Identification of Staircase House Type in Rural Architecture of Iran: Masouleh and Abyaneh Settlements

Ehsan Reza

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Prof. Dr. Elvan Yılmaz
Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in Architecture.

Assoc. Prof. Dr. Özgür Dinçyürek
Chair, Department of Architecture

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Architecture.

Asst. Prof. Dr. Özgür Dinçyürek
Supervisor

Examining Committee

1. Assoc. Prof. Dr. Özgür Dinçyürek
2. Assoc. Prof. Dr. Özlem Olgaç Türker
3. Assoc. Prof. Dr. Uğur Dağlı

ABSTRACT

Vernacular Architecture is derived from the Latin word "*Vernaculus"* which means 'native'. Therefore, this term refers to belonging of people to the regions, where they are from and the places, where they refer their original nationality or hometown. The words nationality and hometown associate some meanings and concepts such as identity, belonging and the heritages from the previous generations. Thus, study and investigation of the built environment's evolution will probably be a helpful approach toward discovering the necessary factors for keeping, preserving and fostering the qualities of the built environment due to identity and cultural backgrounds.

Therefore, in chapter one and two, the dissertation explores the characteristics of vernacular architecture in general where introduction is being explained according to the aim, limitation, methodology and the background of staircase housing. In chapter two, the general overview of vernacular architecture and house form followed by focusing on Iranian vernacular architecture is examined. In sequence, chapter three and four looks at the terms such as physical, environmental and socio-cultural factors of chosen villages of Iran as case studies which are named as Masouleh and Abyaneh. Identification of these villages is processed due to some theoretical factors such as housing typology, plan organization and urban form, typology of forms and elevation and construction and material in Iranian staircase settlements. Discussion part is followed by comparisons of analysis, case studies and findings to draw the final conclusion.

This study, therefore, aims at identifying and analysing the local vernacular architecture of the Iranian steepy land so–called staircase housing and to extract useful principles for

application to contemporary design. It is also hoped that, by such research, a body of knowledge will be built up on the structural heritage of the vernacular architecture of Iran, which is about to demolish specially in these ages. Architects and designers in Iran in particular, need to be aware of the existing traditional construction methods and existing vernacular housing stock in order to be able to develop an appropriate method of design and construction of building and solve the contemporary housing design problems.

It should be noted that there are many type of staircase housing in the whole world like Bahrain, Afghanistan, Pakistan, Greece, and Japan which were built in response to human's needs according to topographical land situation. However, the design achievements and principles are different, according to the variation of cultures and traditions. In this respect, Iranian staircase housing remains distinctive with its local richness and variation on this geography.

The research will be carried out through survey and comparison of two different villages in different geographic and climatic parts of Iran.

Keywords: Staircase house type, architecture in steep topography, vernacular architecture, Iranian architecture.

ÖZ

Yöresel/Yerel/Verneküler Mimari *'yerel'* anlamına gelen Latince kelime "*Vernaculus*"tan türetilmiştir. Bu nedenle bu terim, insanlara ait olan bölgeler, onların geldiği, bulunduğu ve ait olduğu yerler, gerçek aidiyet, orijinal uyrukluluk veya tanımlı bir vatana sahip olan insan anlamına gelir. Milliyet ve vatan sözcükleri, kimlik, aidiyet ve önceki nesillerden kalan miraslar gibi bazı anlamlar ve kavramlar ile ilişkilendirilirler. Böylelikle, yapı çevresinin evrimiyle ilgili bilimsel çalışmalarda ve incelemelerde, yapılaşmış çevrenin, korunması, geliştirilmesi ve yaşam kalitesinin artırılması için gerekli fiziki faktörlere ek olarak, kültürel ve kimliklerine ait geçmişlerine de yer verilmesi yararlı bir yaklaşım olmaktadır.

Bu amaçla, tezin birinci ve ikinci bölümünde, genel olarak yöresel mimari özelliklerini amaç, limitler, metodoloji ve konuyla ilgili diğer çalışmalar detaylı bir şekilde açıklanmıştır. İkinci bölümde, öncelikle, yöresel mimarlığa genel bakış, yerleşim ve konut formu, takibinde ise İran yöresel mimarisi ve konut formuna odaklanılarak incelenmiştir. Sonrasında, bölüm üç ve dörtte, Masouleh ve Abyaneh isimli İran'da örnek çalışma olarak seçilen bu iki köyde, fiziksel, çevresel ve sosyo-kültürel faktörler dikkate alınarak çalışmalar yürütülmüştür. Merdiven kavramıyla gelişen bu yerleşimlerin aydınlatılmasında konut tipolojisi ve mekân organizasyonu, kentsel form, form, yükseklik, bina teknik ve malzeme tipolojisi gibi bazı teorik faktörlerin açıklanması saptanarak işlenmiştir. Analizler doğrultusunda elde edilen verilerin yorumlanması ve tartışılmasıyla birlikte örnek çalışmalar ve bulgular karşılaştırılarak nihai sonuca bağlanmıştır.

Anahtar kelimeler: Merdiven Evleri, eğimli arazide yerleşim, yöresel mimari, İran mimarisi

ACKNOWLEDGMENTS

I dreamed I was a butterfly, flitting around in the sky then I awoke. Now I wonder: Am I a man who dreamt of being a butterfly, or am I a butterfly dreaming that I am a man? Chuang Tzu (389-286 BC)

I would like to sincerely thank to my brilliant father, my patient mother and my adorable brother for all their devotion during my life and without their help standing in my current position would be impossible. Therefore, I dedicate this thesis to them as a very small repair to all their efforts.

I never forget the helps, supports and patience of my friends, Payam Eskandari and Bedia Tekbiyik.

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Chapter 1

INTRODUCTION

Architecture is particularly has broad definition, which is in direct relation with the aspect of human beings. These interactions effect between architecture and lifestyle influenced by various factors such as; culture, economy, politic, society, religious and beliefs, which create built forms as the result. According to this, the role of contemporary architecture, due to Glancey's ideology, is to discover a "radically new ways of shaping the four walls that surround us of looking at old ways." (Glancey, 2000)

Therefore, study and investigation on the evolution of the built environment will probably be a helpful approach toward discovering the necessary factors for keeping, preserving and fostering the qualities of the built environment due to identity and cultural backgrounds.

On the other hand, the lost of local identity and ignoring the know-how from previous generations in architecture started to appear especially during the industrial revolution and increased afterward. Isolating the human from nature and ignoring the respect to the existing natural and urban fabric caused serious problems in architectural identity and the structure of the built environment.

Some key factors, which used to be respected by the architects and the designers of the built environment started to get disappeared by the "modern" designers and planners;

some of those factors can be named as contextual design, environment friendly considerations in building design and respect to the cultural patterns. All of these factors overall, revealed a kind of "identity crisis" in architecture and obliged the architects and designers to rethink about the design approaches and revival of the old heritages of architecture from previous generations and apply them into the contemporary architecture.

In order to re-use of the traditional techniques in today's architecture, there is an essential need to study and investigate some regions as case studies; discover their potentials, put the result of studies in order, present them in a categorized way. And consequently, propose them as some principles to be applied in modern and contemporary architecture. One of the countries or regions, where has various types of vernacular architecture is Iran; these variations have occurred due to the existence of different climatic regions and diverse cultural backgrounds within ethnical groups of people in Iran.

There is no doubt that Iran is a mountainous country. Since, there are plenty of variations in topography; climate and geographical issues among these mountainous areas, there are many useful thought and lessons, which can be learnt from the existing vernacular architecture. Therefore, this study has aimed to identify and analyze the local vernacular architecture of Iran.

On the other hand, vernacular architecture is seen as important aspect for solving present urban accommodation problems (Oliver, 1999), Therefore collecting and analyzing the information about these principles and features to enable design professional is very

important. Usage of local material, detail and style and also usage of topography according to the climate and culture and context are very important

Furthermore, this study aims at identifying and analyzing the local vernacular architecture of the Iranian steeply land so –called **staircase housing** and to identify useful principles for application to current designs. It is also hoped that, by such research, a body of knowledge will be built up on the structural heritage of the vernacular architecture of Iran, which is going to be demolished, especially in these ages. Architects and designers in Iran in particular need to be aware of the existing traditional methods and housing stock in order to be able to develop an appropriate method of design and construction of building and solve housing problems.

It should be noted that there are many type of staircase housing in the whole world like Bahrain, Afghanistan, Pakistan, and Japan, which were built in response to human‘s needs according to topographical land situation. However, the design achievements and principles are different according to the variation of cultures and traditions. In this respect, Iranian staircase housing remains distinctive with its local richness and variation on this geography.

1.1 Aim and Objective

In recent years, Iranian villages have suffered from internal migration to the cities from one hand and difficult situation of life, which are coming from the quality of housing construction and high price of maintenance, from the other hand force people to leave villages to cities.

Therefore, the aim of this study is to analyze the traditional staircase house in three different parts of Iran in order to define this type of architecture and to extract principles applicable to current housing problems. The following research questions will constitute the focus for the study:

- What is the staircase house in Iranian vernacular architecture? Why was it an effective solution to the environmental and functional needs of the people? The house type will be evaluated in terms of its spatial arrangement and use, climate moderation and culture-specific features.
- What is the role of culture in the design and plan organization of this kind of house?

1.2 Research Limitation

The rural vernacular architecture of Iran will be studied in this thesis. In such a multi dimensional study, the limitation needs to be properly defined in order to achieve the accurate result. In this respect, certain limitations are determined in the thesis. Topographical constrain forms the first important limitation of the study. Only the rural settlement, which is locating on steep topography, will be searched during this study. The analyzing of third staircase rural development (Palangan) which is located in the western part of Iran and Fourth vernacular settlements (kajal) in southern part of Iran , are not covered in this dissertation. Due to some difficulties such as; harsh weather conditions for the researcher and proximity to the main cities and also political tensions of that village.

In order to limit the framework of this study, the cultural, social, and demographical aspects of the regions will be evaluated in case of residential building to understand the changes of the house typology in different regions.

1.3 Research Method

Data collection method in this research is based on observations from the area and also literature survey from existing resource books and already published information in periodicals and internet websites. Thus, fundamental theoretical information (including qualitative and quantitative data) is applied in this study. In the following, some kind of analytic and comparative results are going to be presented in order to clarify the topic and a series of suggestions.

The research will be carried out through survey of two different villages in the two different geographic and climatic part of Iran. Photographs and sketches will also be drawn of the buildings, while inhabitant's builders and masons will be interviewed to acquire knowledge of local building materials and processes. The samples will then be analyzed in terms of their design and spatial layout, as well as construction methods and materials.

For the purpose of this study, three (3) research tasks are proposed:

- **Literature Search:** This will be the first stage of finding available and pertinent publications in the research area and finding all sources in relation with environmental and culture according to the vernacular architecture of Iran.

- **Data collection:** In order to collect data on the staircase house type in Iranian vernacular architecture, it will be necessary to conduct a field survey in Iranian vernacular architecture. This will be carried out through the aid of:
    - Photographs
    - Sketches
    - Interviews with inhabitants on rural houses as well as local builders and masons in order to extract information on building technique.

. These interviews done during this investigation with the 20 person of inhabitant of these two villages but because of some reason such as their dialects and their age, most of these studies done by direct perception of the author.

- Preparation and analysis of the maps.

- **Field Survey:** Investigation on Masouleh and Abyaneh settlements was done in summer 2010, by travelling to these villages in four different periods. In the other word this survey done in 18 days in these two settlements by measuring, photography, sketching and informal interview with the inhabitants of these two settlements. Also the author accommodate in the rural houses of these regions to feel these spaces.

Analysis and synthesis: The data collected will then be analyzed according to the following criteria:

- *Construction Materials* – colour, texture, structural quality, climate regulating ability, acoustics.
- *Construction Techniques* – preparation of materials processes of construction, plastering and finishes, maintenance.

- *Design Concepts* – Spaces and their functions, form and shape, scale and proportion, cultural characteristics.
- *Cultural Division* – Demographics, Nomadism, Language, relations between generations, Cloths, Religion.

1.4 Background of the Study

Iran has a unique identity in term of its climate, geography and cultural accumulated vernacular architecture in comparison with neighbors. According to this, investigation on the historical and environmental artifact of this region is adequate. As it mentioned before, the studies, which deal with rural architecture in Iranian settlements, are very limited.

Due to the variation of geographical, cultural and climatic situation, vernacular architecture of Iran has different definitions. From this point of view, this dissertation will focuses on the steep topography area of Iranian settlements which has extraverted orientation. According to this many Iranian and foreign scientist were focused on these topics. In this respect, the related studies of the Iranian vernacular architecture are mentioned as below.

