A Study on Cultural and Environmental Basics at Formal Elements of Persian Gardens (before & after Islam)

Mohammadsharif SHahidi (Corresponding author)
Ph.D. Student, Department of Architecture, Faculty of Art, University of Tarbiat Modares
Jalal Ale Ahmad St, Tehran, Iran
Tel: 9-1-2535-5620 E-mail: Shahidi@modares.ac.ir

Mohamad Reza Bemanian
Associate Professor Department of Architecture, Faculty of Art, University of Tarbiat Modares
Jalal Ale Ahmad St, Tehran, Iran
Tel: 9-1-2108-1534 E-mail: Bemanian@modares.ac.ir

Nina Almasifar
Ms.c Student of Landscape Architecture, Faculty of Art, University of Tarbiat Modares
Jalal Ale Ahmad St, Tehran, Iran
Tel: 9-1-4441-5579 E-mail: Nina.almasifar@modares.ac.ir

Hanie Okhovat
Ph.D. Student, Department of Architecture, Faculty of Art, University of Tarbiat Modares
Jalal Ale Ahmad St, Tehran, Iran
Tel: 9-1-2407-9126 E-mail: okhovat9@gmail.com

Abstract

This article intends to study effective factors on Iranian gardens as similar atmosphere with meaning and environment values. First we try to study cultural roots of ancient Iran and its effect on elements and structure of Iranian gardens; in second chapter similarities among Islamic beliefs in Iranian gardens are studied. Then by accessing to a set of cultural-environmental criterions of Iran as an atmosphere that is binding to Iranian culture and beliefs and Iranian knowledge and techniques as a complementary factor is presented and finally Iranian gardens are presented as perfection and ideal work at its principles. Principles and criterions that are raised as a result of aforesaid factors have ever been developed during history of garden constructing in Iran have been maintained in spite of difference at material and main principles and criterions and surely it will be attention by architects.

Keywords: Iranian gardens, Environment, Structure, Elements

1. Introduction

Man started his life in the paradise (green nature) when he was created; however, one of the issues causing high concerns is the fading relationship of man and nature; while nature had always kept man like a cradle. Much could be said in connection with nature, the principles governing it, inspiration of nature, the characteristics and values of natural elements, their cultural basis and the impact of nature on the living of human being and his relationship with nature and natural elements. In this subject, the Iranian garden is a canal towards the most inner layers of thought and dream, and a wise interpretation of the Iranian philosophy of life. In the Iranian philosophy of life, nature is a rank of the whole hierarchy of existence and passing through it is a step of knowledge. Based on the Aristotle's logic, the source of all differences of artistic works starts from this set of factors, or in another word, this subjective cause. The set of ideological and cultural fundamentals is the factor that gives form that

cause. Therefore, one may say: The full structure of the garden in the environment reveals the close and tied relationship between natural and Iranian philosophy of life and culture.(Behbahani, 2004, 19) And in this context, science is converted into a higher figure by its impact on the environment and helps man in reaching wisdom and perfection. The Iranian beliefs come from his ideological beliefs and in turn, create a divine and heavenly philosophy of life. The basis of all abstractive and cosmological characteristics in the Iranian civilization is based on our cultural beliefs. (Dadabe, 2004, 32), these beliefs create the sets of superficial causes by its effects on the structure and forming elements.

In order to penetrates into the Iranian philosophy of life, we first study the effects of Iranian culture I the structure and elements of the Iranian garden and after achieving the cultural indexes, in the second stage, the Iranian's perception of his surrounding environment and using Iranian knowledge in line with this philosophy of life, as a set of environmental factors.

2. Research Methodology

In line with studying the cultural and environmental fundamentals in the Iranian gardens, we shall first study the physical and structural elements in the Iranian gardens by using a descriptive and analytical approach. The research methodology employed in this research is an analytical-descriptive one. To perform this research, the literature review was made by referring to the existing examples and the "historical evidences in Iran, for the pre and post Islam eras.

In this approach, the garden construction examples are used .as evidences through descriptive procedures and the type, mechanism and interfering organizations are recognized and restudied in the structure and physical elements of Iranian gardens. Then, the research sources and references are studied and compared with the principal fundamentals and design criteria related to the cases, so, in addition to comparing the case samples, which are presented in tables, the type and methods of employing the criteria, characteristics, categories and indexes are recognized in the structure and garden construction figures.

3. Effects of Iranian Beliefs on the structure of Persian garden

Although not much information is available on the pre-Islam gardens in Iran and our information is mostly taken from Avesta, the Sacred Book, Ancient Literature and Archeological Garden (Asanloo, 2002, 40), use of Iranian garden design and its elements and structure coordinated and matched with the Iranian beliefs.

