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The Review of Climatic Indicators in the Context of Village of Ashtbyn for Modeling the Residential Space to Achieve to Harmonized Concepts with the Climate

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Abstract—*How to use the energy is a big problem and crisis because of uncontrolled growing of population, high energy consumption, and also limited resources of non-renewable energies. Therefore, improper use of fossil energies and its consequences obligated researchers to find the methods to use the renewable energies in modern buildings. It now seems that principles of the sustainable architecture could appropriately help us to achieve this goal and the sustainable patterns of life.*

This article reviews the vernacular architecture of the village of Ashtbyn and introduces the climatic design as an effective method in order to reduce the energy consumption in the buildings that we can use its potentials in the contemporary architecture. The Old Iranian architectures used an architectural solution in the traditional buildings with regard to issues of each climate to create more comfort in that area. This pattern has been used in the indigenous architecture of the village of Ashtbyn and the context of the village houses is fully compatible with the environment and the climate so that the homogeneity of the village houses and the residential environment is based on the climatic factors.

In this village, the houses are fully adapted with climatic and atmospheric conditions and also, the slope of the land because of the extreme climatic conditions such as severe cold, wind and etc. According to the traditional patterns, the appropriate solutions have been used to design modern buildings with regard to climatic conditions to achieve to the comfortable condition.

Keywords*: the village of Ashtbyn; sustainable architecture; environment; Vernacular architecture; harmonized architecture with the climate.*

1. INTRODUCTION

We find in the study of house history that human being has compulsory been harmonized himself and his living space with the climate. We can find that three factors have constituted the man-made primary shelters: 1. The climate which has been lived in 2. Type of materials that were available to him 3. Forecasting and using the ways to avoid the dangers that may threaten him (Poordeihimi, page 54, 2001). The architectural history of Iran, originating from several thousand years of experience of living in the particular climatic and cultural conditions of this country, represents the scrutiny of the ancestors when facing many problems. It has finally led to create an environmental suitable form in the vernacular architecture taking into account the different climatic conditions, use of the indigenous materials, and etc. Today, the review and analysis of the Iranian vernacular architecture which has been formed with regard to principles based on sustainable environmental architecture can be considered as a suitable model for today's generation of architects (Nilsen, page 3, 2010). Traditional Iranian architecture has a specific and unique features that has mixed the climate and religion. It has specifications such as suitable design, accurate calculations, proper cover forms, and observing the scientific issues of high porches and various decorations. However it is simple, it is based on principles such as introversion and the veil (Mansouri, page 39, 2010). In this research with regarding to vernacular architecture of Ashtbyn village, and environment sustainability we try to investigate economic, social and environmental sustainability. Considering the ruling conditions in each environment in the architectural design process of that area can not only adjust the building body with the environmental conditions but also it can reduce the energy consumption and provide the goals of sustainable architecture in harmony with the nature (Zargar, 2007).

2. HISTORY

The village of Ashtbyn is in the longitude of 46 degrees and 29 minutes and in the latitude of 38 degrees and 51 minutes and 3620 meters above sea level. It is one of the environs of Siahroud subregion, Nojeh Mehr rural district, Jolfa town, located in the East Azerbaijan province.

The village of Ashtbyn consists of three habitations named Haras, Siavashan, and Jafarabad.

It is a mountainous village located between two valleys.

The range of the village from the viewpoint of weather divisions is an area with the cold climate, has long winters and is a snow-covered area for several months of the year.

The context of Ashtbyn village is completely condensed because it is surrounded by gardens and other physical factors such as roughness, stone bed, steep slope of lands, and specific climatic conditions and there is only a limited possibility of developing in the northern limit of the village.

This village with number 2692 has been registered on June 6, 2000 in the list of national monuments of the country. Documents obtained from the existing inscriptions in the village dated back to 843 and 976 Ah, but it seems that the architecture of some buildings is related to the Parthian Empire period. Several inscriptions written in Sols line relating to the period of Shah Tahmasb Safavi, an old cemetery, the marble inscriptions relating to the centuries of the ninth and tenth Ah all anecdote from its precious and historic background.In the past times, this village has been like a castle and no one could easily access to the village since the village has been located in a valley surrounded by long mountains from three sides and there was a trench on top of every mount. These three trenches overlooked completely on the village and it was like a strong castle in terms of security. Such a safe place seemed suitable to live and so a bigger and more prosperity civilization formed in that place which later was called Ashtbyn.