Reza Shaterian's 'Architecture and Climate' (2008), include comprehensive research in climatic areas of Iran in terms of geology, landform, geography, geomorphology, etc. First chapter of this book covers geographical characteristic of Iran in general. In the second chapter he is attempting to identify the inequality of this region in different categories. In addition to this, third chapter is belonging to the climatic classification of Iran. Lastly, he focuses on the geographical and climatology of Iran's provinces in detail

final chapter. But, lack of explanation with drawings, this study does not cover enough details about the region. Furthermore, lack of construction, structural and cultural aspects of the rural architecture is entirely visible in his studies.

Vahid Ghobadian's 'Sustainable Traditional Building of Iran', is written in Farsi and studies the general information about Iranian traditional architecture. Therefore, chapter one of his book deals with climatic factors, and chapter two to six discuss the climatic conditions of each region of Iran and their effect on urban form, building form, and construction material in particular with regard to houses. In chapter seven to thirteen, the effect of climate on the form of different types of commercial and religious building is presenting for each of the four climatic region of Iran.

Moreover, Akbar Zargar's 'Vernacular Architecture of Iran', is explaining the general characteristic of the vernacular architecture and the effective factors which is determining the rural settlements characteristics of Iran. In addition, he is clarifying the general roles of cultural and economical issues in vernacular architecture of Iran. In the final chapter he is presenting the general construction techniques of the vernacular architecture of this region. But all of these studies are in general and due to the topic of this investigation, it is requiring to focus on the vernacular architecture of steep topography of Iran.

On the other hand, the rural architecture of Iran, categorizing into, extrovert and introvert typology by Gholamhossein Memarian. In the first chapter of 'Iranian Residential Architecture', he is focusing on the extroverted architecture by analyzing the

vernacular architecture of the Germany, Italy and Japan in general and in the second chapter he is describing the Masouleh and Abyaneh case in detail.

Also, in some papers, rural vernacular architecture of Masouleh and Abyaneh is mentioned. Abbas Shakeri zaad, Sarah Mesgari and Hasan Miri papers' 'Identification of Abyaneh House' and 'Understanding the Context' by Naahid Sadeghipey is the examples of these papers which examine the rural house of these two regions.

In this manner, this study will on Masouleh and Abyaneh village which has similar steep topography. Therefore, climatic factor from one hand and socio-economical issues on the other will be the most important variable points in this study. The first village of Masouleh is approximately established in northern part of Iran. The second one called Abyaneh in the centre of Iran which is located on the north-western slope of Karkas Mountains. It is 2500 meters above sea level and 80 kilometers away from Kashan.

The influence of different ethical group such as Persian, Kurdish and Gilaki in the Iranian villages in different parts of Iran will be analyzed in this study. Also economical production such as textile, agriculture, etc. will effect on architecture of these villages.

In light of the discussion above, without a doubt, the lack of the studies about the rural vernacular architecture of these two villages is observed. Especially, the usage of topography and level differences is not clarified. On the other hand the relation of the houses with each other, in this context needs serious investigation. In this respect, this dissertation is developed to fulfill the necessities in this field.

Chapter 2

GENERAL OVERVIEW ON THE IRANIAN VERNACULAR SETTLEMENTS AND VERNACULAR HOUSE FORMS

2.1 The general characteristics of vernacular architecture

"Vernacular Architecture as derived from the Latin word "*Vernaculus"* means native", which has good reason to be recalled as "the architecture of the people". (Oliver, 1997, p. xxi)

Therefore, this term refers to belonging of people to the regions, where they are from and the places where they refer their original nationality or hometown. The words nationality and hometown associate with some meanings and concepts such as identity, belonging and the heritages from the previous generations.

In order to achieve helpful outcome during investigation on 'Vernacular Architecture' proposing a framework based on some key questions such as; What, Why, and How is strongly recommended .With answering these essential questions, it is possible to achieve different purpose from vernacular architecture. (Rapoport, 1969)

Under this scope, Brunskill (1997) mentioned, the description of vernacular architecture, used from 1839 by architects, historians, archeologists and critics when they used to describe a small buildings of town and countryside. (Brunskill, 1997)

From the other hand, in the Encyclopedia of vernacular architecture of the world, which is one of the most essential sources in this study, Paul Oliver argues that looking for a single definition of vernacular architecture is not a healthy perspective on this topic because of its variety. However, he classifies this expression as a part which includes the dwellings and all other buildings that are regularly build by local people in relation with environmental situation by using abundant material with the usage of their experiences. Besides, he adjoins the other form of this style which was built due to meet their particular needs and their lifestyle. (Oliver, 1997)

In addition, Paul Oliver, in his book Dwellings, states: *"*It is contended that popular architecture designed by professional architects or commercial builders for popular use, does not come within the compass of the vernacular.*"* Oliver also offers the following simple definition of vernacular architecture: "the architecture of the people, and by the people, but not for the people." (Oliver, 2003)

Beside this, As Makbule Oktay pointed in her unpublished master thesis (2006), "Definition of 'vernacular architecture' covers cultural attributes, environmental factors and economic circumstances. In this manner, climate topography /site, available resource, existing technology, time, locality, culture, way of life can be classified as the predominantly used key words while explaining the term". (Oktay, 2006)

Also, the construction method of vernacular buildings, visually and experimentally transferred in between generations. According to this construction techniques are not depending in any style or written structural calculation and drawings. Furthermore, crafts men are the occupant of these regions and they have adequate information about

environmental factors, cultural issues, lifestyle and inhabitant needs. In other word, vernacular buildings developed as the essential answer to the routine needs of the inhabitants.

Moreover, Oliver mentions that Porphyrios was expressing this as:"The idea of vernacular has nothing to do with stylistic. It rather points to the universal ethos of constructing shelter under the scarcity of materials and operative constructional techniques". (Oliver, Dwellings, 2003). According to the characteristics of vernacular architecture Rapoport states that: "Lack of theoretical or aesthetic presentations; working with the site and micro climate ;respect for other people and their houses and hence for the total environment, man made as well as natural; and working within idiom with variations within a given order." (Rapoport, 1969)

Thus, study and investigation on the evolution of built environment will probably be a helpful approach toward discovering the necessary factors for keeping, preserving and fostering the qualities of the built environment due to the identity and cultural backgrounds. (Oktay, 2006)

Due to this, Hubka (1986) states; "Information related with the design method of these kinds of buildings is shared by word of mouth, observation, replication, and apprenticeship whereas methods of design of them are stored in the minds of the builders". (Hubka, 1986)

Furthermore, Rapoport (1969) states that, the most successful way to describe vernacular is in terms of process; **how it is design and built**. The vernacular design process is one of models and adjustments or variations, and there is more individual variability and

differentiation than primitive building. Another characteristic of vernacular is its additive quality, unspecialized, open-ended nature, so different from closed and typical high-style designs.

On the other hand the methodology of research on any subject is changeable due the investigators. Each of them has his/her own way of research according to the aim of the investigation. Also, as vernacular architecture has extensive field, it contains many building typology such as: House, shrine, Tomb, cemetery, mosque, church, granary, factory, bazaar etc. Therefore, classification of these functions is very important during their researches. In this manner Brunskill (2000) divide vernacular architecture into domestic, agricultural and industrial fields. (Brunskill, 2000)

Moreover, Rapoport, categorized the vernacular architecture according to the content and subject. As he mentioned, these studies can be illustrative, descriptive, pictorial, and verbal or combination of them. Also some studies are in relation with analyzing, classifying or comparing. (Rapoport, 1969)

Vernacular is also characterized by the greater importance and significance of relationships between elements, and the manner of the elements themselves. (Rapoport, 1969, p. 8) In more detailed explanation, Rapoport divided the classification of building type in this way:

"1.Primitive very few building type, a model with few individual variations, built by all.

2. Pre industrial vernacular. A greater, though still limited, number of building types, more individual variation of the model, built by tradesmen.

3. High-style and modern many specialized building types, each building being original creation although this might be changing, designed and built by teams of specialists." (Rapoport, 1969)

As a result, there are many way for investigation on vernacular architecture, therefore, each researcher can expand his/her exploration according to aim of his/here study. Also making this kind of grouping might be defining a type of limitation. This let researchers focus on their aims and targets.

On the other hand, Oliver classify the concepts and approach of studying vernacular architecture as; Aesthetic, anthropological, archeological, architectural, behavioral, cognitive, conservationist, developmental, diffusionist, ecological, ethnological, evolutionary, folkloristic, geographical, historical, museological, phenomenological, recording and documentation, spatial, structuralist, and generative-transformational. (Oliver, 1997)

In addition, due to Kerken's philosophy it is known that human's house is not only the issue of being a shelter. It also has the big relationship with the human as an occupant. As he mentioned in his ideology, house is a place for performing the personal identity of human being. (Poespowardojo, 1982)

According to his examination the concept of house, is a place for personal identity, knowing each other, the hierarchy of spaces, daily activities. Moreover, as a physical structure, the form of house is not only result in physical forces or any single causal factors, but it is undoubtedly the consequents of a whole range of socio-cultural factors seen in their broadest terms. Forms are in turn modified by climatic condition and by

construction methods, abundant material, and the technology, socio-cultural forces and the other secondary or modifying factors. (Rapoport, 1969)

Beside this house as one form of culture is then also strongly being affected by all of factors above. There is a link between behavior and form in two senses; first, in the sense that an understanding over behavioral patterns, including desires, motivations and feelings, is essential to the understanding of built form since the built form is the physical embodiment of these patterns; second, in the sense that forms, once built, affect behavior and the way of life. In traditional cultures, destroying the physical setting including the traditional house has meaning also destroying the culture itself. (Rapoport, 1969) Nature and social environment are the tangible part of culture, which affect the tradition and also houses.

Habit, as a part of human behavior, is also as great significant impact both for affecting and being affected by the environment. It is clearly explained by figure below (Fig 1), where the belief, the environment and also the instinct of the human being all together created the culture and the needs.

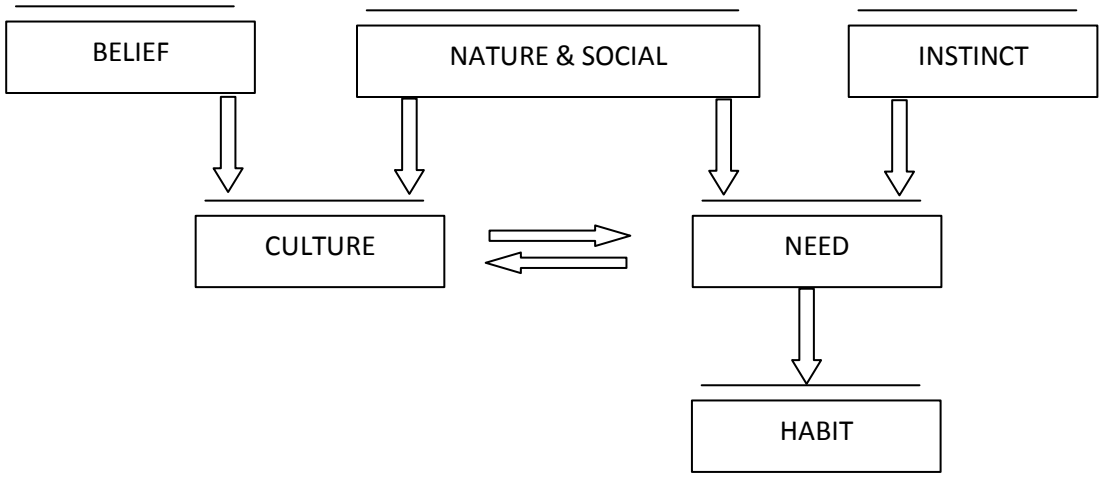


Figure 1: Habitual concept (Maryona,1985)

Moreover, vernacular Architecture, at this time, is still as the most places that we have. It is also evident that the majority of the people of the world still life, work, and worship in vernacular building. In the order of 800 million dwellings come within this immense but largely unrecognized phenomenon, ranging from simple shelters to many-storied tower house This could be happened because of the physical environment, especially the built environment has not been, and still is not, controlled by designer. In archeology, this interest shifted a while ago from temples, palaces, and tombs to the whole city as an expression of a culture and a way of life, although the house, the most typically vernacular building type, is still frequently ignored. While technology may progress, architecture does not necessarily do so. (Rapoport, 1969)

As Henry Glassie mentioned:" Buildings like poem and ritualize culture" (Glassie, 2000). Their designers rationalize their action differently. Some says that, they design and build as they do because it is the ancient way of their people and place. Others claim that, their practice correctly manifests the universally valid laws of science. But all of them create out of the lost of local identity and ignoring the knowhow from previous generations in architecture started to appear during the industrial revolution and increased afterward. Therefore, separation of the human from nature and ignoring the respect to the existing natural and urban fabric caused serious problems in architectural identity and the structure of the built environment. Some key factors which used to be respected by the architects and the designers of the built environment started to get disappeared by the modern designers and planners; some of those factors can be named as contextual design, friendly environmental considerations in building design and

respect to the cultural backgrounds. All of these factors overall, presented a kind of "identity crisis" in architecture and obliged the architects and designers to rethink about the design approaches and revival of the old heritages of architecture from previous generations and apply them into the contemporary architecture. (Glassie, 2000)

2.2 The general characteristic of Iranian vernacular Architecture

A quick look at the villages of Iran, tells much diversity among them. In mountains regions, settlements are the complex texture of homes that stepped into the steep of mountain ranges such as Masouleh in northern part and Abyaneh in the center of Iran. From the other hand, in some of the other settlements have been dug and they have difficult lines of communication with each other like Kandovan village in Azerbayjan and Meymand village in Kerman(Fig 2,3). Moreover, villages are appearing as defending castles, which houses intertwined with each other inside it. We can find these kinds of villages in the central Iran and plains region. (Zargar, 2003)

Figure 2: Location of Kandovan, Masouleh, Abyaneh, Meymand on the Map.