The religion and tradition of ancient Iran put special importance to agriculture and garden construction and praised this practice, as in Vandidad, Zoroaster says to Ahura Mazda: 0' the creator of physical life, 0' the pure One, who is the fourth who beings land into its highest rank? And Ahura Mazda answers, "The one who cultivates more vegetables, plants more trees, the one who dries the wet and swam lands and cultivates them." (Ariyanpoor, 1986). (Figure 1)

3.1 Structure

The Iranian garden is designed in square form. This figure is mostly full square or rectangular. In the square geometry, the quarter is the circle and circle is the depth of universe that hides its essence, From ancient, Iranian know square, as coming from quartering circles, as the basis of their designs in sacred and holy place plans. On the other hand, the structure of Iranian garden is based on circle quartering and Mandela figures with division of water circulation in water canals. (Figure 2)

In addition, special attention is given to geometric figures and square figure that showed the distance between the elements of garden as simple and clear was of special importance (Pirniya, 1994, 4). Among these principles, the Chahar Bagh (the Four Garden) pattern is the most notable models and as one of the most durable innovations of the Archimedean in their garden designs which came to creation for the first time in the second half of 6th century in Pasargad (Esternakh, 1991, 26) (Figure 3).

3.2 Elements of Persian Garden

- Water

Attention to each one of the four elements in the Iranian garden has an old root. Anahita, the goddess of water has always been present in the Iranian beliefs and the life giving water is divided into four parts in its origin to create a paradise in the heart of desert (Nilufari, 1984). According to Avesta, the goddess of water, accompanied by the god of wind (Izad Bad), Farr and Forouhar Nikan, divided a certain amount of water among the countries and Aban Yasht, the largest Yashts (parts) is dedicated to Orovisur *Nahid,* the angle of water (Niktabe, 2000). Iranians always makes skillful maneuvers to show water in quantity more than real. Water in the Iranian garden presents in water canals, the pools, water jets, water pools and bents (motahedin, 1995). The floating of water in

the Iranian garden does not have manifesting characteristics, but is a permanent repeat ion to ote the floating of universe. This category of renewal of universe is shown in literature by using the word *Farashgar*, extracted from the word *Farsh (spread and covering with new materials)* and bears the meaning of renewal and cleaning.

- *Soil*

Soil is the eternal object and bears the pre-existence solid body and the eternity memory in its essence (Dadabe, 2004, 32) and garden in hot and dry lands is a manifestation of revival of soil and an allegory of the paradise on earth (Diba, Ansari, 1995).

- *Fire*

In the ancient figures, *Izadmehr* is created by the hitting of two pieces of rocks. With no doubt; the Iranian ancient gardens had a place to keep fire (fire mantle) (Dadabe, 2004, 32). The aerial pictures taken from *Firozabad* city implies that the present fire temple minaret of this center was in the center of encounter of two axes of a rectangular garden, which was irrigated with a network of water canals. Of other examples, one may note *"Vess*" garden in *Niasar* and its neighboring with the ancient mantle place and at the opening of a garden related to the tradition of *Mehr* in this garden (Figure 4).

- *Wind*

In the Iranian gardens, we come across with buildings named "Eight Paradise". The hexagon figure is made by rotating two squares. In some implications, eight was the code number of sun and place of the purpose and God communicates with humans through that code. In the place of those eight paradises, man is encountered with two t1uidity and senses the hidden respiration of universe in an encounter with his living place.

- *Plant*

The Archimedean art is filled with different types of tree of life. Tree is reminded as the fifth sacred element, for the man's existence is of the four elements. In the Iranian local dialect, tree is named "Dar", "Darvid", "Dorud" and "Dorudgar". *Doroud* means praise and *Droudgar* means the one who praises and the sacredness of meaning of Droudgari (carpentry as its translation into English" in the Iranian culture and the connection between this craft and tree is a secret and code in the recreation of cosmetic event (Dadabe, 2004, 32). *In Takht Jamshid*, water Lily is seen in different forms. On the other hand, in the Iranian garden, each plant has its own special symbol and sign. (Table 1)

Therefore, the Iranian garden is a green environment, filed with symbols that remind an Iranian of a series of his beliefs.

4. Similarities to Islamic beliefs in the Persian garden

During Islamic era; too, cultivation of gardens and planting trees were among the skills founded by people of this land. Like other divine religions, Islam also believes man as ~ creature cast from heaven (Diba, Ansari, 1995). Here, some of the characteristics in the Iranian garden could be attributed to the heaven promised in Koran.

4.1 Structure and elements

Ferdows and *Rozat Jannat* (Gardens of Heaven) *Rozat Janat* is one of the names of heaven, remarked in Shora verse, Ayeh 23. In *Majmaolbayan, Rose* is meant as green, fresh and *Jannat* is a land with trees planted around it. Thus, *Rozat Jannat* are planted gardens in the middle of green and fresh land. The assimilation of this example could be seen in *Eram Garden* in Shiraz (Figure 5).

4.2 The wideness of the Paradise (Jannat)

One of the characteristics of Iranian buildings is their vastness. The main landscape is stretched directly in the length axis of the garden, opposite to the small palace and dividing the trees in the two sides plays essential role in creating a perspective that shows garden longer than it really is (Diba, Ansari, 1995).(Figure 6).

4.3 The Rivers of Heaven

In Ayte 15, Mohamamd Verse, paradise (heaven) is expressed as having four rivers:

1. A river of fresh water that never steps floating (Anhar Mamen Gheyrol Asan)
2. A river of milk with the never changing taste (Anhar Men Laban Lan Taghayoro Taemaho"
3. A river of wind (Anhar Men Khomratol Sharebin)
4. A river of honey (Anhar men Asalol Mosaffa)

The rivers in the Iranian gardens could be assimilation of those rivers. (Figure 7).

