Abstract—There have been decades since the emergence of sustainable architecture by which plenty of solutions have been offered for solving contemporary crisis, but there are still problems for sustainable architecture. Since life grows and develops in a sustainable environment and suitable region, thus human should attempt to know the surrounding environment to be able to make a proper relation between living environment and man-mades.

In between, people in past were consistently trying to construct buildings and their living environment according to the region of the area. But human beings, today, with the help of new technology and materials have been trying to confront the region. In many cases, urban planning, residential constructions, and use of materials which is merely an adaptation and in the long run, can not be accountable for the region changes and impacts, are observed. The best architecture design is the one which can meet social, economical, technological, aesthetics, and environmental needs.

By considering proper designing and correct understanding of the construction materials and components and proper implementation of them regarding the region, cultural and social issues of the traditional buildings, in this paper, it is tried to study different traits of Urmia city and impacts of these factors on designing traditional housing in this city and implicate approaches to these issues and present solutions for new designs.

Keywords—sustainable architecture, vernacular architecture, cold and mountainous region, traditional house

I. INTRODUCTION

The debate about sustainable architecture and causes to the formation of such approach in architecture design requires a deep understanding of the goals and sustainable recommendations. On the one hand, solving environmental problems- cultural-social, economical and the interdependence of these issues lead us towards the traditional architecture to derive knowledge for today’s designing.

It seems that today with advancement in science, new technologies have replaced these vernacular solutions which have problems such as polluting the environment, too consumption on fossil fuel, loss of thermal energy, etc. Thus updating these vernacular solutions and using them will greatly prevent the mentioned problems and contributes to the quality of building in terms of economic, social, and cultural quality.

Therefore, in this paper, Iranian traditional architecture solutions along with today’s science are studied to benefit from environmental facilities and to reach a sustainable architecture and maintain traditional values in order to achieve the human and nature’s convenience.

First, the attention is focused on the concepts and components of sustainable development or sustainable housing characteristics.

II. SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

Development can be known as the evolution of living level and reaching the ideal conditions regarding the economical, social, and cultural domain. Development can encompass the realization of concepts such as justice freedom, social dynamics, and human development, and economical, social, and cultural growth. Development is also known as discovering the new ways of reaching an evolutionary movement. [1]

The definitions which are used in sustainable development are the one which was presented in Geneva meeting and I based on the following principles:

Human is at the center on attention in sustainable development. Humans in tune with nature are worthy of life with health and productivity.

Development is the right which must equally encompass the current and next generation.

Preserving environment is an integral part of development and can not be investigated separately.[2]

III. SUSTAINABLE DEVELOPMENT

The term “sustainability” was first mentioned in 1986 (after the oil crisis) by committee of global environmental development as an encounter with the current age’s needs without risking the next generation’s resources to meet their needs, and yet it is expanding to offer an appropriate strategy for the world. Development is one of the greatest factors of change in living environment and accordingly one of the...
factors in construction and encompasses energy crisis. Sustainability in construction is a significant concept which is defined as: managing a clean and healthy environment based on exploiting natural resources and ecological principles. In this regard, architects also have considered implementing concepts of sustainability and sustainable development in architecture. Among various definitions, the mostly used definition is Brontold’s definition. He defines sustainability as: “An approach to development which meets the needs of current society and doesn’t reduce the ability of next generation in meeting their needs. This pattern of development ensures survival, stability, and sustainability of the things to survive and remain sustainable and ensure the survival of the next generation.

A. Ecological Sustainability

Ecological Sustainability can be defined in terms of continuity and improvement of health and major functions of living environment. The underlying principle in sustainability is a multi-scale or a meta-scale perspective with respect to living environment and managing human activities in a framework according to this perspective. Human development occurs in scope of one or more major ecosystems.

Establishing or maintaining the continuity of sustainable state in one ecosystem is coexistence and a balanced relationship between all the organs and components with each other and with environment.

B. Social-cultural Sustainability

The changes needed for sustainability are always bound with social culture of each society and prerequisite to this change is the change and revision of inconsistent social patterns and values as well as reviving traditions, beliefs, and patterns which grow in historical culture of a society and are consistent with sustainability.

First step in this approach is ensuring to meet the major needs of society.

C. Economical Sustainability

Thoughtful implementation of land, reducing usage of exotic materials to the least possible amount, using non-renewal resources to the minimum, improving quality of living environment, promoting healthy living, coordinating building with environment and applying construction techniques and indigenous materials, and thus reasonable use of natural resources and appropriate construction management contribute to preserving rare resources and promoting living.

By considering definitions above, five major principles can be proposed for environmental architecture:
1- Creating a healthy environment in the building
2- Using safe indigenous materials
3- Efficient design and implementation
4- Proper utilization of energy
5- Standardization of shape and form of the building with the living environment

IV. SUSTAINABLE HOUSING

The most important element in city is housing whose sustainability is considered the most important aspect in sustainable urban development. In addition to living environment, housing development affects economical, cultural, and social issues; while, increasing urbanism and increasing demands on housing attracts officials’ attention to resolve citizens’ housing needs.[4]

V. REASONS FOR HAVING A SUSTAINABLE APPROACH IN IRAN CAN BE MENTIONED AS FOLLOWING:

- Increasing use of fossil resources
- Emission of greenhouse gases
- Pollution of living environment in Iran
- Daily increase in population
- The influx of population in big cities (increase in crime, corruption, and Social and cultural inconveniences)
- Increase in energy consumption by the change in lifestyles in last four decades

VI. OBSTACLES TO SUSTAINABLE DEVELOPMENT

The following terms can be considered as obstacles which might be encountered especially in Urmia city:
- Rapid urbanization phenomenon and its accompanying lifestyles
- Coming of rural approaches to cities in the form of inconsistent and irreconcilable attitudes to urban living
- Migration from cities to rural areas and creating specific suburban areas which transfers urban lifestyles from far distances to villages and rural areas will develop everyday life, disturbing, stressful and unhealthy factors for us.

