

## Designing the Residential Places for Tourists Based on Environmental Factors and Green Architecture: A Case Study in Historical City of Masouleh

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### Abstract

Masouleh is a mountain city and has many striking features. The city has a stepped structure and for many years has been considered as a destination for tourists. A mild climate, breathtaking landscape, newly architectural forms and fresh air are major characteristics of Masouleh. Unfortunately, nowadays many historical and natural textures are converted to touristic and residential areas in such a way that they jeopardize the environment and nature. Although some may claim that these dramatic changes can help cities boom economically and bring many examples of flourishing cities, made by these changes, there are many real world examples showing natural resource are consumed hugely for the sake of developments and moreover these changes are not sustainable. In this article, two important common trends in the architectural world are discussed such as sustainability and it is applied to Masouleh in order to protect and conserve the natural texture of the city and also it presents a solution that help city grow economically.

**Keywords:** Masouleh, Sustainable, environment, green design

### Introduction

The word “sustainable” has the roots in the Latin word “subtenir” meaning hold up. In larger scale, each society should be supported by its residents in present and future in order to maintain its properties including natural, resource and environmental features. Some places stimulate people to protect their own society along with a meaningful combination of cultural, physical and spiritual characteristics; in this case, the progress and development in the future cover all vital aspects. These places are those which benefited from sustainability in maximum but unfortunately, in Masouleh, only economic goals are given the preferences and the future of the city has blurred for enormous changes in the natural texture (Fathy, 1998)

Sustainability is defined as the capability of the eco-social or any system in an activity which can go on till endless future and consider next generation intelligently to benefit from resources as a part of the same society. Sustainability is defined as supplying daily needs in such a way that they do not jeopardize the capability of future generation for supplying their demands. Sustainability means thinking about our behavior in a large scale in order to stay away from the probable negative effects and consequences of our wrong attitude toward nature and consider the people’s health and environment. Commitment to protection and conservation of nature needs people to be committed and responsible for their actions.

### Sustainable architecture

Sustainability is indirect continuation of a path that architecture is supposed to reach in the future. This type of architecture evokes the feeling of human being toward nature. There are many reasons that urge man to change his point of view in order to share the benefits, and retrieve from nature with others. Man should live a little simpler because the depth of digging and excavations and other manipulation in constructions lead to some consequences that impact our life and finally the

nature. Not only does the process of construction relate to man demands but also it influences on all living creatures and plants in environment. Green movement has made a significant progress recently including the spread of structurally technological innovations in construction and using appropriate materials in corresponding with green architecture.

***The principles of sustainable architecture***

The principles that should be respected in order to be categorized in sustainable architecture are included as below:

**Table 1: The principles of sustainable architecture**

Small Thought	Save our forests
Heat with the sun	Recycle Materials
Keep your cool	build to last
Use renewable Energy	Grow your food
Conserve forests	Store your food
Use Local Material	Sustainable urbanism
Use Natural materials	

The aforementioned rules easily depicts that the main priority for living in a healthy environment is respecting the nature. But, there are many touristic areas that destroy the nature and more importantly main sources of energy. Subsequently, these changes can influence the local people's life style and eventually the urban texture changes to comply with new changes.

***Urban sustainability***

What does sustainability of a society mean? It has a relative meaning; to be sustainable mean move on, keep doing something; Sustainability is a direction and is not necessarily a destination. It can protect and promote the welfare of residents in long and short terms and also provide the maximum quality of life, sustainability entails making coherent decisions and results economic boom and social progress.

Environmental sustainability is meant to conserve natural recourses and urge users to respect using the renewable resources and different sources of energy such as water and energy. It can be concluded that users should not consume more than what natural resources can supply as different components of nature are gradually formed. It is worth mentioning that the rate of human being consumption from disposable resources should not exceed than what renewable sources can produce. For instance, oil and fossil fuel cannot be reproduced after running out. Eventually, environmental sustainability means to respect this important rule: the rate of scattered pollutant in atmosphere and nature never should go over than the capacity of being absorbed by nature.

Additionally, environmental suitability is a positive point as it helps conservation and the durability of biodiversity. Hygiene, fresh air and the quality of soil must meet standards to adjust the life of human being with changing conditions. Sustainability is a creative process and seeks for equality and gives this opportunity to every individual to benefit from natural resources. Therefore, residents choose intelligently and works on decisions which can help the society go on and not only does it defend the rights for present generation, but it also protects the rights of utilizing the natural resources for next generation .