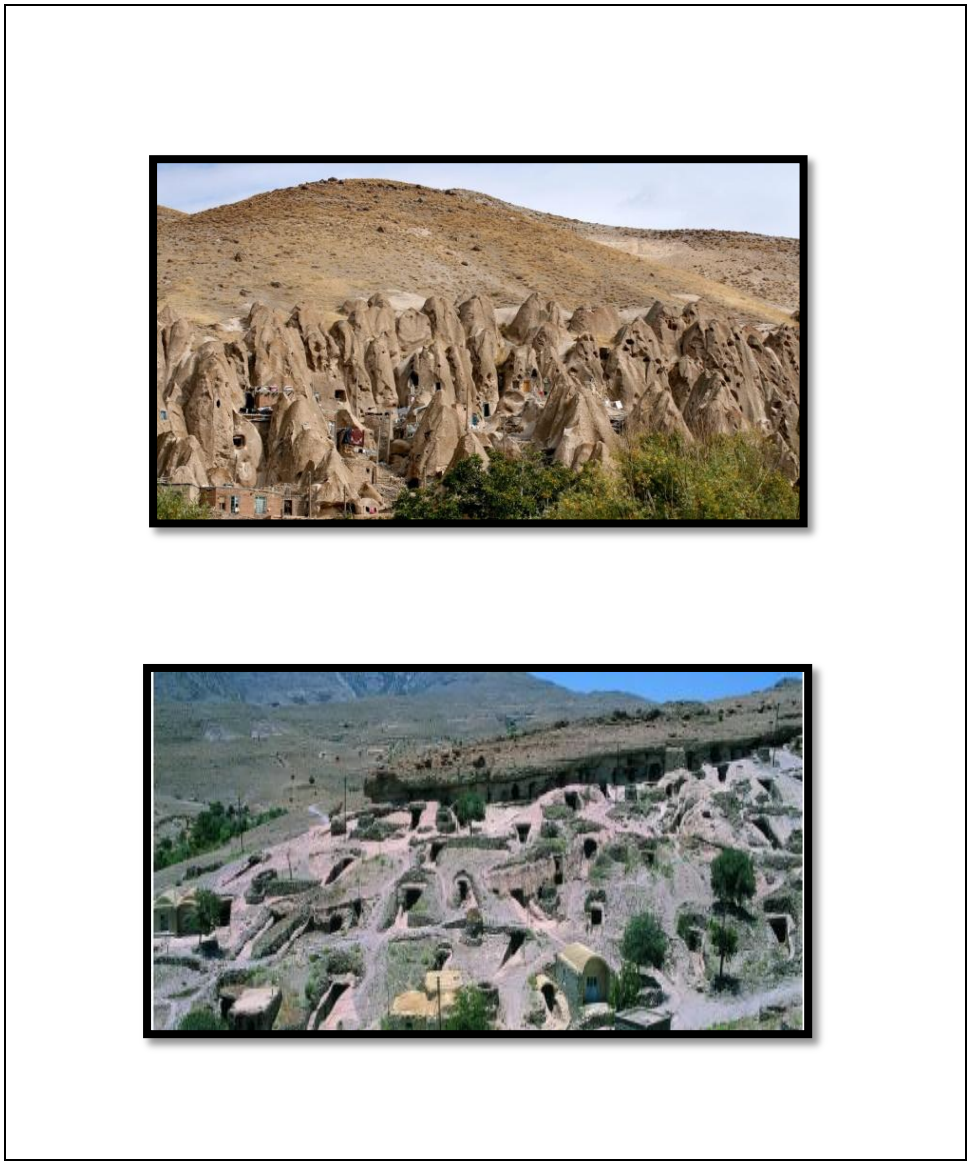


Figure 3: Kandovan village (top), Meymand village (bottom)

Ceiling and roof structures are different in different rural area of Iran. Some houses made by dome or cradle roof which made by mud brick and thatch especially in the central plain and desert margins. From the other hand, in northern and western forest area, steep roofs, clay roof and etc are visible.

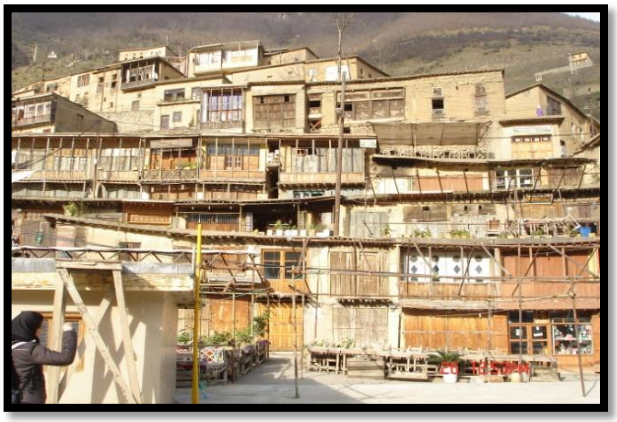
In addition, different villages have different exterior and interior wall. In the central plain and desert margins thick adobe walls built with mud mortar such as Abyaneh village and in the mountainous region and northern coastal regions, walls made by stone, which attached with mortar or without it like Masouleh village. (Fig 4, 5)

Figure 4: Abyaneh village, (by author)

Figure 5: Masouleh village, (by author)

From the other hand, design and general shape of residential units of Iranian villages have diversity in different region. In the mountainous regions, the open structure is governing and houses are visible. But in lowlands area the general forms of houses are

very simple and consist of two or three rectangular room, which rely on each other and courtyard is surrounded by houses. (Fig 6, 7)



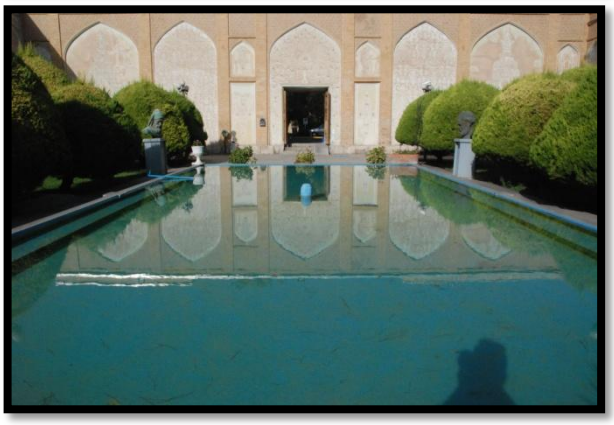


Figure 6: Masouleh house on top of each other, (by author)

Figure 7: House in Isfahan with courtyard, (by author)

Therefore, this simple review represents diversity in vernacular architecture of Iran. The fundamental question is, what is the reason of this much diversity. The most important reason of these diversities is Determinism. Geographic algebra, economic limitation and security or defensive situations are the examples of determinism. (Zargar, 2003)

2.2.1 Important factors that are shaping the pattern of villages

As it mentioned before many factors are shaping the spatial organization of settlements such as: geographic algebra, economy, culture. Therefore, these factors have a key role in creation of settlements and also they are in relation with each other.

According to this, Asghar Karimi states: one building is representing the mutual actions of a numerous factors and their complex relationship and if we think only about one fundamental factor we are limiting ourselves.

On the other hand, most of the professional architects, which occupied in geographic studies, try to dominant the role of climate factors as a main reason of establishing the villages. The numbers of Scholars agree that, the raw material, which can be found in the environment and others believe that in defensive incentive, are the main reason of general formation of these settlements. Another group mentions that economical issues as the main factors, which has played effective role in creation of these rural settlements. From the other hand, religion and cultural issues are the important factors which scientists focus on them. (Ghobadian, 2009)

Moreover, as Dr.Akbare Zargar (2003), mentioned that; all of effective factors (geography, economy, culture, community) are in relation with each other and they are not working independently. They are locating in effective relation with each other. (Fig 8)

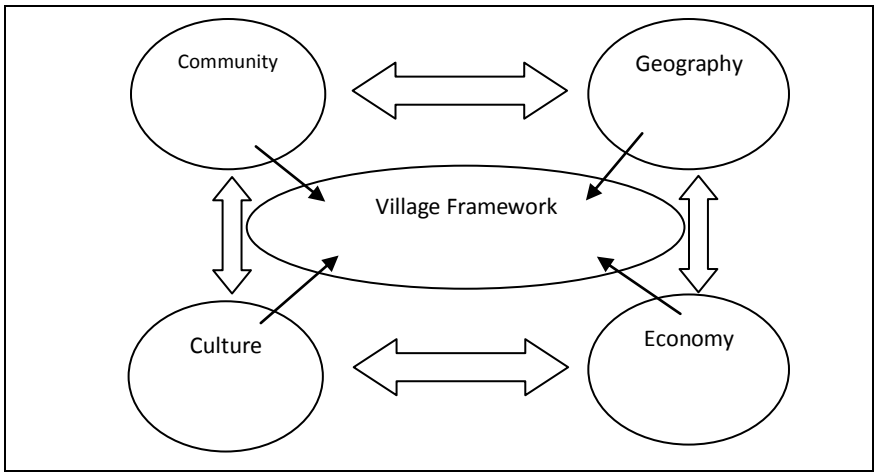


Figure 8: Effective factors in shaping villages (Zargar.A, 2003 p: 30)

2.2.2 Morphology, Typology and Topology of Iranian vernacular Housing in General

According to Paul Oliver; "Only by identification and labeling can classes and categories be identified that make reference possible to unseen or recollected phenomena. While vernacular architecture is as susceptible to classification as is any other kind of human artifact is, however, a complex problem in itself." (Oliver, 1997)

These three items are the main elements and tools of the vernacular architecture language. **Morphology** is related to the physical shape and form of the subject and it is simply analyzing roofs, walls and floors. In another word, it is defining the spatial borders.

In this dissertation the Morphology of the two Iranian settlements will analyzing and all the detail of the Masouleh and Abyaneh houses will be examining.

Topology is directly connected to the space and the connection of the subject in space and in the individual architecture it is mentioned as “Spatial Organization”.

According to this, the investigation will focus on the spaces of the houses in Masouleh and Abyaneh settlements separately and with the combination of these units with each other.

In addition Paul Oliver states, “The observation, documentation and understanding of vernacular architecture are necessary task. **Typology** is a tool of architectural research which addresses this problem in a methodological and comprehensive fashion. Architectural typology may be simply defined as the analysis, classification and grouping of architectural phenomenon”. (Oliver, 1997)

Also he mentioned that, “scientist seek to provide a basic list of ‘type’ within ‘typological categories’ or group within which there are a number of ‘types’, which can be augmented ,or further classified into subtypes” (Oliver, 1997).This list includes the typology of elevation, form, plan, spatial relationship, use and function and structure.

Gholam Hossein Memarian, classified the residential houses of Iran into outward and inward orientation. This investigation will analyze the typology of vernacular architecture in steep part of the Iran. (Memarian, 1991)

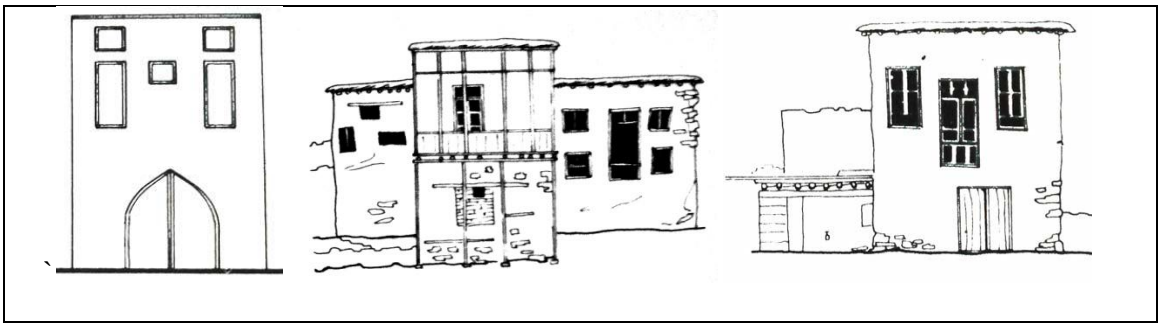


Figure 9: Some example of different typology of vernacular houses, Masouleh village, (Memarian)

Moreover, the classification of the settlement, according to Oliver was realized by means of settling down. cluster, compact, compound, dispersed, grid, linear, nodal, organic, and peripheral are the types of the settlements in general (Oliver, 1997).

