



## **Sustainable development of rural vernacular architecture (Case Study: Ziarat village in Iran)**

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### **ABSTRACT**

*In this paper, we survey the factors of setting up rural housing in Iran from internal and external resources. These factors are studied in Ziarat village as a case study. With respect to the environmental and livable parameters, natural elements and harmonic construction and needs of local residents, we propose a sustainable model of rural housing relies on three principles: a) Respecting the past, b) Within contemporary life and c) Legacy for the future. According to this model, just buildings can be made in the village that in addition to considering the necessary infrastructure, adhere to the three mentioned principles.*

**Keywords:** *Natural infrastructure, Rural Housing, Sustainability, Vernacular Architecture*

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### **INTRODUCTION**

Thorough the Iran's rural architecture multiple performance spaces are evident. The villagers' attitude to the nature influences the physical environment and the body of villages. House is the primitive element of rural architectures that has changed due to the variation of villagers' life styles. The architecture of a village states the culture, life style and the attention of its settlers to their environment. Hence, paying attention to housing, particularly in rural context, which has the required potential of sustainability for development and also because of its direct relation with the quality of life, is one of the main goals of sustainable development. However, the related viewpoints can be categorized in two groups:

1) Development-based approach 2) the approach based on the initial state maintenance.

Proponents of development-based approach by take in to consideration such rural houses that villagers usually prefer not to live there nowadays state that such activities which have been done to preserve the basic state of houses lead to decreasing the quality of life of their setters. This approach considers the conservation as tending to past and recreation as progress and development. On the other hand, proponents of second group believe that development means modernism which is introduced as the main reason of nowadays problems. Therefore, the solution is the interactive model of development and maintenance. This model with respect to the past is seeking the improvement of livability and answering the needs of villagers. Thus, the following research questions are posed:

1- How the proposed model can improve the quality of rural life?

2- To what extent the proposed model can be to control the migration of residents to the city?

3- If the proposed model can control making of heterogeneous constructions which are inconsistent with the rural context?

In this paper, we propose a sustainable model of rural housing in the context of Ziarat village which is placed in Golestan province of Iran. In the proposed approach, the effective factors in setting up rural housing are determined via studying the principle concepts such as village and rural housing. We also studied related both internal and foreign experiments, especially the experiments that have similar conditions with our case study.

### **Rural architectural Challenges**

Modernity and modernism is a feature of today's architecture that its effects are evident in everyday life. Increasing non-standard structures which have no compatibility with rural contexts is a serious challenge in Ziarat village. On the other hand, making non-standard buildings has intensified by the migration of villagers to the cities which is happened because of the lack of attention to the villagers needs. However,

non-standard and heterogeneous buildings with Ziarat context are the serious threats about the natural and unique environment of Ziarat. Hence, firstly, we need to improve the quality of rural s' life by creating compatible and durable settlements with natural environment. To make these structures, vernacular architecture and using of local materials should be considered as much as possible. Secondly, constructions in the village and preserving the natural landscape should be controlled more than before.

### **Introduction of Ziarat village**

Ziarat is one of the beautiful villages of, with an altitude of 1563 meters above the sea level, is located 17 km south of the city of Gorgan, and is really between two mountainous and forested feet of the mount. In spite of its being near an area with mild weather, this village is an attractive destination for tourists and travelers in summer because of its moderate cool climate, and in winter due to being covered with snow. Ziarat village is surrounded by the recreational region of Nahar-khoran and the heights of Darbandsar and Khomam-shahr in north, forested heights in south, the heights of Adim, Mazukesh, and Kamar-sar in west, and Khaal-darreh heights in east [1].

There are also beautiful twin waterfalls in the south of Ziarat. These waterfalls, a hot spring, and also the mausoleum of Imam-zadeh Abdollah, i.e. a successor of the Prophet of Islam are some of the traveller fascinations in the village.