Sustainability has a relative meaning and labeling a city as a sustainable city is not appropriate. The general concept of sustainability is used for a city that is abundant with natural resources of energy and on the other hand, it has less thermal pollutants and wastes. The usage of

sustainability is related to politics, economy and culture. It is true that the world resources are diminishing and the proper assessment and evaluation can help establish a new set of rules which can protect and maintain the natural resources.

- The principles of sustainable city:
- The decisions made by city authorities should not jeopardize the future of children and future generation
- Natural resources belong to all people and the sustainability of the society should not be sacrificed for other purposes.
- Using renewable sources of energy should be encouraged and using the non-renewable source of energy should be minimized.
- Establishing a strong bond among people, syndicates and different levels of decision makers in the local government
- Each society should provide the bedrock for making mutual relationship among people and also prepare the basis for education, employment and entertainment.
- Sustainability is addressing the capability of the society or any current operating system that can go on regardless running out of sources.

### **Geographical characteristics of Masouleh**

In geomorphologic point of view, mountains are essential components of earth. Mountains are formed by tectonic volcanism; these forces raise the surfaces of the earth. To add more, mountain are stretched above and most of its surfaces have a sharp slope and contains a various range of animal species, vegetation and other phenomenon from peak to the surface of the earth (Yavari, 2001).

### **Masouleh as a recreational center**

Recreation and leisure time are indirectly related to man's needs. Recreation includes all activities that mainly occur outside closed spaces and needs space and resources. One of the most suitable resources that increase the quality of recreation is considered as natural places that contain aesthetical aspects.

In recreation, each individual is free in his activities and based on his own will spend time in recreational places. These activities are different from his daily responsibility; In general, recreation contains all activities related to being away from the hustle and bustle of big cities and leisure time (Mikaeili, 1996). One of the most important features of mountain areas is the lack of stability nowadays as they are destroying the vegetation including jungles and plains are in a sever danger. Therefore, we should pay attention to ecological aspects and establishing the stability in these areas (Majnounian, 1995).

Some believe that tourism can play a coordinator role between development and conservation and with respect to advantages of mountains such as people and resources. The development of mountain areas should be simultaneous with tourism and sustainable exploitation can provide both conservation and proper function of ecosystem in mountain (Bonine, 1980). Establishing between conservation and usage is a difficult task because destroying the natural stability in mountain regardless its size, impact on adjacent neighborhood.

Sustainability in tourism industry is complicated. On one hand, a sustainable tourism may jeopardize the tourism because both sustainability and tourism are related to ecology, Here, the paradox is when access to natural resources that tourism industry depend on is remarkably reduced. However, movement to sustainability does not necessarily mean movement toward inside.

Sustainable development, tourism in mountain intend to increase the quality of life and at the same time conserving and protecting the natural and cultural resources (Mckercher, 2002)

On top of that, a sustainable tourism of mountain environment is directly related to the territorial, humanistic and natural capabilities. The fragile nature of these areas with respect to the potentiality of environment for expanding the tourism should consider the environmental factors. In fact, in mountain environment, respecting cultural and environmental dimension are essential, in order to reach the sustainable tourism needs social commitments (McIntosh, 2000).

What becomes more important in mountain areas are suitable weather condition, proper vegetation and water sources. These elements should be in relation with tourism industry in order to keep the balance and avoid pressuring on nature (Benson and Maggi, 2000).

The specific climatic condition, physical characteristic and the general structure of mountain drive the designing to ecological trends in world of architecture. Conservation of natural heritage, the basic resources and natural characteristic should be considered in designing (Edwards, 1999). Therefore, the designing of sustainable landscape according to respecting ecological principles would be possible.

The role of sustainable landscape design and environmental design in creating stability between demanding for using the environment and the ecological capacity is significantly important. Some scholars believe that aesthetics should be valued more than visual features and it includes a vast area that users can perceive by their sensory system and environmental and landscape aesthetic position more than the quality of beauty (Giovani, 1976)

As a result, the function of landscape should pay attention to aesthetics and includes environmental ecology as well (Broad, Hurts, 2001). Therefore, the development of residential places in the nature, expansion, organization with respect to sustainability is a must and it can lead up to functional, organizational and structural promotion.

The outline for designing the residential places with approach to expanding touristic texture are discussed below (Soflaei, 2004):

- Conservation and revitalization of social, natural and bio values in mountain areas for sustainable development.
- Promoting the quality of urban spaces and life
- The development of facilities
- Presenting solutions for conservation and expansion the touristic area in the texture.
- The determination of recreational areas and predict the future development with respect to marinating the historical texture.
- Establishing the spatial-physical system along with development the interaction between Human with environment and human with human with respect to environmental, functional and aesthetic consideration.
- Action plan for designing touristic and residential place in natural and historical areas and optimization of the environment.
- Set planning for recreational and leisure activities.
- The development of the environmental resources through optimization, renovation along with reducing the natural disasters and increasing the ecological capacity.

