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A Comparison of the Effects of Traditional Rural Settlements and Modern Settlements

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Abstract

At the present time, out of the total 3.7 million residential rural units in the country, two million residential rural units are unstable or less stable. The government is to retrofitting these residential units during 10 years. For this, at first the world retrofitting was intended, then they noticed that it is not possible to retrofitting these unstable residential rural units, because their retrofitting is not economical. For this reason, they replaced the retrofitting with reconstruction of residential units. On the basis of this, the government annually loans to reconstruct 200 thousand residential units. Constructing modern settlements beside the traditional ones, has brought about changes in the life of villagers. In this article, the characteristics and the effects of such constructions from the structural, architectural, social point of view as well as energy use and environmental effects were briefly compared. The comparison is done in 10 select villages in Barug region in the north east of Miyandoab and they are exactly located in the south of Sahand. This region is 580 square kms with three central villages have 74 small villages. The found results, more or less, can be generalized to cover the whole area which shows that the relative priority of the modern settlement, against earthquake, in other cases, it has caused heterogeneity in the rural environment.

By changing the traditional architecture, the endemic architectural identity and all cultural elements and economic factors have been changed negatively.

Key words: Traditional Settlements- modern settlements-endemic materials- environment-reconstruction

1. Introduction

The earthquakes that struck Iran shows that a medium earthquake causes a lot of damages to the residential buildings specially in the villages. The financial damages can be compensated through the government aids, but the human damages and their direct and indirect impacts cannot be compensated. Because the all buildings are national assets, preserving them is a national duty, for this purpose billions of rials are spent by the government. The recent plan of building and rebuilding rural residential is prevention better than care. By continuing this plan the rural residential can also be prevented.

2. Statistical situation of Traditional rural settlements

The statistics of traditional rural residential nearly all rural residential are built by stone, wood and brick. These kinds of building include a high percentage of building in the villages [1] (table 1).

Table 1: Number of normal residential units in country according to main materials of building

Percent of available housing units (ratio to total)	Major materials
43%	Brick and iron with iron ore
16%	Clay and wood
13.7%	Brick and wood or stone wood
10.1%	Clay and mud
8%	All wood
3.2%	Cement blocks
3.3%	Metal or concrete
1.4%	All brick or stone and brick
1.3%	other materials

On the basis of the researches [2] the trend in building rural residential like in the cities has been growing. The average in the cities is 12 percent and in the villages is 5 percent. The studied

villages have different topography according to the location of building. Some are located in the flat areas, skirt and some others in the high areas. But they largely have a cold- mountain climate. These villages have only one- story buildings. All the villages have traditionally centralized residential. Which were for the following reasons: defense, social relations, the land for agriculture using, common walls- avoiding energy wastage, use of the best space.

From the historical point of view, the present residence in the villages can be classified in to 3 categories:

- 1- The past, traditional residence which was built before 1330, in these residences all building materials was provided and used in the local way. These kinds of residences have thick clay walls, little openings and low roofs. In all these residences the materials used wood, clay and brick.
- 2- Transitional or the middle- traditional residences which have preserved the architecture of the type 1 residences. They were built after 1330. In these residences the synthetic materials have been used such as brick, cement and traditional materials.
- 3- Residence with modern pattern which was begun in recent years and recent renovations are of this type. These residences have general been built by new materials such as iron and concrete.

By the change in residences, their uses of traditional residences have changed and the new residences have been limited (Figure 1).

