

Original Research Article

An Analysis of the Role of Landscape in the Spatial Structure and Architectural Organization of the Main Mansion of Abbas Abad Garden*

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Abstract | One of the significant issues in the study of Persian gardens is the variations made in the shape patterns and physical structure depending on different conditions of the natural context, as seen in several gardens in northern Iran. The present study aims to investigate the relationship between physical changes in Abbas Abad garden and the landscape of its natural context to gain a deeper understanding of this garden and Persian gardens. To this end, the present study develops a specific “multiple analysis” framework to analyze the case study. First, Abbas Abad Garden is described by reviewing historical documents, and its reference design in the Safavid period was recovered in a three-dimensional model. Then, its physical and spatial structures are analyzed and the role of the landscape of the natural context in the physical changes in Abbas Abad garden is discussed. The research findings indicated that the garden orientation is a scenic orientation based on the characteristics of its natural context. In the studied garden, a powerful central axis, as a common geometric characteristic of Persian gardens, extends to the main mansion, passes through it, and can be traced to Chahartaqi in the middle of the lake. Moreover, in Abbas Abad Garden, the organization of the main mansion has been changed based on the landscape requirements and displaced from the middle of the highest platform to its northernmost point to visually overlook the lake and the Chahartaqi in its middle. The spatial structure of the main mansion includes an observation semi-open space, and the residential elements around the garden to preserve the continuity of the view of nature. This research also indicates that in the design of Abbas Abad garden, the landscape is an organizing factor in the location, geometric structure, and arrangement of the architectural elements of the garden, and in suitable areas, the landscape of the natural context, that can be perceived from the main observation deck, determines the observation deck direction, the spatial structure of the main mansion, the organization of the architectural elements, and the overall structure of the garden.

Keywords | *Persian garden, Persian gardens in Northern Iran, landscape, Abbas Abad Garden, main mansion.*

Introduction | Introduction and Problem Statement
“Persian garden” is the product of one of the oldest garden

building methods in the world, whose geometric structure includes a rectangle with straight and perpendicular axes, and it is terraced according to the characteristics and slope of the land (Shahcheraghi, 2019, 43). Although numerous

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studies have been carried out on the phenomenon of the Persian garden, there are still many unknowns regarding the factors affecting the formation and generative geometry of gardens in northern Iran. Moreover, the conflicting opinions of experts and their inconsistency with some historical examples have made this ancient group of Persian gardens abandoned. The gardens in Northern Iran, due to their different formation context, are suitable examples for learning other aspects of the Persian gardens. The physical structure of the Persian garden is organized as an interwoven and continuous whole. However, no study has addressed the relationship between the orientation, and geometric structure of the garden, the architectural organization, and the spatial structure of the main mansion with the landscape of the natural context around them. One of the significant issues observed in the studies on Persian gardens in northern Iran is the changes in the spatial structure and the positions of the main mansion in some of them, which have a similar structure to the gardens in the central plateau. Therefore, it is necessary to analyze the gardens in northern Iran not as separate and independent structures but as integrated entities including their surrounding natural context. Analyzing the landscape of the natural context surrounding Abbas Abad garden indicates that the landscape and topographic features of the natural context have influenced the orientation and geometric structure of the garden, the organization of the architectural elements. Moreover, the spatial structure of its main mansion and the designer of this garden have determined the orientation and structure of the garden and the organization of the main mansion to make maximum use of the surrounding natural landscape.

Research Objective

The research objective is to explain how Abbas Abad Garden interacts with the landscape of the natural context and what role it plays in the orientation and structure of the garden, and the architectural organization and spatial structure of the main mansion.

Research Background

One of the first national studies on the structure of the Persian garden and its architectural elements is the article entitled "Persian gardens" by Professor Mohammad Karim Pirnia (1994), in which the organization of the main mansion in the Persian garden was analyzed. In their studies, Mansouri (2004) and Teimouri (2013) have discussed the importance of the observation deck in Iranian architecture and then, the observation position of the main mansion in the Persian garden. In his "Persian Pavilion-Gardens", Motedayen (2019) prioritized the garden architecture over the garden building and analyzed the features of the pavilions in the Persian garden and the concepts influencing

their design. In his doctoral dissertation, Mostafazadeh (2015) also analyzed the landscape and its impact on the variety of Persian gardens in Shiraz city. In addition to the limited studies that have briefly referred to the gardens in northern Iran, Heidar Nattaj (2011), in his doctoral dissertation, has analyzed and investigated the formation norm of the gardens in Mazandaran. In his study on Abbas Abad Garden, entitled "Selective nature", Mansouri (2013) had the closest approach to the current research. However, he hasn't addressed how the architectural elements of the garden interact with the surrounding environment to provide the observer with the maximum view of the landscape in its natural context. Therefore, the present study seeks to answer the following question:

How has the landscape of the construction site affected the orientation and geometric structure of the garden, and the architectural organization system and spatial structure of the main mansion of Abbas Abad Garden?

Research Method

Since the present study is looking for examples of spatial qualities and landscapes in the Persian garden, quantitative methods are not suitable due to their partiality and the need for measurable phenomena, and the use of these methods will lead to the neglect of the qualitative and human aspects of the Persian garden. Among the qualitative paradigms, the case study approach is suitable for the present study since it allows for penetrating the deeper layers of a phenomenon and using it to draw conclusions based on a holistic view of the case. To this end, first, the reference design of the garden in the Safavid period is recovered in a three-dimensional model. Then, a suitable and standard framework is developed for comparative analysis to obtain more scientific results from the research. This present study investigates Abbas Abad garden through a multiple analysis (fixed model of cognition)¹. This garden was selected due to its authenticity, dating back to the Safavid era, the possibility of recovering it, and the possibility of answering the research question. On the other hand, during the research process and recovering the reference design of the garden, the approach of historical interpretation was used due to the need for continuous reference to historical documents and their interpretation to advance the research objectives and recognize the garden studied. In this research, Abbas Abad Garden is investigated and analyzed in the framework of a fixed model to study the quiddity of the landscape and its effects on the architecture of the garden to explain the role of the landscape of the natural context in the formation of Abbas Abad Garden.