Furthermore, Mohammad Fateh and Babak Daryoosh state on the Iranian vernacular architecture typologies. Under the scope of typology, they divided vernacular architecture, according to the location of the houses in two parts which is gathered and sporadic. Also they mentioned about another typology, which is 'Dual Type 'and it is located in the middle of the previous one (Fateh, 2009).

From the other hand, dual type villages consist of: 1.Four-way village type 2.String or linear village type 3.circular village type. On the other hand, this dissertation focused on the linear village types. (Fateh, 2009)

Therefore, these gathered and linear villages are the proper types of the villages due to social relation of the people. This comprehensive lifestyle, give the ability to the locals for facing with unexpected events. So, providing security can be considered as one of the most important factors in creation of settlements.

2.2.3 Identification of Iranian vernacular architecture in terms of geographical values

2.2.3.1 Location and topographical factors

Iran is a wide land, which has 1,648,000-kilometer square, and located in the southwest side of Asia. Turkmenistan, Azerbaijan and Armenia from North surround it. Afghanistan and Pakistan located in the east side of Iran and from the west side Turkey and Iraq are Iran's neighbors. All the southern border of Iran defined by Persian Gulf and Oman Sea. The total land border of Iran is 51700 kilometer and the total water border in north and south is 2510.Iran is located in the heart of Middle East and connected Caspian Sea, as one of the most beautiful and biggest lake of the word, to the Persian Gulf. Also Iran is a manifest intersection between east and west in spiritual, cultural and political linkage of culture. (Shaterian,2000)

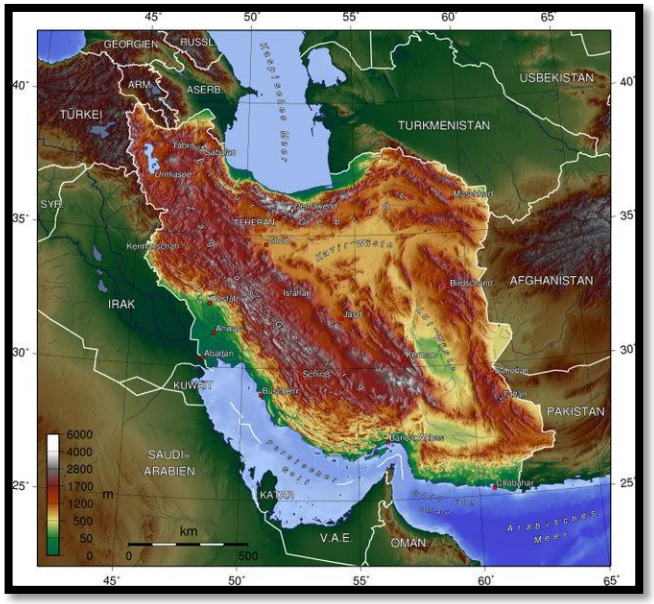


Figure 10: Topographical map of Iran, (Ghobadian.V, p:23)

From the other hand, topography can be considered as one of the important environmental aspects that affect the location and type of settlements. Also in vernacular

architecture, local people usually didn't change the form of lands and topographies and they used the natural shape of them. Therefore, topographical features of the sites mainly determined the form of the buildings and settlement patterns.

Also, according to P. Oliver (1997) in Encyclopedia of Vernacular Architecture, the topographies were classified according the physical occurrence. Therefore, he classified the topography as, **below-ground, coastal, desertic, and forest, grassland, lacustrine, lowland, marine, riparian, slope, upland and valley.** Furthermore, the categorization of the inhabited is recognized due to the means of their organizations such , cluster, compact, compound, dispread, grid, linear, nodal, organic and peripheral are the different type of villages organization which this study will focus on the linear types. (Oliver, Encyclopedia of Vernacular Architecture of the World, 1997)

Moreover, half of Iran is mountainous area and the other half is semi-desert and fertile agriculture planes prone. The general mountains of Iran consist of two huge arches, which stretched out from Azerbaijan to Afghanistan and encompass all the southern part of Caspian Sea. The other arches starting from Azerbaijan and continues to the west and south. These two arches surrounded the tree side of Iran (South, East and West) and not allow atmospheric phenomenon get inside to Iran and the only open side is eastern side which has access to the Turkestan plains and central Asia.

As a result, this investigation will focus on the vernacular architecture with projected form from the terrains, in steep topography.

2.2.3.2 Climatic Factors

According to the formation of vernacular houses, climate is one of the most effective factors in all over the world. Therefore in all generations, inhabitants developed their houses due to the climatic conditions in order to achieve comfortable living style. As Oliver.P (1997) emphasize; “Climate is the most determine environmental factor in the development of human –life”. (Oliver, 1997)

Therefore, before building vernacular houses, considering the climatic characters is one of the essential things in developing the livable space. Moreover, as O.H. Koenigsberger argues that, climatic analysis and importing results to construction process are the responsibility of the designers and also they are recognizing, which factors are beneficial or harmful for the future occupants of their buildings. (Koenigsberger, O.H)

In addition, “Climate is integration in time of the physical state of the atmospheric environmental characteristic of a certain geographical location “ (Shokuhian, 2007). Climatic division of each region is depending on different factors.

Therefore, it is obvious that each part of the world have different climate, which is the cause of differentiation in architectural characteristics. Subsequently, for attainment to the accurate solution, classification of those different climates in the world is significant.

In this respect, Iran is situated 25 and 40 degree of north geographical latitude. It means that Iranian plateau is situated in dry geographic region. The dry climates of the Northern Africa and the Middle East continue into Iran and the central Asia with the result average precipitation in Iran is less than the global average. (Ghobadian, 2009)

Besides, scientists categorize the climatic region of Iran in many different ways. For example Riazee divided Iran into 9 different climates, which include five summers and six winters. He did his investigation from the building construction and human comfort conditions point of view by using Olgyay's method.

From the other hand, Ganji suggested four different climates in Iran, which are temperate and humid climate (southern side of Caspian Sea), cool climate (Western Mountain), hot and dry climate (central plateau), hot and humid climate (northern shores of Persian Gulf). (Iran, 1979)

This investigation is conducted according to the climatic analysis of Ghobadian. As he mentioned, Iran is generally classified as a dry country, in fact it is climatically diverse and it can be divided into four main climatic regions:

- The Northern Coastal Region Temperate climate.
- The Central Plateau Region Hot and Dry Climate.
- The Mountainous and High Plateau Region-Cold Climate.
- The Southern Coastal Region Hot and Humid Climate.

(Ghobadian, 2006)

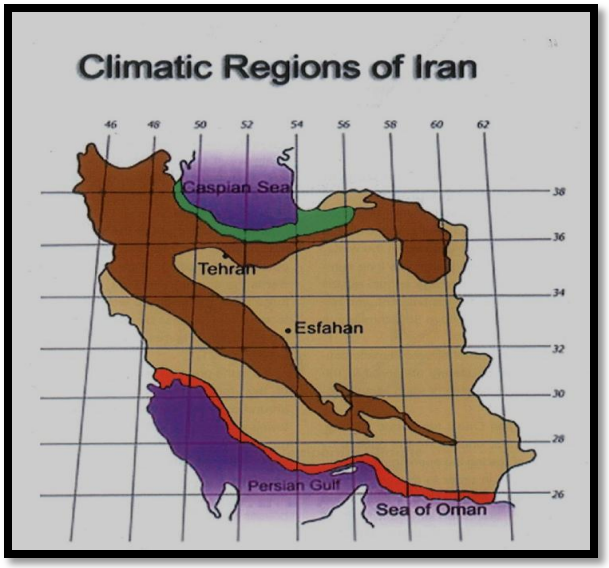


Figure 11: Climatic map of Iran, (Ghobadian.V ,p:25)

According to the different climatic zones in Iran, the Iran chamber society mentioned that, "as the climate ranges from subtropical to sub polar, during winter temperature is 37°C (-35°F) in the north of country, and in the south 23°C (73°F). Summers are hot and humid in the south, but fair and pleasant in the north, and the temperatures range from 25°C (77°F) to 54°C (130°F)" (Iran Chamber Society.,n.d.).(Table 1)

In addition, the annual average precipitation due to different climatic zones of Iran is ranged between 135 and more than 1700 mm.

Table 1: The annual average of precipitation in Iran, (Zandi.M)

Climatic zone of Iran	Annual average precipitation(mm)
Cold	1700 & Snow
Temperate-Humid	680
Warm-humid	135-355
Hot-dry	Less than 200

According to this division, the Northern Coastal Region Temperate Climate, which stretches along the southern coasts of the Caspian Sea, has the highest level of precipitation in the country, very dense forest in its highlands, and its lowlands have been used intensively for agriculture. It is cold in the winter and hot and humid in the summer." Average annual precipitation is between one to two meters, and relative humidity is above 70 %percent throughout the year". (Ghobadian, 2009)

Therefore, these divers' climate condition effects on the forms of the houses of each climatic region. In region one's temperate climate, houses were oriented to the outside by means of placing the opening on the external walls in order to maximize cross ventilation during the hot months of the year .The projection of gable roofs or canopies on the southern sides of houses was kept fairly small in order to maximize the penetration of the winter sun from the southern opening of buildings. (Fig 12)

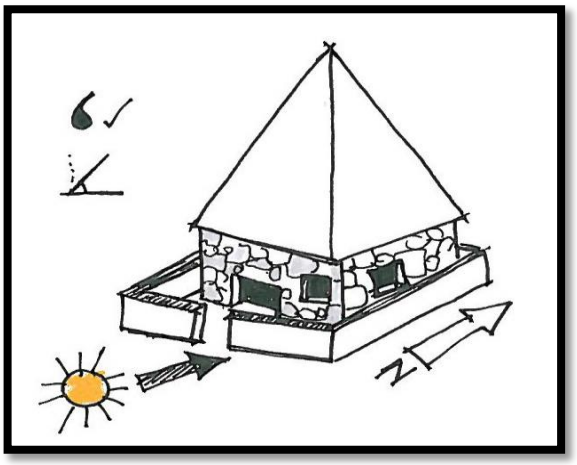


Figure 12: The relationship between the typical simplified house forms of the Northern coastal Region Climate, (by author)

The second region is the Central Plateau region, which is hot and dry, and also it is the biggest climatic region in terms of surface area and covers most of the central Iranian

plateau. It is cold in the winter and hot and dry in the summer. Average annual precipitation is between fifteen to thirty centimeters and relative humidity is about 20% in the summer and 60% in the winter. The two large central desert of Dasht-e Kavir and Dasht-e Lut, which comprise one seventh of the total area of the country, are in this region. (Ghobadian, 2009)

Beside this, in the hot and dry region the central plateau, the interiors of building were protected from frequent sand storms. These building are inward oriented, which means except the entrance door, all the doors and windows open to one or several courtyards. The houses in this region are referred to as houses for four seasons. Because the northern wing of such houses, which receives direct sunlight, is used as family living quarters during the cold month of the year, while the southern wing, which is always in shade, is used during the summer month. Wind towers were usually built above the summer wing .(Fig 13)

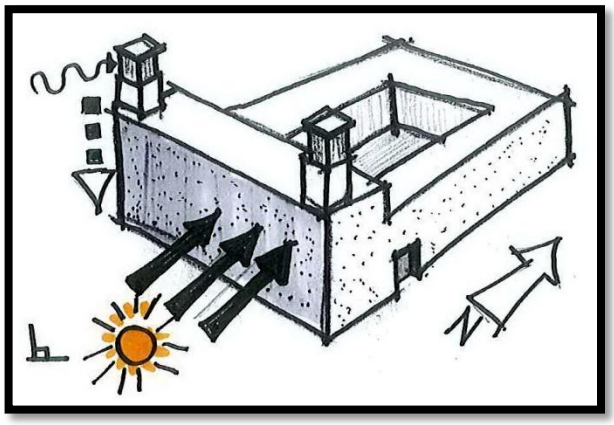


Figure 13: The relationship between the typical simplified house forms of the central plateau Region and Climate, (by author)

Moreover, third region is belonging to Mountainous and High Plateau, which has cold climate character. The high mountain ranges of Alborz and Zagros are situated to the north and the west of the country respectively. This region is cold in the winter and mild and dry in the summer. Some of its mountain peaks such as Damavand and Sabalan are snow capped all year round. Average annual precipitation is about thirty centimeters. (Ghobadian, 2009)

In the cold climate of the villages of the mountainous regions, most of the openings of buildings were oriented towards the southern sunlight. The other three sides of the house would be protected from heat loss by earth or adjoining building. (Fig 14)

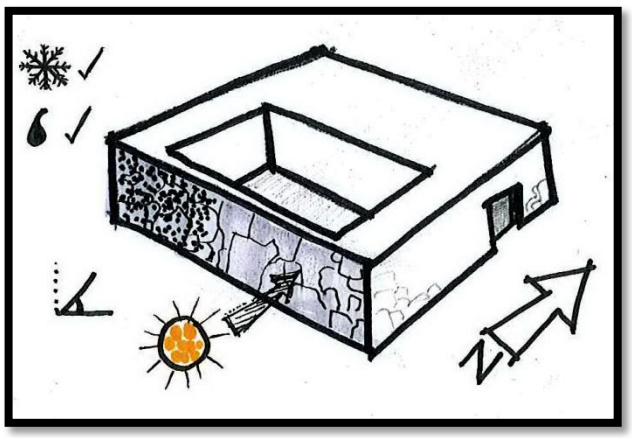


Figure 14: The relationship between the typical simplified house forms of the Mountainous and High Plateau Region and Climate, (by author)

From the other hand, in the previous region, the houses of this region were inward oriented around a central courtyard, both in the towns and in most of the villages on flat grounds. As a result, besides the entrance door, all other openings were located around the central courtyard. The main difference between the courtyard houses of the two regions is that in this case the winter living quarter was the biggest and most important

part of the house. The summer living quarter was either very small or was not included at all.