4.4 The Pavilions of Heaven

In Aye 29, Ankabut Verse it is said: And those who brought faith and acted good deeds, we will settle them in heavenly parlors. There are always springs floating in the foot of the parlors and they will rest there for ever.

The word" *"Ghorf"* is the plural form of "Ghorfeh" (Parlors) that means a very beautiful house on top and in most Iranian gardens, the water springs originate from lower levels of the palace and after running into the pool in front of the building, the water floats in the whole garden through canals (Diba, Ansari, 1995). Therefore, the design of Iranian garden is completely inspired by the figures given of the heavenly gardens in Koran.

5. Study the sets of environmental factors

In general, two epistemological viewpoints assist Iranians in reaching the thought of design, building and maintaining Iranian gardens:

1. Climatologic environment

2. Commitment environment (Khalilnezhad, 2005, 11)

In the first viewpoint, the art of building garden, like architecture, is subject of natural factors and conditions of any environment and the Iranian garden as an integrated complex *(Vaheh)* provides a suitable water and climatic conditions to expand and grow green space, production, moisture, oxygen and adjusting climatic conditions and controlling atmospheric conditions. Beyond the climatic issues, in the subsequent viewpoint, the commitment environment perspective is raised in which, the Iranian culture and belief becomes the basis of this knowledge of environment as an introduction to taking commitment in environmental issues. As a result, an Iranian never sees his encounter with environment as something apart from his culture and both factors always find meaning alongside in the Iranian garden. With respect to the concept of wisdom, placing each object in its own place, the Iranian garden construction is not an act of pleasure, but. is a scientific wise act. In the Iranian garden, any object is in its own place with respect to its merits and qualifications. Using materials, plant, water, geometry and plan take place in a highly conscious form in the Iranian garden and show the deep understanding of the Iranians of their environment and climate for the purpose of proper use of materials in a way that the Iranian garden has been benefiting from perfect climatic design.

5.1 Water

- Subterranean canal (Qanat)

Most Iranian gardens, particularly in the central and desert regions are built in the origin of subterranean canals because a very low amount of water floats on surface. When water comes out of the source of Qanat, it is controlled and floated in the garden. Qanat is a water installation that pulls water from underground through digging canals inside the soil and let the water flows on the surface. Qantas are complicated structures and their main elements are: installations on the land, consisting Heranj (the source), pool, water canals and dividers and the installations inside the ground are: The mother well, *Teran, Tarehkar* (wet work), *Khoshkeh Kar* (dry work) and *milleh* (bar). The system of water float in the subterranean canals employees both pressure and gravity; therefore, water could be collected in the wet work part well based on the proportion of the depth of mother well and the height of the water in main reservoirs. The water in garden floated in three forms: still, floating and water jet, each implying a special concept. Each one of these three methods of manifestation used special tools and installations to fulfill the designer's purpose (Seiedalmasi, 2006). (Figure 8)

- Still Water

Still water in natural form reflects images and due to their reflective nature, are determining factors in composition. Their mirror like surface receives the peripheral environments and reflects them. It expands the images of landscapes and buildings in the water-space. Still waters reflect sky and repeat the depth of endless sky on the earth (Faghih, 2005) (Figure 9).

- Current water

The current move of water versus the static and stability of architecture gives a beautiful contradiction. The light which is reflected by the floating of water looks like dance on ceiling. The trees give broken shadows on the wall and the sun shines into the dark spaces, silent and slow. The water sound penetrates in all levels and changes are made as the water current changes in its tones. The elements of water architecture spreads calling invitations around and calls the building dwellers to itself. The sound of water fall could be changed into a whisper and can possess the whole space with its whisperings (Nilufari, 1984) Waterfalls in step falls, flat surfaces, water rotators, springs and water canals are elements for showing the current water.(Figure 10)

- Water jet

The sound of different water jets in the Iranian garden, while forming the space of garden by their figures and volumes, are beautiful sounds for ear, particularly with the fact that in each flow of water in the water canals, water jets and waterfalls, water creates special sounds (Daneshdoost, 1984). Perhaps, water could come from higher level or flows in a lower level in order to show boiling figures. (Figure 11)

5.2 Vegetations

The plot of vegetations growth in Iranian garden is a sign of intelligence and knowledge of Iranians. The Iranians never cultivated a plant in a place in garden aimlessly and instead, they considered both the beds of cultivation in the garden and the pharmaceutical use of herbs (Khalilnezhad, 2005, 11) (Figure 12). Followings are examples of this. (Table 2)

In the Iranian garden, there is usually a corridor made by cultivation of cypress tree, plane tree and pine trees in the main axis of the garden. (Figure 13)

In addition, care was taken in the system of planting trees. As it has been noted before, each section of garden, made in square and rectangular form, is divided into smaller squares. In the peak of each corner of this square shape network, a tree with longer life was cultivated. These squares are then divided into smaller squares and in the pack of each corners, trees with average life and with the same arrangements, trees with shorter life in the peak of smaller squares were cultivated. This geometric order was so careful that from any views, the rows of trees would be seen. In addition, this order functioned in a form that in lapse of time, there was the possibility of replacing the dead trees and the general figure of the garden would not be destroyed. The light could also be provided for all trees and there was no sudden bare space in a large area of the garden.