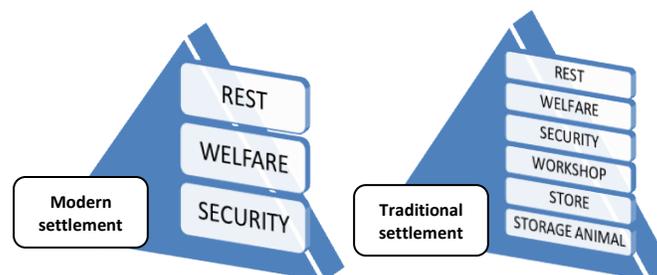


Figure1- Differences in modern and traditional use of settlements

According to written plans [3,4], the new pattern in building rural residential settlements the following should be observed it seems that expect for the first row (discussion only exposure to

the earthquake and with fully observing technical conditions), the rest has been forgotten (table2). More analysis, compare a few cases are discussed.

Table2: Desired goals in building the new rural settlements

1	Supplying house of technical needs
2	The effort to preserve the native architectural identity
3	Supplying beautify aspects of rural environment
4	Supplying house of rural needs
5	Change the space of rural non-health environment to lively and lush environment
6	Matching mold of rural house with today life
7	The effort to close welfare level of rural profit and cities,
8	The effort to optimize energy consumption

3. Structural comparison

The most important problem in clay buildings is the weak performance against the earthquake in the paragraph 2-2-1 of the construction circular (Iranian standard 2800) in the performance of the clay structures has been mentioned “ the traditional buildings which have been built by clay & brick are weak and they cannot resist against the earthquake, their construction should general be abandoned, but in the remote areas where providing resistant materials is expensive, they should be built according to the special instructions by using resistant wood elements or metal, concrete elements, or the combination of them. They should be reinforced to be relatively resistant the earthquakes.” [5]

As it is shown in (table 1), most of the rural settlements in iran are of this type. The foundation of these buildings are from stones, loam mortar, thick walls and the roof of these buildings are from wood in the distance of 40 to 70 cms (centre line to centre line) which are put on the carrier walls and they were covered with thatch (Figure 2). An example of this is shown.

Modern brick buildings with horizontal / vertical hank and concrete, The carrier walls with pressed bricks by 22 to 35 cms thickness and the roof of them is built with iron, multiplicative arch or block joist. It should be mentioned that in recent two decades the trend to use iron in the villages have been common.



Figure 2- Sample of used wood in manufacturing traditional settlements roof

From the structural view, fighting against the earthquake forces 1- the roofs as the location of the earthquake force, should be light 2- the proper connection of the roof with walls as a transmission path of the earthquake force 3- the proper connection of the carrier walls to unify the building, has a special and determine importance in fighting against the earthquake. A lot of researches have shown that by using simple preparations the faults can be removed and the resistance of connection areas can be improved. Applying this packer, will cause about 7 percent additional cost. [8]

4. Architectural comparison

The percent elements in traditional settlements are a big space for living rooms and bedrooms. A separate room for guest usually a few steps higher a corridor, yard, the store house, stable, the oven room, a store room for nutritional materials and a place for bathing. The results show that the rural buildings in this region are generally suitable in terms of providing comfort and create an appropriate environment for living for the welfare of the villagers. For example the thickness of the walls with small windows has caused in different seasons of the year to be the temperature of welfare in residential units. The variety and vastness of residential spaces has allowed the villages to store their products and crops in this environment. Livestock are kept near these traditional settlements in addition of providing the welfare of the residences, they also provided their vocational needs.

On the other hand, the main elements which are present in the urban homes are similar to conventional urban spaces and include hall, reception, bedrooms and sanitary services and an open kitchen(while the kitchens in spaces that are mixed with the traditional customs have no coordination). These spaces have small brick walls. The light and heat of the sun can easily pass through it. Of course the mortar used was cement which adds to the strength of the wall. The

height of the walls are 3 meters, the roof is flat which is covered by iron and brick. The used materials like cement brick, iron, gypsum, ceramic, mosaic and iron windows which are provided from the city, have high expense. In table 3 the expenses for traditional and modern settlements are contrasted.