Recovering the Reference Design of the Abbas Abad Garden

The Abbas Abad historical garden complex is located

on the heights of the Alborz Mountains, after the village of Ali Tepe (Altepe), and in the heart of dense forests. Unfortunately, despite the importance of this complex, there are not sufficient available documents on the Abbas Abad Garden, except for short and general references, none of which fully represent the features of this complex. Iskander Beg Turkman mentioned the Abbas Abad Garden only in one case where he recorded the events that occurred in 1037 A.H. (Iskander Beg, 2003, 1027). Herbert² visited this complex about four hundred years ago (1037 A.H.), i.e. immediately after the construction of its buildings was completed, and pointed out its forest environment and the unique characteristics of the garden (Asgari, 1971, 218). In the book "Abbasnameh"³, the entertainment use of the garden during the dynasty of Shah Abbas II complex was also mentioned (Sarfaraz, 2004, 44). In the sixth chapter "Naser al-Din Shah's travelogue" of the book "A Wondering Monarch", it is mentioned that he stayed in Abbas Abad Garden (Asgari, 1971, 173). Although the campus of Abbas Abad was a royal complex during the Safavid era, in the travelogues of travelers who visited Iran during the Safavid era, one can rarely find any text about this complex, indicating that Abbas Abad complex was the Safavid kings' private recreation complex, and foreigners and guests were less likely to enter it. According to the existing historical documents on Abbas Abad Garden and considering the limited descriptions of it in the travelogues, it can be proved that the currently excavated works are the remains of the complex constructed in the vicinity of the lake in the Safavid era. In this section, it is attempted to recover the reference pattern of Abbas Abad Garden according to which it was constructed, based on the remains of the garden discovered

in archaeological excavations. To recover the reference pattern of Abbas Abad Garden, the physical structure of the garden, the stratified platforms in the north of the lake and within the limits of the garden, and the relationship between the architectural system and the water system in the garden were scrutinized. In the examination of the middle and main platform, one can see the remains of a large pond in the center and four small ponds on its four sides, and the remains found in the north of the central pond, such as the stone pedestals (Fig. 1), walls, and a large number of clay roof tiles represent the presence of a pavilion that has been destroyed⁴.

The chahartaqi, located in the lake of Abbas Abad Garden, also stands out as an island in the middle of the lake. Among the traces left from the mansion, one can mention a small pond and a fountain whose water was supplied from the southwest water tower (Brinioli, 2015, 42). The Cheshmeh mansion in the middle of the lake is a brick building in the form of a chahartaqi, the upper part of which was a platform for a building constructed with light materials of wood and a roof of clay tile (Vafaei, 2002, 162). The lower part of this building went under water when the dam was filled with water, and its upper part remained, like an island, out of the water, and the Chahartaqi is accessed by a boat and a wooden bridge. In archaeological excavations, the remains of wooden structures were found in the northern part of the lake⁵. According to the status quo of Abbas Abad Garden, the traces remained from it, the results of several archaeological excavations, and their consistency with the tourists' descriptions of this garden, it is possible to achieve the reference and fundamental pattern of the Abbas Abad Garden in the Safavid era (Fig. 2).



Fig. 1. The stone pedestals left from the main mansion. Photo: Eshagh Rezazadeh, 2021.

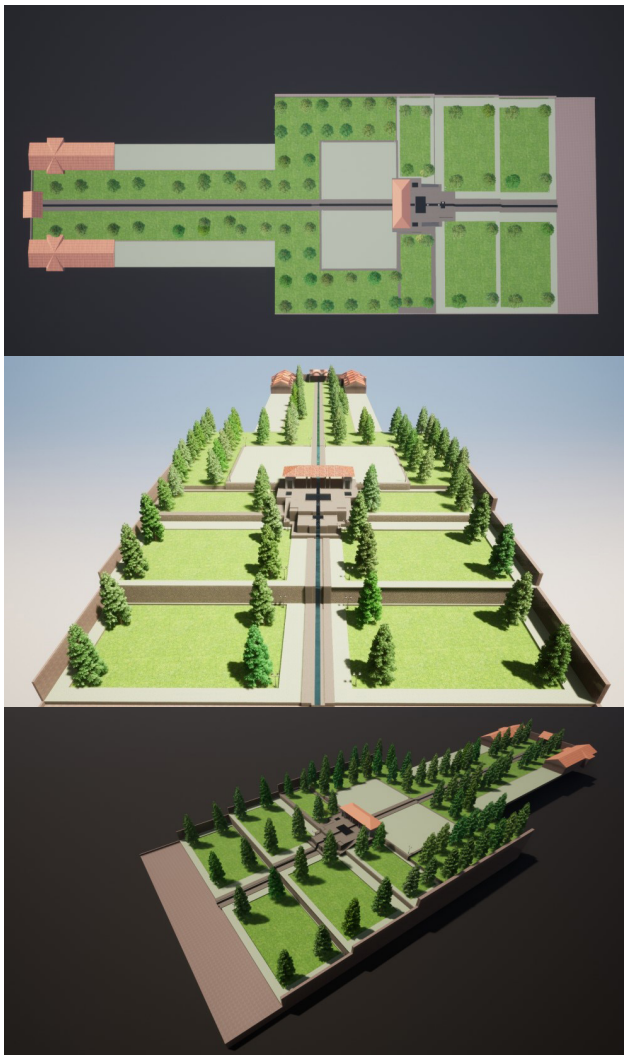


Fig. 2. The reference pattern of the Abbas Abad Garden, Chahartaqi and the lake in the Safavid era. Source: Authors.

Analysis of the physical and spatial structure of Abbas Abad Garden (based on the reference pattern)

Abbas Abad Garden, the most important part of the complex, has unique features: a two-way slope, the main mansion at the highest point, large platforms, the lake and Cheshmeh mansion in the middle of it, regular geometry (the basic feature of Persian gardens), and deep straight axis, a pristine and forest environment (which is very different from the gardens in the desert of Iran).

