

INVESTIGATING THE URBAN VERNACULAR ARCHITECTURE IN THE WESTERN HIGHLANDS OF IRAN

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ABSTRACT

Creating favorable conditions for comfortable living and providing safety from adverse weather conditions for residents are considered as significant criterion in architectural design. since the primitive human took refuge in caves or since they have created the old civilizations alongside the great rivers, purpose of these principles was to create the intelligent architecture to provide comfort for residents and optimal use of natural energies, or is scrambling to provide conditions of life on other planets other than earth based on environmental needs of humankind .The main purpose of the present study is to investigate about urbane vernacular architectures in the highlands as a case study in the west of Iran. The data has been collected using field and library methods. Most of the buildings in the southeast and southwest sections are in square shape with relative elongation. Having small openings, flat roofs, small yards and porches, thick walls and short height of walls are some features of Iranian architecture in highlands in order to benefit from the winter sun and reducing the heating costs in the winter.

KEYWORDS: Vernacular Architecture; Highlands; Heating Costs

Iranian architecture derives from the traditional and local architecture. The elements of this architecture derive from the material and spiritual needs of the urban and rural residents. Its base such as dwelling is associated with the environmental issues, geographical factors, income, and technical skill. On the other hand, it is impressed by the social patterns, the family base, traditions, customs, and human beliefs. The highlands of Zagros has a local architecture far from any influence of other architectural styles of different regions of Iran and is disappearing due to the emergence of modern architectural methods in the world and the renovation as well as renewing the constructs in Iran. In the present study, we attempt to study some texture characteristics, the construction position based on the climate and relative to the mountain as well as an evaluation of the residential buildings in the frame of local and traditional urban architecture.

The first well known stages of building construction in Iran took place in the valleys of the west as well as in the east of Zagros Mountains. They were the first old Neolithic communities. For instance, some evidence of the old civilization can be observed in Alikosh located in Dehsavarani alley (current Dehloran), the sequence of Khuzestan (Pope, 2003, 12).

The city as the manifestation of the customs and vision of the community cannot be appeared in different civilizations. The variation of the cities in the world geography and history is the main effect of this

difference. Iranian plateau as one of the oldest human settlement has experienced different civilizations and has embedded many cities. The researcher seeks to investigate about the subject matter (Mansouri, 2007, 49).

According to Deh-khoda encyclopedia, city is defined as “a community of many houses in which people can settle there” (Majedi et.al, 2010, 53). The most general definition of city is provided as a place for settlement and activity of a group of people (Rabani, 2006, 1). The most important element for creating city is human or resident of city whose accommodation and activity place is city. city body is impressed by especial environmental, economic, technical, scientific and artificial situations (Naghi Zadeh, 2008,45).

ARCHITECTURE DEFINITION

Ruskin and Morris as the architectural scholars have provided a definition for architecture as a composition of body and knowledge (substance + art). Ruskin in his book as” The Seven torches of architecture” (1846) has defined the architecture as “architecture is the art of building and decorating a construction by human. Architecture has a strong organization and geometry and the more important is the creation that displays the beauty and is far from boredom (Akrami, 2003, 35). Architecture is a phenomenon based on thought and a mixture of emotions, feelings and technical knowledge (Callins, 1996, 1). Architecture is embodied music, Mirror of History, Registration book of Human works and expresses

ideas and values (Falamaki, 1996, 5). Architecture is intersecting fields of culture, art and technology (Abol-Ghasemi, 2000, 378). Architecture is a new method of thought whose results are not calculated yet (Bene Velu, 2011, 17).

METHODOLOGY

Data was collected first through the library method using the references, the books and the articles and then the field method was used indicating that the western region of Iran contains some parts of Zagros Mountain with a width of 74268 Km² or 7/4 % of Iran's area between the latitude of 34degrees and 2 minutes to 35 degrees and 17 minutes north and 48 degrees and 3 minutes to 48 degrees and 6 minutes east entailing the borders of Ilam, Kermanshah and Kordestan provinces. The western region of Iran is a continuous region topologically beginning from Ararat Mountains in Iran-Turkey border continuing to Persian Gulf coasts with a northwest-southeast direction (Jahan-Bakhsh-Asl, 2002, 235).

