Rural Architecture Based on the Indigenous Knowledge an Instance of Sustainable Architecture

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ABSTRACT

A village can be considered as a residence whose production is mostly to agriculture and stockbreeding and which has a limited population. This area due to its special characteristics and conditions has accommodated a series of social, economic, culture and political behaviors whose influences which are considered as the main factors of village formation can easily be observed in rural architecture. Rural architecture which is caused by its resident’s indigenous knowledge has unique factors. Completely regarding the environment and without endangering the resources of the future generation, it has been able to provide its inhabitant with the vital social, culture, economic and political needs. In addition to the fact that village shove different function in the society today, rural architecture, too, as an instance of sustainable architecture whose aim is to respect the environment and conserve is for the feature generations, is considered as one of the important columns of the sustainable development in human societies. The principle and rules used in the rural architecture are influenced by the social beliefs and are the result of the indigenous knowledge of their residents and comprise lots of principles and concepts of sustainable architecture. We can attain the architectural solutions and time-bested tools through a deep study and examination of the field so as to reach the sustainable architecture. This article intends to study the concepts of sustainable architecture in rural architecture while topically examining an instance of rural residence and the indigenous pattern of rural architecture.

KEYWORDS: Rural architecture, sustainable architecture, Sustainable development.

INTRODUCTION

Constant agriculture which is in course of reaching to constant development, harmony with nature, saving energy, harmony with continent and indulging in inhabitants needs has become an obvious job. For years and years rural inhabitants with regard to their native knowledge and by performing special rules and technologies could keep up in addition to answer to life needs with regard to gain comfort, between his own handmade environment and natural environment and by this way the concepts of constant development has been shown in rural architecture. These concepts can be seen not only in environmental background but also in other dimensions of stability like social and economical dimensions. In this essay at first in summary has been paid attention to the subject of constant development and constant architecture, after that by a short look to the example of rural habitats and native models of architecture with a general survey it will be paid attention to the concept of rural architecture. By this thought that surveying models of rural architecture as an experimental sample of constant architecture will open ways and will be a source of inspiration in designings and making decisions for the future of the village.

RESEARCH METHOD

It is obvious that any scientific research in order to having an aggregate structure needs research method appropriate to its own subject. In this essay, it has been tried to use library research and field study to analyze and come to conclusion that by field visit we can gain some subjects from library study.

Sustainable development

The word constant development has been used very much from the middle of 1970s. Today, the discussion of constant development is one of the important and current topics in international level. The apogee of this discussion in 1992 in universal conference of constant development known as earth conference in brazil enumerates, that in it, a manifest to issued for giving solutions toward constant development of the world's
countries. Ten years later. It had been held another conference in south Africa with the aim of emphasis on rio conference enactments and being more executive at those enactments in universal level.

The most important definition that represented in rio conference about constant development, is: ((A development that indulges toady's needs without endangering future generation needs and in it, pays attention to environment and future generation. )) Based on the world's commission of the U.N, constant development is ((The development that answers today's needs without this fact that influences future generation power in supplying his own needs.))

World's development bank defines constant development in this way that: ((A development that lasts repertory we can say that the basis of all of These definitions is paying attention to the future generations, environment and protection of it.

**Constant architecture**

It is obvious, architecture is one of the effective factors in human communities development, in this way, consequently after being important the concepts of constant development, constant movement in architecture is considered and various definitions about constant architecture introduced, that we can refer to the following:

A building that has the least discordant and discrepancy with it's around environment and in wider blade with the world and the region.

"The creation of human made environment and its bound management based on environment adaptation elements and resources efficiency. These elements are minimizing the consumption of nonrenewable resources, upgrade and uprise natural environment Conditions and minimum ecological damages on environment. " (Charles k Bert 1994)

"Determination a more ordinary relationship and coexist of architecture trace with environment which is constructed based on self conscious action of architecture trace related to environmental conditions. " (Hagan 2001)

Based on "OECD" plan constant buildings are buildings that " have the least destroyer effects on artificial and natural environments near them, and so their overall background. Constant buildings pay attention to the whole cycle of building life, High quality environment, desirable function and future. "

**The elements of constant architecture**

Principles should be considered that a building categorized as a constant building are as follows:  
First principle: energy saving  
Second principle: harmony with continent  
Third principle: reduction of use of new resources  
Fourth principle: estimate of inhabitants needs  
Fifth principle: harmony with site  
Sixth principle: holistic

**Models of rural constant architecture**

Village as a kind of concerted habitat establishes a close relationship with the environment in a way that it can be said rural habitats form a part of environment, here upon it can perform a very qualifying role in environment pollution. Rural architecture always tries by using inhabitants' native knowledge, meanwhile keeping from nonrenewable resources reduction of energy consumption and raising life quality level, to create a healthy environment for inhabitants life and providing their welfare.

Today inattention and lack of knowledge about rural Architecture and concepts and aims latent in it causes rural development exclusively wanted for elevating their inhabitants welfare and its identity as an instance of constant architecture stands at stake.