• The construction context of Abbas Abad Garden and its connection with other elements of the complex

With detailed investigations, one can conclude that the organization of the formal Abbas Abad Garden in the complex, the large northern platforms, the creeks, and the Sin-e Kaftari (inscriptions resemble fish scales) along the main axis, show the formality of this garden among the elements of the complex. As mentioned, in the north of the garden, there was an entrance area, which, like the Bagh-e

Shomal in Behshahr, played the role of a pre-entrance space for the official garden and supported service uses. Currently, its axis, in the entrance part, and the remains of the mansions have emerged in archaeological excavations. The residence and bathroom were located on the west of the main garden, and the extension of the sub-axis of the formal garden formed the entrance of this complex and its geometric structure, indicating the geometric relationship between the complex and the formal garden. The extension of this sub-axis led to the sub-entrance of the garden in the east and then, the towers and water supply facilities. In the northern part, the extension of the main axis of the official garden extended to the Chahartaqi mansion in the middle of the lake. The alignment of the main entrance, the main semi-open mansion, and the Chahartaqi in the middle of the lake, emphasize the significance of the main axis. All the elements of the Abbas Abad Garden complex, with diverse functions and separate from each other, are organized in a way to complete the function of the formal garden, and the functional continuity and spatial connection between them are completely evident. This garden was located at the top of a hill with a gentle slope (nearly ten percent) in the north and east and a steep slope (nearly twenty percent) in the south and west, and the slope aspect was northeast-southwest, and towards the sea. Accordingly, the Abbas Abad Garden can be considered the most important garden organizing other elements of the complex (Fig. 3).

• The overall structure of Abbas Abad Garden

Abbas Abad Garden was constructed in a context with two-sided slopes and natural elements such as a lake and forest. The slope of the garden, on both sides, has been terraced and some platforms have been constructed. This has influenced the structure of the garden. The overall structure of the garden follows a regular geometry. The official garden is in a rectangle form with a length of 200 meters and a width of 150 meters. The main axis of the garden continues by 300 meters, corresponding to the ridge of the context, and forms the main path in the garden. The terracing lines were perpendicular to this axis. The topography of the garden context has been converted into seven platforms. The platforms on both the north and south sides were built on top of a hillside with a height of 30 meters from the pool floor and in a step form, with the central platform at the highest point, and the main mansion and the ponds around it were constructed on the highest platform, i.e. the central platform. The platforms on the north side have been constructed with a milder slope than those on the south side. Parts of the southern platform building are still buried under the soil. According to the ponds and their floors discovered in the excavations, one can say that the southern platform building was similar to the northern one. But, due to its steep slope, this part has not been as important as the northern part. The service mansions in

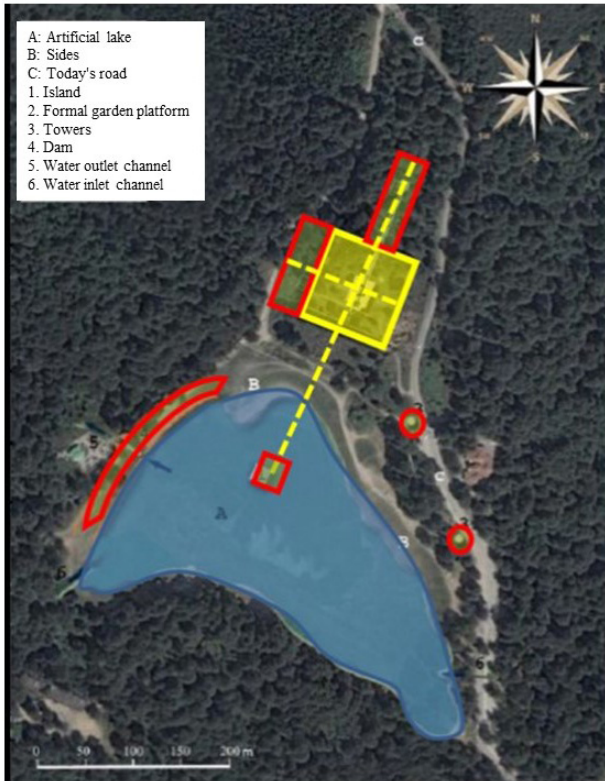


Fig. 3. Analysis of the construction context of Abbas Abad Garden and its connection with other elements of the complex. Construction context of Shah Garden: Extending the main and secondary axes to organize other elements, Being established in the heart of Abbasabad complex and on top of the hillside & The slope of the hillside faces north and south. Source: Authors.

the garden are established at the end of the northern axis. With this organization, the platforms of the garden form the main part of its regular green space. Regarding the main axis of the garden, it is noteworthy that it extended with the design of waterfalls, on both sides of the garden, to the lake and the northern entrance of the garden, leading to the creation of a two-sided axis. As mentioned in the analysis of the reference pattern of the Abbas Abad garden, this garden structure has remained from the Safavid era (Figs. 4 & 5).

• Architectural elements

The architectural elements of the Abbas Abad garden have been influenced by the specific pattern of the garden context. According to the archeological findings indicating the remains of a stone foundation in the central platform, it has been proven that these were the foundations of a pavilion constructed with light wooden structures that have been ruined. An observation building with tall wooden columns and a sloping roof (according to the discovery of roof clay tiles) indicates the existence of a mansion similar to the structure of the Chelhelsootoon porch in the Shah Garden in Behshahr. The mansion has a rectangular form with an east-west elongation, and it was a semi-open and roofed space (Fig. 6).

In the northern part, the entrance of the garden and service buildings were located, which served as the pre-entrance

of the main garden. In addition to the north side, there was another entrance on the east side. There have been buildings such as a private garden, a residence, and a bath on the west side. The most prominent architectural element of the garden is the Cheshmeh Mansion in the middle of the lake. This Chahartaqi building was built along the southern axis of the official garden and in the middle of the lake. Due to its dimensions, this building can be used as an accommodation for guests, and it was planned for short-term use and to benefit from the landscape near the lake. According to archeological findings, the garden was surrounded by a wall and only its southern side had no wall and was combined with pristine nature (Fig. 7).