5.3 Land and situation

In connection with land as one of the main elements of the garden, apart from the shape and general position, other factors and characteristics such as texture of the soil, slope, difference in level, irrigation capability and fertilization were important, As an example, one of the main reasons of planting gardens in slope lands- with many examples- was the possibility of water flow in garden in natural form to give both irrigation and use of water jet in a more simple way.

The Iranian garden might be built in a slow slop or high slop land. If the land has sharp slop, the shape of garden is usually influenced by the form of land and is made in few levels. In such cases, the possibility of establishing water downstream and waterfalls could e possible.

In the location of the Iranian garden, places with potentials of gardening were mostly used. As an example, Shahzadeh Mahan garden has the most distinguished sense of its formation and by placing the view of Sefid Kuh peak on one hand and Tigran vast valley landscape on the other hand, in the length of main axis of garden, as the landscape point would give the sense of location as the most significant characteristics of an Iranian garden (Mir Fendereski, 2004, 10).

6. Conclusion

In conclusion, one could say that the Iranian garden should be known as a wise and philosophical relationship between man and the nature of God. Knowing the secrets and codes of this relationship could be recognized through observing the genuine' culture and Iranian environment of this country. By finding the precise relationship among those factors in the structure of Iranian garden, each element is placed in its place as its merits and qualification dictates and the Iranian garden comes in harmony with cosmic rules and eternity. Therefore, the Iranian grade, by considering the human need in all its physical and Meta physical dimensions plans to meet his needs "to create this suitable and beautiful link" and in this line, it uses a series of fundamentals (Table 3).

Following fundamentals might have been changed in the length of history of Iranian garden; however, in terms of context, it always continues and can be used as a sets of indexes by the architects.

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Table 1. Symbolisms of trees in the Iranian garden (Authors)

Cypress tree	Death, corpse
Plane tree	Training, glory
Pine tree	Vertically, vital power, fertility, salient authority, sooth
Poplar tree	Yino yang, lunar, and solar year symbol
Mulberry tree	Effort, obedience, and life symbol
Fig tree	Fertility, living, peace and successfulness
Grape	Wisdom
Apple tree	Love, peace, harmony, divinity and wisdom
Pear tree	Hope and soundness symbol, justice, justly arbitration
Cherry tree	Human kind bare birth in the world
Peach tree	Insipidity, dedicating, exorcism of evil, fairy fruit
Prune tree	Freedom and loyalty symbol, longevity, neatness
Wild plum tree	Fairy plant, evil exorcism, roman, and Hellene bride flower
Palm tree	Symbol of happiness, concupiscence, truth, luxuriant, sacred, victory, honest man, and existence(survival) tree
Almond tree	Symbol of virginity, fertility and welfare in married life

Table 2. Use of trees in the Persian Garden (Authors)

Cypress tree	Casting a shadow, luxuriant ,and green and thriving during the year
Poplar tree	Swift growth and utilized at constructing
Fruit trees	Edible usage
Oleander flower	To Keep away the obtrusive insects
Rose flower	Extraction of rose water, sweet smell
Espest	Prevention of water wasting, repulsive of mosquito and true fly

Table 3. Designing indicators of Iranian Garden

Elements & structure		Cultural bases		Environmental bases	Components
		Before Islam	After Islam		
structure	Plan & location	Sanctification of The fore cardinal points	*Janato arzeha assamavato valarz(* the vastness of the janat surround the nirvana*)*	-the order of planting - the order of water distribution	-Sample of the *Char-bagh* -patulous perspective view -squarely distance -direction of planting -rectangle frame
Original elements	water	- Water goddess	- Rivers of paradise	- Lack of water and moisture in the desert region - making tranquility	-steep pools and water fall in step falls -fountain - water rotator -well and subterranean canal(*qanat*) -pool *-breast-partridge* *-Shotor Galoo(camel-throat)*
	Soil & Earth	- Eternal inanimate	- Human creation by soil	- Making soil so fertile and cultivated	-Suitable soil -suitable slop - suitable perspective
	Wind	- Sacred element	- Spirits fluids in the hevenly parlors	- Ventilating	- *Hasht behesht*(eight-heaven)
	Fire	*-Izadmehr* *(god of the sun)*	-God	- Release from darkness	- Fire temple
	Plant	-Eternal tree - tree of life - *daro darvid* - *Nenuphar* (water lily) - symbolization	- *Rozatoaljanat* (paradise garden) Garden of heaven	- in constructing - as a meal - medicinal and chemical property - fragrance -casting a shadow -Keeping away the obtrusive insects	Cypress, Poplar, fruit trees(orchard), rose, and oleander flower, *Espest*

