MANZAR, *17*(70), 6- 17 / Spring 2025
DOI: 10.22034/manzar.2025.496337.2324

Persian translation of this paper entitled:
خوانش اصول و الگوهای باغ ایرانی با هدف استفاده در فضاهای سبز شهری معاصر
.is also published in this issue of journal

Review Article

Reading the Principles and Patterns of the Persian Garden for Application in Contemporary Urban Green Spaces*

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Received: 28/12/2024 Accepted: 19/02/2025 Available online: 21/03/2025

Abstract | Persian garden design, which began with the creation of the Pasargadae garden, continued until the Qajar period. However, during this era, the traditional Persian garden-making approach gradually faded into oblivion. In the Pahlavi period, the first modern green space, known as "Park-e Shahr", was established. Today, due to the increasing psychological and mental health crises affecting modern humans, many scholars are seeking to restore the connection that has been lost between humans and nature. In Iran, efforts have been made in this regard; however, not only is there no clear approach to urban green space design, but the disconnection from the Persian garden and, more broadly, Persian architecture leads to a loss of Persian identity. This study aims first to analyze the principles and patterns of the Persian garden and then according to them, propose principles and patterns that can be adapted for contemporary green spaces. The research initially conducts a literature review to read the principles and patterns of the Persian garden. Then, using a descriptive-analytical method, the obtained data is analyzed to extract applicable principles and patterns for contemporary green spaces. Finally, considering the preservation of Persian identity and behavioralist theories, the study discusses the reasons for utilizing these patterns and how they can be used in contemporary urban green spaces.
The study identifies principles and patterns from the Persian garden that, while preserving Persian identity, can also address the needs and behaviors of the modern era and be applied to contemporary green spaces. The principles are categorized into six key aspects. The patterns are divided into two categories: First, the Geometric pattern of the garden, which defines the overall layout, and second, the planting pattern, which is both influenced by and influences the garden's geometry, shaping other elements within the space.

Keywords | *Persian garden, Persian garden principles, Persian garden patterns, contemporary urban green spaces.*

Introduction|According to some researchers, the Pasargadae Garden is considered the first Persian garden. Following this garden, the construction of Persian gardens continued throughout the ages and this style of making gardens crossed the borders of Persia. However, during the Qajar period, this approach gradually fell into oblivion, and in the Pahlavi era, the first green spaces in the modern sense, known as city parks, were built. Nevertheless, there is still no definitive methodology for creating contemporary parks, and the disconnection from the Persian garden and, more broadly, Persian architecture would lead to a disconnection from Persian identity. According to Wilber, the Persian garden is

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nature-oriented, as the trees are left unadorned, and the flowers are planted in a mixed manner, contrasting with European gardens where plants are shaped to fit personal aesthetic desires. However, nature within the Persian garden does not exist as it does in the pristine gardens of China and Japan. Rather, the Persian garden is neither "in nature," as in Eastern gardens, nor is it "over nature," as seen in Western gardens. It can be understood as being in harmony with nature (Mansouri, 2005). Therefore, one way to ensure that contemporary green spaces interact with nature is to avoid European and Eastern landscaping styles. On the other hand, when discussing the Persian garden, certain considerations must be taken into account in its design and construction. These spaces must be inspired by Persian culture; the values of Persian culture should be reflected through the form of these spaces, ultimately this ensemble must possess Persian identity. If national assets are neglected and not updated, those elements will find their way into museums. Consequently, foreign models will proliferate within society, giving rise to rootless and identity-less patterns (Naghizadeh, 2007). A significant factor contributing to the identity of the Persian garden throughout history has been its pattern. In essence, a substantial part of a person's identity is formed through their environment and its patterns; when individuals identify with an environment, it causes a sense of similarity and closeness to others. By being in the Persian garden and experiencing its mental and physical space, individuals contemplate upon their perfectionism, their Persian identity, and their unity, which they then pass on to future generations. This process ensures their continuity as a vibrant nation. Thus, the role of garden patterns becomes crucial in this context (Barati, 2011). Furthermore, Alexander notes in his book "A Pattern Language" that informal observations and experiences affirm that people largely favor places that reflect the past (Alexander, 2009, 83). Therefore, the patterns of the Persian garden in contemporary urban green spaces must utilize and avoid European and Eastern landscaping styles.

This research aims to elucidate the patterns and principles of Persian garden making that can be applied in contemporary urban green spaces. Principles serve as foundational assumptions that must be adhered to. Sustainable principles refer to consistent realities that may take various forms depending on interactions or phenomena. These principles are not necessarily objective but lead to the creation of objectivity within architecture. Sustainable principles can be regarded as constant and shared concepts that exist within human life, giving rise to motivations and shaping behaviors in their lifestyle. (Mahvash, 2006). However, in defining patterns, we refer to Alexander's interpretation. In "A Pattern Language," he states that a pattern, akin to a shared language, is a rule. The roots of these patterns and rules are embedded in an individual's subjective experiences. Patterns can provide key characteristics for addressing issues such as cities, gardens, homes, or anything else through description and elaboration. Each person can apply these solutions in their own way, considering their specific context and circumstances (Pakzad, 2007, 249). Alexander also describes these patterns in "The Timeless Way of Building" as integrated combinations of place and activity that are repeated over time, each time with slight variations (Alexander, 2013, 159). According to him, just as conventional language enables individuals to make a myriad of different sentences, the language of patterns empowers individuals to create numerous new buildings (Alexander, 2017, 145).