• Water circulation

In the Abbas Abad Complex in Behshahr, water has been the most fundamental natural element to create unique landscapes. Water was displayed in the Abbas Abad garden in three still, flowing, and erupting forms, each of which has evoked a specific concept, and in each of these three forms, the designer has used specific facilities, tools, and technologies to present the design goal. In this complex, using hydraulic rules and clay water pipes, water was directed from the springs in the highlands in the south of the garden to the central platform and the four smaller ponds around the pavilion. The water overflow of the central pond was sent to other places and platforms using stone fountains and shallow creeks. Such a water circulation, along with the sound of waves, created pleasant visual and sound effects of water (Vafaei, 2002, 163). As mentioned, water was supplied to the central platform through clay water pipes, from the upstream springs, and then the water flowed from the central pond to other parts of the garden. Moreover, the two-sided slope of the garden has made it possible for the water to flow on both the north and south sides as if the water was welling up from the central pond and flowing into the creeks along the main axis in the north and south parts. Among the different forms of water presented in the Abbas Abad Garden, the lake is the most important element



Fig. 4. The view of the lake and the chahartaqi in its middle from the north porch. Source: Authors.

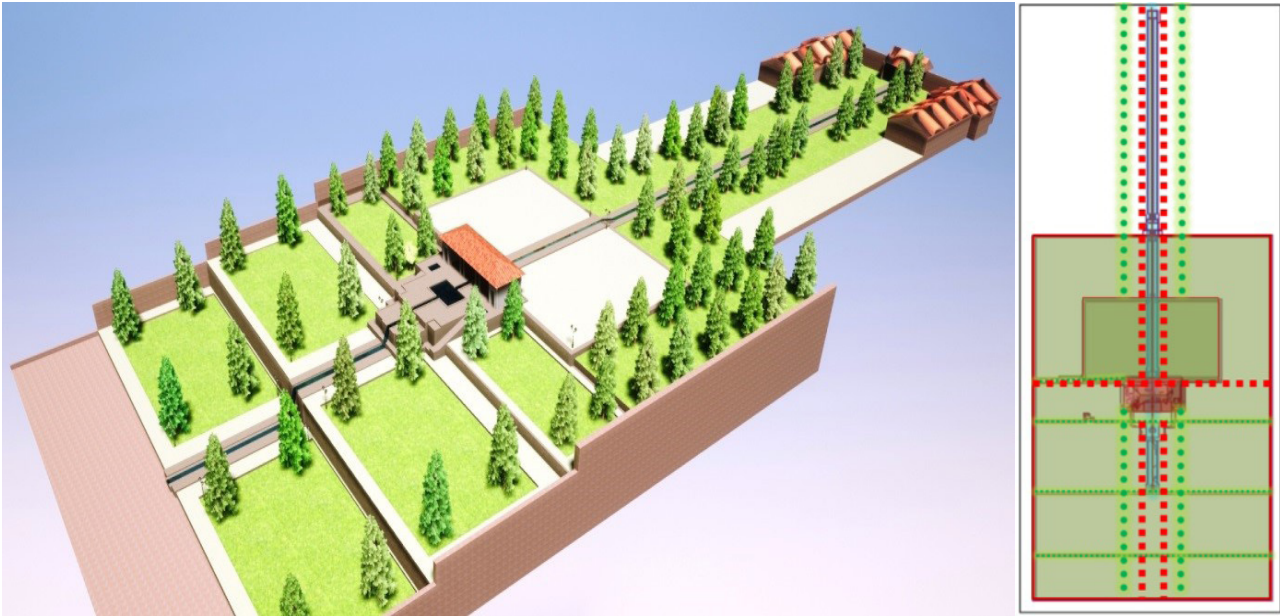


Fig. 5. Analysis of the overall structure of Abbas Abad garden: A regular rectangle and straight lines, The use of a long axis to create a deep perspective on both sides of the mansion, The terracing of the sloped land of the garden on both sides & Two-sided slope and the existence of a building at the highest point (two-sided Bagh-e Takht). Source: Authors.



Fig. 6. The main mansion in the form of a light and semi-open structure. Source: Authors.

of the water system in this garden. The close contact with the water and the landscape as vast as the aquatic area from Cheshmeh Mansion shows the special place of water in this garden. This important place is more noticeable when the lake is filled and the piers of the Cheshmeh mansion are completely submerged, making the aquatic area displayed more than it is. On the other hand, the main mansion was in such a way that it overlooks the lake and the Cheshmeh Mansion (Fig. 8).

• Explanation of the landscape element and how it is observed in Abbas Abad Garden

The natural location and topography of the Abbas Abad garden context are considered special features for creating picturesque landscapes in this garden. The existence of the lake in the complex, the lush forest, and the springs provided an opportunity for the Persian garden designer to define a new border between the geometric arrangement of the Persian garden and the liberation of pristine nature.

• Quiddity of the landscape in Abbas Abad garden

The issue of the landscape in the Abbas Abad garden can also be divided into three general categories: the well-ordered landscape inside the garden, the landscape of the main mansion, and the landscape of pristine nature around the garden. The three categories of landscape in the garden are interconnected and cannot be understood separately from each other, and here, they are categorized just to be analyzed.

• The well-ordered landscape of the garden

There are two different aspects regarding the arrangement of natural elements in the Abbas Abad Garden. In the official part of the garden, the natural and artificial elements are organized with straight lines, while in the northern part, the natural form of the lake has been preserved and unlike other water gardens such as El Goli, the lake has an unarranged rectangular form. Therefore, the natural elements inside the Abbas Abad garden are organized to create a landscape with two general policies: well-ordered nature and pristine nature. In the ordered nature of the garden, which is formed in the formal garden, the most important part is the walkway (formed between two terraces), which is also the most important part of the built landscape. It is a deep and long axis that was defined by shady cypress trees. This axis starts from the northern entrance of the garden, continues to the main mansion, and then leads to the end of the garden, near the lake, in the southern part of the garden. The permanent water flow in the middle of this axis towards both the north and south sides, together with the waterfalls, displays the visual effects of the water and creates a pleasant sound. The next important elements are the northern and

