 2: Shrubs, decorative iveries, seasonal flowers, cover plants and hedgehogs of The Golshan Gardens in 2016. Source: Authors.

Seasonal flowers	Ground cover plants
<i>Canna spp</i>	<i>Cercis siliquastrum</i>
<i>Alcea rosea</i>	<i>Salix alba</i>
<i>Matthiola incana</i>	<i>Spartium junceum</i>
<i>Erysimum cheiri</i>	<i>Ligustrum vulgare</i>
<i>Dahlia spp</i>	<i>Lagerstroemia indica.</i>
	<i>Nerium oleander</i>
	<i>Rosa spp.</i>
	<i>Euonymus japonicas</i>
	<i>Callistemon citrinus</i>
Hedges	decorative iveries
<i>Medicago sativa</i>	<i>Trumpet vine</i>
<i>Agropyron repense</i>	<i>Lonicera caprifolium</i>
<i>Ligustrum vulgare</i>	<i>Wisteria sinensis</i>

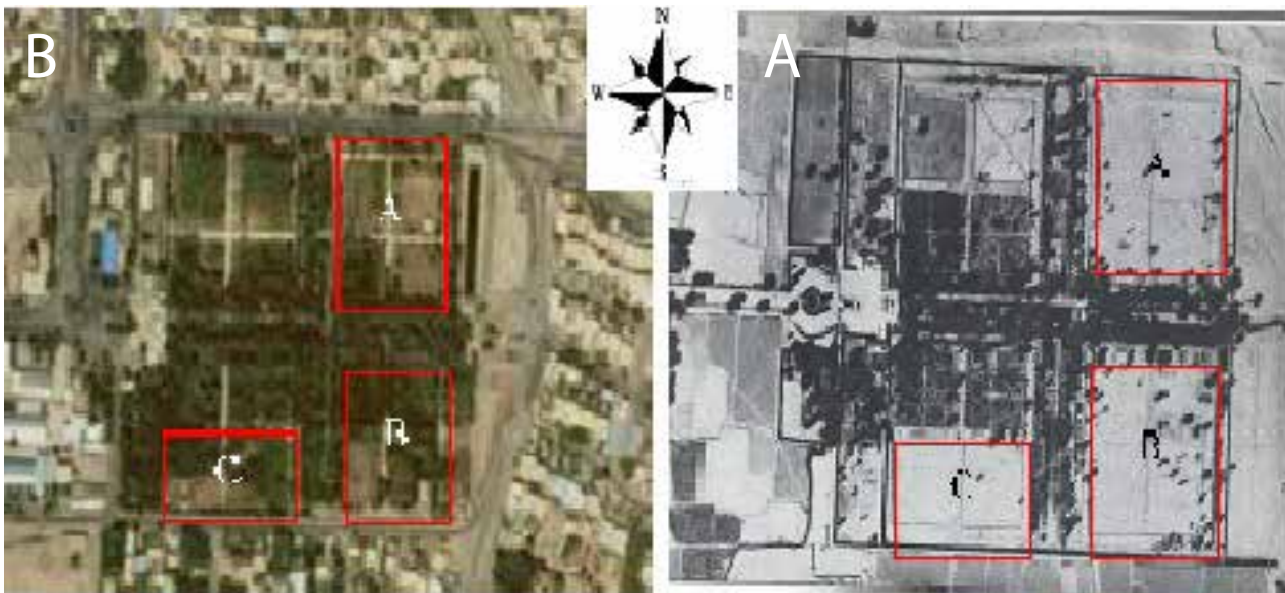


Fig. 2: Comparison of the current and past vegetation density in the aerial images of The Golshan Garden. Source from A to B: Google Earth edited ny authors and Daneshoust, 1990: 96 edited by Authors.

by the municipality in the 90's and only one of them remained. Water scarcity in the region has also been a major concern. In the past, some parts used to be decorated with colored stones, the slopes of ground used to be covered with grape trees, and now due to the water shortage, neither of them is being practiced (Daneshoust, 1990: 136). Based on this evidence, planting some fruit trees like palm trees for saving water and having fruits can be justified.

Another issue that has damaged the landscape of garden is trees which are planted regardless of the pattern of the garden. An example of this can be a hackberry tree among orange trees, or several pistachio sprouts, and fern trees. Based on the ancient pattern of Iranian gardens and the his-

torical explanations of the Golshan Garden in the past, this garden was initially a grove of palm and citrus trees (Alemi, 2011: 7) describes four gardens, like the vast forest of fruit trees and shaded and enclosed walls, with jetties and water-filled daisies. This is not a description of the massive fruit trees associated with the original form of the trees in the Golshan Garden. However, the fruit trees in Iranian gardens reflects the impact of the Islamic-Iranian culture on agriculture and gardening; cutting productive trees is forbidden in Islam and farming the most legitimate occupation practiced by the prophets and, and introduced the palm tree as the best fortune. (Khalili-Nezhad & Tobias, 2016: 6). Even in various books and in the culture of the Tabas in the past, there was a

belief that cutting off the productive trees, especially the palm tree is a sinful act and cause distress.

Informal or informal gardens, the plants were not grown only for decoration, but the plants were productive and its fruits were given to as a wage to the gardeners or brought to the owners of the gardens (Ruggles, 2008). The economic reasons and the use of products, and the self-sufficiency of the community have been among the factors contributed to the formation of gardens. Therefore, the gardens have long contributed to livelihoods (Khalil-Nezhad & Tobias, 2016). It should be noted that the geographical conditions of Tabas and its remoteness from the fertile towns have encouraged people to produce fruits and vegetables in the area. However, nowadays, the municipality annually put up the products of the garden for auction.

Conclusion

The vegetation examined in this garden indicates an increase in planting inappropriate trees and seasonal flowers haphazardly. Therefore, in answering the question of why the productive landscape can be seen in different gardens such as productive, formal and designed, we can highlight multi-dimensional features and the multifaceted merits of this type of landscaping and underline its association with cultural, environmental, and cultural contexts and economic concerns.

Examining the planting pattern in the the Golshan Garden shows that the productive plants outnumber the decorative ones. The combination of productive and unproductive trees in Iranian gardens improves both quality and aesthetic aspects of the landscape. It also reveals the multifunctional nature of the plants and a productive plant system. In fact, the productive landscape as a part of the native landscaping can contribute to production and decoration. It also serves as a platform for strolling and supporting traditional local culture and traditional agriculture.

The results of this study show that the concept of productive landscape is not limited to the selection of productive plants and is closely tied up with cultural and native components in the planning and design of Iranian gardens. Also, the function of this landscape approach is not restricted to agriculture, fruit production or the creation of visual diversity in the landscape. In fact, the use of a wide variety of plants from productive to unproductive, from a seasonal to a perennial, forms a multi-functional landscape which generates income, entrepreneurship, and self-sufficiency. Such a landscape can be characterized as healing, beautiful, safe and ecological, and an optimal.

Although the condition of the region has influenced the diversity of cold or warm- climate plant species in the Golshan Garden, planting design by non-specialists often has expedited this change and caused serious disturbance to planting order.



Fig. 3: Cypress trees that do not follow the main pattern of the garden. Source: Daneshdoust, 1990.

Footnote

1. Madoon in Tabas refers to the gardens shaped by dividing each main square into four sub-squares.

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HOW TO CITE THIS ARTICLE

Ghasemi, H. & Mehrabani Golzar, M. (2018). Planting plan playing the role of Garden's Landscape. *Journal of MANZAR*, 10 (43): 6-13.

DOI: 10.22034/manzar.2018.68095

URL: http://www.manzar-sj.com/article_68095_en.html