Research Methodology

Since the primary objective of this study is to present principles and patterns applicable to the design of contemporary urban green spaces, this research is categorized as Applied research. In the first phase, this research utilizes a variety of resources that introduce the characteristics and principles of Persian gardens to extract the principles of the Persian garden. These principles are classified into six main categories. Subsequently, the information obtained from the reviewed sources is analyzed and interpreted using the descriptive-analytical method. This analysis places particular emphasis on two key elements of the Persian garden: geometry and plant cultivation. These two patterns are examined and described as the main components constituting the Persian garden.

Ultimately, in light of the significance of preserving Persian identity in the design of contemporary green spaces, and with reference to behaviorist theories in urban design, the research analyzes the reasons for utilizing the patterns of the Persian garden in contemporary urban green spaces and elucidates the necessities of employing these patterns. In this regard, the research examines the methods of utilization of these patterns in contemporary green spaces and specifically presents the necessary implementation processes for the realization of these patterns in urban spaces.

Research Background

Previous studies on Persian gardens and the application of their characteristics within contemporary urban green spaces can be categorized into two main groups. The first group includes studies that have focused on the characteristics of Persian gardens but have not provided theories or solutions regarding the utilization of these

traits in modern urban green spaces. The most notable research in this category includes:

- The article "Persian Gardens" by Mohammad Karim Pirnia (1994): This article introduces Persian gardens and their characteristics from the perspective of geometry, structures, plants, and water. Pirnia comprehensively examines the foundations and principles of Persian garden construction; however, he does not offer practical solutions for utilizing these features in contemporary urban green spaces.
- The book "Paradigms of Paradise" by Azadeh Shahcheraghi (2013): Shahcheraghi discusses the necessity for the revitalization of Persian gardens in this book, and analyzes the characteristics of these gardens within various systems. This research mainly focuses on the analysis of Persian garden features without considering their application in contemporary urban spaces.
- The book "Persian Garden" by Vahid Heydarnattaj (2010a): Heydarnattaj examines the Persian garden from various aspects including historical, typological, stylistic, and elemental perspectives.This research, like the aforementioned examples, describes the features of Persian gardens but lacks specific practical suggestions for application in contemporary urban green spaces.
- The book "Persian Gardens" by Gholamreza Naeima (2013): Naeima introduces various gardens in Persia across different climates and discusses the characteristics of Persian gardens from multiple aspects. This study emphasizes understanding the features of Persian gardens while giving less attention to their practical usage in the design of contemporary urban green spaces.

The second group of research not only elucidates the characteristics of Persian gardens but also offers strategies for utilizing them in contemporary urban green spaces, as follows:

- The research " An analytical study of Iranian gardening with the aim of developing strategies for contemporary outdoor design" by Hamidreza Jayhani (2012): In this study, Jayhani utilizes texts such as "Abdi Beg" and "Irshad al-Zara'a Heravi" to analyze and formulate strategies for designing landscapes and contemporary open spaces. He examines selected examples from Isfahan in the 11th century AH and introduces certain principles of Persian gardens into modern design.
- The research project " Urban Park with the Pattern of the Persian Garden: Study and Formulation of Design Principles and Criteria for Gardens and Parks Based on the Model of the Persian Garden " (Heydarnattaj, 2010b): This project was conducted by the "Nazr Research Center" and the management of the "Urban Development and Architecture Research Center of the Iran Ministry of Roads and Urban Development." In this research, existing regulations for garden and park construction were examined, and criteria for designing gardens and parks based on Persian patterns were developed. This research meticulously aligns the principles of Persian gardens with the design of parks and contemporary green spaces while evaluating their practical applicability.

The article "Revitalization of the Concept of the Persian Garden in the Development of the Iranian-Islamic Landscape of the Future City" by Heydarnattaj (2014): Heydarnattaj examines the role of gardens in Persian cities and proposes strategies for reviving this role in contemporary urban landscapes. This article emphasizes the revitalization of the Persian garden within the contemporary urban environment, focusing more on conceptual and cultural aspects.

The present research differs significantly from existing studies, as it not only elucidates the characteristics of the Persian garden but also provides principles and models that can be employed in modern urban green spaces. This study posits that the Persian garden embodies specific principles that should be adhered to in the design of contemporary urban green spaces for its continuity. Furthermore, this research examines two important models of the Persian garden, namely geometry and planting, which, through psychological and behavioral theories, can be effectively employed in the design of contemporary urban green spaces.

The Reading of the Principles of the Persian Garden

Persian garden design possesses characteristics that are foundational and stable and can thus be regarded as principles. The constancy of these principles implies that they remain unchanged across all gardens in Persia. Furthermore, these principles encompass the values and mentalities of garden designers, determining how artificial and natural elements interact. The principles to be elaborated upon include: interaction with nature, unity in generalities and diversity in details, hierarchy, balance, local symmetry, and alternating repetition.

