

Study of the Cold and Mountainous Climate and Obtaining Architectural Indices of the Effecting Region on the Climatic Design of Housing

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ABSTRACT

In our country, the climatic regions are different and the climatic conditions are various in the seasons, the traditional architecture has created and provided the reasonable solutions and procedures for man comfort. One of the symbols of sustainable architecture is the Iranian traditional architecture that has been responsive to the ecological issues and the energy efficiency, both in terms of the first low cost and also due to the low current and functional prices of the building.

KEYWORDS: cold and mountainous climate, native housing, the traditional architecture, climatic indices

INTRODUCTION

The architectural art of Iran has an ancient history and the capable hands, creative minds and the taste of the art-loving of this country people has always created wonderful phenomena, which in many cases and its principles have become the root of the architectural art in the world. In the Iranian traditional architecture, the buildings have formed according to the Iranian-ethnic culture and identity, and the form and architecture of buildings has not been opposite the cultural, ethnic and religious beliefs of that region's people. Meantime, the solutions should be extracted that the past architects had been to the questions about the designing. The review of the pervious solutions is necessary for adapting to the harsh climatic conditions, because the architecture of those days was the result of the continuous process in the local architecture that has been transferred from a generation to another generation during a long time, and their position and continuity were tested by error and test over hundreds of years. Then, suddenly these processes were shut down, because the modern architecture provided the result the faster and easier solution and it made us to forget all the ecological methods that were based on the climatic design.

Statement of the problem

Earth's population growth with the depletion of fossil fuel resources due to the %40 consume of these fuels in buildings and the requirements and needs of the reduction of it and the management of these important problems are the requirements of the scientific researches. In the present age, on the one hand, increasing the energy carriers price and on the other hand, increasing the emissions of greenhouse gases from the fossil fuels requires a special attention to how energy consumption. At the same time, now there are no saving and optimization of energy consumption and the use of the sustainable energy in the building culture of the country (Iran). Therefore, the buildings must be designed in such a way that could meet the goals, wishes and needs of the residents of each region.

Thus, using the valuable and available experiences of the local and traditional architecture of this land and the derived sustainability principles of the Iranian traditional architecture such as link of the architecture and nature, minimalism, interiority, privacy and so on can be used to promote and advance the architecture of this land and achieving the noble objectives (Biranvand, 2011, 35). This study includes the mountains and cold climate zones in Iran. Due to the wide, cold and dry climate that surrounds a large part of Iran, paying attention to the design of buildings in the cities with the cold and dry climate which they are counted as the main consumers of the fossil fuels can decrease a large number of the consumption of these fuels and as well as can lead to decrease the pollution from those (Shaghghi et al. 2008, 12). The buildings must respond well to the climatic condition and situation from their design stage and the establishing way, therefore, in terms of the sustainability is an important and valuable field for the research, both in terms of the attitude type to the human beings and the environment and also in terms of solutions. By examining the thinking ways about the traditional and vernacular architecture, especially in those eras that the men had to use merely the natural and clean energy, we can learn lessons for the modern architecture in propose of adapting to the environment.

Apart from the various parts of the building, the factors such as the locating way and building form can reduce the amount of the energy wasting from two directions, the sunning direction and the winding direction. The best building shape is a rectangle shape and its east–west extension should be longer than the north-south one and it

should have a main courtyard in South part. Most windows should be faced in the South and few of them should be located in the North and East and West (Kasmaee, 2006).

Research questions

- A) The main question: What is the base of the compatible residential building design with the cold mountainous climate?
- B) Subsidiary question: What are the architectural characteristics of the compatible residential buildings with the cold mountainous climate?

Research purposes

- A) The main objective of the research: Explaining the design model of the compatible residential buildings with the mountains and cold climate,
- B) The Subsidiary objective of the research:
 - Explaining the features of the residential architecture in the cold and mountainous climate

Requirements of research

In all climates, buildings that have been built according to the principles of the climatic design reduce to a minimum the need for the mechanical heating and cooling and in return, they use the natural energy available around the building. The climatic design causes the buildings have better comfort conditions and instead of the heating and cooling systems are engaged by a great pressure, the buildings provide automatically the comfort situation without the noisy fan and the air conditioner and without the maximum pressure to other central generating devices. Constructed buildings on the basics of the climate have not only a good function against the bad weather, but these buildings provide also a healthy, beautiful and human environment.