COLD AND MOUNTAINOUS CLIMATE OF IRAN

Alborz and Zagros mountain hillsides separate the central areas of Iran from the Caspian Sea in the north and the Mesopotamia plain in the west. The western mountains includes the western slopes of the mountain hillsides of the central plateau of Iran and all over Zagros Mountains are considered as the cold regions of Iran having thin maple, elm and oak forests. The temperature average in the warmest month of year is more than 10 °C and the normalized deviation mean is - 3 /4 °C. January is the coldest month of year and temperature is minimum temperature in August. The cooling systems including the high-pressure system of Siberia, the European high-pressure system or an integrated system result in cold weather. It seems that two factors including the distance of the Caspian Sea's atmospheric humidity and the latitude affect the intensity of the cold in this region. The local architecture has direct, immediate and strong communication lines with culture of parties and their routine life (Gudarzi, 2003, 3). This architectural style traditionally entitled to the forms created based on the needs of a residents of a region and the climate and the location limitations (Oktaiy, 2007, 22). In such architecture, the structural mass distribution is in such a way that makes benefit from the sun heat completely in

the winter and the heat losses is also minimized. Furthermore, it is possible to use the radiation for cooling construction in addition to minimizing the heat conduction in summer. The building plan makes the best use of the sun in the winter and in return, it minimizes the heat losses. Also, it makes use of the good ventilation in addition to delaying the heat conduction in the winter (Pourdihimi, 1999, 69). Developing such architecture has often been a simple process by applying the local techniques and the local building materials and was suitable for some functional needs of the residents. That is why, some designers call it as "the stable and suitable architectural model" (Mohamadzade, 2012, 3).

The anonymity of designer is the first feature of such architecture (however, only the name of designer is not enough for understanding the value of the work). Not needing to the issuance date of the work is another feature which knowing it generally results in illusion and is misleading (Alpogonolo,2005, 3). In addition to the climate effect, the available materials, the religious aims and the neighboring cultures had a significant role in the architecture development (Pope, 2003). The following table indicates the local architectural indexes in 2 micro and macro forms.

Table 1: The local architecture micro and macro criteria (Rafii, 2011, emphasized by the writer)

Row	Macro aspect	Micro aspect
1	Culture	Beliefs, customs, religion
2	Nature	Climate and geography
3	Economy	Types of meeting ends
4	Society	Tribal structure, homogenous and heterogeneous society

VERNACULAR ARCHITECTURE FEATURES OF COLD REGIONS

Although degree and duration of the coldness is different in the cold regions, the same principles have been used to avoid the heat losses in the building constructions of different regions and generally these principles are similar to those principles that have been considered in the architecture of hot and dry areas. There is a difference as the heat generating source is inside the building in the cold areas. Also, it has been sought to make warm the inside space naturally or using the heat of presence of individuals, cooking or even the animals. The main difference between the architecture of the cold areas

and the hot and dry areas is tendency and necessity of using Sun heat inside the construction in winter. However, this need usually is influenced by the wind as well as the coldness of blowing wind against the building .generally, it is sought to keep the outside surface in the

minimum size. Anyway, dark color is selected for the outside surfaces and the windows dimensions size are larger relative to the hot and dry areas to utilize the sun heat (Kasmaii, 2003, 92). The following table shows the general criteria of this climate’s architecture.