### **The geographical position of Masouleh**

Masouleh town is located in the far west of Gilan province, a mountain area; dwellers are doing business and animal husbandry. The town is located on a sharp slop and has two main slops

including north-south and east-west. The height difference between its peak point and ground level is almost 100 meter and the numbers of houses are 700, dated back to 15 A.D century.



**Figure 1. A view of Masouleh (a mountain area)**



**Figure 2. Masouleh on the slope**

### **Masouleh Climate**

Masouleh is located between Rasht and Zanjan. Rasht has a mild climate whereas Zanjan's climate is cold, therefore Masouleh has the combination of two different climates. To summarize, winters are very cold and summers are mild, and of course sun is very hot and blazing in the summer.

Since the Masouleh's climate is the combination of cold and mild weather, its vernacular architecture is the combination of these climates as well.

### **Morphology and texture climate**

In Masouleh, like other cities, in mountain area there is a stepped and flat structure.



**Figure 3. The morphologic texture of Masouleh**

Due to precipitation and extreme humidity, the Masouleh's forms are formed mainly to confront this issue.

### **Orientation**

Wind and ventilation are the best solutions in mild and humid areas to adjust the temperature and to achieve this purpose, the best architectural morphologic shape is extroverted types. In this



form, in order to provide for the residents with comfort, buildings are constructed at maximum height and are open in four sides. Balcony as a bio space can combine the interior space with the exterior part of building and also, a big window in façade proves the extroversion in the term of architecture.

The urban texture of Masouleh displays coexistence between green space as natural environment and architecture as built environment. This mutual relationship shows a climatic architecture. Additionally, some scholars believe that Masouleh is city-garden and like other cities, located in a mountain area, the urban texture is not situated at the bottom of valley because at nights cold airs go down and due to flood is at risk.

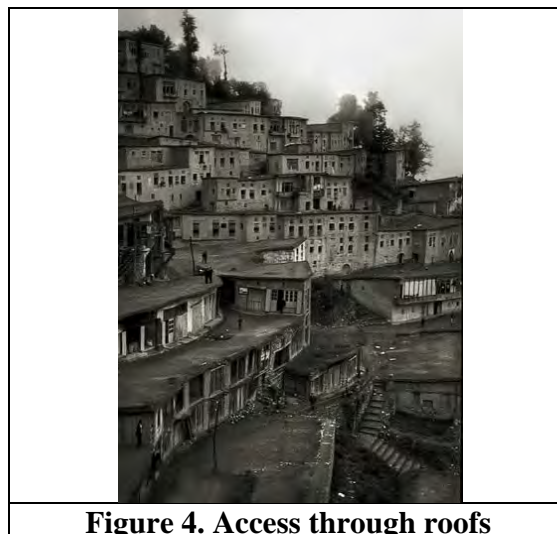
On the other hand, on northern side of mountain, there is a shade and is very cold which may cause discomfort and inconvenient for residents, also, on top of mountain due to the strong wind and lack of wind barrier, settlement of the city is not appropriate, therefore, the best part for establishment of the city and compatibility with environmental criteria, is on south side and middle of foothills.

The building orientation is correspondent with natural slope of earth. For this, , part of the city faces to south and other parts to south east. Masouleh orientation with respect to very cold winters and mild summers is in south part of mountain to benefit from the sun in the winter. It proves the environmental factors on forming the city.

### **Access**

Paths and passages in Masouleh are designed in such a way to be in harmony with a slight slope. There are two different paths in Masouleh, firstly are few paths which are long and parallel and second are plenty of latitudinal paths which provide circulation between urban spaces in upper and lower parts. Another striking feature is usage of the roof as a path. Residents have come to an agreement to use roofs as public paths.

In fact, the roofs are social yard for people and in different ceremonies are used as a gathering place. Walking on roofs is communal life style and in aesthetic point of view, residents on roofs at different levels can benefit from landscapes and natural scene. It is worth mentioning that each lot length for having access to higher part is limited and houses in these lots each has a different paths.



The materials used in different parts of building are different and is the combination of local material such as adobe and wood. Construction is on an integrated stone. Interestingly local architects never break the integrated stone and as a result, buildings are constructed on a natural slope in two or three floors, showing the compatibility with natural topography and providing fabulous landscapes for residents in all floors and spaces.