The first suggested principle is interaction with nature. In Persian gardens, interaction with nature is always observed. This is neither akin to European gardens that alter nature nor akin to Japanese gardens that present nature in a pristine state; rather, it consistently exists in harmony with nature (Mansouri 2005).

The second principle, unity in generalities and diversity in details, indicates that a place must possess continuity while also having defined and non-uniform units. Certain points should have significant importance and identity, ensuring clear structures that convey unity (Salehi, 2014). Thus, a place should adhere to a general unity while presenting diverse details, each possessing distinctiveness and clarity. Just as the Persian garden maintains unity in its entirety, it also possesses

spatial diversity in its geometry, lines, and materials (Mansouri 2005).

The next principle is hierarchy. This means that there should be a sequence in the placement of functions and spaces and a gradual pathway to access them (Rostami & Moradi, 2015). The principle of hierarchy suggests that there is a differentiation among forms and spaces in most or some architectural compositions, with these differences highlighting the significance of forms and spaces, as well as their functional roles (Ching, 2008, 350). In a Persian garden, hierarchy begins at the entrance, potentially starting from a water feature or square outside the garden. It then progresses through a vestibule, traverses the main axis, and ultimately reaches the pavilion. It is worth noting that this principle can also be observed in the color, size, and height of the garden elements (Daneshfar & Seddigh, 2013, 221).

Balance is another principle present in Persian gardens. According to this principle, when two artificial and natural elements confront each other in terms of pattern, form, color, and texture, they should possess balance. This ensures that when they coexist, visual equilibrium is achieved. For instance, in Persian gardens, trees are planted adjacent to hard elements such as walls to maintain visual balance (Jayhani & Rezaeipour, 2017, 137).

The next principle, local symmetry, considers symmetry a binding force that gives rise to "life." Comprehensive symmetry is ineffective; rather, local symmetry (Fig. 1) should be utilized. (Alexander, 2013, 154). In the Persian garden, while complete symmetry is absent, we can observe it in components such as the pavilion, entrance, and main axis. For example, the Hasht Behesht garden displays local symmetry, evident in the symmetry of its pavilion and main axis, although the overall plan lacks symmetry.

The final principle discussed is alternating repetition. Repetition refers to the rhythmic repetition of a phenomenon or element in an artwork, which can be complex or simple (Daneshfar & Seddigh 2013, 222). In alternating repetition, repetition does not occur in single, isolated forms, but rather is created within a holistic structure. In this approach, when the principle of repetition is applied to all components, elements, the spaces between them, and even their arrangement, a unified whole is established. (Alexander, 2013, 134). Like Persian gardens, this alternating repetition can be seen in the terracing of sloped lands, garden walls, and the planting of cypress and plane trees along the main axis (Daneshfar & Seddigh, 2013, 222).

In summary, as previously noted, these sustainable principles can be considered stable and common concepts that exist in human life, inspiring motivations and shaping behaviors in their lifestyles (Mahvash, 2006). Consequently, all the principles elaborated upon can be applied to contemporary urban green spaces.

The Rationale for Employing Persian Garden Patterns in Contemporary Urban Green Spaces

One of the reasons for utilizing the Persian garden pattern is the continuity of Persian identity. As previously mentioned, a disconnection from the Persian garden and, generally, from Persian architecture will lead to a disconnection from Persian identity (Mansouri, 2005). A significant factor contributing to the identity of the Persian garden throughout history has been its pattern. In essence, a substantial part of a person's identity is formed through their environment and its patterns; when individuals identify with an environment, it causes a sense of similarity and closeness to others. By being in the Persian garden and experiencing its mental and physical space, individuals contemplate upon their perfectionism, their Persian identity, and their unity, which they then pass on to future generations (Barati, 2011).

Another rationale for the utilization of Persian garden patterns is the attention to the needs and behaviors that must be responded to in the design of contemporary spaces. Activities shaped by humans are culturally dependent, and culture creates specific behavioral patterns. These patterns dictate how individuals interact within their environment and how they utilize spaces (Bahrainy, 1999, 1). Consequently, within the behavioralism movement, efforts are made to identify

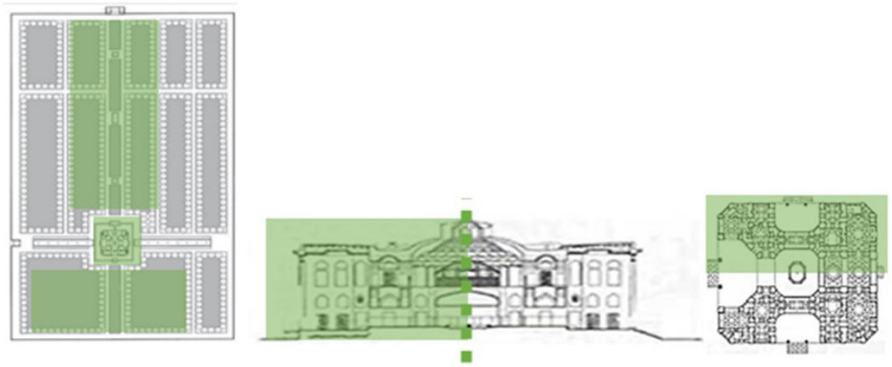

Fig. 1. Symmetry and Local Symmetry in the Pavilion of Hasht Behesht. Source: Pirnia, 2012, 311.

the behaviors and factors that engender them in urban environments to create spaces that align with users' needs, such as pedestrian areas, legibility, visibility, desirable vistas, security, and so forth (Bahrainy et al., 2009). An examination of the features of Persian gardens indicates that Persian garden design has consistently responded to these needs. The following sections will examine two geometric patterns of Persian gardens and the plant pattern within Persian gardens, subsequently discussing how these two patterns can be applied to contemporary green spaces to respond to human needs and behaviors.