Table 2: General architectural characteristics of the western highlands of Iran (Kasmaii, 2003, emphasized by the writer)

Vernacular architecture features of cold and highlands									
Climate	Material type	Plan type	Roof type	Positioning direction	Connection of building to the ground	Surface and number of opening	Amount of using the natural ventilation	Complex texture	Outside color type
Cold	High thermal capacity and resistance	Compact	Flat	Southeast to southwest	On the ground	Low	Low	Dense	Dark

EFFECT OF THE CLIMATIC FACTORS IN THE URBAN VERNACULAR ARCHITECTURE

Settlements are formed based on the climatic, topographic and geological conditions. climatic factors has played the most complex role in different regions of Iran (Ziari, 2010, 83).As house dwelling is the private space of human life, the ease and comfort of the space as well as the economic ways to achieve the above mentioned are highly considered. The comfort and the economic comfort have been considered in the vernacular architecture of the cold region by presenting the local

solutions. Houses consistent with the climatic conditions and comfort have been repeated as an appropriate architectural pattern by traditional architects during the time. The time sequence of the accepted patterns has caused the vernacular architecture to have the form, texture, volume, and materials consistent with the climatic conditions (Molanayi,1999, 23). Accordingly, the following general principles can be involved in shaping the architecture volume and its different types by studying the cities of Zagros region.

Table 3: Vernacular architecture principles to design based on the climate (Molanaii, 1999, emphasized by the writer)

vernacular architecture principles of homes based on the climatic conditions	Placement of the house main spaces in south and southwest front and avoiding the residential textures` placement in northern slopes not using direct sun exposure
	The minimum area of the opening connected to the uncontrolled spaces
	Using the compact and flat textures in the spatial arrangement of the architectural elements
	Considering the hierarchies of the spaces based on the required heating and cooling systems
	Organizing the access spaces such as the vestibule and corridor to control the air exchange volume
	Changing the openings size based on the climate type so that the opening size changes from a vertical rectangular into a narrow square in the mild highlands
	Building construction against the wind direction
	Using the materials with high thermal capacity
	The semi-open (terrace like) spatial element in front of the main living room
	Nested design of the rooms by decreasing the outdoor space access
Using the thick and wide walls	

PLACEMENT OF THE RESIDENTIAL TEXTURE IN THE HIGHLANDS

To reduce the thermal exchange through the walls, it is better to place them in the ground since the temperature changes inside the ground is very slower rather than the ground surface. On the other hand, the building should be constructed in connection with the ground to use the ground cooling. Constructing some

parts of the building in the soil greatly support the comfort of residents in this region. The air inside the earth relative to the surface ground is warmer in the cold weather and is cooler in the warm weather. Urban buildings made in past times had a suitable performance due to observing climatic principles and criteria against adverse weather factors and protected humankind in hot or cold situation (Spenani, 2004, 84).

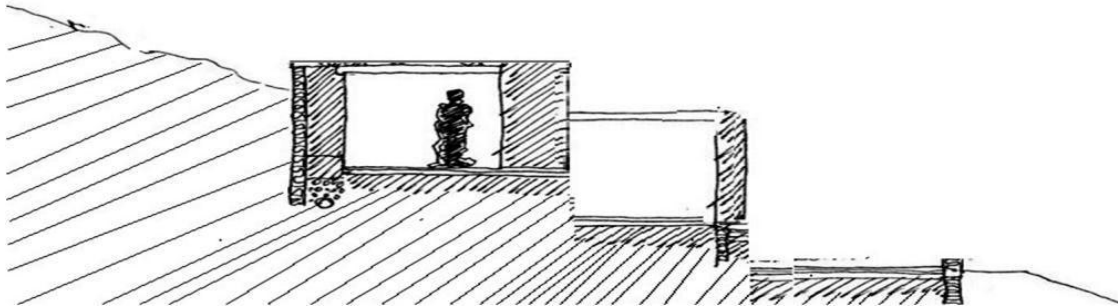


Figure 1: The placement of the constructions in the soil in the cold climate (writer)

Form and Placement of the Construction

Coldness of weather in certain duration of year makes the maximum uses of the sunlight, using daily temperature changes, maintaining the heat and preventing the cold wind of the winter necessary in the houses of the cold and highlands. Therefore, the construct form has been designed and implemented to deal with severe cold. The general characteristics of the construct form include the buildings with the central or introverted yards, low ration of the outer shell of the construction to the construct mass, the low height of the rooms, the flat roofs,

small terrace and yard, small openings, relatively thick walls (Ghobadiyan, 1998, 102).

