Vernacular technologies of qanat and its effect on sustainable architecture
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Abstract
The construction and use of qanat introduce a historical ground and a widespread civilization. It has been common in the central plateau of Iran for centuries and has been the origin of some developments. Qanat has revealed the climax of art in Iranian developments as well as the technical and aesthetic aspects of it on the ground surface and underground layers.

The investigation of this wonderful phenomenon before and after Islam in Iran has been a source of creation of buildings that introduces and conveys reflection of beliefs and material - moral values. This value has reflected in dealing with form and content layers of society, especially in urbanism and architecture, and introduces the lifestyle that makes acquaintance and ideology harmonious and concordant with new order. In a manner that intellectual atmosphere with wisdom, has founded life and soul spreading in urban society.

The qanat formation has associated with cultural and historical influences. This useful research has investigated the brief information of formation history and influence of this wonderful phenomenon in sustainability of human societies, and it makes accessible the quantitative and qualitative situations of qanat influence in the creation of some public utility buildings in historical fabrics.

Construction and exploiting of qanat introduce a change of civilization that has a source of coming to existence on nations and cultures from east to west of world. The first steps in all areas of enjoying of water returns to ancient days and have been mixed to the proportion of that days' people knowledge. In addition, the Islamic - Iranian culture shows the holiness of water in a manner that more than explanation of holy Quran verses and Islamic narratives and allegory, metaphor and symbolic shows main role.

The Islamic - Iranian culture and also Islamic narratives have believed in special value and place for water. Also the role of presence and manifestation of qanat technology at different places makes double the value of space in architecture and urbanism, because the water conversion technology of underground layers to surface has been enjoyed from contortion and discipline by exploitation of qanat knowledge.

Qanat as a city vital artery has been introduced that exploitation of it in city infrastructures establishment has been able to create and influence the architecture and urbanism horizontal development in central plateau of Iran. Such a role related to qanat has formed the construction of some public utilities buildings such as: water supplies, water gates, public bathrooms, drinking fountains and ... which have been more distinguished. Furthermore the influence which qanat has had in promotion and efficient of urban fabric and also the socioeconomic (agricultural) development have been noticed.

City and architecture of Yazd with the reason of strong connection to place specialties among them relation and tie that institute with water, are under influence of exploitation method and situation of qanats a lot.

So that the corridors of urban development, establishment methods of water supply, public bathroom and water gates are main elements of district and different symbols of architecture are influenced by the situations.

In fact this subject can explain this theory, that whatever is flowing underground, over ground and on the surface of earth, has formed the creation of architecture and urbanism.

The influence of qanat in urban development forms behind the infrastructures, in a manner that its role has appeared either for providing drinking water and consumption of urban residents or in agricultural development that its role also has been companion in the way sometimes with existence and water flowing in urban fabrics and has caused the fundamental changes in relation with architecture and nature.

The methodology in this research is based on documentary studies and field references, that documentary research method includes written documents in the qanat forming area as one of the vernacular technologies.
that has role in creation of some public utilities buildings such as: water supply, public bathrooms and water gate. The field research method includes the influence of qanat in the urban structure with dealing forms and procedure. In the middle of Yazd city is one of the patterns that qanat influence area in the urban form structure, regions and districts in it has formed a better visualized appearance and as a case study is capable of investigation. Also recognition of more than three thousand series of qanats makes sense value double.

The result of this study defines that qanat as one of the vernacular technologies has determined the vital artery and infrastructure of forming cities. The organization of cities and public buildings which are rooted in culture and historical - religious traditions of Iran demonstrate the role of qanat in the development of buildings. Furthermore, the qanats have been multipurpose; some have been constructed just for farming, some others for drinking and still others, after passing through the city an refreshing the neighborhood, were used for farming.

The recognition of qanat has not only technical aspect but also has cultural value. Qanat construction has been one of the technologies that it has formed foundation of a civilization. So the different layers of history, culture and economy of time and place of society and / or civilization can be accessible by qanat recognition.

The necessity of optimum investigation of urban development shows necessary the optimum output in the vernacular structures investigation. Apart from investigation of hot and dry climate of region and central plateau of Iran, the quantity and quality life of region especially villages as development discipline cells subjected to exploitation and recognition of qanat capability in the ground furnishing of cities and villages development. Construction and exploitation of qanat, in addition to lots of difficulties, also as a safe and sustainable choice in central plateau development of Iran, has been declared.

The special geography situation of Iran and shortage of water in central plateau of Iran, has guided scientists of architecture and urbanism area to pursue some methods for useful profit and also true Islam with referring to many verses of Quran and narratives, has given holiness and more depth to this culture. So that before Islam, the architecture has been going after water and has been finding comfort beside it and after Islam the architect was leading water towards inside the architecture.

The influence of qanat in a vernacular architecture and urbanism has been in a manner that in addition to private buildings, the public buildings have formed around qanat route in firm organization and development of urban fabric has come to true. Also preservation of qanats limits and prevention of demolition of them is the most important actions of city’s administrators that taking care of them is necessary at all times.

The educational and research centers in the area of introducing and establishment of qanat value as a phenomenon of civilization builder, lead the scientific activities a direction that in the Islamic-Iranian architecture and urbanism area, the technical values are investigated and recognized. This research has investigated only a negligible aspect of the subject that recognition and influence of and qanat in the historical fabrics and development of cities and villages in past can be another subject for research and investigation.