The Reading of Patterns in the Persian Garden

Among the thinkers and scholars who have researched the Persian garden, several have elaborated on the characteristics of Persian gardens or categorized these features. One of the notable scholars who has described the features of the Persian garden is Mohammad Karim Pirnia (1994). he elucidates these characteristics through the lens of geometry, artificial elements within the garden such as pavilions and gateways, and natural elements namely plants and water. The subsequent researcher, Azadeh Shahcheraghi (2013, 65), examines the characteristics of the Persian garden within a systemic framework. She states that "the physical form of historical gardens comprises three systems: planting, water, and structures. Prior to this, geometric structure has been examined as a system integrating natural and artificial elements organized within the physical systems of the garden". Another researcher, Vahid Heydarnattaj (2010), in a portion of his book on Persian gardens, analyzes the features of the Persian garden from four perspectives: architectural elements, natural elements, geometry, and aesthetics of the Persian garden. The present research, based on the classifications provided by these scholars in the field of the Persian garden, and taking into account the definition of a pattern previously articulated, identifies geometry and vegetation as fundamental patterns. "This is because, on one hand, the geometry of the Persian garden serves as the primary infrastructure and integrative element of both natural and artificial components" (Shahcheraghi, 2013, 45). On the other hand, the planting of various plants is influenced by geometry while simultaneously impacting the geometry itself. In fact, "Since the advent of agriculture, humans have recognized that the easiest way to plow land is to move in straight and parallel lines, which led to parcels of land being shaped into squares and rectangles. This geometry was also considered the most efficient method during irrigation, minimizing water wastage by covering shorter distances" (Diba & Ansari, 1995, 35). Consequently, it can be articulated that the pattern of plants in Persian gardens influences both the geometry and other elements of Persian gardens. Therefore, this research will further examine the reading of these two patterns.

• Geometric pattern of the Persian garden

The geometric pattern of the Persian garden is simply described as the area of the garden being shaped either as a complete square or rectangle based on the water volume that can be supplied and in accordance with the characteristics of the land (which may be sloped, flat with a slight incline, close to a river, or beside a pond). This is followed by the subdivision or terracing arranged in a systematic geometry (Shahcheraghi 2013, 43). The network of streets in the gardens is designed such that two main intersecting streets, one running north-south, and the other east-west, alongside several narrower streets that are perpendicular to the main axis, not only shape the garden plots but also cause the connection of the main building and the surrounding structures (Heydarnattaj 2010a, 83) (Fig. 2). Some researchers believe that the primary pattern of the Persian garden is the uniaxial pattern. Mahvash Alami is one of these researchers (Omrani & Jayhani, 2005, 39). It appears that the rectangular shape of the garden is the main reason for the formation of the uniaxial pattern within the garden. In a rectangular plan, the longitudinal axis is the principal axis, with the pavilion built at either one-half, one-third, or one-fourth of its length (Heydarnattaj, 2010a, 85). The Dowlat Abad Garden in Yazd is an example of a Persian garden that features a single longitudinal axis (Fig. 3). This longitudinal axis begins at the portal and continues to the main building of the garden.

Another geometric pattern is that of the two perpendicular

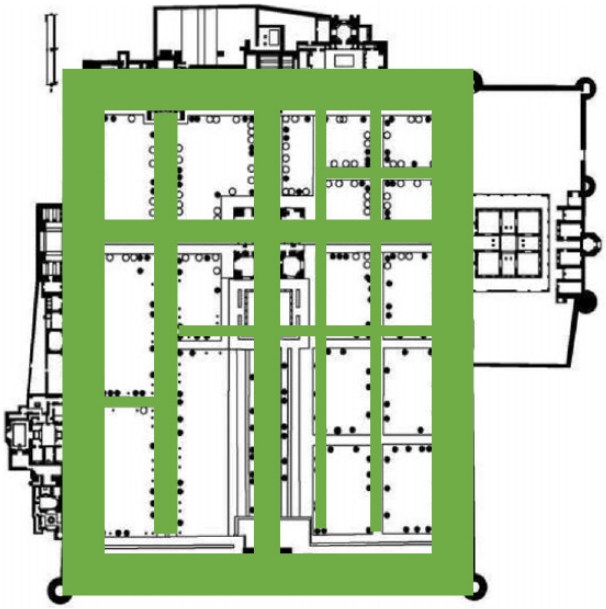

Fig. 2. The network of street Fin Garden. Source: Naeima, 2013, 140.

axes, in which Two primary axes that are perpendicular to each other, divide the garden into four sections. Some researchers interpret the Charbagh in this manner due to its division into four parts, such as Mir Fendereski (2005, 10), who considers the division into four to have a long historical significance. Another reason for the emergence of this layout is the square shape of the garden plan. A square plan has two perpendicular axes that may be either equal or unequal in length, and they intersect at the center of the plan. These square layouts create four axes of symmetry, where their intersection point holds great significance, as it is at this location that the pavilion or main building of the garden is constructed (Heydarnattaj, 2010a, 85).