Ziarat is among the very old village of the city of Gorgan and has historical antiquity and many natural fascinations. Since Ziarat village has been located in the valley of the river Khasseh-Rood, it has been protracted along the river and because of the ground being very steep it could not develop from north into the upper jungle. Architecturally speaking, the houses of this village are very impressive with their beautiful inward architecture, their roofs covered by mud, and outward surfaces. The yards of houses make the pathways which is one of the fascinating points about the contexts of this village. In better words, the private outdoor part of the houses is the same as the paths in the village in which small ponds, water taps, traditional ovens, and warehouses can be observed. Unfortunately, this old and interesting kind of architecture has been changed in some parts of the village where structures with urban architecture are seen. Before the construction of a hotel in the village, tourists traveling to Ziarat village used to rent the villagers' houses in the past, but nowadays travelers are provided with this hotel to stay.

The men of the village usually work in the fields of agriculture, and animal husbandry; while the women folk weave a kind of handicraft called Jaajim (that is a coarse loosely-woven woolen cloth). Being a tourist village has contributed to the prospering of Ziarat village very much. Ziarat hot spring on the southern suburbs of the village, neighboring the mausoleum of Imamzadeh Abdolleh, is the only hot spring in Golestan province.

It should be declared that Imamzadeh means a male or female descendant of the prophet of Islam (blessings of God upon him and his progeny). This hot spring has clear, pure, fresh and tepid water. It has four openings. The first one gushes out from underneath a piece of stone with a small inscription on it. Native people believe that this hot spring has a soothing influence and can be used in curing various skin illnesses and pains of the joints.

Another natural attraction in the area is Ziarat waterfall which is located in 5km south of the village and 19km south of the city of Gorgan. There are two waterfalls in the region that gush into a natural pool from an altitude of 15 meters. In the area close the waterfall, droplets can be seen in the air because of the pouring water from a high height; and rocks are covered with moss and lichen owing to the rather high dampness. Such natural sightseeing has provided interesting sites for travelers and tourists. Moreover, Ziarat River gushes over the eastern edge of the village and provides water required for the villagers along its 40 km trip. Picture 1 shows a typical view of Ziarat village.



Picture 1- A typical picture of Ziarat Village

The valleys, mountains, river bank, flora and fauna are some natural attractions in the outskirts of the village, while an ancient mosque and the mausoleum of Imamzadeh Abdollah are the places of pilgrimage in the village.

Ziarat village is easily obtainable via the forested and enjoyable Nahar-khoran region 4 km south of the city of Gorgan. Nahar-khoran region comprises a set of forested places near the road, the river bank, and urban and tourist facilities. This complex with distinct geographical circumstances, is located on two steep mountainsides, and so has a good weather and is visited by many tourists from different areas. There are also a few hotels and some of villas in the area. Very tall trees of the old forest together with tourist conveniences in Nahar-khoran area have provided a recreational place with magnificent views that attract the people of Gorgan and also a great number of tourists throughout the whole year particularly spring and summer. The meandering path in the forest to Ziarat village commences after Nahar-khoran. After ending the road ends, one takes a short enjoyable walk in the nice nature and forests there, to arrive Ziarat village.

However, the main reasons for choosing this area as our case study are:

- Availability of information and statistics about the village
- possibility of deep understanding for a researcher
- Suitable dimension and diversity, so it can be studied in rather short time
- Cultural and valuable architecture of the village
- Economical and special conditions of the village

#### Quality of parameters in Ziarat buildings

**a) Archaism of buildings:** researches show that about 10.92 percent of the buildings in Ziarat are under construction and the age of other buildings are as follow: about 14.09% are between 0 to 5 years old, about 22.18 percent are between 5 to 51 years old, about 20.47 percent are between 15 to 20 years old and about 32.35 percent of the buildings are 30 years old.

Also available statistics about the sustainability of Ziarat show that 10.92 percent of the buildings are under construction. Reported information show that 26.75 percent of the buildings are categorized as sustainable buildings and 26.01 percent are grouped in semi-sustainable buildings and 36.31 percent of the buildings have not enough sustainability (Housing foundation Islamic revolution of Iran, 2012).