Final region is the Southern Coastal region with hot and humid climate. The hottest region of Iran stretched along the coasts of the Persian Gulf and the sea of Oman .It is mild in the winter and hot and humid during its long summer month. Its average annual rainfall is less than twenty centimeters, and relative humidity is above 50% throughout the year. (Ghobadian, 2009)

In addition, central courtyard house were also common in the hot and humid region along the Persian Gulf and the sea of Oman. Houses of this type were semi-in-ward oriented, to the effect that they had openings both around their central courtyard and also on their external walls. In this way, cross ventilation could be facilitated for the rooms, which is essential to achieve human comfort zone in the space. Shade and cross ventilation could be facilitated for the rooms. Shade and cross ventilation was also provide with the help of wide balconies, large openings facing sea air, and wind towers.(Fig 15)

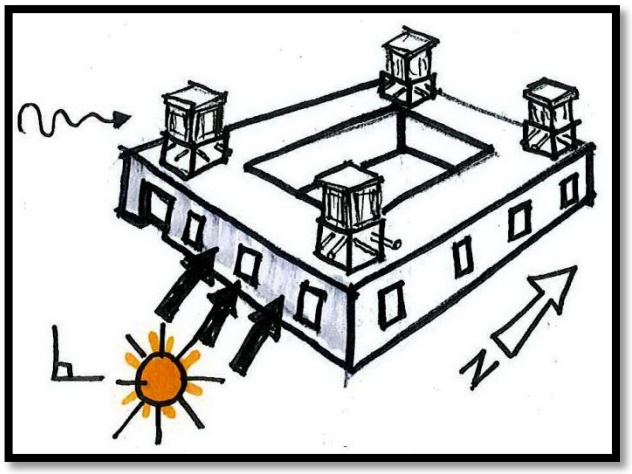


Figure 15: The relationship between the typical simplified house forms of the Southern Coastal region with hot and humid Region and Climate (by author)

In the following part, this investigation will focus on the vernacular Iranian typology in the steeply part of Iran.

Chapter 3

GENERAL SYPNOSIS OF PHYSICAL, AND SOCIO-CULTURAL FACTORS OF TWO VERNACULAR, IRANIAN SETTLEMENTS WITH STAIRCASE HOUSING; MASOULEH AND ABYANEH VILLAGES

3.1 Physical and Environmental Factors of Masouleh and Abyaneh

Settlement was shaped according to the natural sources, which can provide the need of human being and water is one of the most important requirements of human being life. Therefore, villages established in the vicinity of water sources such as; springs, aqua ducts, oasis and rivers.

According to Dr.Zargar, water is one of the crucial factors in particular, which have the key role in creation of villages in general and rivers are one of the water resources. (Zargar, 2003)

“Masouleh Rood Khan” is the river, which passes from Masouleh village and it has a spring source in 200 km far from this village. This river is pour to Anzali pond in the end. (Golboo, 2009)

On the other hand Abyaneh Village water provide from “Do’ Abi” spring, which keeps water throughout the year. Moreover, because of the hot climate situation of Abyane the “Khoshk” river, which is located parallel to the village doesn’t have water all the year. Therefore, conduct the water of this spring into Khoshk River, when it doesn’t have

water. All local farms, fields and orchard are irrigated by the Do'abi spring, and number of underground aqueducts. (Memarian, 1997)

The old Masouleh village is established around 1006 AD in the Northwest of the current village. It is called old Masouleh or Kohneh Masouleh in local dialect. Local people moved from old Masouleh to the current village because of neighbor attack and deadly diseases (Pestilence) which has 150,000 msq areas. This village has 500 meter eastern-western and 300 meter northern-southern length. Also level differences make the roof act as pathway. This approach will create a unique elevation for this village. On the other hand, Abyaneh village has very old history. There are many different opinions on how old Abyaneh is. In fact, there is not enough evidence about background of Abyaneh. Also, there is a path leading to the east gate on the east side of the village. Furthermore, the path is overlooked by a hill called Nezatoon castle. According to this, the civilization of Sialk (the city near Kashan) is said to be 6,000 years old. Also, Abyaneh could have developed from one of those communities. Moreover, clay pots in Abyaneh are similar to the finds uncovered in Sialk ruins. Also, most of the local people of this village remain from Safavid era and they converted to Shiite Islam after Safavid era. From the other hand, they claimed that, the old Abyaneh was placed beside Nezatoon castle, in the south-east of the village. (Qorbani-Zadeh, 2008)

Moreover, Abyaneh is a village with a mild mountainous climate, which has a limited space and interconnection between mountain, village and river forced inhabitant to move their agriculture fields, far from their settlements. According to that, these fields located in the east and west side of the valley and orchards placed in the southern part of this village.

3.1.1 Geographies and Locations of Masouleh and Abuaneh Lands

Masouleh is locating in the western part of Gilaan province. This village placed 32 km west of Fuman and 60 km southwest of Rasht. This village is 1050 meters above sea level in the Alborz mountain range, near the southern coast of the Caspian Sea. Therefore, we can claim that Masouleh is locating in mountainous region and the occupation of the locals is limited because of the harsh slope of the mountains. The direction of slope is not only from north to south; moreover it has eastern-western slope in this village. This use village built according to the environment and geographic character of this region therefore Masouleh is one of the proper examples of nature friendly design in Iran. (Ramezani, 2009)

On the other hand, in the past, one of the way for achieving Zanjan and Khalkhaal city, was passed from Masouleh. In the other word this village was the nodal centre in between Eastern Azerbaijan and Gilaan province together. Therefore, it was introduced as a trading center in this region. (Memarian, 1991)

From this point of view, Abyaneh placed in 40km northwest of the town of Natanz–Kashan road in the central Iranian province of Isfahan. Also, this village nestling in the Barzrood valley, and located 2,220 m above sea level. Moreover, on the left side, the alley lined with the large number of homes. These houses built on top of one another and oriented by the sheer face of the mountains. Therefore, this settlement surrounded by several mountains such as: Domilan (literally meaning ‘sign’) to the southwest, Kolajar to the northwest, and Mount Himand to the northeast. (Qorbani-Zadeh, 2008)

According to this, both settlements (Abyaneh and Masouleh) locating in mountainous region with different climatic situation.

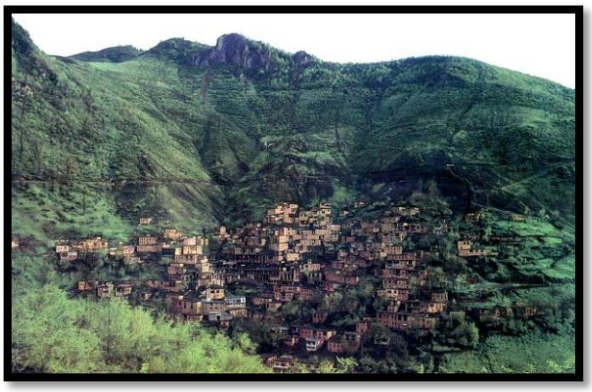


Figure 16: Masouleh Village and nature (www. worldisround.com)

Figure 17:House formation in Masouleh (www. persiatours.com)

3.1.2 Topography of Masouleh and Abyaneh villages

Before locating settlements, usually inhabitants examine several factors, which effect on the shape of their villages such as environmental features and topographies of the sites. Moreover, it might be said that instead of changing the topographic character of this

region and due to the environmental factors, some society construct their habitations according to the constraints of the site.

According to P. Oliver in Encyclopedia of Vernacular Architecture, the topographies were classified according the physical occurrence. Also, as it mentioned before he classified the topography as, below-ground, coastal, desertic, and forest, grassland, lacustrine, lowland, marine, riparian, slope, upland and valley**.** (Oliver, 1997) Under this scope an according to the aims, this study will focus on steeply regions.

Also ‘Undulation’ as one of the basic character of the land features, effect on the framework of the village. Topography and land position, according to the natural factors, such as rivers and mountains are more pronounced impact. (Zargar, 2003, p. 37)

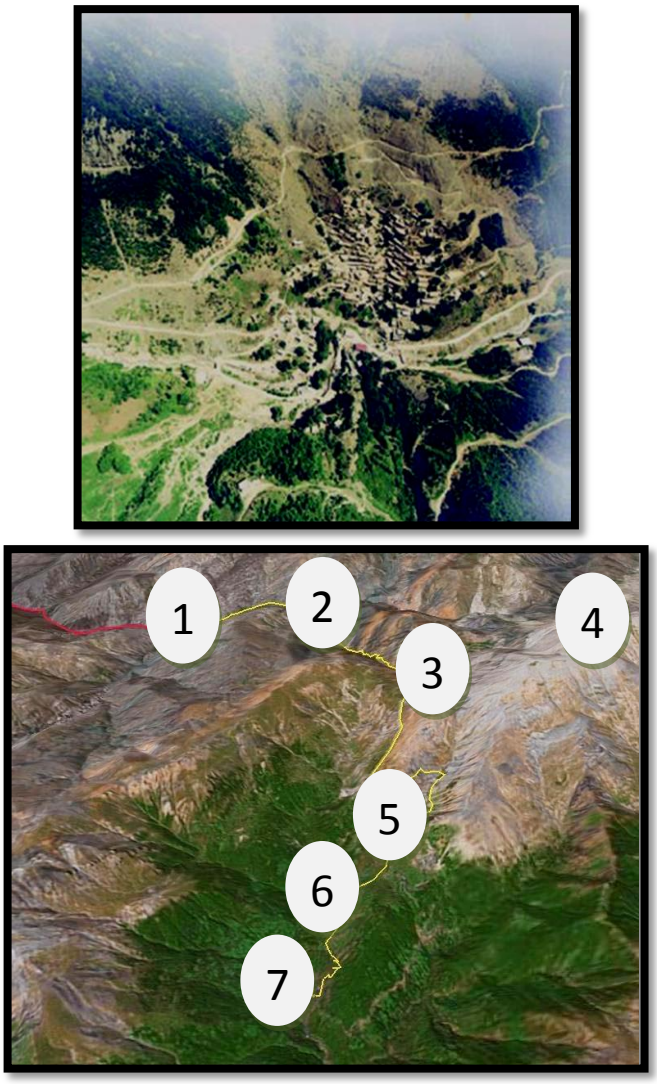


Figure 18:Topographical images of Masouleh: 1.Siah rood 2.Taze kand 3.Andareh 4.Kooh shah 5.Olad way 6.Mirza 7.Masouleh

Masooleh village is the village, which is locating on the steep part of the Alborz Mountain. It has 100 m level differences between the highest to lowest point. (Golboo, 2009)

Figure 19: Location of Masouleh and Abyeneh Villages between Mountains, (www.network54.com)

Two long mountain ranges of Alborz in the west separate the region of the central plateau from the Caspian sea to the north and the once ancient Mesopotamia to the west .These mountain ranges are the main source of water for the major rivers. (Ghobadian, 2006)

According to Zargar, there are two important concerns that should be considered in the developments of the settlements on the skirt of mountains. The first one is the risk of avalanches, in the cases of the hilly settlements which are located on the steep topography. The local people of this village in the use of their experience didn't make any accommodation in the place which is in the route of avalanches. Secondly, they were built in hillside because of some special reason and situation. In this case, the villagers always careful about falling rock and avalanches and for prevention, they have

some solution. For example for being safe against avalanches and rubble, they reap the plants and forage of these lands because these plants increasing the temperature, therefore snow masses will move and create avalanches. (Zargar, 2003)