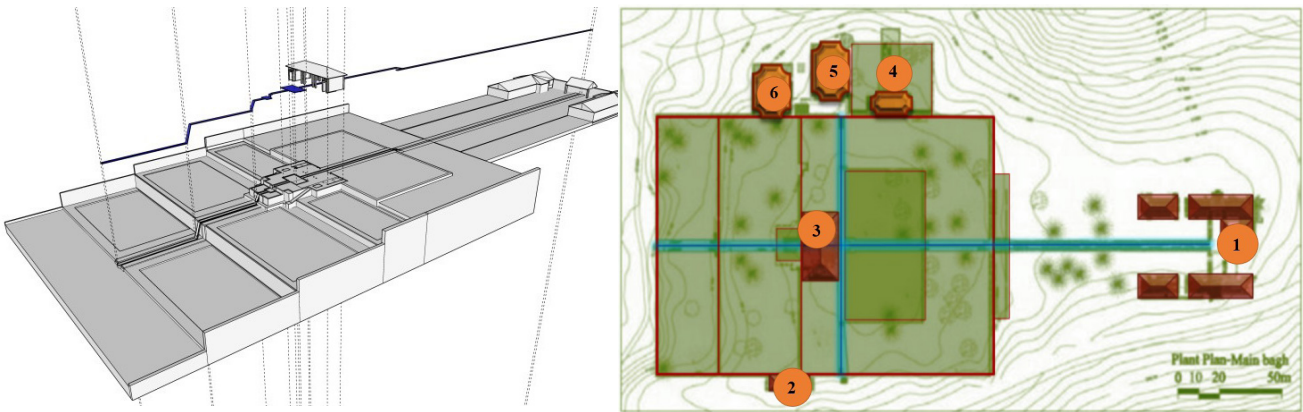


Fig. 7. Analysis of architectural elements of Abbas Abad Garden: 1. North entrance and service buildings 2. East entrance 3. Main mansion 4. Private garden 5. Private residence 6. Bath): The construction of the main mansion at the highest point of the garden and having a view of the landscape from both sides, The semi-open and observation structure of the main pavilion provides a space connected to nature, The presence of a wall around the garden (except the southern side adjacent to the lake), The use of huge stone pieces in the main path and watercourses, The organization of all service and residential buildings around the official garden, The organization of the main portal on the northern side of the garden and the secondary portal on the eastern side of the garden. Source: Authors.

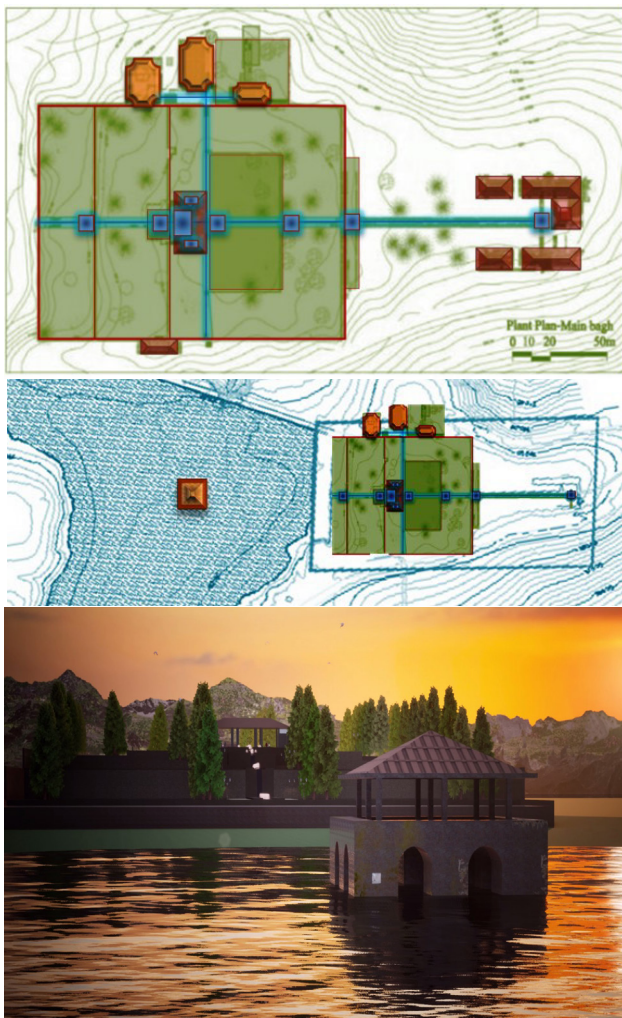


Fig. 8. Analysis of water circulation in Abbas Abad Garden: The presence of water in the garden in various forms: still water, flowing water, waterfall, and fountain, Using water on different scales; From the waterfall, fountain, and small pond to the vast aquatic area of the lake, The two-way flow of water in the main axis & The extraordinary combination of a Chahartaqi building and water as the Cheshmeh Mansion. Source: Authors.

southern forecourts of the mansion: the northern forecourt has made the observation spaces overlooking the northern part of the garden by separating the garden from the main mansion and creating a wide platform, while the southern forecourt does not have a large area due to the higher slope of the land, and the mansion is combined with water through the ponds. Next to them, the garden terraces show the landscape of dense fruit trees.

• The view of the mansion

The main building of the Abbas Abad Garden was an observation mansion that, in combination with water, forms one of the most unique landscape effects of Safavid architecture. When looking at the mansion from the northern walkway, one can see a semi-open columnar building, with the image of lush mountains in its background, at the highest point of the garden. The same thing is seen in the Chelchotoon mansion in Behshahr, where the image of the mansion is combined with the southern lush nature. This view of the main mansion from the northern entrance of the garden, which is located at the end of the view corridor, has made the main mansion the most important element forming the garden's identity.