So, the shapes such as cubes are used for reducing the outer surface of the construction to its inner volume ratio and keeping it in the minimum amount. The buildings are places between 20 degrees toward west and 45 degrees toward east and outside of the sun shadow. Due to severe coldness, Those constructions whose northern-southern sides are higher than the eastern-western sides are not appropriate and have not been used (Kasmaii, 2003, 120).

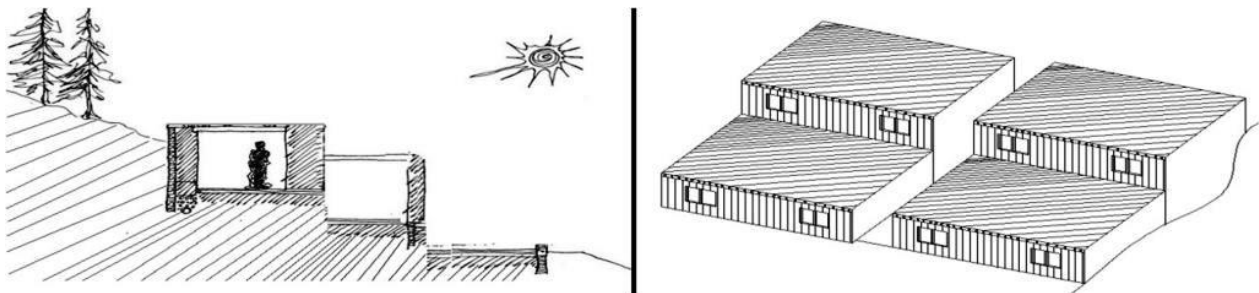


Figure 2: Cubic form and the constructs' placement to make use of heat and sunlight (writer)

Using Terrace and Small Yard in Construction

As weather is cold or very cold in the highlands often, most of the routine activities are done in rooms.

Rooms located in north of yard are larger than the other sections and hall. Living room is located in this part of yard for using direct sunlight and heat in winter. As

summer is mild and duration of this season is too much short in this area; southern part of the building is less used. Therefore, the southern, eastern and western rooms are used as a warehouse or WC. In the vernacular architecture of these regions, home heating has been done naturally or by using heater, cooking and presence of people (Ghobadiyan, 1998, 103).

The size of yard is smaller than other regions of Iran central plateau. In this region, the buildings have terrace but with lower depth relative to the southern regions terraces. The highlands terraces are not used for sitting such as terraces of Caspian area and are only used to protect the house against rain and snow.

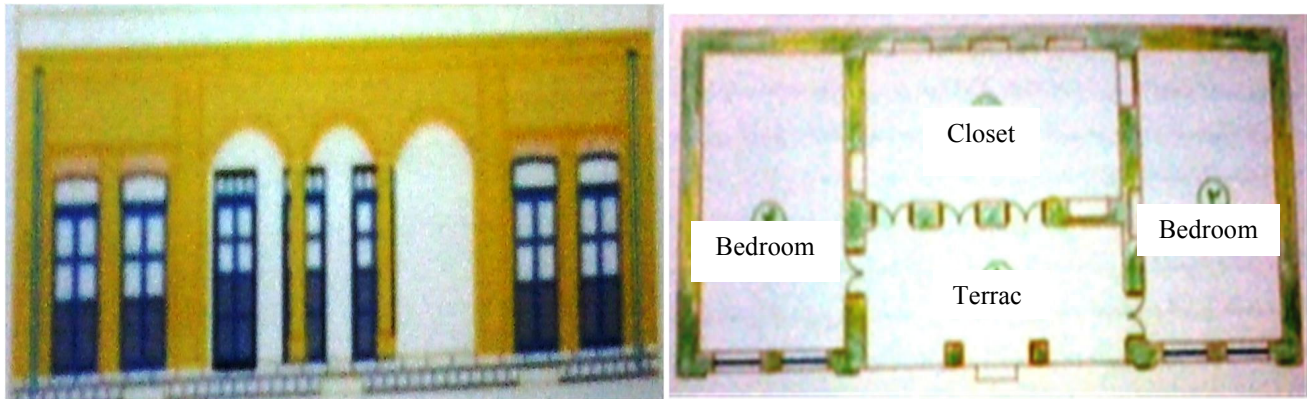


Figure 3: Usage of the terrace in the urban buildings of the highlands, Ilam (Akbari, 2004, emphasized by the writer)