On the other hand, probability of falling rubble is another problem of Masouleh. There are many large piece of rock exist on hillside and highest point of this village, which created problem for the people. In the earthquake, which took place in 1990, the movement of those rocks destroyed many houses and many people died. (Zargar, 2003)

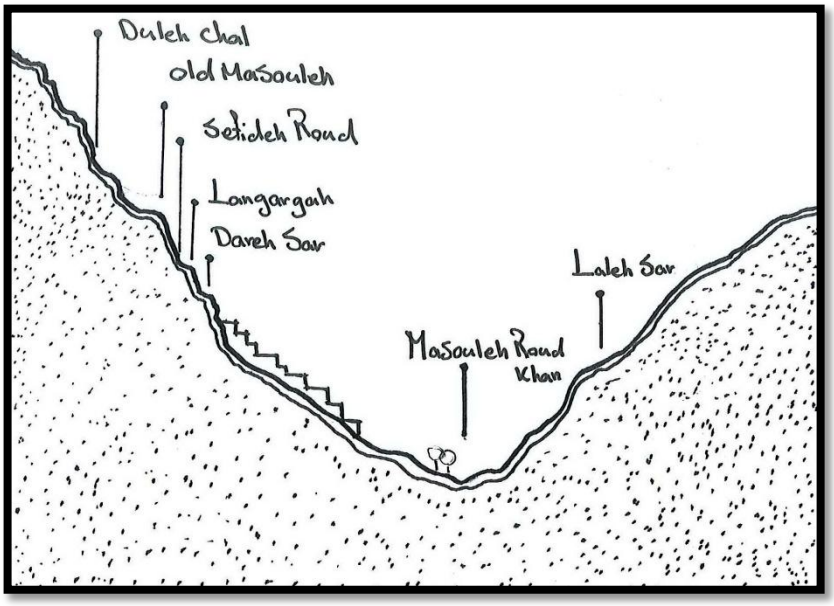


Figure 20: Location of the Masouleh Village in the valley (by author)

This steep topography didn't let any motor vehicle to come inside this village. This will be the one of the important factor, which Masouleh village is still keeping its originality.

Moreover, Pavlides (1997) mentions about some reason for settling on the hill and mountain slop. According to him, transportation, construction and agriculture are much efficient on flat lands. Also he identifies these explanations such as, disease, avoidance,

flood, defensive purposes and the proximity to pastures were included in as the effective reason for choosing the sloppy areas as settlement sites.(Pavlides E., in Oliver,P., 1997)

On the other hand Abyaneh village is placed in the border of central plateau region with hot and dry climate and mountainous and high plateau region with cold climate. This village located in between two foothills, in the middle of wide valley (Barzrood) and because of that it is protected from the dry desert wind. In addition to this, the expansion of the village toward the north direction was impossible because of the steep slope of mountains. Also, this village has limited space from south side because of the orchards and agriculture lands. Moreover, the height difference between the highest and lowest point of the village is about 70 meters and it is positioned in the East-West direction. (Abdali, 2008)

This village located in the North-West angle of Karkas Mountain and in the end point of Barzood river, in center part of Iran and the houses, were built on the northern slope of the valley which has steeply slope. In addition the slope of this village is less than Masouleh village, however in both settlements; the local people didn't manipulate the pattern of nature shape of nature and built their houses according to the form of the context. Moreover, houses settle on the north domain of that valley which has a green sedimentary rock foundation. (Shaterian, 2008) Moreover, Abyaneh village was located parallel with the ridge of its mountain behind (Ghaleeh Kooh). The direction of these ridges is parallel to the direction of valley, which they are perpendicular to the main transportation rout in between Kashan and Nataz. (Fig 21)

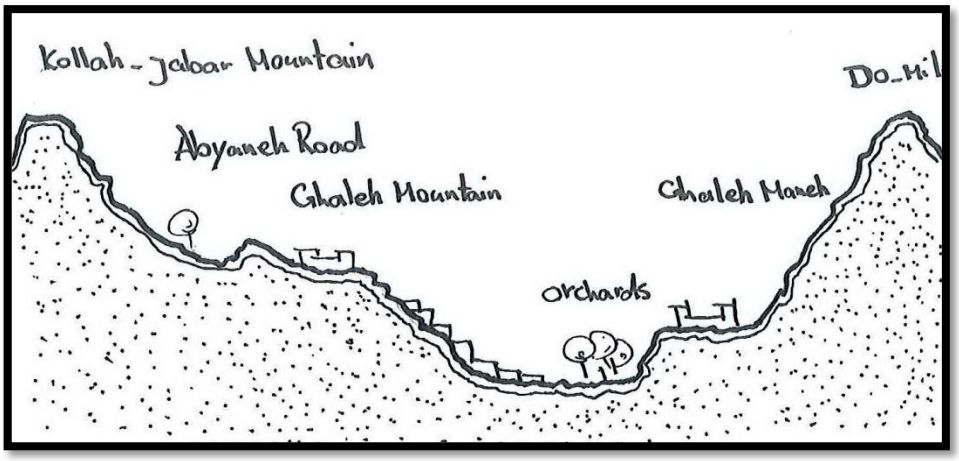


Figure 21: Location of Abyaneh village in the valley (by author)

In addition, the Nezatoon castle, in the eastern part of the houses units, which was made up with soil. Due to the historical evidence the first civilization was shaped around this castle but after the earthquake, the rocky mountain wall was falling down and inhabitants moved to the west part where the spring is locating. Therefore, local people selecting the location of Abyaneh, refer to the natural shape of that region proved that, Security issues have been carefully considered in addition to the social life standards. According to this, three castles were built for taking refuges in the emergency situation. (Memarian, 1997)

As it is mentioned before, Abyaneh village has high density in the housing development due to its natural environmental factors. Therefore, residential units located on the steep slope with rectangular shapes and parallel with the main pathway of the village or in the other word, it can be claimed that, all buildings in this village are built in parallel to the contour lines. It is mainly observed that the roof of one house can also be a pedestrian pathway on the other level topography. (Fig 25)

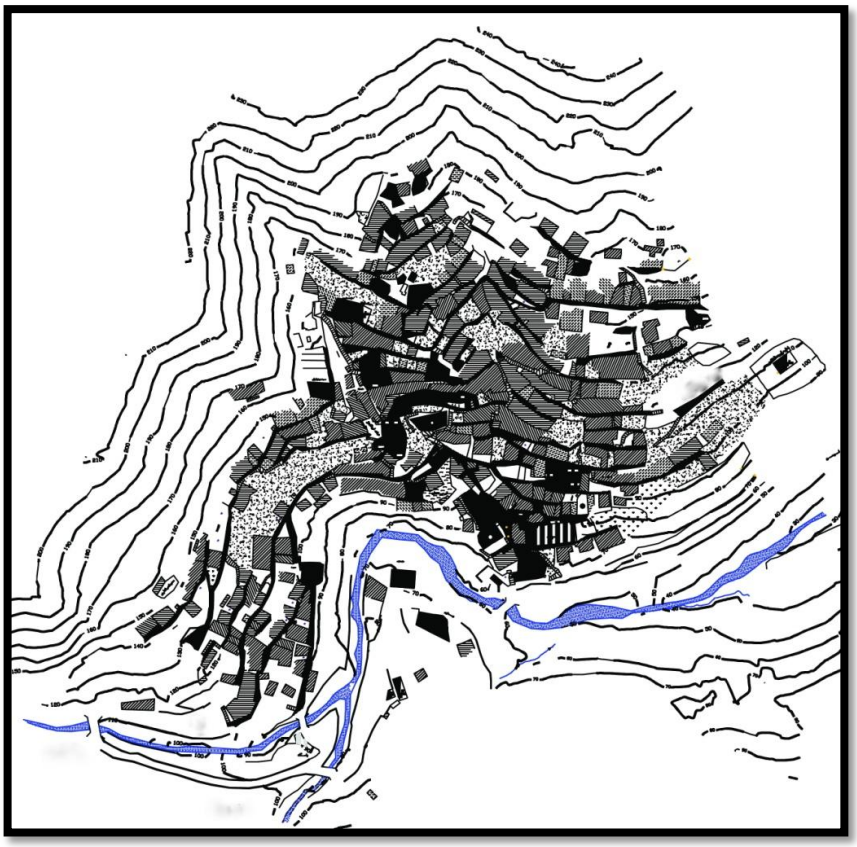


Figure 22: Situation Map of Masouleh (by author)

On the other hand, the availability of the building materials in this mountainous region were helped the local people of this topographic area, to construct their houses. For example: The walls of the building at ground floor are made of rubble, which has a good comparison capacity and good resistance against rising damp. Upper floors are made with the lighter material of adobe, and the roofs are covered with timber, branches, and finally a mixture of mud and straw. These materials are abundant locally, very economical to use, climatically suitable and environment friendly and sustainable.

3.1.3 Analysis of Climatic Characteristics of Masouleh and Abyaneh Villages

As it mentioned before Masouleh village is locating in between steep slope of Alborz Mountain on one hand and humidity effect of Caspian Sea on the other hand. Therefore, this village has a multi climatic character.

According to Ghobadian, Masouleh region is locating in the border of The Northern Coastal Region (Gilaan), which has temperate climate and the mountainous and high plateau region (Zanjan), which has cold climate.

In this manner, like the other villages, rural people of Masouleh built their houses in response to the climatic conditions by supplying the necessary requirements. Locals of Masouleh to improve to develop their life quality according to provide comfortable living milieu. Therefore, the impacts of climate as one of the important environmental factors, which dominates the formation of the settlements.

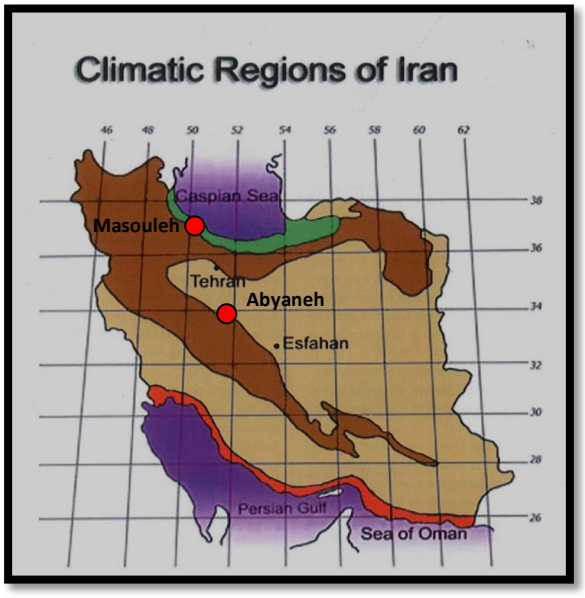


Figure 23: Climate Regions Of Iran,Ghobadian.V,p:25

In parallel to the above mentioned, Masouleh has multi climate character which has very cold winter with heavy snow fall and moderate but sun burn summer. (Ramezaanpour, 2010)

According to this, cold winters, is the main important climatic concern issue that should be cope with. Therefore, making a warm and comfortable environment for different human activities was the main concern for the traditional builders of these high altitudes. In responses to these climatic situations, and also for providing the accurate air ventilation, Inhabitants built their windows and openings, toward south direction. Besides this, buildings adjoin on their eastern and western sides, which is about the mountainside in both villages.

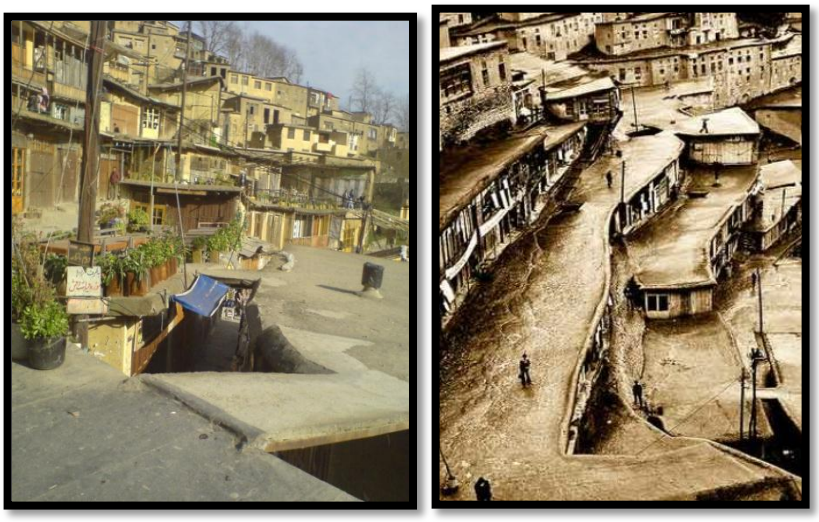


Figure 24: Pedestrian Walkway On the Roof, (www.ombramaifubh.blogspot.com & www.artlimited.net)

Morever, as Ghobadian mentioned, Abyaneh region is locating in the border of the central plateau region which has hot and dry climate and the mountainous and high plateau region which has cold climate.