Pre-hypothesis of the study (statement of the relationships between the research variables)

Research hypothesis will be based on the examination of the variable feature and relations between them and their amount and the effective method of each other. Therefore, the main variables are as follows: So, designing the residential buildings (the dependent variable) of the architecture is outlined compatible with the climate (independent variable) of the cold mountainous climate (control variable).

So the following hypotheses can be considered as the relationships among the above variables;

1. The residential architectural design of the cold and mountainous zones uses the vernacular potentials in line with the compatible architecture with the climate, and has vernacular features.
2. Compatible residential architecture with the climate

RESEARCH METHODOLOGY

Collecting the information on a scientific research is extremely sensitive and all information must be collected regularly and systematically to gaining reliable results. Several methods are used to gather information which the choice of any method is considered according to the circumstances and the type of information.

The applied research type and research methods are the analytical-descriptive.

Data Collection tool

Library method: the use of the technical libraries and the reference books and specialized sites and referring to the scientific-technical papers and academic research articles,

Climate conception

The weather is outcome the atmospheric conditions of an area over a period of time (usually several decades). In other words, the frequent climatic events are called the climate. So in short, and according to the presented definition by the Kaveyani and Alijani (2000), the weather can be defined as follows:

"Prevailing weather conditions (long term) in a location is called the weather (climate)."

The subtle aspect definitions of the climate and as a result the science which study (climatology) is as follows (Table 1):

Number	Title	Explanations
1	The atmospheric conditions comprise the state of the atmosphere.	These conditions are usually stated by the measuring the climatic elements and its modes. Climate elements are the describing phenomena of the weather (radiation, temperature, precipitation, humidity, pressure and wind) that are measured in the atmosphere measuring stations.
2	One of the features that is clearly marked in the definition of the climate is its dependence on the time.	The main factor of distinction "climate" from the other features of the atmosphere is its time scale such as "air", therefore the immediate circumstance of the atmosphere is called the weather and its long-term conditions is called the climate. In addition the "prevailing atmospheric conditions" in the definition of the climate are as a time adverb indicates the frequency of climatic events reiteration on over time and for the formation of the climate in each region.
3	The climate depends on the location.	These phenomena which show such dependence with the location are called the spatial phenomena considering to the spatial distribution is inevitable and necessary to analyze the climatic facts, because the study of these facts and the climatic events has formed a main part of the climatology science in terms of the causes of creating, evolution, patternicities, distribution quality and influencing of on around, the way of the spatial arrangement as well as the spatial differentiation and the influencing factors of on these differences. (Rezaei, M., 2014). Thus, the emphasis on the location as the manifestation of the climatic events and the location of its action lead to consider as the spatial phenomena and the meteorology as the dependence sciences to the location.

Effects of the climate change

Climate change means any given change that takes place in the expected patterns for the average of the climatic situation in a particular region or for the entire global climate in the long term. Climate change represents the unusual changes in the climate of the Earth's atmosphere and the consequences from it in different parts of the Earth. (Jamshidian Gulpaigani, Sufian& Zandiye, 2016)

Especially in the current application, in the field of environmental policy, the term of the "climate change" refers often to some changes which take place in the current climate. In some cases, this term is also used to assuming a humanistic causal relationship, as it was used in the UN Framework Convention on Climate Change (UNFCCC). The UNFCCC Convention applies the term of the "climate change" to changes that have non-human origin. Climate change is a phenomenon that occurs due to the factors such as dynamic processes of the earth, or the external factors such as changes in the intensity of sunlight or human activities. An external factor that affects the climate are often called climate forcing and includes such processes as variations in the sunlight intensity, deviation in the Earth's rotation path and the increasing concentration of greenhouse gases (Shams Dehkordi, Raiesi Dehkordi and Sadeghi, 2016).

Climate change factors

Climate Change depends on the variations in the Earth's environment, existing of the natural processes around it and the impact of human activities on the Earth. External factors that can shape the climate are often called climate forcing which includes such as processes like the variations in the solar radiation, Earth's rotation and concentrations of greenhouse gases.

Table 2.

Number	Title	Explanations
1	Variations in the Earth,	Weather on the Earth is an irregular nonlinear dynamical system, but in many cases can be seen that the climate (the average of the weather condition) is fairly stable and predictable.
2	Frosts	Glaciers are known as one of the most sensitive indicators of the climate change which increase mostly during the getting cold the climate. (Like the short period of frosts)
3	Ocean variability	The climate change can also obtain on a scale almost 3 decades of the internal changes in the atmospheric systems.
4	Climate memory	Most forms of variability in the climatic system can be considered as the waste, in the sense that the current state of the climate, not only represents its inputs, but also shows the history of how the emergence and access to this stage in it.