Small Rooms with Low Height

Building big rooms and vast spaces should be avoided in cold and snowy regions, since it is hard to warm up rooms due to increasingly level of contact with cold air. Therefore, the heights of the rooms are lower than other regions to reduce the room volume and minimize the ratio of external surface to the construction volume. The low height of roofs in the main rooms, halls and the market chambers can be seen in these regions.

Small Openings

Small openings are used in limited numbers for reducing heat exchanging between inside and outside of building. Canopy should be used in the buildings with large windows. The openings will be selected larger and longer in southern side in order to make the best use of sunlight. placing the openings in the cold winds direction should be avoided as well. In addition, double-glazed windows are more suitable to minimize the thermal exchange. By the way, the natural ventilation should be minimized in order to prevent the heat losses and entrance of cold weather into building.

Thick Walls

High thickness of walls prevents thermal exchange between inside and outside space of building, in turn. The architectural criteria of the cold and mountain climate, and hot and dry climates are approximately the same and their difference is in their heating sources.

Flat roofs

Most of roofs of the traditional constructions in the highlands of Zagros are flat. The slopped roofs are better than the flat roofs in case of the appropriate covering since they remove the rain over the roof easily. As rain and melting snow penetrate into thatched roof, building will be damp and moist; and its power will be greatly weakened by moisture, rain, and especially snow. Therefore, thatch roof is shoveled and is flattened with a heavy and small roller to condense its thatched cover and closing the holes. The flat floors are used as a thermal insulation by keeping snow on roofs. The doubled-glazed form of roof in mountain climate is important for keeping heat of building.

CONCLUSION

Understanding patterns of vernacular architecture, way of forming them and continuing the

symbols during successive years in different regions of the country determines styles and patterns of this architecture. The mountain architecture of Zagros region in Kordestan, Ilam and Kermanshah with an organization of the similarities and differences relative to the central regions of Iran has unique patterns. In addition, urban architectural structures of these regions have a noble architecture based on the certain traditional and local patterns. The main factors in forming the urban buildings of this region include climatic factors, earth topography and social and cultural status of people. Topography type and form of earth which is mountainous in this region; and climatic factors have the most influence on vernacular architecture criteria. The determined principles in the vernacular architecture of cold area indicate that decreasing the heat losses in building, decreasing wind effect in heat losses, utilizing solar energy to warm up buildings and considering natural elements of water and soil should be regarded. Regardless of different parts of the building, some factors such as building form and placement have important effect on the energy losses amount. The building form and placement can decrease the energy losses due to the sunlight and wind direction which can be in the direction of southeast to southwest. Most of the windows are placed in the south side to make use of the winter sunlight. The local building materials are also used as the available sources. Moreover, texture of cities of mountainous area is compact and continuous in order to prevent thermal exchange and most of passages are thin.

Modern architecture has been promoted without study, investigating and adopting with the climatic conditions and the vernacular architecture of each city and cities of this region are not excluded of this principle. As energy is provided without natural wind and sun method; building direction, material type, walls thickness, windows sizes, and canopy are not considered. As a result, a great amount of nonrenewable energy is wasted. With appropriate architecture adopted with the climatic conditions and vernacular architecture of region, the renewable, cheaper and free sources of energy are available for utilization in company with stable architecture and saving energy. We hope this study regarding urban vernacular architecture of mountainous region of city lead to keep vernacular architecture as well as can provide modern city designers with useful information.

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