

Manifestation of Architecture Compatible with Nature in Configuration of Urban Landscape Pattern: A Case Study in Kandovan Rocky Village, Iran

Mojdeh Feyzi¹ and Mohammad Reza Khakzad²

¹M.sc in Architecture, Islamic Azad University Shabestar, Iran)

²(Student of PhD in Architecture, Islamic Azad university Tehran branch, Iran)

E-mail: ¹mojdeh.feyzi@yahoo.com, ²khakzad.mr2@gmail.com

Abstract—Human from the beginning has continually modified the nature to provide suitable conditions of life and has built environment. Designing compatible to environment and sustainability is one of the main topic in design world today, it emphasizes that human and environment affect each other. It describes environmentally conscious design methods derived from harmonic to environment and ecologically to the design of the built environment. This research scrutinizes Kandovan texture and a unique structure and compatible architecture which has appropriate integration of the village is linked between the living place for inhabitants and environment that is a major source of wonderment and fascination. In summary, this article presents the theoretical framework and comprehension of form and characteristics of rock architecture of Kandovan Village which impact of the consolidation of two-sided nature and village architecture and shows reflectance of man's encounter with the nature in order to the completion of nature. it is obvious that the formation of the Kandovan rocky village, not only the devastation of the nature is not the surrounding environment, but also has been adapted to nature that is considered one of the amazing models of compatible to nature and sustainability.

Keywords: Kandovan village; rocky architecture; Compatible with nature; Sustainability.

1. INTRODUCTION

Sustainable architecture and designing compatible to environment is one of the important issues in design world today. It is plausible that the aim of this designing is decrease of environmental damages and energy resources utilization and adjustment to environment. The main cause for choice of Kandovan village is its specific architecture (rocky architecture) originated from this region Natural landscape that plays a significant role in shaping of the village. This unique architecture manifests human relationship with nature in the best way. In this village composition of nature and following nature and exploitation is seen. (Akrami, 2009)The village of Kandovan showcases houses and barns carved

entirely inside pyramidal cliffs. The architectural methods used are the most practical ways of utilizing the dome-shaped cliffs to make inhabitable places. The village is situated in the Sahand Mountains, whose lush pastures hold great appeal for many nomadic tribes in search of food for their livestock. According to renowned archeologists David Roll and Peter Martini, Kandovan dates back to ancient times. They even go so far as to claim it as the Garden of Eden, where Adam and Eve lived (Moghimi Oskouei & Mosazade, 2007, 221). Human nature has always been associated with manipulated nature has tried the best way to bring nature into their service. Sustainable architecture is probable that the aim of this designing is reduction of environmental damages and energy resources consumption and adjustment to nature (Yahyavi and Shaghaghi, 2012). The intimate, intrinsic relation between man, nature and architecture is clearly visible in this village. It is often said that architecture is the art of creating space in nature, but here humans, instead of constructing space in nature, have managed to extract it from the very heart of nature (Rezaei, 2003, 68) Aim of this article is to discuss to introduce eco-friendly architecture. After that, it will analyze the architectural practices famous with their natural components in Kandovan village in Iran as practices accepting eco-friendly logic.

2. DESCRIBES THE RESEARCH METHODOLOGY

Providing appropriate housing and compatibility with nature and climate to the needs of modern communities is among the major issues in planning and development of urban, and searching for its theoretical history is of great significance. The purpose this article is to assess and explain the housing design which is sustainable and in harmony with its nature in Iran and understand and transmit that there are certain morphological and situation types for typical traditional houses in each area. The relevance between this body,

geographic condition and environmental sustainability will be analyzed as well. The predominant approach in this study has been descriptive-analytical and data is collected by written sources, library research, internet, articles and related magazines and then the collected data is analyzed and physical presence to evaluate the capabilities of the village for sustainable development and also field study method is done.

3. NATURAL ENVIRONMENT OF KANDOVAN VILLAGE

As one of Iran's wonders, Kandovan Village is famous for its cave houses that are still inhabited today this village of homes

carved in stiff rocks and endless wonders. Sahand rural district is a rural district in the central district of Osku county, east Azerbaijan province in Iran, familiar and famous with Kandovan village. Kandovan is one of the villages of eastern Azarbaijan province located in south of Tabriz in slope of Sahand mountains. This village dates to more than 850 years (Statistical center of Iran, 1375). The village height from sea is 2300meters and its climate is cold in winter and has nearly hot temperature in summer. Because of rocky architecture characteristics and it's special fabric. This village has been registered in Iran national monuments list. (Ghobadian, 2003) Kandovan's rocky architecture is more important than common architecture according to