Climatic architecture and its function

The impact's importance of the climate on architecture requires comprehensive studies and research in this field. In particular in our country in which the diversity of the climatic conditions is completely clear. The wide research performance is inevitable in this field (Moradi and Muazzen, 2016). The climatic architecture has several thousand years of the history by in most parts of the world. In fact, with the beginning of the human settlement, attention to the climate has always been important in the design of the main buildings. With the emergence of the modern architecture and the increasing use of air conditioning equipment, the importance of the climate was downgraded in the architecture and similar patterns were used for different parts of the world with the various climatic conditions. But, on the one hand, due to the reduction of exhaustible energy resources,

the pollution in the cities and on the other hand, the irreparable damage to the environment from the fossil fuel emissions, attention to the climate and the climatic design became popular again in the twentieth century. Climate functions in architecture refer to those features that in addition to geographical location, it includes the physical manifestation of these features as well. According to the climatic divisions in Iran, the climatic architecture is defined and formed based on these vernacular indicators. Due to the forming of the vernacular architecture in different region of Iran, we found out that the different features of each climate have had a great influence in the formation of cities and the architectural composition in these regions. So, the determination of the climatic zones in the country and access to the climatic features in the different regions is very important for proposing appropriate designs and consistent with the climate of each region. Iranian architecture was initially formed in the area of the Iranian plateau and then in the area of the Iranian cultural influence, as all the architectures that are rooted in the vernacular culture, it has also paid attention to the climate and has left precious works by the end of the Qajar period (Afshari & Kamel Abadi, 2016).

Table 3.

Number	Title	Explanation
1	Narenjestan Cortile	The Narenjestan courtyard was a small yard in the inner courtyard that in addition to providing light around the space, it allowed to maintain plants that are sensitive to frosts of the winter nights in desert areas. The typical pattern was a square that is divided into 9 parts and in any side of it will be a three-door space or they are octagon shape.
2	Trench of flower beds	The trench of the flower beds was built in the middle of the central yard and one floor was in into the ground. Examples of this space have been seen in a very arid desert climates such as Kashan, Yazd and Nain (cities are located in Iran). Trench of garden could provide the needed soil of the used bricks in the building and in addition it provided the access to the water of the aqueduct.
	Roof	Roof in the Iranian architecture is certainly a part of the living space, in addition, the existence of complex and beautiful volumes; it was also used as the yard. The surrounding of the roof was increased by wall about a meter and a half, and a kind of yard was created on the roof which has been used to sleeping in the summer evenings. The walls were also shaded on the part of the roof at different times of the day and it had a climatic secondary role.
4	Winter stay location	Although the spaces that built as the winter stay location was located in the northern side of the courtyard to use the winter sun that shines into the room with a bevelled angle, but a certain set of spaces with special relation formed a set of spaces to the winter stay part that include Sehदारis, Panjدارis and Shekam Darideh, which have been placed on the main axis, and two communication space which could be hall way, and the abutments that were formed by the Sehदारis room, the Sash window room or Tehrani room and Dudari room and they formed the corners of this section.
5	Summer stay location	Summer stay location has the position like the winter stay location with the difference that it is located in the South of the courtyard to protect from the direct sunlight in the summer. A half-open space with the hall is usually placed on its main axis.
	Terrace	This space is the same Mahtabi and it is also called Takht Bom in some regions of Khorasan (a province of Iran). This space without a roof is built beside the courtyard on the higher floor of the first floor and the inhabitants sleep on it for the summer nights. And depending on its location, it is used in the times when it is properly shaded by the surrounding walls. It is used in the spring and fall during the day and in the summer evenings.
7	Tail water	Tail water is the access place to the aqueduct water in the courtyard of houses and mosques. Its common pattern is octagonal that is covered with Turkish room or Coulombe, and a pool is built in the middle of the aqueduct path. The very cool air in summer is the climatic point of it that in addition to use as a refrigerator for food storage, it was also used to sleep in the afternoon.
8	Cellar	Although, sometimes the main hall of the summer stay location is also called the cellar, but, predominantly it is a basement where is built under the summer stay location and it is as a porch with semi-open space and has often a pool.
9	Shvadan	It is a basement with a great deep that usually is the lack of the building materials and the maximum, parts of the wall are covered with the plaster. Its roof is dome shape and it is the lack of the structure. There is a hole on top of its roof that would usually reach to the floor of the courtyard. Sometimes, this space goes down 6 to 7 meters under the basement and it could penetrate under the adjacent houses.
10	Seraglio	It is used in some times of the day in the summer, spring and autumn and in some cases as a warehouse. Its structure and decorate are built with bricks, and its plan is along the first floor plan is planned in the old palace, the seraglio was called to Harem that had a more complex decoration.