**b) Floors:** About 30.31 percent of houses in Ziarat have a floor, 44.91 percent of them have two floors, 8.81 percent have three floors and 5.15 percent have four floors or more.

However, number of floors in houses can show the economic situation of its settlements. As mentioned before, in two-floor houses, the upper floor is used for resting and the ground floor is usually used as loom and to store wood and straw or commercial activities.

**c) Building materials:** To build a base of the building and the wall of ground floor usually stones are used which are collected from the surrounding village and Ziarat river. Doors and windows are usually wooden and to make the fences of the buildings branches of trees are used. Instead of cement which is widely used in making buildings in cities, villagers use the mixture of mud and straw. Because of the special kind of the soil of this area, the color of mud is gray which is widely used to make the structures beautiful. However, although villagers do their best to make their houses with vernacular materials, they also use some modern materials like tin sheet (in making the roofs) to make their new buildings.



Picture 2- House made with vernacular materials

#### d) Construction methods:

The ground floor of vernacular houses in Ziarat has been made by stone and black which have about 1 to 1.5 meters thickness and these stones are available freely around the village. Windows, doors and pales are made of wood. Traditionally, to link the main and secondary beams and also to make porch rails nails are not used. Instead of nails, links are done in forms of mortise and tenon. Of course to link wood hemp may also use. However, linking in forms of mortise and tenon improves the resistance of buildings against earthquake.



Picture 3- linking beams to columns with vernacular materials

Table 1 shows the different types of houses in Ziarat based on the construction methods, used materials and design patten in eight groups and related examples are shown in Pictures 4 to 11.

Table 1: different types of houses in Ziarat

Type	Construction Method	Used Materials	Design Pattern
<b>A</b>	Vernacular	local	Vernacular
<b>B</b>	Vernacular	local	Modified/developed Vernacular
<b>C</b>	Vernacular	imported	Modified/developed Vernacular
<b>D</b>	Vernacular	Local and imported	Vernacular
<b>E</b>	Vernacular	Local and imported	Urban
<b>F</b>	Mixed	Local and imported	Vernacular and Modified/developed Vernacular
<b>G</b>	Mixed	Local and imported	Urban
<b>H</b>	imported	imported	Urban



Picture 4- a typical example of type A

Picture 5- a typical example of type B





Picture 6- a typical example of type C



Picture 7- a typical example of type D



Picture 8- a typical example of type E



Picture 9- a typical example of type F



Picture 10- a typical example of type G



Picture 11- a typical example of type H

### Proposed Model

According to our research, since reaching to sustainable development has not been taken to consideration by the villagers, consistency with the nature in making houses in Ziarat has not been considered seriously but implicitly this parameter is considered in the design patterns of houses. We believe that consistency with the nature should be considered seriously in making houses because it has profound impact on the quality of buildings. On the other hand, in the design of houses native culture should be considered but unfortunately, in the recent structures of Ziarat native culture has been forgotten and villagers make their houses according to the urban patterns which has decreased the sustainability and consistency of the rural houses and because of this problem vernacular culture and rural aspects may forget in the near future.

According to our model, in the design of rural buildings numbers of rooms should increase and determine based on the present need of villagers. Also because of recent variation of the style of villagers' life, the independency in the different parts of houses should be considered. Hygiene is the other parameter that should be considered and improve in the design of houses. For example, old houses usually have not a bathroom and villagers should use the public bathroom in Ziarat. In the opposite of the old houses where W.Cs were made in the yards, according to our model, W.Cs can make in the buildings. We believe that all of the parameters such as patterns of designs, materials and construction methods should be vernacular and in order to have as much as consistency with the nature, vernacular materials should be used in the make of houses as much as possible. According to our model, to make houses needs of the its settlements should be considered and the related parameters such as number of floors, number of rooms, size of house and also size of the parts of the house and so on should be determined according the needs. In fact, comfort of settlements is main parameter that considered in the proposed model and this parameter is considering in the whole process of making houses but respecting the nature is the other main point that

considered in the model simultaneously. However, other specifications of the proposed model are as follow:

- Considering the sustainability and also consistency of architecture with the nature
- Effective use of natural resources and new resources of energies
- Improving the harmony of architecture with the environment and the native culture
- Houses design based on preserving of the context of Ziarat and vernacular parameters
- Focusing on the quality of structures rather than their quantity
- Improving the harmony of new structures with the thoroughbred context of Ziarat
- New buildings should be in harmony in terms of height, details, materials and etc. with the neighbor buildings. Which was also emphasized by Sucher in the design of rural houses (Sucher,2003).
- Man scale is one of the important parameters that should be considered in the design of houses.
- To make buildings vernacular materials should be used as much as possible which shows the culture and original architecture of Ziarat.
- Using the wind to have natural air conditioning via making windows in both sides of the house.
- In order to improve the sustainability, our model tries to improve the consistency of buildings with the environmental and vernacular factors.

Other factors are climate factors such as velocity and direction of wind, quantity and direction of raining, measure of humidity and temperature of the environment which are considered in the structures that constructed based on the proposed model. As a sample, we designed a three-floor house (considering the base floor) to be made in Ziarat based on the proposed model which is shown in Picture 13. We used photovoltaic cells and collectors on top of the roof and to have better performance the slope of roof is determined 35°. We put windows in two sides of the house to have natural air conditioning. We also designed wide balcony in the floors as an open private space which are increasing the perspectives and help to have better control on the surroundings.

However, as mentioned before this design is just a sample which was done based on the proposed model and can be modified if needed.

## CONCLUSION

In this paper, the construction factors of rural houses in Iran were studied from related internal and foreign resources. We also gathered and analyzed the villagers' viewpoints about Ziarat village and resultants are showed in table2.

Results show that unfortunately, in the new constructions natural environment and its preservation is not considered and vernacular patterns are going to forget but people prefer to prior the factors that decrease the construction costs and also the factors which have direct impact on the settlements tranquillity rather than vernacular and sustainable factors. In the contrary, foreign and Iranian researchers believe that natural environment and sustainable developments must be considered in making buildings.

However, the main points which should be always considered in the construction of rural dwelling are firstly what kind of dwelling is suitable for what kind of people and secondly, what parameters in construction of dwelling should be hold and which one should be updated. Moreover, considering of villagers' needs should not be forgotten. It should take in to consideration that there is some difference between researchers and settlers' viewpoints about the impact of building on the quantity and quality of resident's life. These differences may originate from the reasons which are:

- 1) The first reason caused the importance of proportional factors with supplying accommodation situations is their efforts for providing themselves with initial needs. Based on Mazelo theory that has been paid to appropriate quality supplying from applicant point of view, concentration on higher aspects of requirements is related to providing the lower levels with components such as tranquility and calm. Nowadays in villages, most of rural residences have problems with their tranquility situations. Besides with their communication increase with urban people and also their enhanced level of information, they have understood their exclusions with respect to urban people. Therefore, their rural tensions to supplying initial needs has caused that they should pay to their higher needs such as paying attentions to preservation both native identity and natural environment.
- 2) In today rural societies, in spite of the past, disregarding many of values like respecting to the nature is obviously. Consumption view that has entered to the nature is the result of today life in comparison with worldwide scale.

- 3) Rural people's appropriate houses properties, today, are completely similar to the urban patterns and they are not agreeing with native patterns.