- How to implement the geometry pattern of Persian Gardens in contemporary urban green spaces

To utilize the geometric patterns of Persian gardens in contemporary green spaces, one can refer to quadrilateral geometry with 90-degree angles and straight lines arranged in a grid (Fig. 4).

This geometry responds to the need for legibility, which behaviorists emphasize. Such clear geometry is also present in Persian gardens, stemming from a spirit of simplicity and order that has existed in Persian culture and life. The simplicity inherent in the garden means it should be legible and comprehensible to those present within it. "The owner or designer of the gardens did not intend to create spaces filled with ambiguity or complexity" (Naghizadeh, 2013). Thus, with such geometry, the spaces will be legible and comprehensible to users. Furthermore, as legibility is considered a criterion for safety (Monam & Zarabian, 2012) (Table 1), it can be asserted that this pattern also positively influences the sense of security.

According to studies conducted in the field of environmental psychology, a geometry characterized by direct and purposeful axes can create feelings of contemplation, exploration, and purposefulness in individuals (Shahcheraghi, 2009) (Table 1).

Part of the geometry that can be employed is an axial pattern characterized by a straight line (Fig. 5). The method of implementing this geometry involves selecting one of the straight lines as the main axis and emphasizing it. To create an enclosure at the end of this axis or in certain sections along it, a space can be placed that creates feelings of contemplation, exploration, and purposefulness. Such a space, aligned with the main axis (Table 1), can create a visual illusion related to the observer's line of sight being above or below the horizon, resulting in an altered perception of distance, making an object or space appear farther or closer than its actual dimensions. Consequently, when an individual gazes from the beginning of the main axis toward that space, the distance appears reduced, encouraging

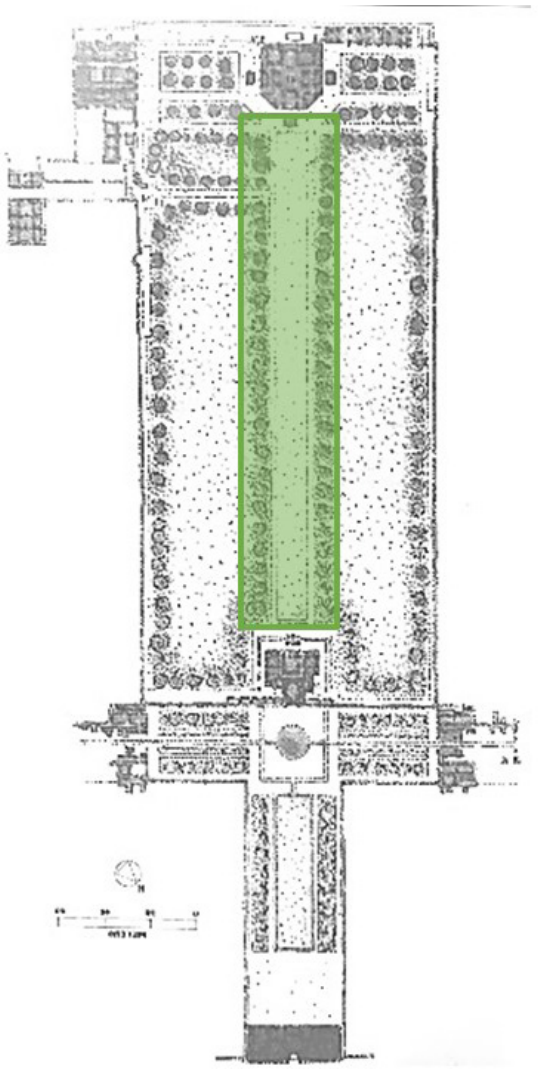

Fig. 3. Uniaxial pattern in the Doulatabad Garden.
Source: Khansari et al., 2004, 140.

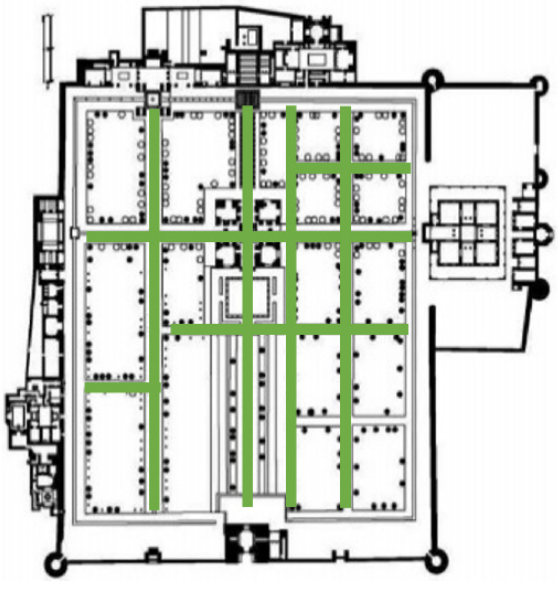

Fig. 4. The pattern of quadrilateral geometry with 90-degree angles and straight lines in Fin Garden. Source: Naeima, 2013, 140.