• The landscape of the pristine nature around the garden

The landscapes presented in the Abbas Abad garden are not limited to the inside of the garden. Landscapes overlooking the surrounding scenery, along with internal and artificial landscapes within the garden, can also be considered defined landscapes for observation. Regarding the landscapes seen from the main mansion, it should be noted that a major part of the plain, lush mountains, and the lake can be seen, and the best combination of these can be achieved from the main mansion. What can be observed from the north of the mansion is a wide landscape including Behshahr Plain, the Caspian Sea, Miankaleh Peninsula,

and the Gulf of Gorgan. From the south of the mansion, one can see a landscape including the lake, Chahartaqi in the middle of it, the Alborz Mountains, and their green forests. It should be explained that the Chartaghi located in the middle of the lake also provides unique landscapes to the viewer: a view close to the water, a view of the huge platforms and the mansion of the official garden, and a view of the dense forest encompassing the garden and the lake (Fig. 9). Spatial proportions, the organization position on the axis of symmetry and at the highest point of the garden with a two-sided slope, the semi-open architecture, and even the location of the ponds, show that the main mansion is the most important observation space of the Abbas Abad Garden, which among the types of landscape, it presents the landscape of the garden and the environment outside the garden from the mansion, based on the position of the observer. Considering the uses of the garden landscapes (establishing in a place and taking advantage of the view) and the lack of observation decks with such a landscape overlook in other parts of the garden, one can say that

observing the garden landscape and the pristine nature of the surrounding environment from the main mansion of the garden has been more considered than other landscapes by the builders of this garden.

• **How to present the landscape from the main observation deck of the Abbas Abad Garden**

As mentioned, the landscapes in the Abbas Abad Garden are presented to the observer in different positions. The observation deck of the main mansion, the observation decks within the garden, and the observation deck of the Cheshmeh mansion. The observation decks of the main mansion and the Cheshmeh Mansion present the landscape to the stationary observer and the observation decks within the garden provide the landscape to the moving observer. The landscapes inside the garden are viewed by a moving observer through a permanent change in his observation point in relation to the landscape when walking along the axis. Although this landscape has a predictable whole, the landscape is constantly changing as you approach or move away from it. According to the terraced context of the garden, the general landscape of the garden and the surrounding environment can be understood from different points, including the walkways, platforms, etc. However, it is noteworthy that there are no stops at these points to define the selected landscape and pause and reflect on it. The absence of architectural buildings creates no space for pausing and no opportunity to stop.

Against observation decks, there are defined places in the main building mansion of the garden and the Cheshmeh Mansion in the middle of the lake to stop and observe the landscape in the Abbas Abad garden. These are places where the observer looks at the landscape in a calm state. In this way, the landscape structure was organized in a way so that it can be viewed from a far distance. Therefore, the elements limiting the field of vision in the main axis have been minimized. The wide platform in the north of the main mansion, and the high platforms in the south of the mansion create an open and wide space, making the space in front of the observation decks of the mansion empty, thereby increasing the field of vision. The main mansion of the Abbas Abad Garden was an elongated building in the east-west direction, which was dedicated to a semi-open space. On the sides of the columnar hall, only a closed and confined space was built. Therefore, it has not been possible to observe the landscape from these places. Since the main mansion was in the extension of the main axis of the garden and was located at the top of the hill, one can conclude that the importance of viewing the landscape from the main mansion was far more than observing it from other places in the garden. Due to the height of the construction platform from the bottom of the lake (nearly thirty meters) as well as the natural slope of the garden context on the north side and the two-sided slope of the

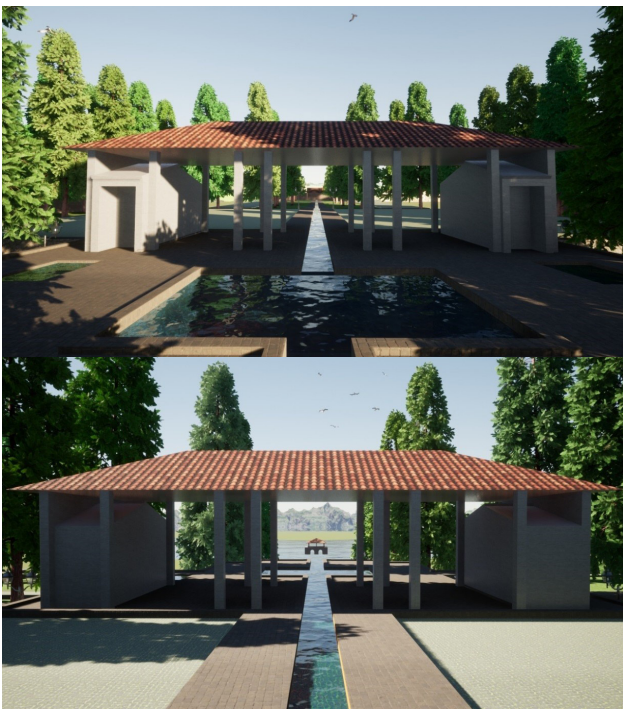


Fig. 9. How to present the landscape from the main observation deck of the Abbas Abad Garden: Provision of a wide view by increasing the area of the field through the creation of open space (northern wide platform) and the steep slope of the southern platform of the garden, Placement of the main mansion and the Cheshmeh mansion along the main axis of the garden, Visual overlook of the landscape of the garden and natural elements of the surrounding environment with the organization of the mansion on top of the hill, Elevating the horizon line and increasing the share of the sky in the landscape of the main mansion with a significant increase in the height of the observation deck in the garden, Maintaining the line of sight by using a columnar mansion one on its two sides as a link between the interior and exterior & Construction of a Chartaghi mansion in the middle of the lake as the Cheshmeh mansion to provide a view close to the wide aquatic area. Source: Authors.

garden, the visual overlook of the garden landscape and the natural elements of the surrounding environment have increased. Also, increasing the level of the observer's vision by establishing at the highest point, along with increasing the height of the columns, has led to the elevation of the horizon line and the increase of the share of the sky in the landscape of the garden from the north side of the building. This is also understood in the landscape of the garden from the southern side of the mansion, and a major part of the southern lush mountains can also be seen. To increase the field of vision and remove disturbing elements, the columns in the main mansion were constructed with light wooden materials and structures of minimal dimensions (Fig. 9).