Other elements	Materials	Making use of local material	Making use of local material	-Necessity of thermal insulation - inexpensive and facile preparation - long-life - porosity and penetration factor - flexible	Brick, and wood…
	Wall	Inner-directed architecture	-Privacy -preventing against the hellions ingress	-oasis -being centralized for keeping garden -temperature difference between indoor and outdoor - security	- the high walls -the netted wall
	Animals	Visual attraction, making use of good sound, and hunting			
	Frontispiece portal	Place for watch dwelling, place to review			
	Mansion Palace	Place for living, walking for pleasure and to celebrate the ceremonies, and spectacle			

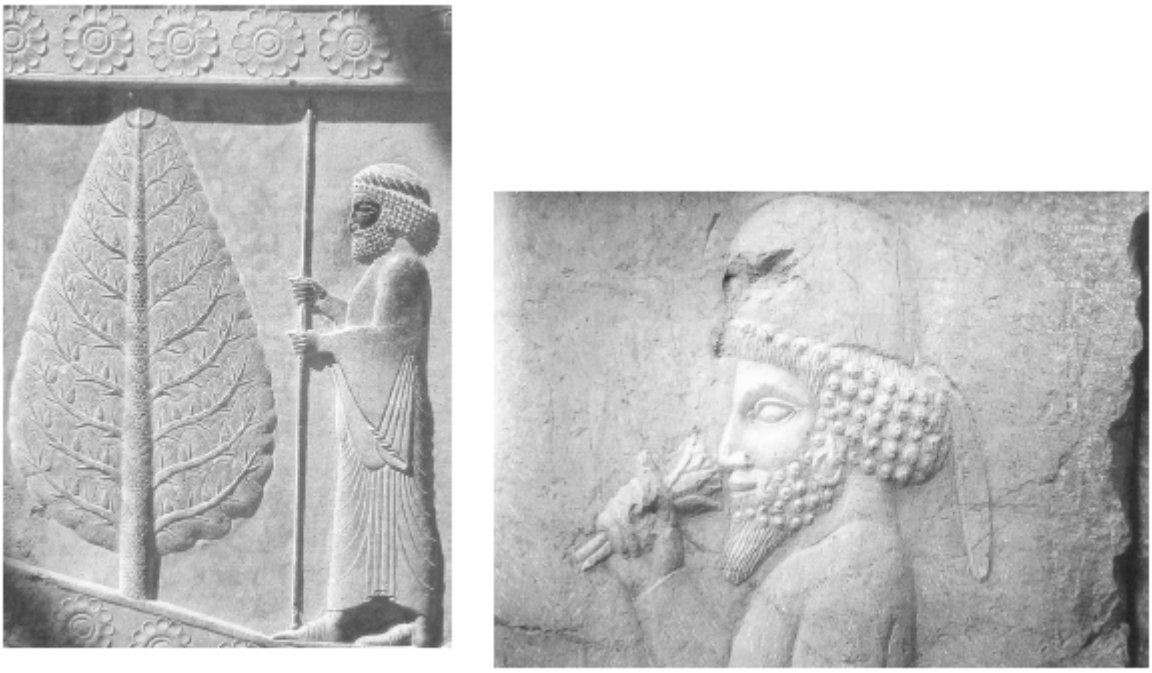

Figure 1. The figure on the wall of Takht-e-Jashid, based on respect to nature (Khansari & colleague, 2004, 32)