movement along the main axis (Shahcheraghi, 2013, 45). This phenomenon can respond to the needs of individuals which is pedestrian spaces. There are additional reasons for employing a main axis in contemporary green spaces (Tabl 1). The axis is one of the principles that organize architectural spaces, structuring spaces in either a regular or irregular manner around them (Ching, 2008, 334). Another reason to utilize a main axis in green spaces is the power of thought and reflection. To cultivate such perception, the space is designed to be static, introverted, and characterized by symmetrical and axial geometry (Noghrekar, 2014, 70). An example of contemporary designs that have employed the geometric patterns of Persian gardens is the Management

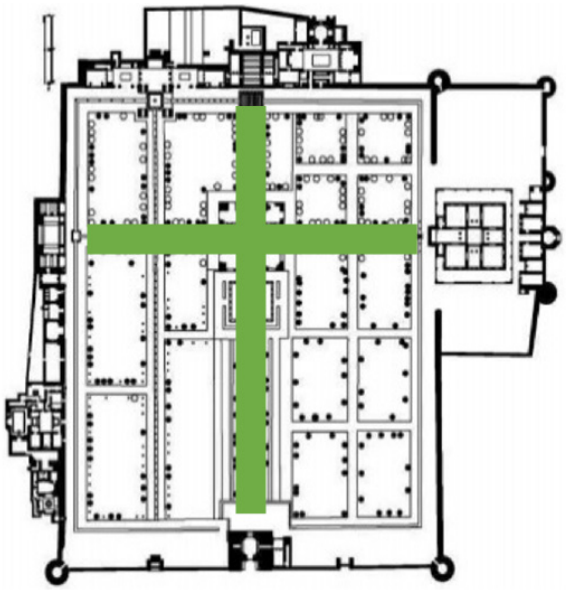

Fig. 5. The axial pattern in a straight line in Fin Garden. Source: Naeima, 2013, 140.

College designed by Nader Ardalan. This garden, inspired by the Fin Garden in Kashan, is an introvert garden situated on a plot measuring 110 by 70 meters. The library and administrative building are positioned along the longitudinal axis of the garden, with classrooms surrounding it as an enclosure wall (Shahcheraghi, 2013, 238). As depicted in Fig. 6, this garden features a main axis that extends from the beginning to the end, and like Persian gardens, it contains networked flower beds.

• The plant pattern

The most fundamental element shaping the Persian garden is the plant, with the objectives of planting including the creation of shade, the harvesting of produce, and decoration. Generally, plants are categorized into three groups: trees, ornamental flowers, and shrubs (Heydarnattaj, 2010a, 65). There are two patterns for planting trees in the Persian garden. In the first pattern, trees are planted parallel to each other at defined distances within the plots (Fig. 7). In this pattern, the planting distance is initially determined from each side, such that squares are formed, allowing for the visibility of rows of trees from any perspective (Pirnia, 1994, 5). The second planting pattern, known as the five-point pattern, involves planting four trees at the corners of a square and one tree at the center (Fig. 8). According to this method, the rows of trees are parallel to each other but are not alternately facing each other. This means that the trees are positioned facing each other either in odd or even rows. The distinguishing feature of this method compared to the first is the dense vistas created by the trees, although it retains all the characteristics of the first method as well (Shahcheraghi, 2013, 68).

Table 1. Patterns of Geometry in Contemporary Urban Green Spaces.Source: Authors.

Patterns for Contemporary Urban Green Spaces	Reasons for Presenting Patterns
The rectangular geometry pattern with 90-degree angles and straight lines	- Possessing legibility and security - induction a sense of contemplation, exploration, and purposefulness - creating unity
The main axis is represented as a linear form and its blocking	. A portion of rectangular geometry and straight lines . Induction a sense of contemplation, exploration, and purposefulness . Proportional to the strength of thought and reasoning (having an axial nature and symmetry) . Organizing architectural spaces
Presence of space along the main axis	- Blocking the axis - Encouraging individuals to move, and walk