• How the landscape element affects the orientation, geometric structure, architectural organization, and spatial structure of the main mansion of Abbas Abad Garden

The Abbas Abad Garden is located in an exceptional place to interact with pristine nature. Considering the organization of the garden in the heart of a forest area, the presence of deep axes on both sides of this garden, and the main semi-open mansion. It is combined with a wide view of the surrounding environment. This provides a privileged position for the garden. To analyze the interaction of the garden structure with the landscape, the three axes of the orientation and the geometric structure of the garden, the location of the main mansion, and the spatial structure of the main mansion are investigated.

• The impact of landscape on the orientation and geometric structure of Abbas Abad garden

As mentioned in the previous sections, the Abbas Abad Garden was considered the most important space in the complex in such a way that the entire complex was constructed in a coordinated way to improve the spatial and functional qualities of the Abbas Abad Garden. According to the features of the natural context and its potential, the orientation and organization of the garden should be analyzed with a holistic view. According to the field evidence and historical documents, this garden was the most important space in the Abbas Abad complex and the king's residence, and the main axis of the garden has a north-south extension, which is tilted to the northeast and southwest with an angle of 20 degrees. The axis of the garden is not exactly along the north and towards the Caspian Sea because of the extension connecting the approximate center of the lake to the ridge of the hillside on which the official garden was built. The reason for the location of the Abbas Abad Garden on the current hillside was the natural harmony of the slope of the hill and the location of the lake, along with the simultaneous visual overlook of the Behshahr Plain and the lake, which formed the main axis with a slight deviation towards the sea and the transverse axes perpendicular to it. This orientation has led

to unique landscapes, based on the topographic features of the garden context.

The geometry of the garden is also unique where it faces pristine nature. In its main part, the garden follows a straight and orthogonal geometric system, and the overall shape of the garden is close to a golden rectangle. The garden is surrounded by walls on its three sides, but there is no wall on its south side facing the lake, and from the last platform, the garden tries to combine with pristine nature. Only the main axis of the garden extends to emphasize the point at which the Chahartaqi was constructed in the lake. According to this approach, the natural shape of the lake has been preserved and its form has been not changed to a regular geometric form. The organization of the garden started from the main entrance with a formal approach, and after the highest platform and the main mansion, interaction and combination with nature gradually increased.

• The impact of the landscape on the location of the main mansion of Abbas Abad Garden

The Abbas Abad garden can be classified under the group of Bagh-e Takht (terraced land), where the garden land is terraced by building platforms, the main axis perpendicular to the platforms organizes the garden, and the main mansion is constructed in the last third of the garden and on the highest platform. But in the Abbas Abad Garden, the mansion was not located at the end of the garden and was moved to the middle of the garden, because the garden has a two-sided slope and the building was constructed on the highest platform in the middle of the garden so that it overlooked the landscapes of the Behshahr Plain and the lake. On the other hand, the building was not built in the center of the highest platform, because, due to the steep slope of the southern part, it was no longer possible to see the lake, and the building facing the north had to be built. However, since the designer of the Persian garden preferred to take maximum advantage of the landscape elements, the main mansion was located on the southmost side of the highest platform so that it overlooked both the north and south sides. Following the organization of the main mansion on the top of the hill, water was transferred from the upstream springs to the heart of the garden, i.e. the main mansion, using clay water pipes, and then, it flowed in two directions, north and south, in the creeks of the main axis (Fig. 10).

• The impact of the landscape on the spatial arrangement and structure of the main mansion of Shah Garden

One can see the construction pattern of the main mansion of the Abbas Abad Garden along the observation halls. The high columns and a high wooden hall with a sloping roof are among the characteristic features of this building. The main mansion of the garden has an elongated rectangular plan, which is established along the east-west direction.

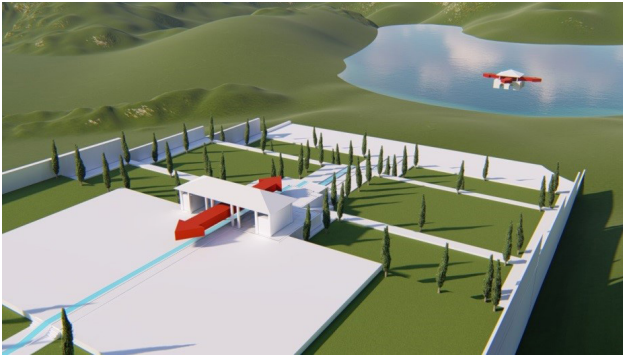


Fig. 10. Providing the main semi-open mansion with a two-sided view. Source: Authors.

The main part of the mansion is in the form of a roofed semi-open space. Considering the organization of this part along the main axis of the garden and its dimensions and proportions, its observation porch is considered the main element of the mansion. Considering the landscape of Behshahr Plain, Caspian Sea, Miankaleh Peninsula, and the Gulf of Gorgan Bay in the north and Alborz Mountains, lush forest, and a lake in the south of the garden, the designer of the garden has chosen a view of both and considered the semi-open building as the most suitable building type to provide a two-sided view. Moreover, he has proposed a semi-open space to extend the view of the garden in such a way that the building was integrated with the surrounding nature and its perfection depended on its maximum interaction with the natural context of the garden. On the other hand, the existence of a wide aquatic area made it possible to build the Cheshmeh mansion in the middle of the lake, and this potential led to the creation of one of the most unique Persian gardens. The main mansion on the highest platform of the garden with a full overlook of the distant landscape, and the chahartaqi in the lake with a close view of the wide aquatic area and dense forest, on the two sides of the southern axis of the garden, have created diverse landscapes on different scales and have complemented the garden's landscapes (Table 1).