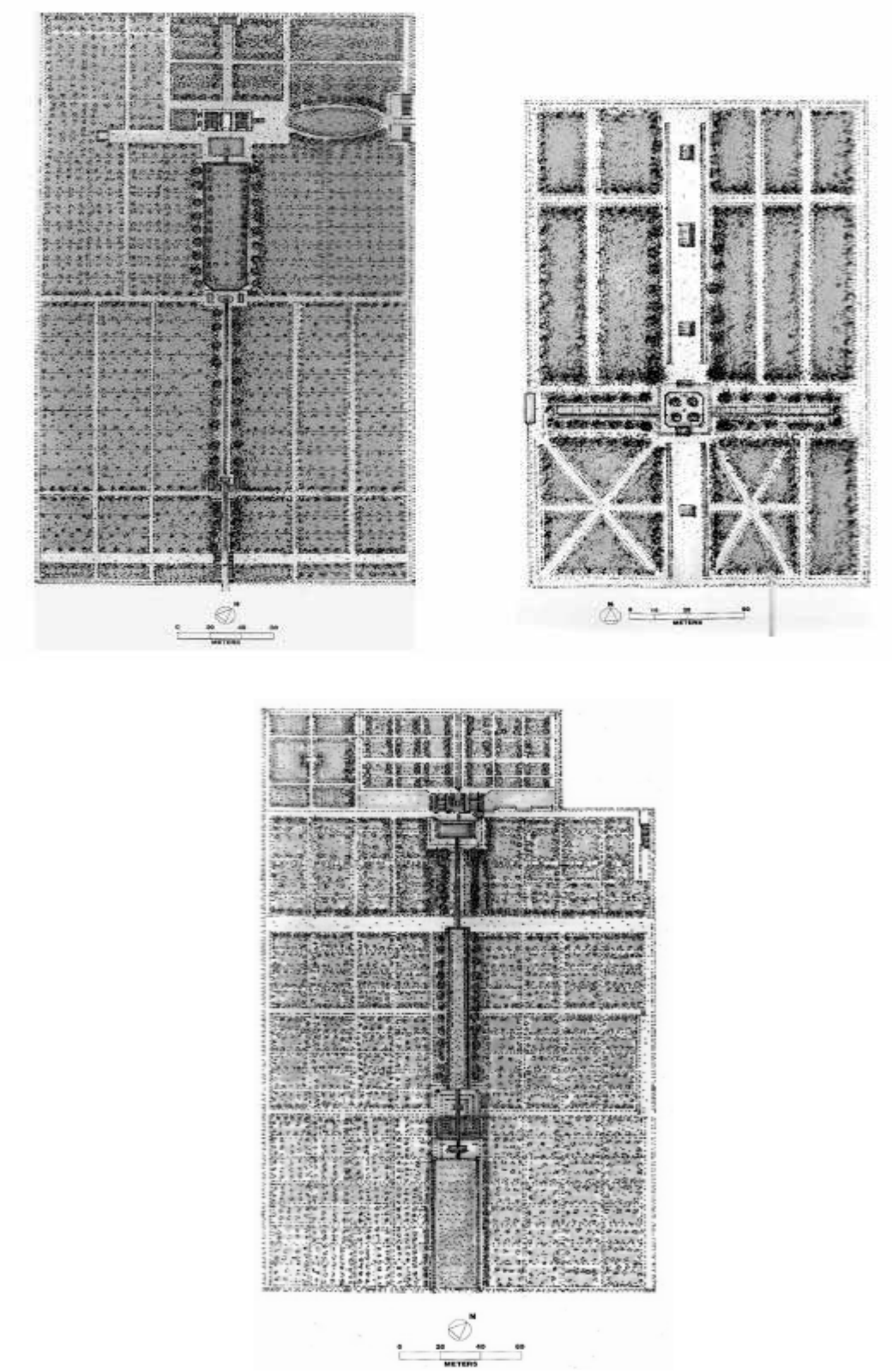

Figure 2. Examples of square design structures in the Iranian gardens (from left to right: Golshan garden, Hashtbehesht garden, and Eram garden) (Khansari & colleague, 2005, 97-144).

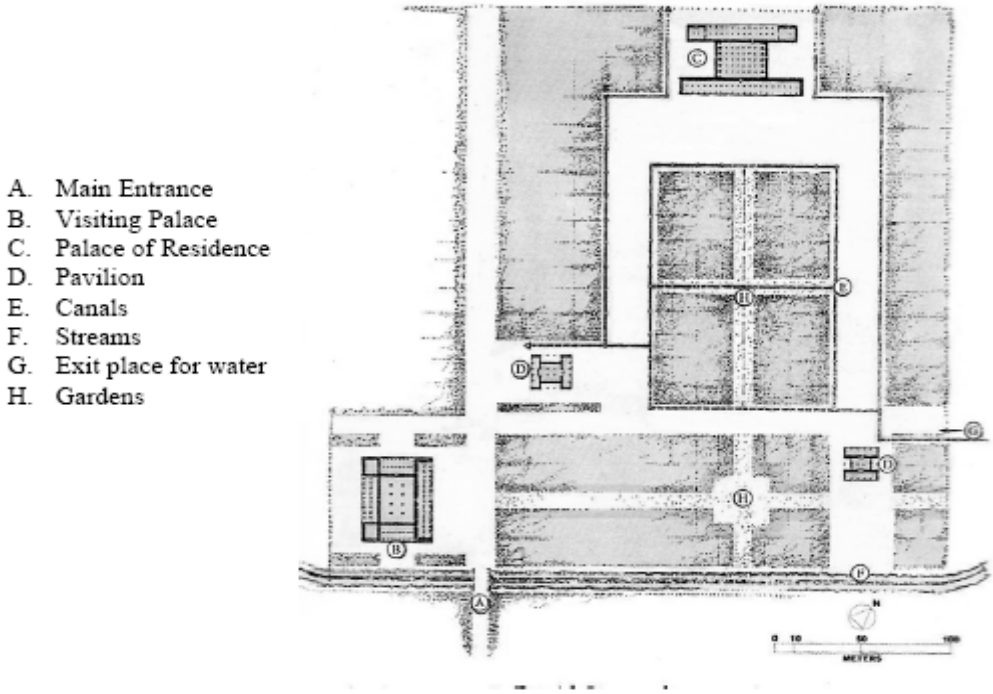

Figure 3. Pasargadae and Chaharbagh Model (shahcherghi, 2006)

Figure 4. Presence of the elements of water and fire as sacred elements in the palace of Takhte Soleyman (Azargoshnasb) Fire mantle

[Online] Available: http://www.ittic.com/DesktopModules/Contents/assets/chehelsooton.jpg, (May 24, 2010)

Figure 5. Eram Garden, assimilation of Rozat Janat (Khansari & colleague, 2005, 144)
[Online] Available: http://www.ittic.com/DesktopModules/Contents/assets/chehelsooton.jpg, (May 24, 2010)