By surveying village architecture we can see the following character is ties:

- minimizing the exploitation of non renewable resources and using natural and renewable energies .  
- destroyng or minimizing poisonous and polluted materials consumption .  
- retaining culture and ethic identity .  
- promotion of healthy life .  
- wise using of earth’s assimilated of building with environment .
- being economical of construction by using efficient replace technology.
- preventing from air sonic pollution.

Therefore village architecture as an example of constant architecture attempts in addition to preserve of non-renewable resources. Reduction of energy consumption and improving life quality level, creates healthy environment by maximum welfare level inhabitants. Today, inattention and lack of knowledge about village architecture and aims latent in it causes rural development exclusively wanted for elevating their inhabitants welfare and rural architecture identity stands at stake, the thing that we observe as the villages direction project in all parts of our country.

**Village architecture**

Iran because of its extant has village that its inhabitants during years and years by relying to their native knowledge and by considering different factors like, to pography continent economical, culture, political, and... factors can create unrivalled architecture that can be a very valuable inspirational source for all-out development of villages, so in this section, it has been tried after giving explanations in summary pays attention to the architecture of the village “Roein” and aspects of its constant architecture.

**The history of village and rustic**

Basically, the largest evolution during the advent of human can be attributed to the stage that human being could reach from different stages of collecting food to the production of food. This important event affected by human’s need feeling in order to dominate on his around environment an at the period of “new stone” shaped and the first groups of human in villages created. creation of house or cottage from foliage has been the oldest human-made production which has had a round shape.

The oldest signs of civilization in Iran refers to the 6th millennium before Christ, the time that human before who were in cause and mountains gradually went to ward production plains and shaped group habitats. the things that we can get from remains and lefts from different historical courtyards like “Sistan” burned city and “Sialk Kashan”, shows life based on agriculture and hunting, which we can refer to them as oldest village in Iran.

The oldest documents obtained from historical habitats in the region of North Khorasan is related to about 6000 B.C., and at the ancient courtyards of Gale’ khan hill in ”Mane and Samalghan”, Pahlevan hill in “jajarm and farouj” yam hill. (5th millennium)

**The concept of village**

Although at the first seeing an obvious concept can be seen but we can consider different definitions for it, thoroughly village is a collection of living activities that have direct relation with habitation and house and can prepare all part or most part of his yearly needs inside itself.

Based on this and based on the kind of dominant function, each of the rural habitats have special characteristics differ them from each other and in this course all living-existance activities in each village influence directly on the forming on architecture models in a way that their framework effects in the texture of villages and in residential units, the importance of this point is in a manner that each activities have a spatial and framework equivalent.

**Models of forming the rural habitats**

Rural habitats from the manner of families habitation and rural groups usually divide into two groups: permanent and seasonal rural habitats, and from the manner of shape it can be divided into two groups: focus or collective and sporadic or straggle, and so in addition to these two main models we can introduce a middle form that interferes in by attention to the ecological environmental, historical-culture, and social-economical characteristics in different regions, different factors and forces interfere in collecting or being a part of rural habitats, and among them, continent problems and environmental circumstances are the most important factors.

Framework structure of rural habitats differ in forms, the form of habitats are the result of forming an manner of growth and their spreading that various factors affect on them.
Village’s histology
Framework, construct or structure of rural habitats is the result of mutual in traction of different environment-ecological and social economical factors and forces and showing their framework texture, shape form and patterns.

Rural habitats have different structure patterns that can be divided into three main parts:
- Linear rural habitats, which its habitats units establish along a main line and in the form of lining.
- Focus rural habitats, which their main center consist of a public place or central place.
- Vast rural habitats, which usually have disorder or collective framework and known as hill villages. The path of streets or main avenues in this habitats maybe sphere, in volute disorder, in the form of dead-end alleys and so on.

Roein the village
In 52 km south east of bojnurd and 25 km north of efarayen, there is a village in a valley that Roein river passes in it. Existing historical natural attractions and climate conditions has been caused this region is one of the distinctive points in city and province. The antiquity of this village is more than ten centuries.

In this village, there is no single building that from the architecture points of view has a special art value, but the texture of the village is a complex collection and step like in hillside, buildings form are objective and cubic with the doors open toward the valley and the sun, and finally the kind of things used are based on mountainous environment, has created and very beautiful collection and compliment.

Village establishing
Village in habitats by relying on their own native knowledge have always tried by considering all natural, social, economical, circumstance, choose the most suitable place for establishing the village. overall, effective factors in establishing villages can be divided in to two categories:
- Natural factors
- Cultural, social, economical factors

In this village natural potential facilities, have been the most important factors in finding the place of establishing the village, proper facilities for agriculture activities, natural potentials like appropriate soil, even plains, favorable climate and spurt water have supplied an appropriate background for establishing the village.
Village fabric
In forming village texture, the manner of establishing houses and alleys, land characteristics and climate elements have played a very important role.