Therefore, inhabitants of Abyaneh village like Masouleh people built their houses on the slope of mountain. Moreover, Abyaneh has very cold and long winter with heavy snow fall and very hot and sun burnt summer. Due to the multi climatic character of this village, houses construct according to the environmental factors and for the response to the climatic conditions of this region. (Shaterian, 2008)

From the other, Abyaneh, similar to Masouleh, built in parallel with the contour lines, along the river. Moreover, Masouleh village, due to the existence of Caspian Sea, has the ever green plants situation. But Abyaneh village is placed under the effect of central plateau of Iran and because this, it has a limited green area which is located near the river.

According to this the, many trees planted by the locals and they are visible in many district of this village. Some of them planted long time ago; for example in 'Vasat deh', in the middle of two mosques and cistern there is two Buttonwood trees, which have 1400 years old age. (Memarian, Mamari Maskoony Irani ,Borungara, 1997) . (Fig 25)

In addition local people used to call the village 'vioneh', meaning the land of willows" (Qorbani-Zadeh, 2008)

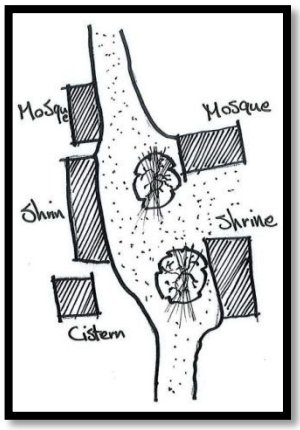


Figure 25:Vasat deh, (by author)

3.2 Social, Culture Traits in Masouleh and Abyaneh Settlements

As Oliver.P (1997) claimed: "Traits are distinguishing qualities or characteristics, identified in specific instances within a larger conceptual class. They have therefore been perceived as physiological features, which have been employed to delineate races or human types. The concept of traits has also been applied to the smallest definable units of which an assemblage of artifacts within a society consists. Recognition of the interaction and dependence of traits has led to clusters of characteristics being regarded as trait complexes, by which related clusters may be mapped within culture areas." (Oliver, Encyclopedia of Vernacular Architecture of the World, 1997, p. 69)

Under this scope, he categorized the trait in many different branch such as; Domestic routine, economy, family type, gender roles, house, language, religion and beliefs and many other activities and descriptions. Moreover, this investigation will focus on some of them in the current part.

As Oliver also pointed out that: "The daily routinized behavior of individuals is a key to understanding the underlying structures of society." (Oliver, 1997, p. 71)

In this respect, family is the basic elements of social structure of the community.Number of families are creating larger social frames. Moreover, vernacular settlements are shaped under the effect of the families' requirement and needs, through the history.

Therefore, cultural backgrounds have direct relations to the architectural approaches. There is a strong linkage between the form and life pattern. According to Rapoport. A (1969), "Both physical and socio-cultural aspects need to be considered, but the latter needs primary stress". (Rapoport, 1969)

Beside, as Von Fee.C(1998) has pointed out; "vernacular house forms evolved according to different cultural settings and are the results of long-term modification, adaptations, shared experiences and innovations". (Voonfee, 1998, p. 11)

On the other hand, Jonson.M (1993) argues that; "the structure and layout of domestic architecture relate not only to functional and economic considerations, but also to the cultural and mental life of its users". (Johnson, 1993, p. 15)

In addition to above lines, current study also supports Vellinga's argument that; "vernacular should not be regarded as an architectural category consisting of static buildings that need to be carefully safeguarded but as a concept, which identifies dynamic building traditions that continuously evolve while remaining distinctive to a specific place". (Lindsay Asquith, Marcel Vellinga, 2006, p. 9)

Under these scopes, this investigation will clarify some of the socio-cultural parameters of vernacular architecture which effect on the Masouleh and Abyaneh settlements formation.

3.2.1 Integration of History and Evaluation of Masouleh and Abyaneh villags

These two traditional villages which are locating in the steep region of Iran have deep roots in the history. However, in their history, local people have changed their place and formation of their settlements because of some political developments.

"Locals of Abyaneh, directly converted from Zoroastrianism to Shiite Islam, dates back more than ten centuries. These beliefs supported by the 1000-years-old altar at Abyaneh Mosque. The growing trend of Shiite Islam as well as construction of building in Abyaneh reached its apex during the safavid era after which it suddenly ground to a halt. The stopping of the process is attributed, by some, to the invasion of Sunni Afghans." (Qorbani-Zadeh, Abyaneh, 2008)

The fire temples are the traces evidences of showing that Abyaneh residents were most probably Zoroastrians before they converted to Islam some around 1000 years ago. On the other hand, the inhabitants of this village had a isolated society which shares the same faith. For example they didn't accept marriage with non-Zoroastrians and also they didn't believe in promoting their religion. Therefore, appearance of unity in this society such as; unity in house formation, cloth and etc, are coming from the local's beliefs and ideologies.

In addition to this,"Women's clothing include hand-woven cotton shoes, long stocklings, Tanban (black pants similar to a pleated skirt), blouses, Kurtis (velvet jackets, shawls or cashmere scarves embroidered on the edge.)They have been in vogue since the Safavid era and flowerly kerchiefs and men's clothing includes black and loose pants embroidered with geometrical design on the lower part near the ankle. The embroideries

are in the form of plain stripes for the elderly and diamond-shaped for the youth. In the past, men wouldn't wear coats, but rather a special clothing item called 'Sardari' plus knee-long cloaks usually made of cashmere." (Qorbani-Zadeh, Abyaneh, 2008)

Figure 26: Abyaneh people (by author)

On the other hand, the history of Masouleh settlement was referring to 1300 years ago. Moreover, local people of this village established their settlements in 'Salarkuh' region which was located, 4 Km away from the north-east side of ancient current Masouleh's settlements.

Also, according to the current inhabitant's speeches of Masoule village, the place of old settlement was changed because of 'Plague' which killed many people. From the other hand Memarian.G claimed, that they are religious society and this is observed by the existence of some tombs and shrines (Oun-ebn- ali). (Memarian, 1997, p. 219)

Masouleh village has 18 mosques and 5 shrines. Therefore, it's obvious that, the religious beliefs of the inhabitants are directly effect on the formation of buildings.

According to this definition, their ceremonies and activities are performing under these Islamic ideologies.

In addition, people of this village have similar dress as Abyaneh peoples but usage of colorful textile is much more visible in this village. Also, because of the location of this village in between the intersection of main mountainous passages of Azerbayjan, Gilaan and Telesh, the social relation among the locals is much more powerful in comparison with Abyaneh case.

Figure 27: Masouleh people (by author)

3.2.2 Economy, Family type and Social Structure in Masouleh and Abyaneh Settlements

According to Oliver.P (1997); "The term economy 'derives from the Greek word 'Oikos', home. In Ancient Greece, the primary meaning of economy was the management of a house or household". Also he pointed out that; "the economy of human population is defined by numerous factors including the availability and abundance of arable land, raw materials, human and frequency animal labor, mechanical aids and facilities." (Oliver, Encyclopedia of Vernacular Architecture of the World, 1997, p. 73)

"Although, the family is a level of organization universal in human societies, often accomplishing the task of production central to the persistence of a social order, the way in which its core membership is constituted by ties of kinship and marriage are highly variant. Such variations occur across culture, across strata within a single society, and in the stage or cycle of a family as it is transformed by marriages, birth and deaths." (Oliver, Encyclopedia of Vernacular Architecture of the World, 1997, p. 77)

Variations of the family types create a different requirements and it is directly effect on the house formation of these villages. As Oliver.P (1997) mentioned, family structure type divided in different branches such as; polygynous, polyandrous, nuclear family, lineally extended family and etc; (Oliver, Encyclopedia of Vernacular Architecture of the World, 1997, p. 77). According to this definition, nuclear family which is consist of a single conjugal pair of husband and wife with or without children with separate sleeping places, is one which can be find in the Masouleh and Abyaneh settlements.

Chapter 4

COPMARATIVE ANALYSIS OF TWO IRANIAN VERNACULAR, SETTLEMENTS WITH STAIRCASE HOUSING; MASOULEH AND ABYANEH VILLAGES

4.1 Urban Pattern and Spatial Relation in Masouleh and Abyaneh villages

The form and arrangement of the units in Masouleh, were mainly developed by considering two climatic factors which are high precipitation and high humidity. Thus, outwardly orientated form is one of the best solutions in humid and moderate regions for the maximum usage of windflaw and air ventilation. (Ramezaanpour, 2010)Also, outward-oriented organization is also existed in western mountainous and central Plateau of Iran's settlement which doesn't have humidity such as Abyaneh village. (Fig 28, 29)

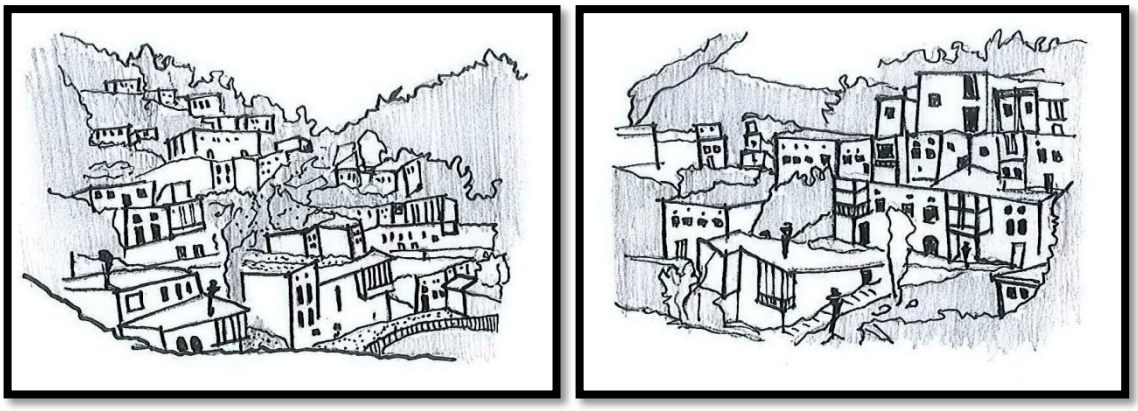


Figure 28: Urban fabric of Masouleh village, (By author)

Figure 29: Urban fabric of Abyaneh village, (By author)

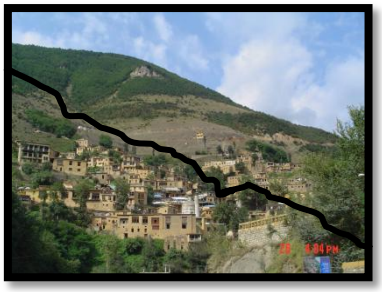
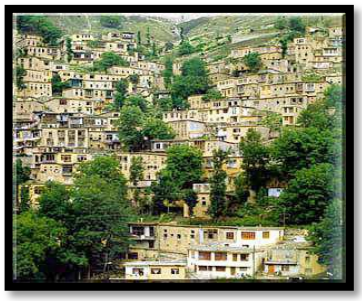
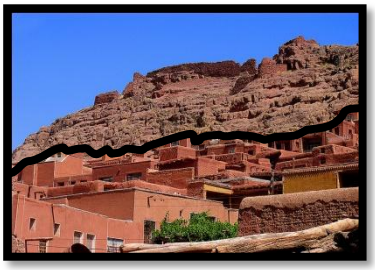
Morever, Masouleh village is faced towards the south direction, on top of the valley and stretches along the slope of that, in east-west axis, which is parallel to the contour lines of terrain and at a safe distance from the Masal (Masouleh rood khan) river. (Ghobadian, 2006)

On the other hand, Abyaneh village has a same orientation as Masouleh. This linearly developed settlement, aligned parallel to the Khoshk River.

In this form, houses built in the higher level than the earth level and they are open from two to four sides. Existence of balconies as a kind of transitional element in between built and natural environment, which makes integrating internal space with external. Also the large windows on the elevation are the other evidence that shows the tendency of the locals.

According to Memarian; urban fabrics in these villages, made a symbiosis between green space as natural environment and architecture as an artificial environment. So, this is one of the fundamental and signifitient principles of the nature friendly design.