Figure 6. Creation of linear perspective in Chehelsotoun garden (Khansari & colleague, 2005, 99)
[Online] Available: http://www.ittic.com/DesktopModules/Contents/assets/chehelsooton.jpg, (May 24, 2010)

Figure 7. The water division system in Bagh Fin, Kashan (Khansari & colleague, 2005, 85)

[Online] Available: http://upload.wikimedia.org/wikipedia/commons/a/a9/Kashan-Bage_fin.jpg, (May 24, 2010)

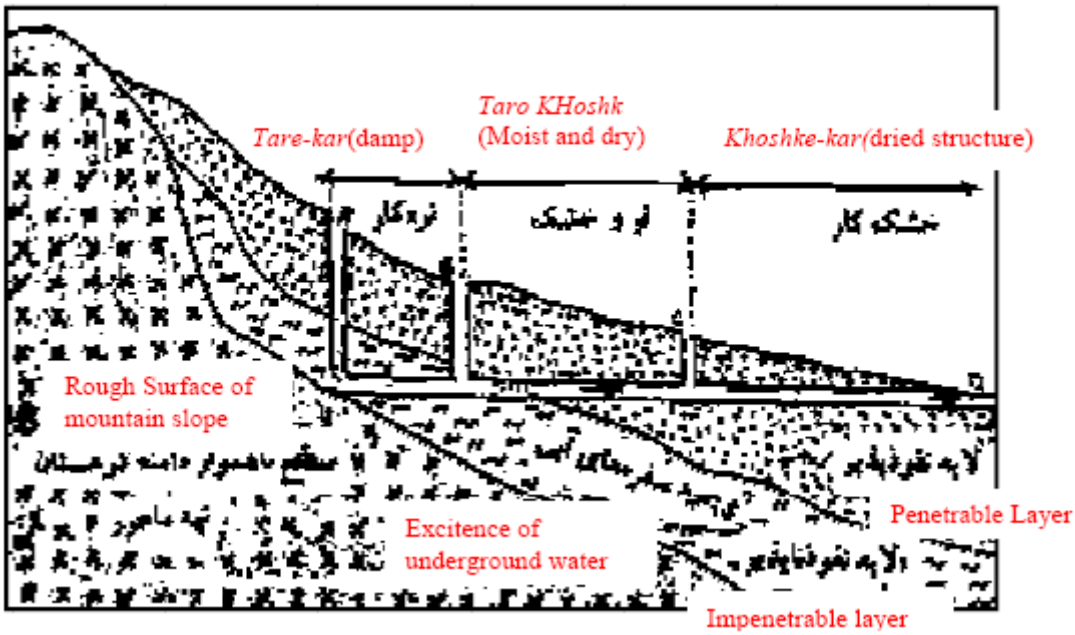

Figure 8. A cross section of a Qanat

Available: Javan, M, & Javaheri, M. (2000).” technical and engineering specialties of aquatic structure which are used in Ghanats of Shiraz plain”, Collection of Ghanat essays, regional water limited company of Yazd

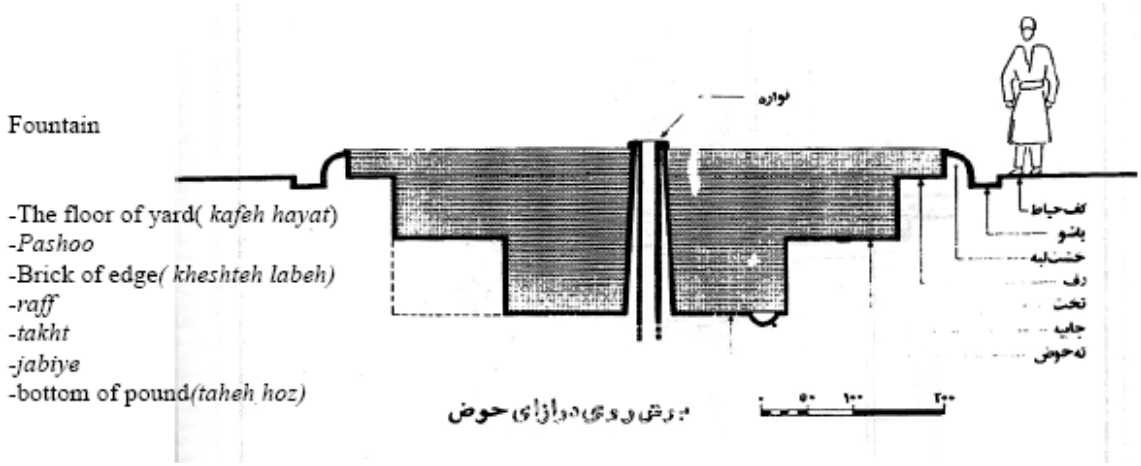

Figure 9. Section of a pool with fountain

Pirnia, M.K. (2009), Acquaintance with Islamic Persian Architecture, collected by: Memarian. GH.H. the fourteenth edition, Tehran: publishing center of Soroosh Danesh, p. 314