Conclusion

According to the features of the natural context and its potential, the orientation and organization of the garden should be analyzed with a holistic view. According to the field evidence and historical documents, the main axis of the garden has a north-south extension. The axis of the garden is not exactly along the north and towards the Caspian Sea because of the extension connecting the approximate center of the lake to the ridge of the hillside on which the official garden was built. The reason for the location of the Abbas Abad Garden on the current hillside was the natural harmony of the slope of the hill and the location of the lake, along with the simultaneous visual overlook of the Behshahr Plain and the lake, which formed the main axis

with a slight deviation towards the sea and the transverse axes perpendicular to it. The geometry of the garden is also unique where it faces pristine nature. In its main part, the garden follows a straight and orthogonal geometric system, and the overall shape of the garden is close to a golden rectangle. The garden is surrounded by walls on its three sides, but there is no wall on its south side facing the lake, and from the last platform, the garden tries to combine with pristine nature. Only the main axis of the garden extends to emphasize the point at which the Chahartaqi was constructed in the lake. According to this approach, the natural shape of the lake has been preserved and its form has been not changed to a regular geometric form. The organization of the garden started from the main entrance with a formal approach, and after the highest platform and the main mansion, interaction and combination with nature gradually increased.

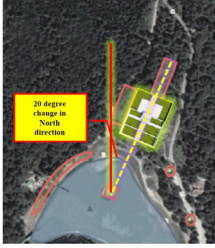
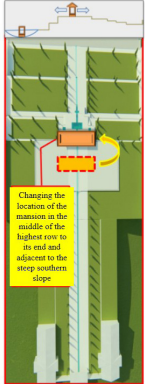
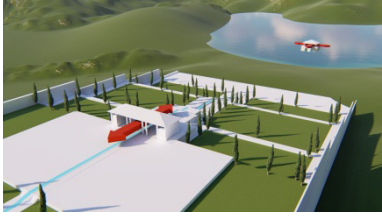
Abbas Abad garden can be classified under the group of Bagh-e Takht (terraced land) and its main mansion was not located at the end of the garden and was moved to the middle of the garden because the garden has a two-sided slope and if the building was constructed at the end of the garden, it would not be possible for it to overlook the landscapes of the Behshahr Plain due to being too close to the lake in the south of the garden, and the building facing the south and lake had to be built. So, the main mansion was located on the highest platform. On the other hand, due to the steep slope of the southern part of the garden, if the main building was built in the center of the highest platform, it would not be possible to overlook the lake and the chahartaqi in the middle of it, so the building was located on the southernmost side of the highest platform, indicating that the designer of the Persian garden preferred to take maximum advantage of the natural landscape. For this reason, the main mansion was located on the southmost side of the highest platform so that it overlooked both the northern and southern landscapes.

The construction pattern of the main mansion in the Abbas Abad Garden is along the observation halls in Persian gardens. The high columns, a high wooden hall with a sloping roof, and an elongated rectangular plan in the east-west direction are the characteristic features of this building. The main part of the mansion is in the form of a roofed semi-open space. Considering the organization of this part along the main axis of the garden and its dimensions and proportions, its observation porch is considered the main element of the mansion. Considering the landscape of Behshahr Plain, Caspian Sea, Miankaleh Peninsula, and the Gulf of Gorgan Bay in the north and Alborz Mountains, lush forest, and a lake in the south of the garden, the designer of the garden has chosen a view of both and considered the semi-open building as the most suitable building type to provide a two-sided view. Moreover, he

has proposed a semi-open space to extend the view of the garden in such a way that the building was integrated with the surrounding nature and its perfection depended on its maximum interaction with the natural context of the garden. The importance of distant nature landscapes and how to observe them are considered to be one of the most important factors generating and forming the structure of the Abbas Abad Garden and its main mansion. In addition to the functional, physical, and semantic structures, the natural features of the garden context and the natural landscape surrounding the garden can be considered the

elements organizing and influencing the physical structure of the Abbas Abad Garden and other gardens in northern Iran. The Persian garden, in suitable areas, is oriented and organized in a way to take maximum advantage of the natural landscape around the garden, meaning that in such contexts, the natural landscape, that can be perceived from the observation deck, along with the artificial landscape of the garden, the observation deck orientation, and under its influence, determines the architectural organization system, the structure of the main mansion plan, and the geometric structure system of the garden.

Table 1. The impacts of landscape elements on the garden structure, the architectural organization system, and the spatial structure of the main mansion of the Abbas Abad Garden. Source: Authors.

Affected physical factors	How to be effective	Graphical analysis
The impacts of landscape elements on the orientation and geometric structure of the garden	<p>The main axis of the garden, in the north-east and south-west directions, matches the topography of the context and the natural element of the lake</p> <hr/> <p>Following the rectangular geometry in the formal garden and the natural geometry in the South Lake</p>	
The impacts of landscape elements on the garden structure, the architectural organization system, and the spatial structure of the main mansion	<p>The impacts of landscape elements on the architectural organization of the garden</p> <hr/> <p>Establishing the main mansion on the highest platform of the garden and moving it from the center of the highest platform to its southernmost side, to benefit from the landscape of the greenery hillside and the lake in the south and the Behshar Plain and the Caspian sea in the north.</p> <hr/> <p>Removal of all other service buildings from the view of the main mansion and moving them to the environment surrounding the garden</p>	
The impacts of landscape elements on the spatial structure of the main mansion	<p>Linearly organizing the mansion in the east-west direction to increase the field of view</p> <hr/> <p>Providing the main semi-open mansion with a two-sided view to enjoy the views of the northern and southern pristine nature</p>	

Endnote

* This article is an extract from Eshagh Rezazadeh's Ph.D. thesis entitled "Recognition of the role of look-out in the formation of the Persian Garden; Case study: Safavid's garden in the north of Iran" which was carried out under the supervision of Dr. Armin Bahramian and Dr. Ahmad Aminpour and advisement of Dr. Vahid Heidrantaj, at the Faculty of Architecture and Urban Design, Art University of Isfahan.

1. This case study framework has been taken from the book "Research in Landscape Architecture, Methods and Methodologies" (Van den Brink, 2018).

2. Sir Thomas Herbert, one of the English nobles and courtiers, who came to Iran in 1627.

3. The book "Abbasname or the description of Shah Abbas II's 22-year life" was written by Mohammad Taher Vahid Qazvini (Vahid Qazvini, 1950).

4. The information in this section is derived from the reports on the archaeological survey in the Abbas Abad complex, prepared by the strategic board of the complex.

5. For more information, see (Sarfraz, 2004).

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