Table3: Overall compare of costs of some activities for modern and traditional settlements

Row	Type of activity	Traditional settlements	Modern settlements
1	Cost of building design and mapping	No map- experimental and traditional- free	Reference map and confirmed sufficient-costly
2	Cost of providing building materials	Supply of nearby nature - low cost	Supply of the city-costly
3	Cost of interests transport to rural	Carrying close to local with facilities - low cost	Carrying relatively out-Special Features
4	Architect and construction worker wages	No need for special expertise - the use of native workers - low cost	Require skilled or semi-skilled people -Costly

In modern settlements, the separation of residence from the place of vocational activities and the heterogeneity and the lack of agreement between the construction materials white the natural environment has created problems.

This unsuitability with the structure of the settlements regarding the different ways of the villager activities has caused undesirable effects.

5. Comparison in energy use

At the present time the fear of falling behind has caused the new construction materials such as glass, iron in the building of houses. An example of these changes is the big windows of glass and iron in the modern settlements instead of small wooden windows. Regarding the importance of the energy and observing the consumption pattern, these changes are negative elements in energy consumption in the modern settlements. The researches show [8] that in a volume and side level for traditional and modern settlements, some factors such as the thin walls and insensible use of the materials in architectural planning can cause an increased need in heating the building and wastage in the heat and cold produced in the settlement and this type of savings are more in present traditional settlements (figure 3).

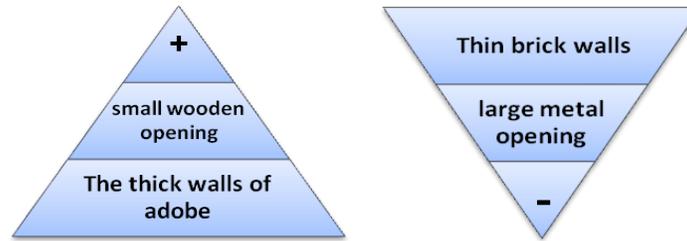


Figure 3- Positive and negative effects of walls and openings in saving the energy

On the other hand, the vast spaces in the modern settlements need the new cooling & heating systems and then we can provide them with the traditional type of construction such as thick walls with high thermal resistance and small two-layer opening and in general case with architectural thinking.

6. Comparison of social & welfare aspects

The building of new settlements and providing different facilities in the villages like water, electricity has brought different electrical apparatus in the villages while in most cases, these accessories are not never used.

The small spaces in traditional settlements were covered with the hand- woven carpets.

Use the urban pattern has caused villagers not to be able to cover their large settlements with hand- woven carpets. A change in one life pattern causes other changes. The decoration of modern settlements is done with less valuable decorative equipments and a rural family does not to decorate their home with their own artifacts. A kind of cultural has alienation has appeared in them. Doubtless to say that any change in the world in different dimensions enters our society sooner or later that one of them is a change in the architecture of the residence [7]. But this should be adapted with local cultures and specific environment of each region. It is apparent that we cannot block the entrance of new technologies and because they are the main aspects of development, We should use them to prevent the dependence on the foreigners the equipment should be produced in the country. Life in the new residence changes the cookery, clothes and architecture. These changes cause the villagers do some jobs which are not suitable with the village environments. The nature of using the new residence is in contradiction with what the native people have accustomed to.

7. Preserving the environment

Nowadays, one of the most important problems which have attracted the global attention is preserving the environment. The differences and contrasts in consumption methods and use of consumed materials between the traditional and modern settlements in the villages can be seen. These differences the way of interferences in the natural state of the earth the entrance of the polluting materials into the water, soil and the atmosphere, the consumption of non- renewable sources and the negative effects of waste matters on the environment. In this connection, the issue of industries and stable buildings are important. The stable buildings can be home that have the least negative effect on the environment. In the production of the materials, most important thing is the stability for example it is proven that the development of concrete (as one of the most useable materials) is not stable for many reasons. First the production of cement uses the most part of resources on the earth. Second, cement production has a share in the production of green house gases. Third, many of the concrete structures being less durable have negative effects on concrete production from natural resources. Thus, logical use of resources and suitable management of raw materials helps to preserve these resources and reduces the energy consumption. It also improves the quality of the environment, using materials which destines the environment solves the temporary problem of providing materials, but solving the problems relating to the destruction of the environments, while be much more difficult.