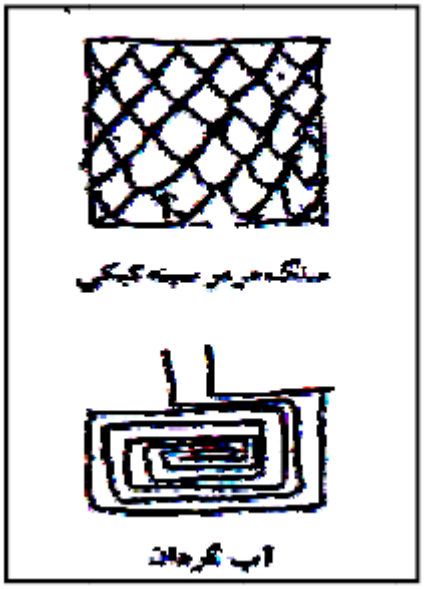

Figure 10. The scheme of flat water fall (sin-e kabki(partridge breas)) and water rotators

Faghih, N, (2005),” Face of Persian Garden”, [online] Available: Persian Garden Website, Persian essays, Access data (June 12, 2006)

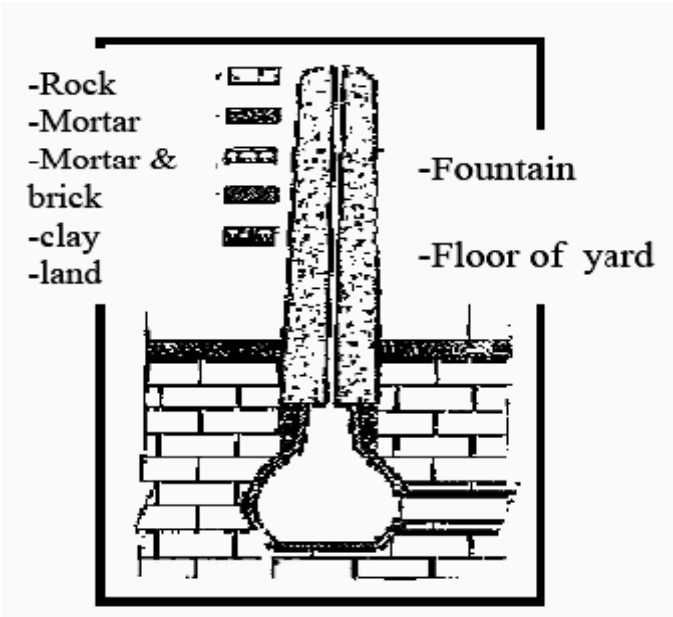

Figure 11. cross section of elements of a water jet

Javan, M, & Javaheri, M. (2000).” technical and engineering specialties of aquatic structure which are used in Ghanats of Shiraz plain”, Collection of Ghanat essays, regional water limited company of Yazd

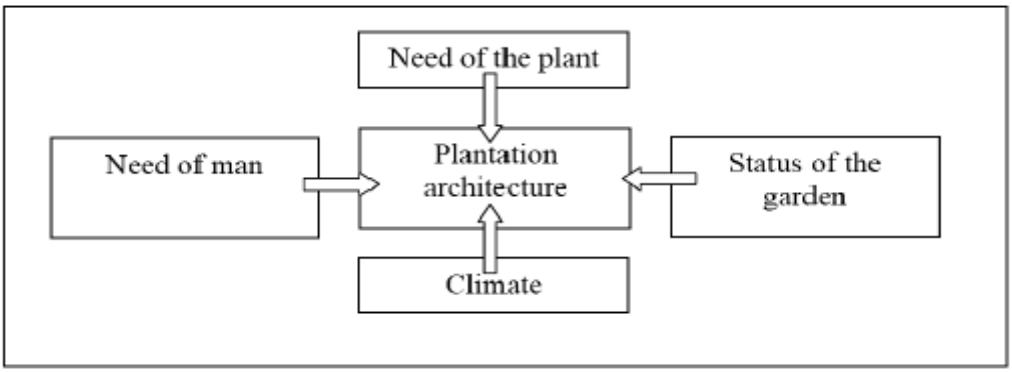

Figure 12. A sample plot of definition of pant agriculture in the Iranian Garden

Khallil Nejat, M,(2005). “Persian Garden as a sight of Persian Philosophy”, Monthly magazine of green massage (Payameh Sabz), No. 42, p11

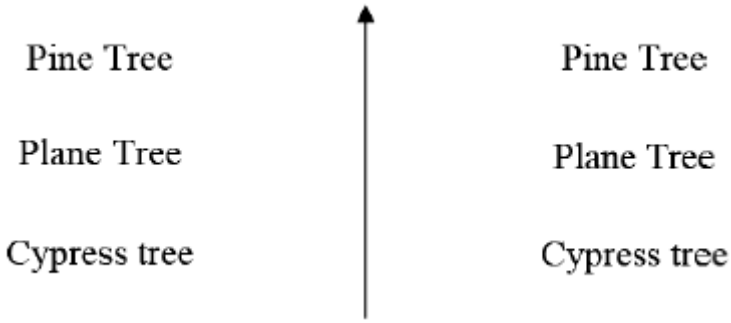

Figure 13. Passing corridor in the main axis (Authors)