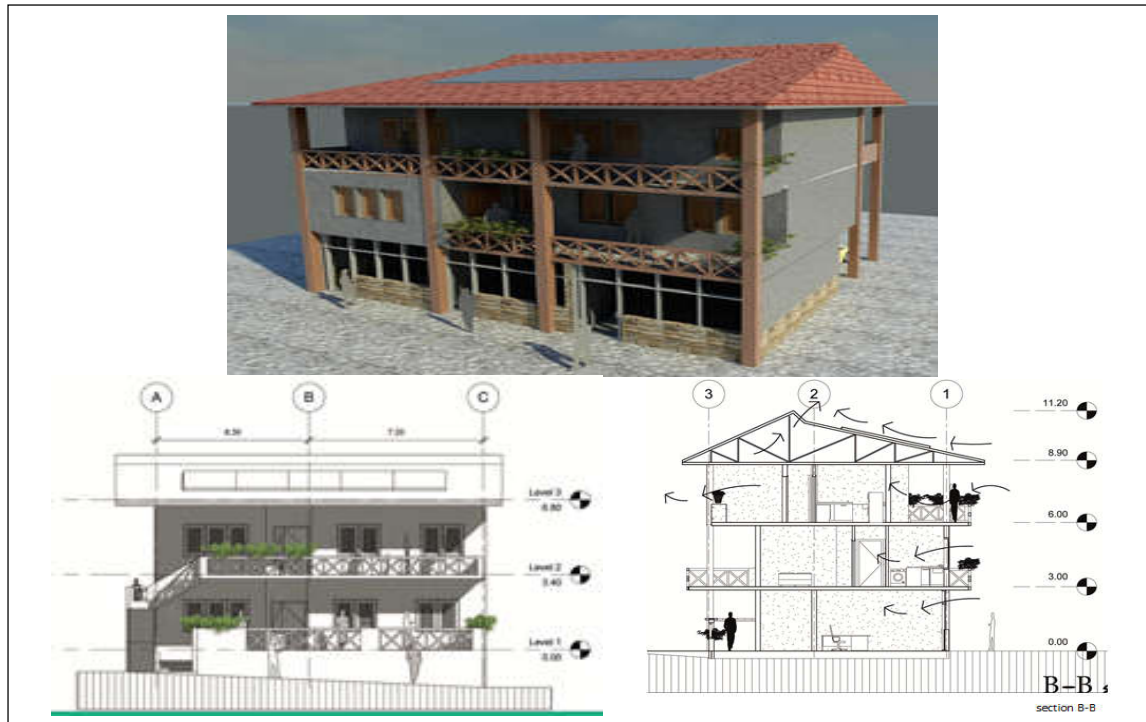
Hence, in this paper, a sustainable model based on vernacular architecture of Ziarat, to build houses, proposed and then according to this model a sample of Ziarat dwelling has been designed. In the proposed model, designs are done in support their settlers' needs with regarding to ecological and natural construction factors of Ziarat village which are compatible with natural environment. According to this model, in the design of every building in addition to providing comfort for its settlers, three important principles should be considered which are:

- Sustainability and consistency with the vernacular architecture
- Compatibility with the settlers' needs
- Considering the future needs

However, according to our vast studies it can be concluded that employing the proposed model to build houses in Ziarat will have a profound impact in the development of sustainable rural vernacular architecture of this village.

Table 2. Results of analyzing the villagers' viewpoints

Threats	Opportunity	Disadvantage	Advantage
Because of existing river in that district, passages and pastures may be impaired by flood	Existing a river for fertility of the soil and farms	Insufficient equipment and primary service such as educational and curative services	Suitable climate , humid and mild weather ,green space and vegetation
-	Role of the village as tourism pole	Incomplete rural substructures such as electricity and telephone lines	Appropriate distance up to Gorgan city(7km)
-	Providing the occupations related to tourists for the settlements of Ziarat village	Insufficient drinking water in summer	Social and Intimate relations between the people living in the village (homogeneous rural context)
The increasing amount of migration of the youth from villages to the city}	The lack of ownership documents for some land which decreases the trade of <u>lands in the region</u>	Existing land between farms that lacks appropriate access and roads	Existing agricultural land
Lack of occupation generating and insufficient profitable equipment in the village	Activities of private organizations in support of development plans of the village which consider partnerships of people	-	Suitable space for sport because of nice weather and view of the village.
Incompatible constructions with village context has caused appearing ecological damages	Existing natural resources in order to provide criteria for preservation of ecology	Lack of agricultural equipment such as machinery or primary loans	Availability of stones surroundings of the river and altitudes as a valuable resource.



Picture 12. A typical designed house based on the proposed model

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