Iran climates

Morteza Kasmaee in his book entitled "Climate and Architecture" the Iran's climate is divided into four groups; the temperate and humid climate (The Northern shores of the Caspian Sea), cold climate (the Western Mountains), hot and dry climate (Central Plateau) and hot and humid climate (The Southern shores) which each of these regions have their own climatic features and their own architecture (Kasmaee, 2006). The brief features of each of these climates are as follow (Table 4):

Number	Title	Explanation
1	The temperate and humid climate	The shores of the Caspian Sea have a temperate climate with the abundant precipitation, high humidity and a moderate temperature. The temperature is usually between 25 to 30 degrees Celsius in summer, and at night between 20 and 23 degrees Celsius, and in the winter usually above zero. Precipitation in summer is often shower rain
2	Cold climate:	Western mountains where include the western slopes of the central mountains of Iran. Considering the fact that the average temperature in the warmest month of the year is more than 10 °C and the minimum temperature average is less than -3 °C in the coldest month. In this climate, winters are long, cold and hard and several months of the year the ground is covered with ice. The rainfall amount is low in the summer and in the winter is high. The spring season is short and it separates the summer and the winter.
3	Hot and dry climate	This climate included more the subtropical regions and the air are very dry due to the wind. Direct sunlight in these regions is intense. The sky of these regions is without the cloud in most times of the year. But, the fog and dust storms occur, usually in the afternoons due to the warming effect and moving layer of the air close to the ground. The climate includes the desert and semi-desert regions.
4	Hot and humid climate	Southern coasts of Iran have been separated by the Zagros Mountains from the central plateau, summers are very hot and humid and winters are temperate. In these regions, the maximum of the temperature is 35 to 40 °C in summer and the maximum of the relative humidity is 70 percent. In this climate, the humidity is high in all seasons of the year; as a result, the difference degree of the temperature is low between the night and day and in the different seasons.

Vernacular solutions in climatic architecture

With the advent of the Industrial Revolution in the nineteenth century, interference in nature by human was possibly more to enhance the quality of human life. In the meantime, to meet personal needs and greed of people, a kind of architecture and urban planning was on the agenda. The proliferation of buildings on the technology-based on the factory was carried out regardless of this fact that in addition of that the physical needs of the human being, she/he has also a spiritual dimension and these kind of the proliferation of buildings lead to loss of diversity that is influenced by the climatic conditions, social culture among cities and buildings (Givoni, B 1998). This issue caused to create a kind of separation in the growing process of the architectural, quality of the buildings, the lack of the identity of cities and damage to the natural resources in different regions. Therefore, according to the definition of sustainability which is trying to improve and maintain the economic, social and environmental features of a region, the review of climatic architecture’s history and values lies in it could help us to achieve this goal (Alhomoud, M.2002).

The created thinking that was formed by the Industrial Revolution emphasized only to gaining more benefits. This process influenced soon on the other areas; the process that caused the transition of the various societies, the transition from pre-modern to modern era which caused a change in a great number of the issues. Meantime, the architecture and urban planning was also not excluded. The international style was created in the architecture and could influence it.

This style insisted that a building has one form in different circumstances; as a result a city has also only one model for different people. The effect of these changes multiplied, when this imported technology carried out improperly. So, not only it could not solve the problems of the past, but it led to switch the problems and incorrect simulation. Emigration caused the marginalization at the edge of cities and increasing the land prices and the loss of green spaces in the cities and reducing the quality of urban space. Therefore, there was a need to think about these issues and restoring the quality of the buildings and cities which had caused the serious changes in the lifestyle in different fields and also more damages in the environment (Huisom, and others, 1997). In response to these changes in the 1990s, the theory of "sustainable development" was formed. Discussion about the sustainability in terms of sustainable development was formally placed on the political agenda through the World Commission on Environment and Development in 1987 through the report that is called the Land Brandt report entitled "Our Common Future."