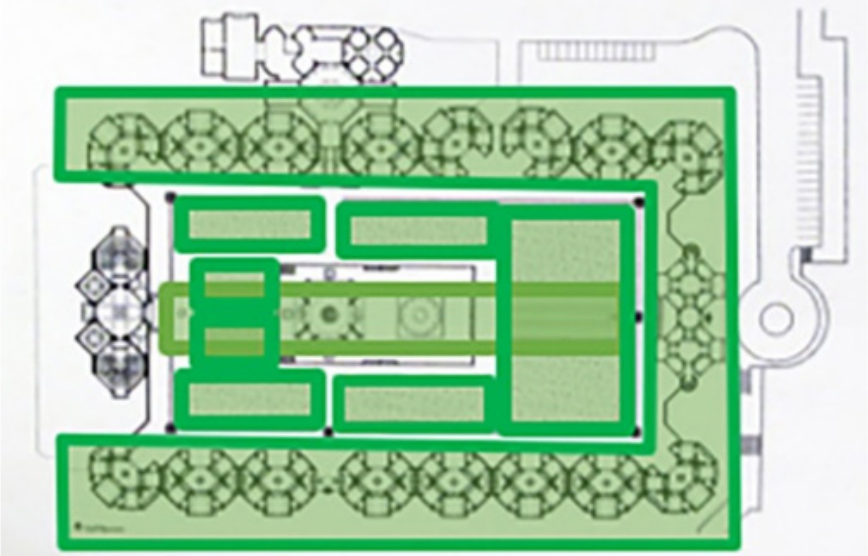

Fig. 6. Main axis and organized garden beds at the Management College. Source: Naqsh- e Jahan.Pars Consulting Engineers.

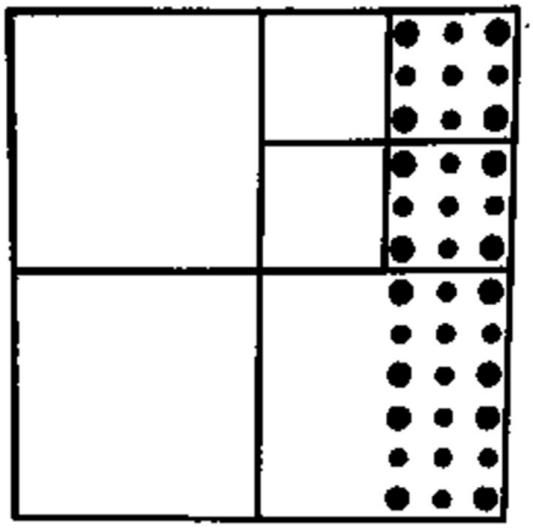

Fig. 7. Pattern of Parallel Tree Planting. Source: Shahcheraghi 2013, 68

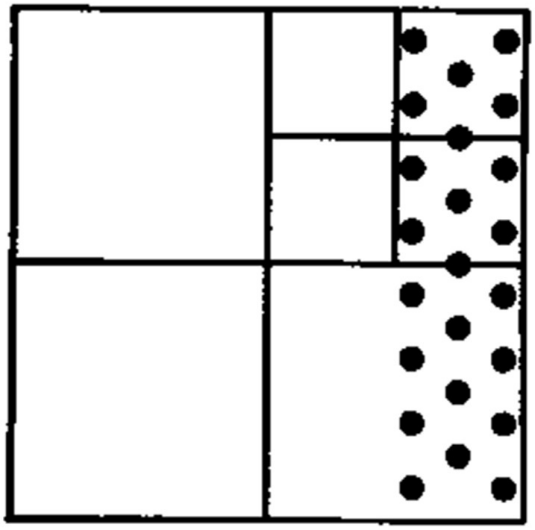

Fig. 8. Five-Point Planting Pattern of Trees. Source: Shahcheraghi, 2013, 68

To emphasize the main axes of the garden and the inter-plots, a covered corridor of trees is created on both sides. These corridors serve as viewpoints that organize the landscape. The planting of trees in this area is conducted in such a manner that a cypress is planted first, followed by a plane tree, and this sequence is repeated. The same arrangement is observed on the opposite side of the main axis, in a manner that the cypress is planted opposite another cypress and a plane tree opposite another plane tree (ibid., 69). In addition to tree planting in Persian gardens, ornamental flowers are often planted in garden beds in front of buildings and along the entrance axis or main axes (Heydarnattaj, 2010, 66).

- How to implement plant patterns in contemporary urban green spaces

Medical professionals and psychologists believe that plants not only contribute to environmental hygiene but also play a significant role in the health of citizens. When individuals seek a space for relaxation to heal their minds and spirits, plants and green spaces come to their aid, and They play a significant role in this context. Moreover, plants are essential in terms of security (Asadifard, 2014). The plants' cultivation can be executed in a manner that doesn't create obstructions to visibility and surveillance. To achieve this, trees should be planted with consideration of standard spacing between them (ibid.). On the other hand, contemporary urban green spaces often lack a systematic planting design. At times, tree planting occurs immethodical and without prior planning, resulting in an environment resembling a forest park, which is one of the reasons that attracts malefactors and inappropriate users, leading to insecurity in the enclosure and its surrounding (Alikhani et al., 2018, 45). Thus, systematic planting designs, such as parallel and five-point planting patterns

traditionally used in Persian gardens, could be employed to enhance security as well (Table 2).

Another pattern applicable to tree planting includes the planting of cypress and plane trees (Fig. 9). According to this pattern, referred to as "Didro" by Mir Fendereski (2005), it is proposed to plant cypress and plane trees along the main axis. Since one of these trees, the cypress is evergreen, it causes the green space to remain lush throughout the year, while the presence of the deciduous plane tree causes seasonal diversity (Table 2). The Didro pattern can address the need for desirable views and landscapes, which are among the users' requirements. A key urban factor when sitting or walking in a space is observing the life that unfolds within that environment. In fact, the desirability of views and landscapes is considered a fundamental principle. Consequently, designers strive to provide the visibility of trees, water features, flowers, and attractive architectural elements during the design process (Gehl, 2015, 172).