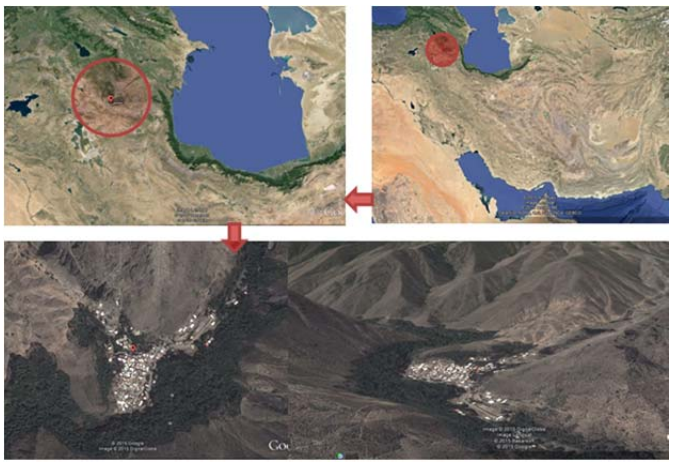

Fig. 1: Geographical position of Ashtbyn village.(Google Earth)

3. THE ARCHITECTURAL CHARACTERISTICS IN THE BUILDINGS OF ASHTBYN VILLAGE

The village houses are concentrated and integrated according to the mountainous and foothills climate and the slope of the land. In this type of villages, the houses are so close to each other and have a concentrated visual overview. The houses are so condensed due to physical factors such as roughness, stone bed, steep slope of lands, and specific climatic conditions and there is only a limited possibility of developing in the northern limit of the village.

The village houses have a stepped architecture. The yard of each house is the roof of another house that usually has no empty space. A river is running in the east and the lowest part of the village valley. In every corner of the village alleys, we can see a silk production workshop. The village houses are very functional and unpretentious. They have certain spaces such as kitchen, corridor, hall or guest's room, accessible room, and balcony. In the village houses, the yard has not a particular function and the corridor works as a communication space. The majority of the houses have a down door in the first floor of the building used for moving the animals and there is a door in the second floor that is opened directly into the corridor.

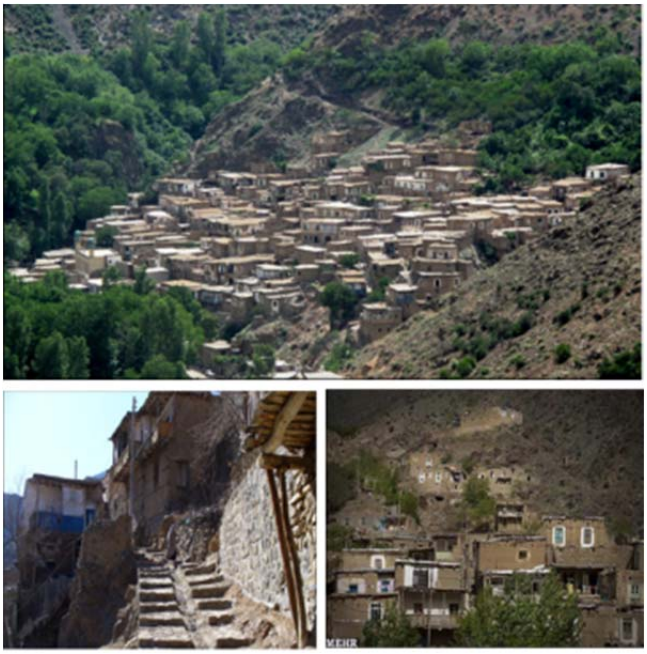

Fig. 2: Views of Ashtbyn village landscape, Rocky arc.

One of the specific architectural elements of this village is balcony or in the villagers' dialect "artirma". It is a space outside the building located on the top of the pathways and is used by villagers because of the climatic conditions of the area. It is in the opposite of the south side of the sunlight.

This element makes people to be more comfortable for two reasons: the first is that it prevents the sharp shining of the sunlight in the summer into the room and the second is that it is a windward and relatively cool space that is used in the summer.

Another special architectural element of this village is a space called "baneh gah " or " banagah" and villagers believe that it has had security applications. This part of the building has not

any orifice to the outside and takes the light just from the bottom of the ceiling. Its height is approximately equal to a two-story building and four wooden columns that usually have engraved bells keep the pyramid and wooden ceiling. There is usually an oven in the below of this ceiling for baking the bread.

4. CLIMATIC FACTORS

Climatic factors play an essential role in shaping the rural context and residential houses. The climate determines the status of the air inside the building. One of the foundations of the formation of Iranian architecture is climate. Forgotten values of Iranian architecture in the optimization of energy use, utilization of the vernacular architecture, preserving its values in the architecture design, and incorporating the vernacular architectural strategies in design and construction of the architecture and urban development of modern cities can be a wise decision for sustainability and globalization of the vernacular architecture of any city or country since the vernacular architecture of each city has been originated from the indigenous patterns of that city and such patterns have been changed to a method to design and construct the architecture of that city in a long time. Passing time causes to remove or reduce the shortcomings of that architecture because of the repetitive uses. This has higher prevails compared to our today's architecture and design (Renee Short, 2011).