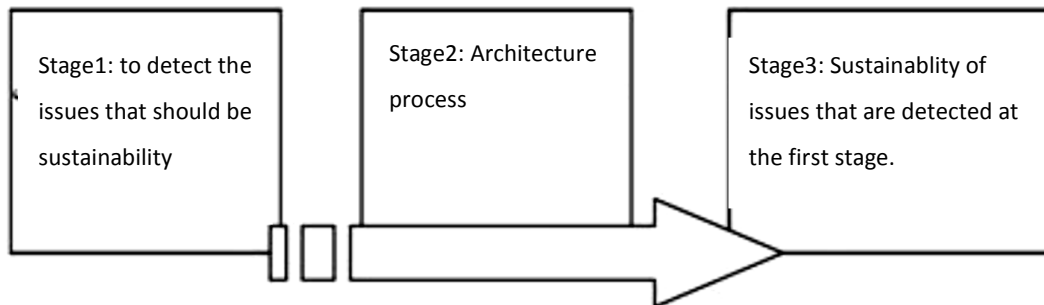


Figure 1. Three stages of sustainable architecture (writer)

The planning system and urban design were introduced as one of the important tools and mechanisms to keep track of the sustainable development. One of the most important raised teachings in the pattern of sustainable architecture is attention to the traditional architecture of buildings and cities; namely, the consideration of the pre-modern city and the lifestyle of the people in the old age. It seems that the concept of sustainability has seriously been in pre-modern communities (whether urban or rural), and maybe that's why the contemporary urban and rural movements and schools that each one is the manifestation of the parts of sustainability are searching part of their aspirations in recreating and of course modernization some aspects of the traditional cities and old communities (Wong, MC., Mok, HY.2009). It means that the tendency of contemporary urban planning schools to the features lies in the traditional city and the vernacular architecture indicate to this fact that the traditional and vernacular architecture of each region has had some significant effects on the sustainable pattern of their own. Though, many of the environmental, social and economic features of the traditional cities and vernacular architecture are reminiscent of the three dimensions of the sustainable development. Therefore, the prerequisite for achieving the sustainable development and preparation of a proper bed is to pay attention to some of the local architectural and urban planning values. Researches that have been done in this area have led to give some suggests which are derived less than the current principles in the local architecture and urban planning. Therefore, in the present study with the emphasize of the values of the vernacular architecture, it attempts to update them and to make recommendations in accordance with the principles of vernacular architecture and return to these values should not be for the replication and imitation.

Cold climate in Iran and its structural impacts

Man needs always the shelter or house throughout his life. Among the features of the human's need for housing, it can be mentioned to his need to create a very small climate despite the adverse climatic conditions of the environment, including the wind, rain, snow, extreme sun radiation and very high or very low temperatures and ambient air to provide the thermal comfort. The mankind has always paid attention the existence of the convenient location both in terms of convenience and comfort as well as the beauty from a long time ago. The masters have learned to solve their problems with cooperation and coordination with the nature (Mousavi & Sharifi, 2016). Primitive man built his/her shelter often wiser than our manner for building and he observed the architectural principles which we ignore them despite their contradiction with our interests. It should be mentioned that the built structures of the primitive man should not be considered very desirable, because those structures were in appropriate in terms of the size, quality, utility, security and durability or life of the building. The natural heating and cooling methods of buildings has been considered in the region for a long time ago. Iranian architects and engineers were able to create masterpieces from the centuries ago that despite the govern climatic conditions in the region create their own thermal comfort using the wind flow, the air temperature difference between day and night and over the year with the lowest energy consumption in buildings. The masterpieces included design of the windcatcher, the chimney, and spaces for summer with the dome or elevated roof, courtyards, cellars, basements, underground reservoir and natural refrigerators. The natural flow of air aside the wind, it takes place by the chimney phenomenon as well. This is done due to the difference in the temperature inside the building by the buoyancy force, and thus, the natural flow of air was remarkably more, often inside houses, multi-storey buildings, especially tall buildings. Existing spaces with more height that were for the warm seasons in the traditional homes in the region are some significant examples of the chimneys phenomenon use of natural ventilation and airflow into or out of the residential areas. Perhaps, some of the creators of these masterpieces could not write even their names, but all of them were aware the principles of thermodynamics, aerodynamics, heat transfer, strength of materials and human thermal comfort conditions and they used these principles in their designs with a great competency (Mohammadpur, 2016).