Finally, the importance of abstaining from tree pruning is emphasized concerning plant patterns. In contemporary green spaces, tree and plant shaping has become commonplace. This approach, however, is rooted in European landscaping traditions. In European environments, Before the tree is present, trimmed boxwoods and geometric gardens are already present. Trees are also pruned to take on forms resembling animals and humans (Najarnajafi, 2015, 76). However, as previously noted, to sustain and invigorate Persian identity, it is possible to utilize planting patterns characteristic of Persian gardens, which align with the principle of interaction with nature (Table 2).

Conclusion

Scholars in the field of landscape architecture consider the Persian garden to have originated from the Garden of Pasargadae. Despite the transformations it underwent throughout different periods, the Persian garden continued to exist until the Qajar era. During this time, Western landscaping methods gradually supplanted traditional Persian garden designs, and the first modern urban green space, known as "Park-e Shahr," was established during the Pahlavi era. Today, in light of the neurological crises arising from life in densely

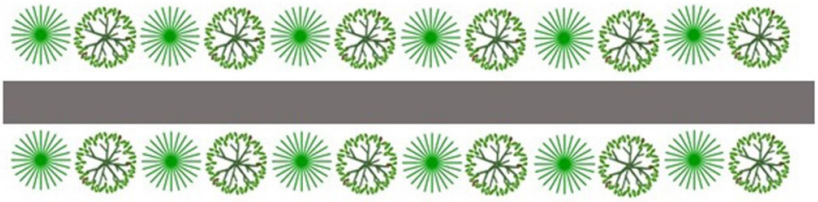

Fig. 9. Planting pattern of cypress and plane trees. Source: Authors.

Table 2. Patterns of Plant Presence. Source: Authors.

Patterns for Contemporary Urban Green Spaces	Reasons for Presenting Patterns
Parallel Planting pattern and Five-Point Tree pattern	- Having vision and oversight, consequently creating security - Planting and organized layout
Adhering to standard spacing during tree planting	- Possessing vision and oversight, thereby fostering security
Planting pattern of cypress and plane trees	-Contributing to the creation of diverse green spaces across different seasons
Avoiding the pruning of trees and plants in various forms	- Avoidance of European Landscaping styles - Interaction with nature

populated and bustling cities, the creation of green spaces is increasingly emphasized. Various individuals have attempted to offer diverse solutions to mitigate these neurological issues. In Persia, where the tradition of making the Persian garden has historical roots, contemporary scholars are focusing on these gardens as a solution for addressing modern neuroses through urban green spaces. This research also considered the Persian garden as a solution for designing contemporary urban green spaces. The Persian garden, and Persian architecture more broadly, have always been shaped in relation to Persian culture, contributing to the formation of Persian identity. However, in the contemporary context, where Western and modern styles have taken precedence over traditional Persian architectural and garden-making methods, this shift has resulted in a loss of identity. Engaging with green spaces designed in the manner of Persian gardens allows individuals to reflect on their Persian identity and unity, facilitating the transfer of this identity to future generations, thus ensuring its continuity. Persian gardens embody specific principles and constant concepts that influence human lifestyles. Should landscape designers utilize some of these principles in green spaces, they would make significant contributions to the preservation of Persian identity. Moreover, employing the methods of Persian garden-making in the design of green spaces responds to human needs and behaviors within an environment. The various patterns and principles of the Persian garden possess the capacity to respond effectively to these needs. This study identified two significant patterns that not only respond to certain human needs and behaviors in an environment but also play essential roles in Persian landscaping. The first pattern is related to plant arrangement due to the convenience of tilling in straight lines, thus fostering a geometry of straight lines in the Persian garden, with various garden elements aligning along this plant alignment, such as water flow in channels designed for irrigation following the planting Pattern. Furthermore, the geometry of the Persian garden shapes the overall layout, with all elements and diverse systems of the garden being organized according to this structure. Ultimately, the two models of Persian garden geometry and plant arrangement can serve as guidelines for designers seeking to utilize Persian garden-making methods in contemporary urban green spaces. It is hoped that subsequent researchers will present improved solutions for revitalizing the Persian garden, Designers strive to utilize these studies and solutions.

Declaration of No Conflict of Interest

The authors declare that they have no conflict of interest in conducting this research.

Endnotes

* This article extracted from Master thesis of "Fahimeh Barati" entitled "Providing Principles and Patterns in order to Recreation of Persian Gardens in Contemporary Urban Green Spaces through the Comparison of Persian Gardens and Contemporary Green Spaces" that under supervision of Dr. "Abouzar Salehi" and in consultation of Dr. "Armin Bahramian" which has been done at Faculty of Architecture and Urban design, Art University of Isfahan, Iran in 2020.

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HOW TO CITE THIS ARTICLE

Barati, F., Salehi, A., & Bahramian, A. (2025). Reading the Principles and Patterns of the Persian Garden for Application in Contemporary Urban Green Spaces . *MANZAR, The Scientific Journal of Landscape, 17*(70), 6-17.

DOI: 10.22034/manzar.2025.496337.2324
URL: https://www.manzar-sj.com/article_217625.html?lang=en