For example, in Urmia city, factors that caused a distance between this city and sustainable development can be mentioned as below:
- Informal settlement
- Slums
- Continuity of worn-out structures in the city
- Increase in consumption and development of unmanageable situations
- Land speculation on housing and other urban spaces construction

However, the goal in sustainable environment designing is
to reach visual and thermal comfort in buildings by using natural resources of energy, coexistence with the surrounding environment, Response to various conditions, considering time as designing dimensions, etc, are the factors that can be mentioned as designing goals.

Misconceptions in creating sustainable approach to architecture

Things that cause difficulty in the creation of sustainable architecture can be mentioned as below:

- Policies that are resulted from continuous growth and not reviewed sustainable approaches
- Aesthetic program that is embedded in an architectural sense and understanding and marginalizes sustainable correlations or contemplates the construction of form as a statue

It is incorrect to assume that sustainability can be achieved through hybrid technologies which are symbolically represented. In this situation, the appearance of the building is a reminder of sustainability issues and the complex is still not sustainable (Willis, 2000). The above factors caused sustainability to be conceived as a technology whose two occurred forms are; viewing architecture as a product and not considering the necessity of adapting any issues and new technology with features of area, in other words ignoring the necessity of naturalizing the issue.

VII. EFFECT OF REGION ON URMIA’S ARCHITECTURE AND APPROACHES TO SUSTAINABLE ARCHITECTURE

A. Urban structure

Urban and rural structure in this region is dense and compacted and the external surfaces of the building are minimized with respect to its volume so that heat exchange between external and internal spaces reaches to its minimum.

B. Openings

Openings in this region have the least width so that the heat exchange is minimized to a minimum. By creating openings in the south part of the building solar thermal energy is used to a significance extent in winter and in directions that are exposed to cold winter winds it is reduced to possible minimum amount.

C. The orientation of buildings

In urban and rural parts of this region, buildings are typically established in south range foothills and this length of villages and cities of cold region is established in south range foothills and this establishment is developed along east and west with the most dominance in south.

By creating wide openings and porches in southern part of the building, the heat of the sunshine can be saved substantially on this part of the building.

With establishing buildings along east and west with the smallest surface possible, the building is exposed to undesirable winds that often blow from west. [3]

D. Locating the house (cold and mountainous region)

Valleys and top of the mountains are not considered good alternatives for housing due to floods and cold winds and snows. The north range is not considered a good position for buildings since this range is in shades most of the time of the day.

The south range is considered as the best alternative for housing due to sun exposure.

E. Considering criteria of the designing region

The executive term of designing region refers to specific construction methods which aim at reducing costs of heating and cooling by using natural energy flows to create comfort conditions inside the building.

F. Form of the building

The form of the building is close to square and cube forms. In this case, the external surfaces are minimized with respect to the building volume. In this situation, heat exchange between external and internal spaces is reduced to its minimum amount.

Buildings have stretch along east and west.

Typically, houses have basements which help to dampen the air in these spaces and due to having a high temperature capacity upon the soil, basements are warm in summer and cool in winter.

G. Roofs can be flat or sloping;

Sloping roofs: the still air in the outer layer and the inner layer of the roof (ceiling) can act as a thermal insulator.

Flat roofs: these types of roofs make more sunshine possible ( in the day ) and The remaining snow on flat roofs is good heat insulation.

Building materials

Materials used in walls and buildings must be examined most carefully ( in most regions, using indigenous materials around the building can desirably fulfill the regional needs of the people in that area ).

In cold regions, it is desirable to use materials with low density and high thermal capacity.

VIII. CONCLUSION

Iranian traditional housing in cold and mountainous regions is a manifestation of providing comfort and regional design in this region. Houses often with central yard with indicators such as thick walls, and small openings specifically in northern parts show that architects of these buildings have a good
understanding of the environmental conditions. In the field of architecture and construction, Iranian traditional buildings are formed relying on natural energy sources. Buildings are constructed in ways that provide the most sunshine and solar heating for the habitants in winter. Iranian traditional houses in mountainous regions are formed considering all the regional and cultural factors. The study concluded that today new ideas can be extracted considering subtle patterns and issues that exist in Iranian regional houses and with their means design safe houses that are accommodated with regional and environmental design. Given the goal of implementing sustainable housing development and integration with traditional architecture, considering a few basic principles are recommended:

- Training requirements and methods of construction to the building executives
- Using intelligent technologies in order to improve safety and saving energy
- Understanding traditional regional and indigenous architecture in order to construct houses according to the region
- Interacting with nature and designing with little need in energy resources
- Using renewable energy resources such as wind and sun
- Providing social and economical safety
- Managing construction wastes
- Separating buildings and trying to use modular designing methods and using dry materials
- Flexibility and ability to develop and implement spaces

REFERENCES