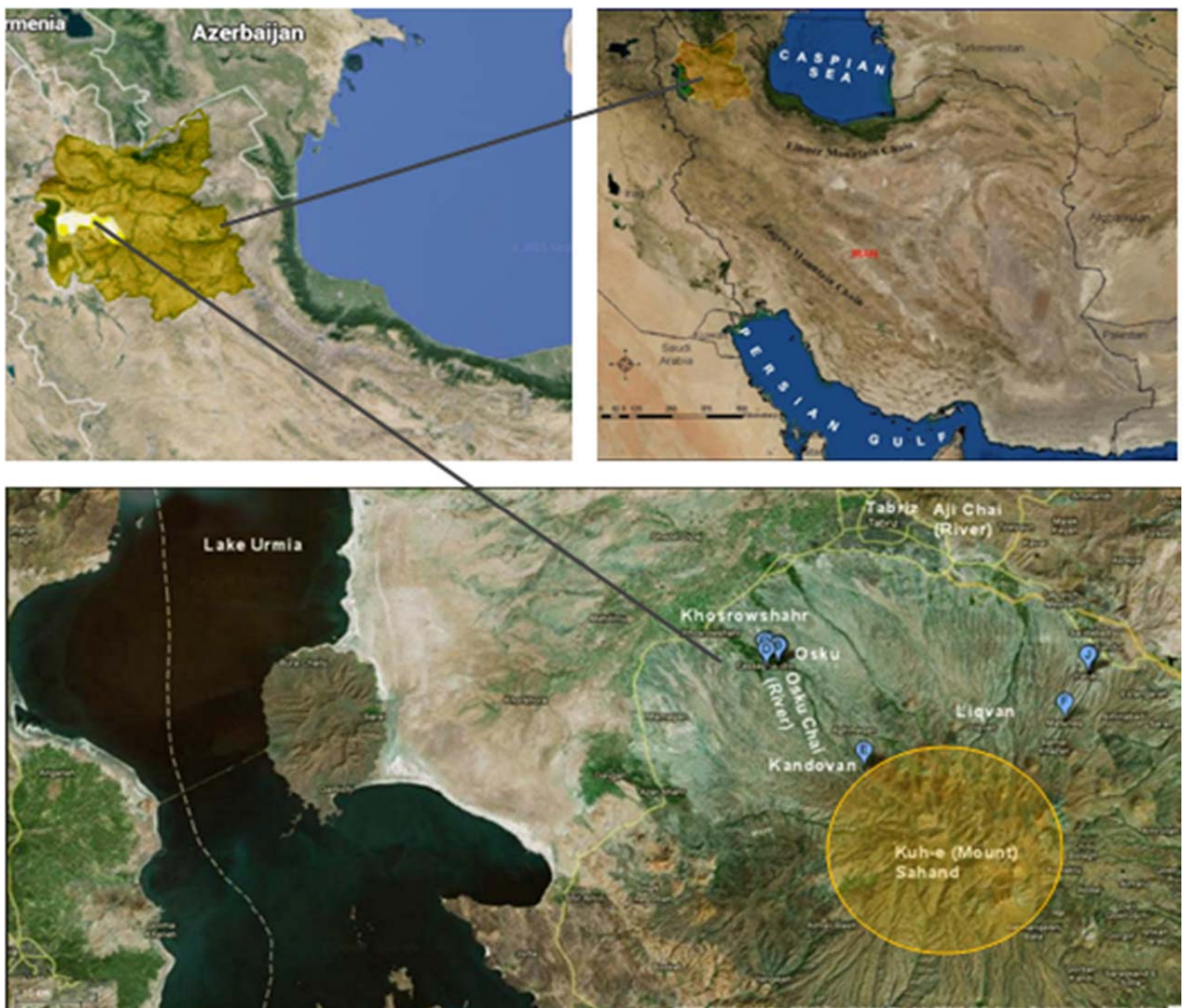


Fig. 1: District introducing its history revitalization.

In common architecture the main architectural frame is built by materials like lime, adobe and brick and spaces result of the main frame and building volume. While in rocky architecture the trend is reversed and the architecture begins from space. While in rocky architecture the trend is reversed and the architecture begins from space. The main characteristics of this village are creation of space and following region nature and form of Karans (cone-shaped rocks). The villagers have selected the practical, optimal and easy way to build and utilization of space. In Kandovan it is tried to use more by less space. (Akbari , 2009).

The ancient individuality of the Kandovan is one of the third rocky villages in the world that the only inhabitable rocky village which the cone-shaped houses on Sahand slopes makes for the most attractive natural and historical sceneries. The village is located in a green valley and its inhabitants are well-

known for cutting stones and residence in cone-shaped houses from stones. The architecture of this village is unique and fluidity of people life in an ancient texture is considered exceptional in the world, for nobody lives in Cappadocia and Dakota of Turkey and USA. Today there are more than 117 families and houses inside the rocky piles of pyramid and conic shape.

1. Position of Azarbayjan sharghi province in Iran. (The upper right fig)
2. Position of Osku in Azarbayjan sharghi province. (The upper left fig)
3. Position of Kandovan village. (Bottom fig)



Fig. 2: Kandovan village (www.google.com)

4. TEXTURE

The physical texture of this village is formed based on geographic features and by volcanic ashes spewed by Sahand Volcano and compressed over hundreds of years by natural forces. This happened so far back in time that many residents don't know the antiquity of the village. The multistory hills have been constructed on old alluvium. Such factors have caused logical relations in the creation and formation of buildings which have revealed themselves in an organic

geometry in their texture. The same principles have given this village a specific identity which can be a model for its compatible to nature and sustainability.