Factors affecting on the vernacular architecture space:

A. Physical factors: material, knowledge and technology of the building, Economics

B. Environmental factors: climate, natural environment, artificial environment

C. Functional factors: behavioral patterns, spatial characteristics of activities, technology and living tools

–D. Cultural factors: culture and sustainable patterns, beauty, mode and monger, innovation and creativity.

Among the above factors, historical-time and environmental-cultural factors are playing an important role. So from the perspective of this culture, anything has an outward and inward. However they are different, they are not separated. There is no outward without inward and the inward does not emerge without the outward. Although the architecture of historical monuments in Iran has religious and ethical concepts and purposes, it depends on factors such as climate, available materials, and culture of the region, neighbor's culture, religion, ethics, and builder of the monument like the rest of the world (Beheshti, p 357, 1999). The vernacular architecture has specific characteristics that have considered aesthetics and environmental issues in its design. The vernacular architecture tries to provide the comfort for users economically, socially and environmentally according to the cultural issues of each region. There are the principles of the vernacular architecture in many Iranian traditional buildings. The review of the climatic indexes of Ashtbyn village confirms this. Since the principles of the vernacular architecture are considered less in Iranian contemporary architecture, preserving the vernacular architecture values in the contemporary architecture design is necessary and inevitable. Rereading of the vernacular architecture principles used in Iranian architecture and urban development elements can be used to help the improvement of the quality of Iranian contemporary architecture. Since the vernacular architecture has sustainable architecture principles and strategies, it can be a forward step for a proper design in comparison with other existing architecture strategies. Nowadays it has been proven that paying attention to climatic conditions and solar energy when designing and constructing any building specially the ones which use such capacities directly is important and necessary. It is important to consider the climate characteristics, the sustainable energy principles, and the influence of such characteristics in constructing a building. Human is more comfortable in the buildings in harmony with these principles. The environmental conditions of such buildings are safer and better. Daily and seasonal variation and changes in light, temperature and air flow in such buildings provide a variety of spaces (Vasigh, 1992). Sustainable design minimizes the adverse effects on the environment, production and consumption of energy and materials. In ideal condition, if necessary for the development, sustainable design should be able to form based on existing natural materials in the region, provide needed energy through natural renewable resources, and manage the lesions and produced discard materials (Qibalco, p 2, 2010).

5. CONCLUSION

Analysis of Ashtbyn village shows that formation of this village has always been to organize the vernacular architecture based on behavioral patterns and social, cultural, religious, and economic values of its habitants. Rereading these patterns and preserving the architecture ecological values is an opportunity to maintain and use them better and it results in reducing the design and sustainability inconsistencies. Thus, rereading these patterns and preserving the vernacular architecture values of each region cause that indigenous inhabitants use them continually. Hence, we can use the renewable energies like sun and wind for heating, cooling, and ventilating the buildings in the maximum level with the proper use of the indigenous materials and combining them with the new situation of the construction and also utilization of the professional experts' experiences in the energy. This is possible with the accurate and comprehensive understanding of climatic and weather condition of such areas. The features and potentials of this village (consistent with the nature, use the renewable energies and use the vernacular architecture) explained before in the section of the analysis of its vernacular architecture. We can present some strategies according to such issues:

- Energy conservation: buildings should be constructed in such a way that is consistent with the climate and energy resources of that region.
- Coordination with climate: buildings should be designed in such ways that are consistent with the climate and energy resources of that region.
- Reducing the use of new resources of materials: buildings should be designed in such a way that reduce the use of new resources as much as possible and their materials are used as a new resource to build new buildings at the end of their useful life.
- Providing the residents' needs: it is important to meet the residents' physical and psychological needs in the vernacular architecture.
- Coordinating with the site: it should be compatible with the surrounding environment.
- Holism: all principles of vernacular architecture should be embodied in a complete process that leads to a healthy environment.
- It can be expressed that traditional architecture is always consistent with sustainable construction and can be transferred to the modern architecture especially in the area of the housing architecture due to the above factors. The sustainable architecture tries to create a healthy environment based on the efficiency of resource and helps to protect the renewable resources, reduce the consumption of renewable energies, and promote the living quality with reasonable use of natural resources and the appropriate management of construction. Studying the principles used in the traditional buildings shows that used criterions in the sustainable architecture have been used in Iranian architecture very creatively and with tact and intelligence of the traditional architects. Thus, we can adjust the methods of old architecture with nowadays needs to establish sustainability and provide welfare and comfort of the residents considering the protection the environment in the modern age. We can also play a key role in preservation and survival of environment and providing welfare and comfort for the residents using the optimized use of the clean energies and modern technologies.

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