In (Figure 4) the decreasing trend with steep for the use of traditional materials in comparison with synthetic materials is shown traditional materials such as, wood, clay, brick, stone, synthetic materials such as traditional materials plus brick, cement blocks and new materials include iron, concrete, brick.[9]

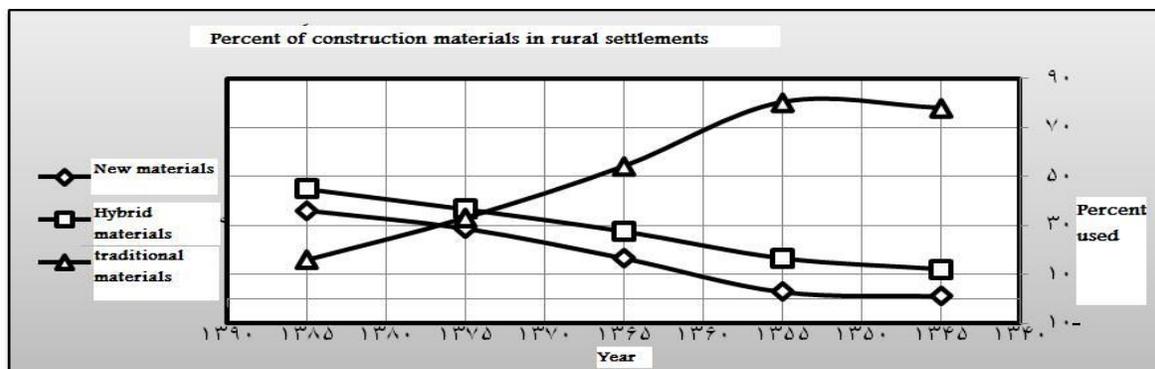


Figure 4- Use of traditional, combined and new materials in different years

The general structure of traditional buildings are of bricks, stones, local plants, wood, lime the production of these materials, unlike the materials which are used in building new settlements, does not destroy the natural resources and don't enter serious and irreparable damages to nature.

The constructions are in agreement with the nature. [10]

8. Summary and Conclusion:

- 1- Although the clay buildings are of less stable buildings against the earthquake, the habitable homes dating 70 to 90 years regarding the earthquake, records shows their stability. Meanwhile, by using less expensive materials (local materials) stable buildings can be built so the authorities' s orientation for renovation of rural settlements, can be in this way.
- 2- Architecture is part of every nations culture regarding the geographical and climatic conditions, customs, values and ideas has been formed the history. If wanted they can gradually change and we cannot create sudden changes in architecture because of technical, economic or political reasons.
- 3- Building new settlements beside the traditional settlements cause the negative cultural and vocational dependence. By the increase in the skills and specialization related to the architecture in the villages and matching the plan and the architecture with the natural environment and rural culture and the use of environmental facilities, we can reduce the dependence and prevent the exit of money from the villages.
- 4- With the influence of modern architecture, the elements such as carpet- wreathing workshops, valuable traditional productions, will be gradually eliminated from the rural settlements and will be forgotten. The activities related to these will be eliminated, too. This may be, from the cultural and social view, one of the most destructive elements in the use of modern architecture.
- 5- We should not consider all accepts of reconstruction as good. Reconstruction can both be creative and destructive. It causes hopes, opportunities and expectations and sufferings that are combined with human destructions.

- 6- Building local traditional settlements have no bad effects on the environment. It can be one of the indices of stable development in villages if it is directed well. While the industries related to the materials production in the building of new settlements is in contradiction with the universal definition of the environment. It gradually effects negatively in providing the needs of coming generation.

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