5. ARCHITECTURAL FEATURES OF KANDOVAN VILLAGE

Rocky architecture displays the sense of combat and effort of human with the nature to establish close relationship with nature. Building materials in the normal architecture is created

by construction materials like gypsum, lime and bricks. While in a rocky architecture the living space becomes visible in the lump of stones and also stone like a skeleton constructs stable cover around the space. Kandovan rocky architecture creates world of beauty with its natural Karans and surrounding landscapes. Melted materials have thrown from holes of Sahand volcano and other volcanic mountains for thousands of years. These lavas have been cumulated during centuries and

gradually a skin of Tuff rock with different resistance has been made. Volcanic melted masses and lavas have been shaped by wind, storm, snow and rain in hundreds of years and the Karans have been established. Gradually Karan's less hard sections fell down and hard sections have been remained and current shapes have been made as natural miracle. (Ghobadian 2009)



Fig. 3: Views of Kandovan village.

Houses are conical and also some holes have been built in the rocks to keep domesticated animals. The Karans have been expanded in east and west directions and they are concentrated in east. West Karans have gradually destroyed or they are semi destroyed because of insufficient preservation. Since people live mostly in east part because of less solar radiation in west part while east Karans are used due to sun radiation and this part is undestroyed. (Homayoon, 1977) In constructing Karans, other parameters such as security and form have been taken into account. Through the decades, the softer parts of the walls have been eroded by strong winds and abundant precipitation in the area, leaving intact only the hard volcanic tuff, a natural insulator (Homayoon, 1977). The insides of the pyramidal

cliffs were chiseled out in order to yield cavities. These cavities were then enlarged sufficiently depending on the intended use of the location, i.e. residential or public. When encountered with huge boulders in the process, the builders would either have them removed if possible, or work around them. The cone shape of the cliffs has limited the scope of carving feasible, in effect forcing the builders to construct partitions, additional platforms or ledges inside and outside, invariably aiming to create as much space as possible. Moreover, left-over rocks from previous carvings are mixed with mud to make new construction materials for building staircases and extra partitioning walls (Akbari & Bemanian, 2009, 145).

Table 1: feature analyze

Landscape features in Kandovan village from compatibility with nature perspective

- Thickness of walls of karans is near to two or three meters that are optimal for cold weather and winter and they are like thermal insulation and energy resource saving, For this reason the temperature fluctuation inside the Karans is less and winters are warm and summers are cool.
- Karans are located in direction of river and surrounding hills and the main village direction is vertical on south west. So from climatic view point and solar radiation direction, valley and river, the Karans are in good positions. (Ghobadian, 2003)
- The main property in creation of space is compulsive following of nature and the Karan's form, also in characteristics of these spaces the practical and easy way has been selected.
- The living space (Karans) are not only comfortable habitation but also unusually 'green energy efficiency', these homes require the least supplemental heat during the long cold Season and remain cool in the summer.
- Karans exclusively meet functional needs and extra, waste and unusable spaces have been avoided that the model of these spaces is compatible to human size. (Ghobadian, 2003)
- The proportion of outward spaces in the Karans is less than inward areas that it is suitable for mountainous climate. (Ghobadian, 2003)
- Because of manner of placing houses next to each other, the cones surface causes to wind breaking. And shape of doors and windows in inside walls prevent entering rain and snow in inner spaces. Smallness of openings and also relatively small space and short ceiling inside the Karans, are effective in prevention of thermal exchange between interior and exterior. And it causes to easy heating of inner Spaces. (Ghobadian, 2003)

The Karans include usually of two floors. In some cases three or four floors are seen. Upper floors of the Karans are connected by pretty steps made from the Karan itself. Because of high thickness and diameter of the Karans, lighting of lower floors is dim and difficult. Accordingly lighting facilities are located in upper floors. Windows are made of wood mostly in checkered shape and there are small parts of glass among them. Although reduce heat exchange between internal and external sections small holes are positive aspects but lack of adequate light and ventilation inside rooms are considered as their weak points. The Karan's first floors are used frequently

for keeping of animals because of less light entering and being wide spaces and using heat provided by animals. Second floors are residential.

6. CONCLUSION

Nature is always primary pattern that can be used to attain stability and peace and security. By consideration the nature of human conflict and the nature of metaphysical and create a true relationship between human to nature as an important principle nature-oriented in rocky architecture that joins and becomes one with nature. This kind of architecture is also in adaptation with the natural environment, no Pugnacity with nature, any degradation and friendship with it.

Man-made compatibility with nature and features of this architecture that is as a clear example and the exquisite in architecture of kandovan and human encounter with nature in order to complete views from nature demonstrated and the correct nature of the pattern that is one of the most fascinating instances of human acclimation to nature and as well as it is worth mentioning that old texture of kandovan village is one the scenic and unique perspectives among Iran historical villages and it is only alive rocky village in the world.

In conclusion, the paper will contribute to acquaintance with architectural rocky. It provides to review architectural features of kandovan village and also enables to discuss the significant influences of nature on architecture this village in terms of eco-nature perspectives.

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