They use a kind of grey soil as insulation. In case on walking on insulated roofs, the resistances of the insulation increase.

In façade of buildings, a type of yellow clay which is abundant in environment is used and attributes more harmony with surroundings and it looks as if it was part of nature.

### Openings

Windows in Masouleh are used to benefit the most from the landscapes because each façade has two or three windows in all sides, Sometimes above each window, there is another smaller window, decorated with geometric patterns; also sash windows are made delicately as well.

### Residential places

The land limitation in Masouleh caused expansion in floors in such a way that most houses are in two and few in three floors. The city has been divided into different parts. The residential lots contain extroverted house and also there are one of the urban texture elements, they are as a path for other lots.

### Architecture

The residential units in historical texture of the city included more than 350 houses in comparison with 600 units in the past. The most considerable characteristics in adjacent and identified interior space in such a way continuously chain the houses along with topography.

Each residential unit has between 1 to 4 floors and more than 70% are built in two floors. Generally the lowest floor is non-residential and used as a store, the main corridor of the house is in this floor. The upper floors are used for residential spaces and lower floor is made by stones and upper parts by adobe. The climatic architecture is in harmony with topography.

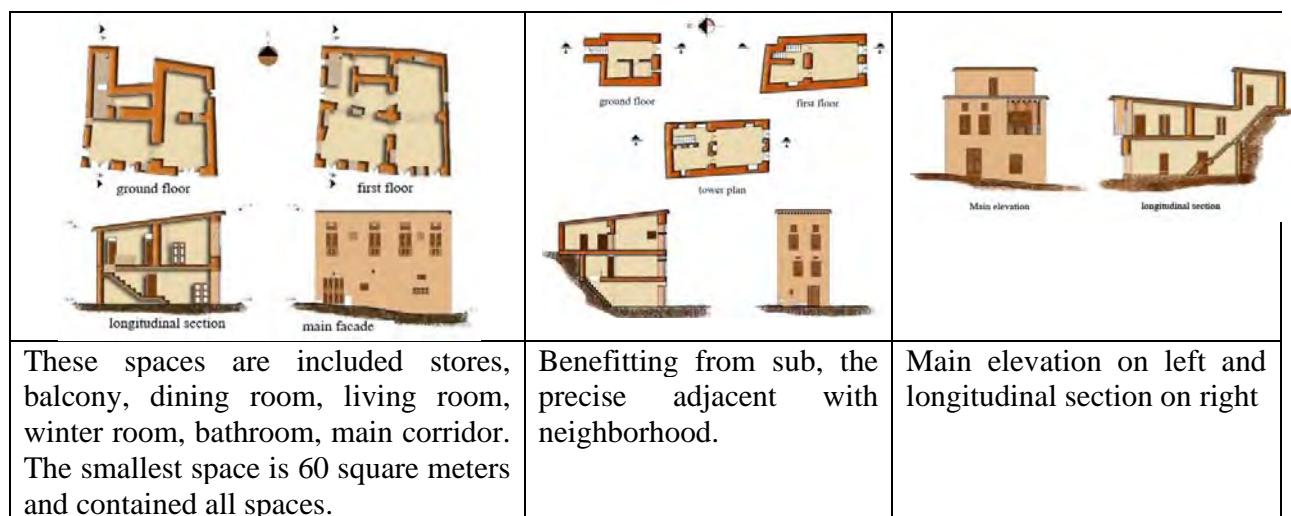


Figure 5. Climatic architecture of floors

### **Urban spaces**

Masoule's spaces are formed according to people's belief and culture and religious spaces regarding people attitude to the religion is mainly. Considering the touristic feature of the city, some seri are seen as well. Bazar is the main important architectural components of the city and due to its roofless feature, it provides more opportunity for people to benefit from the nature.

### **Conclusion**

Masouleh, due to its architectural features and sustainability, can be introduced as an ecological and touristic city.

- The establishment of urban texture in foothill in accordance with climatic criteria
- The city orientation is faced to south and south east corresponding the natural land slope for benefiting from sun
- The stepped structure of the city, high density and the expansion of house with limited area in height are in harmony with natural slope of land.
- The formation of north-south paths are in harmony with topography
- Using local material such as wood, adobe and natural stones
- Designing some climatic spaces, used in different seasons.
- The lack of air, sound and environmental pollutants
- Using natural resource such as pond to supply water for residents.
- Designing sloped ceiling for driving rain and humidity to determined areas.
- The existence of insulation for facing cold and humidity
- Using the narrow ways for defecating the waste water.

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