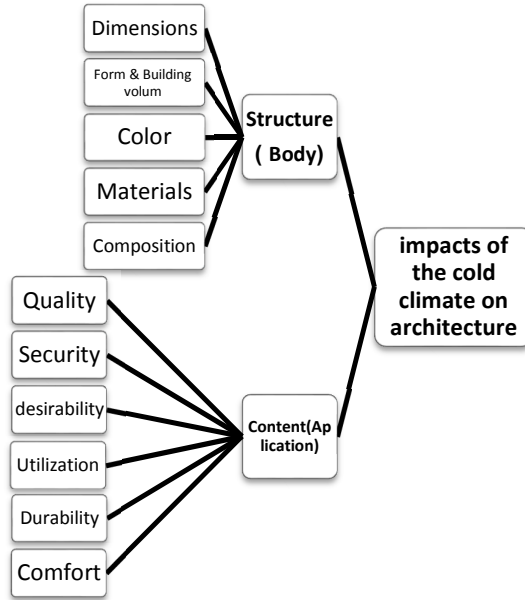


Figure 2.

Climate design in cold and mountainous regions

Building design is the first "line of defense" against the outside climatic factors of the building. Climatic design is a way for a comprehensive reducing the energy cost of a building. In all climates, the building that has been built according to the principles of ecological design, the need for the mechanical heating and cooling are reduced to a minimum and the natural energy around the building is used instead of it (Watson, Donald and Labs, 2009).

Architects can convince people that the importance of the climatic and environmental projects is not less than the current common decorations. Traditional architectural values and tradition of the environmental values in the traditional architecture of Iran have very great values in the various ways to optimal use of the energy and ecological utilization of the various energy and especially the use of sustainable and renewable energy (Nouhi, 2005). In this regard, with the review of the climatic factors impact on the mentioned region and seeing the existing status of the old texture the architecture notes about it will be explained as follows:

Table 5: Architectural design of housing in the cold climate basis of the relevant climatic factors,

Radiation characteristics in cold climate	The effects of radiation in the form and geometry of the building	The effect of radiation on the way of selecting the building materials	The effect of radiation on the establishment of the building
For placement in the high Latitude and low intensity of radiation and the oblique radiation angle	Use of the dense plan to reduce the thermal exchange between the inside space and outside space - Increasing the diameter of walls as insulation and energy storage resource- Increase the sizes of the Southern windows ratio to the surface	Use of the dark color on external side Use of materials with rougher texture- Use of the materials with high thermal capacity	Establishment of the spaces is such a way that subjected to the direct radiation. Texture is formed on the slopes with facing With the Sun. - Orientation of houses is the east-west
Air temperature properties in the cold climate Extreme cold in the winter and Moderate thermal in summer Extreme difference of the temperature between day and night	The effect of temperature on the form and geometry Use of the dense plan to reduce the thermal exchange between the inside air and outside air - To minimize the external sides- Use the flat roof for maintaining snow as the thermal insulation - The use of heat from cooking for balancing internal temperature of the building	The effect of temperature on the selection of the materials The use of materials with a capacity of high thermal – The use of thermal insulation materials	The effect of temperature on the building establishment
Characteristics of the moisture in the cold climate The air moisture is relatively low-precipitation is as rain and snow	Effect of the moisture in the form and geometry of the building Often the roofs are flat- -homes	The effect of moisture for selecting materials The use of local materials such as stone in floors and walls	The effect of moisture in the building establishment In most cases the houses have been formed on the slopes behind the

and it is more on the mountain	are built on the platform in the highlands to create the height difference with the surrounding area	prevented the influence of moisture	precipitation - Due to the high slope of the ground and to avoid the risk of avalanches in the area a pit is dug between the mountain and housing units
The wind features in the cold climate	The effect of wind on the form and geometry of the building	The effect of wind on the selecting materials	The effect of the wind on the establishment of the building
Cold wind in the autumn and winter	By minimizing the openable parts and doors, the natural ventilation rate is reduced - To prevent the influence of cold and warm air outlet - Use of introvert buildings within -Doors and windows of houses are placed in The behind side to the wind-The use of dense plan - Dense texture for minimizing contact to the cold air	The use of stone as the proportionate wind breaking in view of the buildings	It is built in order to prevent from the cold winds and cold- heavy weather of buildings in the middle of the foothills and in the southern and leeward side against the undesired wind

Outlines of the thought principles in the traditional architectures in the cold regions show that should be important the need to reduce heat loss in the building and reduce the effect of wind on heat loss, taking advantage of the solar energy for heating buildings and considering to the natural factors of the soil and water. Apart from the various parts of the building, the factors such as the establishment way and also the building form have an essential role in the loss of energy. The best shape of a building is the rectangle and the best orientation of a building is that its east-west side is longer than its north-south side and has a main courtyard in the southern part. Most windows should be faced to the southern part and a few of them are located in the North, East and West. It should be attempted to have a two-storey buildings with a central courtyard, pool and flower beds, basement, porch, the winter stay location and the summer stay location. (Darband Yurdshahi & Sharif Nejad, 2016)