In this village climate circumstances (severe coldness) and earth’s natural position (earth with rather high slope) have been caused that following characteristics can be see in the texture of the village architecture:
- The village texture is dense and the buildings are joined together, have by the joint surface of the residential hot space with the outside cold environment will be less.
- The manner of texture establishing and buildings are in a way that in addition to confront with cold winds, maximum use of solar energy is done.
- Natural compulsions (land slope) have been caused that the village has more compress that village texture has been shown in the form of stairs.
- In residential unit as the village texture components for using sunlight and confronting with severe coldness below jobs have been done:
  - The ratio of outside surface of the building to the size is low. This subject causes that the lower surface of the building is in bleak.
  - In order to confront with coldness, walls and ceiling have a high thickness and thermal capacity is high.
  - The kind of outside of color of the building has been chosen dark because of more absorption of the light.
  - The direction of the establishing the houses are toward a place that absorbs maximum solar energy in order to heat homes in winter.
  - Glassy surface of windows and doors are low because of thermal exchange with environment.
  - Residential units mainly builds in two floors, the first floor allocates to the store and animal space and second floor is for human living, in this case the space between these two floors is a barrier for spreading earth coldness to the second floor.
- In most of buildings have been tried by merging in to the soil, thermal exchange with environment will be less.
And . . . . 

Overall, all factors in shaping the village texture and observed characteristics in its constructive elements represents the effort of village architecture is in direction of interaction and along with the nature.

Aspect

One of the characteristics of village texture and architecture is their harmony with natural environment that privileges them from ecological beauty. Using aborigine facilities and harmony with natural and geographical bed in establishing texture and construction of building shows standing construction process in a healthy environmental and ecological cycle.

Build material

Facilities which are used in constructing most building consist of stone, brick, clay and mainly aborigine facilities that are used based on easy access and abundant in the region. In foundation it has been used of stone, in walls from clay, brick or stone in ceiling from wooden stick and wider spans from larger wooden sticks and wooden columns.

We can refer to the following cases about used facilities:

- Being economical of facilities with regard to naturally abundance of them in region.
- Reduction of energy consumption with regard to the facility characteristics and technology used in construction.
- Harmony between village and nature because of created aspect.

By attention to the above mentioned items we can say that, roein`s architecture in selecting materials intellectually Pays attention to the harmony and interaction with nature and reducing energy consumption.
Fig. 6: using wood in wall

Manufacturing technology
To reach considered aims in village architecture, in addition to attention and familiarity with all factors of village constituent, should consider how to use these factors. Village inhabitant’s usage from different kinds and methods of using region materials, natural resources, color, proper shapes and … are showing this fact.

Fig. 7: An old building in Roein village

Fig. 8: Drowing of this old building
Fig. 9: An old building in Roein village

Fig. 10: Drawing of this old building
Summary

<table>
<thead>
<tr>
<th>Building components or village fabric</th>
<th>Divulge kind in village</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction material</td>
<td>Stone-clay-wood</td>
<td>Abundance in place</td>
</tr>
<tr>
<td>The manner of relationship with construction and land.</td>
<td>On the stone basis.</td>
<td>Preventing from penetrating coldness and moisture from the earth.</td>
</tr>
<tr>
<td>Kind of fabric</td>
<td>compact</td>
<td>Reduction of touch of surface with cold air</td>
</tr>
<tr>
<td>Direction of establishing buildings</td>
<td>South east to south west</td>
<td>Maximum use of sunlight and using wind in summer from the valley direction.</td>
</tr>
<tr>
<td>Kind of ceiling</td>
<td>Flat(composition of wood and clay)</td>
<td>Abundance of wood and soil in the area and ceiling insulator against coldness.</td>
</tr>
<tr>
<td>Window surface and glassy surface of window</td>
<td>low</td>
<td>Reduction of arrival of coldness in to the building.</td>
</tr>
<tr>
<td>Kind of plan</td>
<td>compressed</td>
<td>Preventing from thermal losing and reducing energy consumption to heat the space.</td>
</tr>
<tr>
<td>Kin of outside color</td>
<td>dark</td>
<td>Absorbing maximum energy in winter</td>
</tr>
<tr>
<td>Material characteristics</td>
<td>Material with high thermal capacity and resistance</td>
<td>Reduction of thermal transferring by material.</td>
</tr>
<tr>
<td>Sunshade</td>
<td>have</td>
<td>To control sunlight inside the building specially in summer.</td>
</tr>
</tbody>
</table>

Table 1: characteristics of village fabric under the influence of region’s climate.

Conclusion

Today, increasing the course of constructions, human’s diversity, draw architecture toward new shapes of building and diverseness in it, and this course highly put natural environments in ruining and destroying position. Rural architecture that selects and applies design, technology and kind of used material in construction them, based on native knowledge of inhabitants during history and based on test and error method, by increasing precision to all impressing and impressionable factors tried to create an environment with a quality in accordance with human needs and based on native architecture values, most of method, course of actions and technologies that have been applied in village native architecture for compatibility with continent and special circum stance of environment and living place and some of them can be applied with some reformations. But using them with regard to the social and economical changes and evolutions and facilities that new technology of architecture has created, needs to be studied and researched more, in case of studying and detection of rural architecture characteristics and using it in quantities of today’s technology, in addition to give identity to rural architecture, we can take architecture to a direction that function in accordance with harmony and interaction with nature.

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