Interpretation of “Vernacular”

The definition of this word in the linguistic is a language that is used by a particular group and in a particular time and place. This word is also used in the architecture for a manner of construction which show the cultural features and native artistic taste of the region, which is limited in time and place, as well as this word in the Persian language speaking is "Boom" meaning, nature, territories, region, cities, town, castle, a place where someone lives in it, the house and shelter. Therefore “Vernacular” can be known an achievement that becomes a pattern by the continuous replication of a specific region by over time. This pattern can be dissimilar completely with other patterns and it can be considered as a part of its identity with having the cultural characteristics of that region.

Vernacular architecture

It should be said that initially, the folk, vernacular, traditional, uncertain, improvisational architectures and so on were created. And then other architectures were created such as the fortified architecture, architecture relies on the legality of shapes and applications, formal architecture or in other words, the global and “classical architecture.” Hence, vernacular architecture can retain the improvisational character, without having style and without the special formation and "model". As a result, we find out the vernacular architecture in the face of the unknown lands with a mysterious, familiar and understandable link. Our modern culture is the result of the encounter between man and nature during occurrence of multiple events in the history. Rappaport knows vernacular architecture as one that is opposite of the official and monumental architecture. In other words, this architecture is simpler, more public and generally, it can meet the needs of the general public. He also argues that monumental architecture has had roots in vernacular architecture (Mirzavndy; Esfandiari, Zaheer and Taban 1392).

Environmental realm of the vernacular architecture:

This realm is known more about the impact of vernacular technology on the around environment and nature. In other words, what the extent of the vernacular technology could impact on the city and its surroundings in terms of sustainable development and how it could cause to create the relationship between the buildings of a city and nature, so that it has been able to gain the maximum advantages of the nature and its energy without creating a gap between the buildings of the city and nature, and how both of them have been able to move in one direction. The community's commitment to the environmental issues and protection of it, observation of the sustainable development principles and ecological diversity are the basic standards for assessment of population growth in the recent years, in particular the preservation of the nature and expending its culture. In fact, the modern man

concern about such these issues is the main reason to address such things that they should be remain, stable and sustainable in the changing phenomena to guarantee the survival of future generations. Ecologists recognize two main factors which are responsible for environment transformation factors and the unbalancing the ecosystems that one of them is the depletion of the natural resources by man, such as underground resources energy, foods, and main metals and generally the non-renewable resources. And other important factor is to create the variety of pollution such as air, water, soil pollutions and the accumulation of the waste and pollutant materials in the environment.

So, in order to achieve a maximum of the sustainable development aspects in the environmental area, some strategies will be reviewed in the framework of the following principles (Table 6):

Number	Title	Explanation
1	To apply and sustain the use of the renewable sources of energy	The use of existing energy in the nature The use of solar systems and to convert it to another form of the clean energy and its use in the buildings
2	To optimize the use of non-renewable resources and minimize the consumption of natural resources	With the expansion of the city, the climate studies should be the most important parameters for selecting the new cities in the future. Therefore, the passive design process will be taken place with a design by relying on the methods that do not require energy consumption. The method in the urban areas requires considering a lot of factors at all stages of design and construction of the building in all its elements and details (Urban design, architecture, engineering construction and so on). It should be like any other successful design lead to create a comfortable and desirable environment for its residents.
3	Energy efficiency in the architectural and urban design	Energy efficiency with urban planning and energy-efficient architecture are easily accessible and the capability of its performance is possibly very high. As well as with the codification of the regulations and rules about the architecture and urbanism and with standardizing the urban planning and architecture, we can reduce the energy consumption of the complexes and buildings

To minimize the energy consumption in cold climates

The maximum amount of energy consumption in buildings and the city part should not be exceeded 25% of the annual total consumption of a country. Some countries, such as England have determined a certain goal to reach the 20% of the energy consumption by 2020. It means that we can or we must able to reduce the consumption energy in our country up to 25 percent of the building and city sector. In case of obtaining this reduction, we will able to raise our national budget and it helps our health and environment very much. However, the answer to the original questions is not easy and it requires deep thinking about them. The first step is to understand that what the consumers of energy in buildings are. Obviously, the consumption is various for each building due to the diversity of users. With considering three issues, we can be hopeful for reducing the energy consumption up to 25%. First of all, with considering the design to comply with thermal requirements that Doctor Heidari could obtain it in his research for the cold climate. Secondly, it is the training for the correct energy consumption and the third is using the appropriate equipment. Energy consumption in Iran is about 50 percent of the heating and cooling sections. According to what was said, we can easily reduce this amount up to the one-thirds in the cold climates. On one hand, the remarkable point is that what should be done for producing the coldness in warm climates? And other hand what should be done for producing the warmness in the cold climate? The active equipments should be used in all cases? Section 19 of the National Building Regulations has paid attention to this issue greatly and its look is on the appropriate design of the shell and insulation. This step is the most basic and important step and all developed countries in the world have started from this point. Along with this step, there are some steps defined that should be considered in the building design. The first issue is attention to the solar radiation and gaining heat from it timely and it leads to reduce the need for the heating system greatly. Proper orientation, the use of greenhouse space, the use of the window facing to south, appropriate design of the plan, the proper use of the shadow and suitable light for lighting are items which the designer should be used in using the solar radiation with specific arrangements. To prevent the influence of the cold air and the exit of the warm air from the building is considered as the next step. This issue has a great impact for wasting the energy. Existing of some joints that we are unaware about them can exacerbate the problem. With the winter winds, we will be aware how the cold air comes into the building through the windows, doors and canals. Therefore, we must prevent it with the aid of some arrangements. The preventing methods should be used during the construction, but if we encounter with such problems after the construction, some special solution should be adopted to control the amount of energy consumption. In the third step, the natural cooling should be noted and used it for designing in terms of the cold climate. In the final step, it should be paid attention to block the cold wind in the cold areas that can make cold the walls. Suitable direction, using blocking elements, creating interface small and low-use spaces between the outer and the warm atmospheres are some possible solutions that can be considered, therefore:

1. In the range of the minimum temperatures, we are always below in the range of comfort. This difference in all months except the May to October is more than 8 °C., So sometimes we need to use the active equipment.

2. In the range of the moderate temperatures, the months of May to October, we are in the range of comfort. But in the months of December to April, the difference between the range of low temperature of comfort and the average temperature are more than 8 °C., And people need the active equipment along with the inactive equipment. In other months, only with active equipment can be achieved the comfort.
3. The maximum temperatures months of June to October, the limitation of thermal comfort can be achieved and in the case of a problem, it can be solved by inactive equipment.
4. By changing the comfort temperature and using the result arising from the present study and similar studies, we could achieve a significant amount of energy reduction.

CONCLUSION

As previously mentioned, what is called the sustainable type is one that is formed compatibility with the surrounding environment and in this case, it will be continued and it can be considered as one of the original type of housing. And it must be examined in conjunction with the affecting factors on the formation. For example, many samples of the physical changes in the housing can be seen that have been influenced from arrival an external method or to order some special people and different materials or entrance a person with the special executive skills in an area that cannot form a sustainable type in the region. That could shape a sustainable way in the region.

To investigate the causal relationship between the results of the phenomenology of the existing status with the environmental effective factors for forming the type could lead us to recognize the originality type. In other words, a type is stable and continue-able and sustainable that can appropriately be responsive to the various factors that impact on housing forming. These types are certainly counted the ones that have persisted by over time and have a compatible relation with their surrounding environment. It leads us to a basic type that the focal point has been formed in the desirable area and has a certain influence radius that in a spectral transformation could lead to types of another component. Therefore, this approach leads us to some fundamental types as the focal points in the area of the country that transformer types are formed as a spectrum between them.

Climatic design features are titled based on the existing definitions as follows:

- Use the density Plans
- Minimize the outer surface against the covered volume
- Buildings with a central introverted courtyard
- Use the materials with capacity and good thermal insulation
- Low room height
- Choose the flat roofs (to keep the snow on the roof as the thermal insulation)
- Minimize exchanging the indoor air and the natural ventilation and thus to avoid creating the nipping cold into the indoor and exit the internal heat to the out of the building.
- Small openable part
- Relatively thick walls.
- Porches and small courtyard.

And generally the below indices can be seen in harmonic design with the climate:

- Climate factors: including the Sun and solar radiation, wind and its characteristics, moisture (humidity) and the geography,
- Rural and urban texture: the establishment way, neighborhood, density
- The building form and volume: made Fronts (faces), orientation and proximity
- Materials and their characteristics
- Spatial elements and schedule of the Plan

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