Table 2:Masouleh (top) and Abyaneh (bottom) views

		
Perspective	The Apparent	Natural Area
		
Perspective	The Apparent	Natural Area

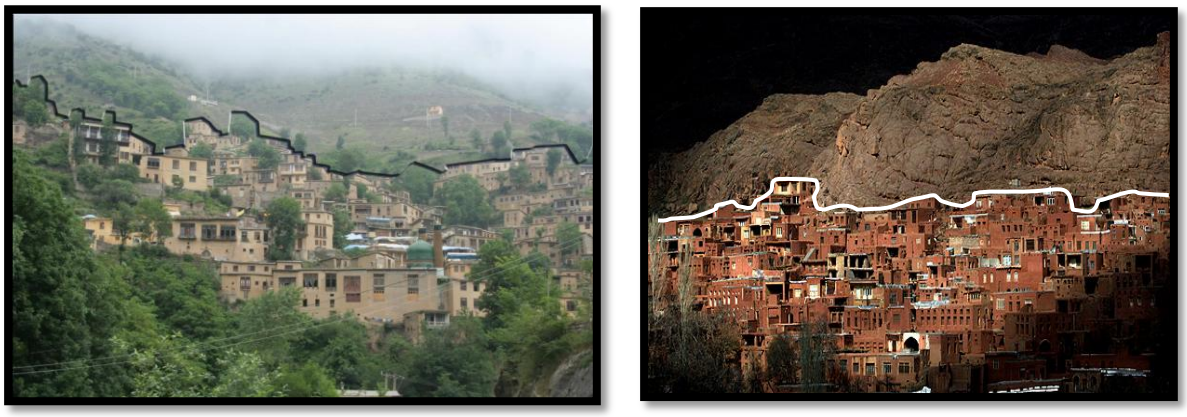


Figure 30: Masoule(Left) and Abyaneh(right) views,(www. panoramio.com & www.didiran.com)

As the result of these findings in the case of morphology, this village will be very visible elements which invite human beings and it bears a typical character in perspective.

As it is mentioned in the climate problem of mountainous region, they have cold winter especially at nights. Therefore, making a warm and comfortable environment for different human activities was the main concern for the traditional builders of these high lands.

On the other hand, the residential units were not locating under the valley. Because, the cold weather which has light weight density, transferring to the lower part of the valley in the night times and it is the reason of flood. The northern part is located in the shadow and it very cold and windy. So the southern and in the middle of foothill is the best place for accommodation. Due to the above mentioned realities, all the houses of Masouleh and Abyaneh were oriented toward south and east direction.

According to Ghodian, 2009; the main characteristics of the forms of towns and villages of theses region had the following characteristics in general:

1. Dense and compact urban configurations.

2. Enclosed Urban Spaces.

3. Orientation of the urban fabric towards the southern winter sunlight.

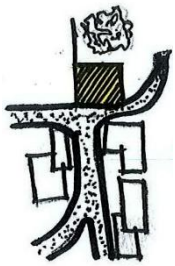
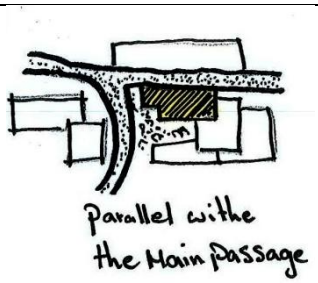
4. The importance of topography in the configuration of the urban fabric.

5. In the villages, which were located on foothills, the main paths were parallel to contour lines, while the minor ones were perpendicular to them.

6. For sitting small towns or villages in mountainous area, the middle of southern slopes was considered to be best. In this way, in winter the town or village could benefit from solar heat from the south. At the same time, they would be close enough to their respective rivers for access to water, but far enough to be safe at times of flood. (Ghobadian, 2009)

Moreover, "Higher level of Masouleh and Abyaneh has been a colder place to live and also they are far from the river .The direction of the physical development and growth of town or villages was parallel to the contour line of the terrain, which meant a horizontal development half way up the particular slope." (Ramezaanpour, 2010)

Table 3: Formation of Routs in Masouleh Village, (By Author)

		
In the End Point	Parallel	Perpendicular

Besides, Masouleh has four main districts, which are called as; Khaneh-bar, Masjed-bar,Keshe-sar and Asad. Also this village has 6 more subsidiary districts. Each region was dominated by a special mosque. As it mentioned before, the existing channel effect on the formation of passages. Therefore, there is a very few parallel way in this village, they don't have any extension in their length and break with rotation in their directions. According to this, perpendicular passages are connecting the level differences with each other. Therefore, they usually have gentle slope or may construct with staircases. (Table 3 & Fig 31)

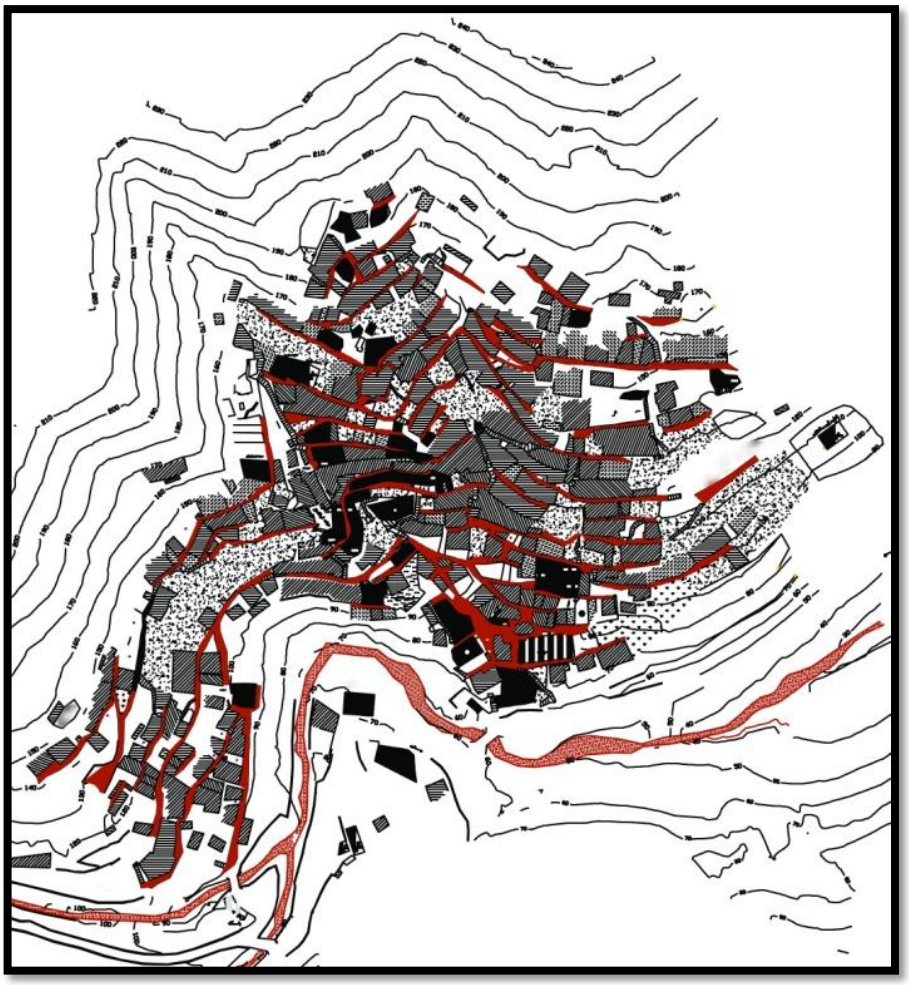


Figure 31: Masouleh Rout Map, (By Author)

Figure 32: Vertical Circulation in Masouleh, (By author)

On the other hand, Abyaneh has an accumulated architectural heritage, which bears traces from Seljuk, Safavid to Ghajar Period. It has few cul-the-sacs (Blind Alleys) in it. Zigzag connections of the alleys enable to conduct the wind flow in this village. Morever, Abyaneh has three major district, which are called as; Heradah, Pal and Yosmoon. In addition, houses of Abyane made by red-clay, which looks like dancing flames on the gray slope of the mountain. (Qorbani-Zadeh, 2008)

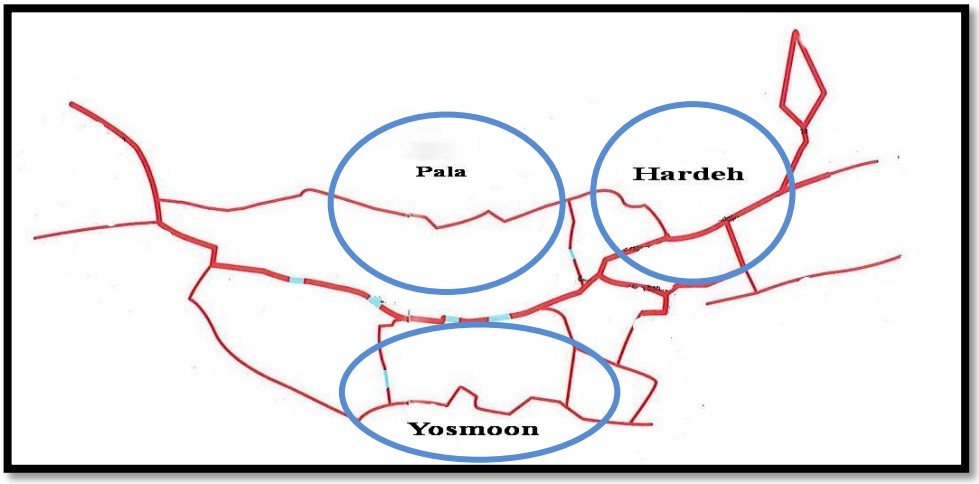


Figure 33: Location of districts in Abyaneh, (Ghorbanzadeh, p:76)

Moreover, main pathways have organic shape in this village, and they are parallel with the contour lines of the terrain. Also, perpendicular passages are connecting those long passages with each other. Therefore, they are usually constructed by staircases. (Fig 51, 52, 53)

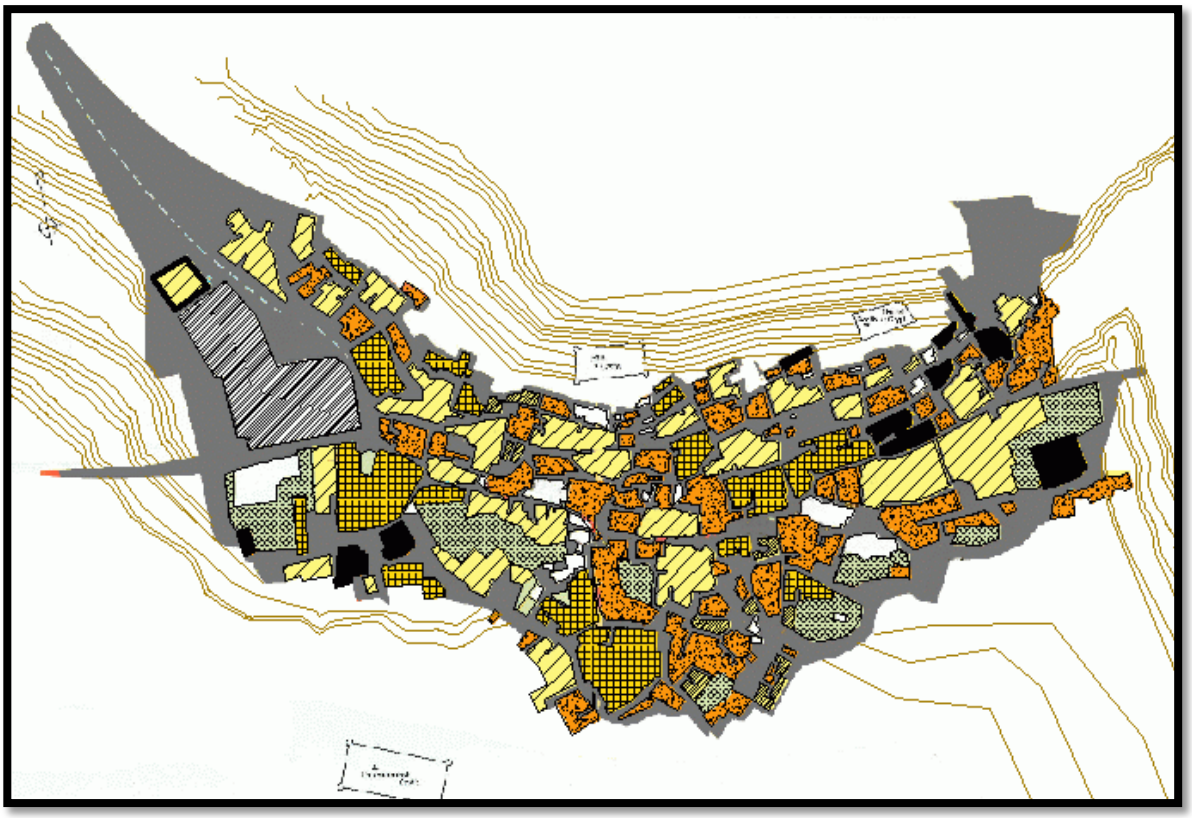


Figure 34: Map of Abyaneh , (By author)

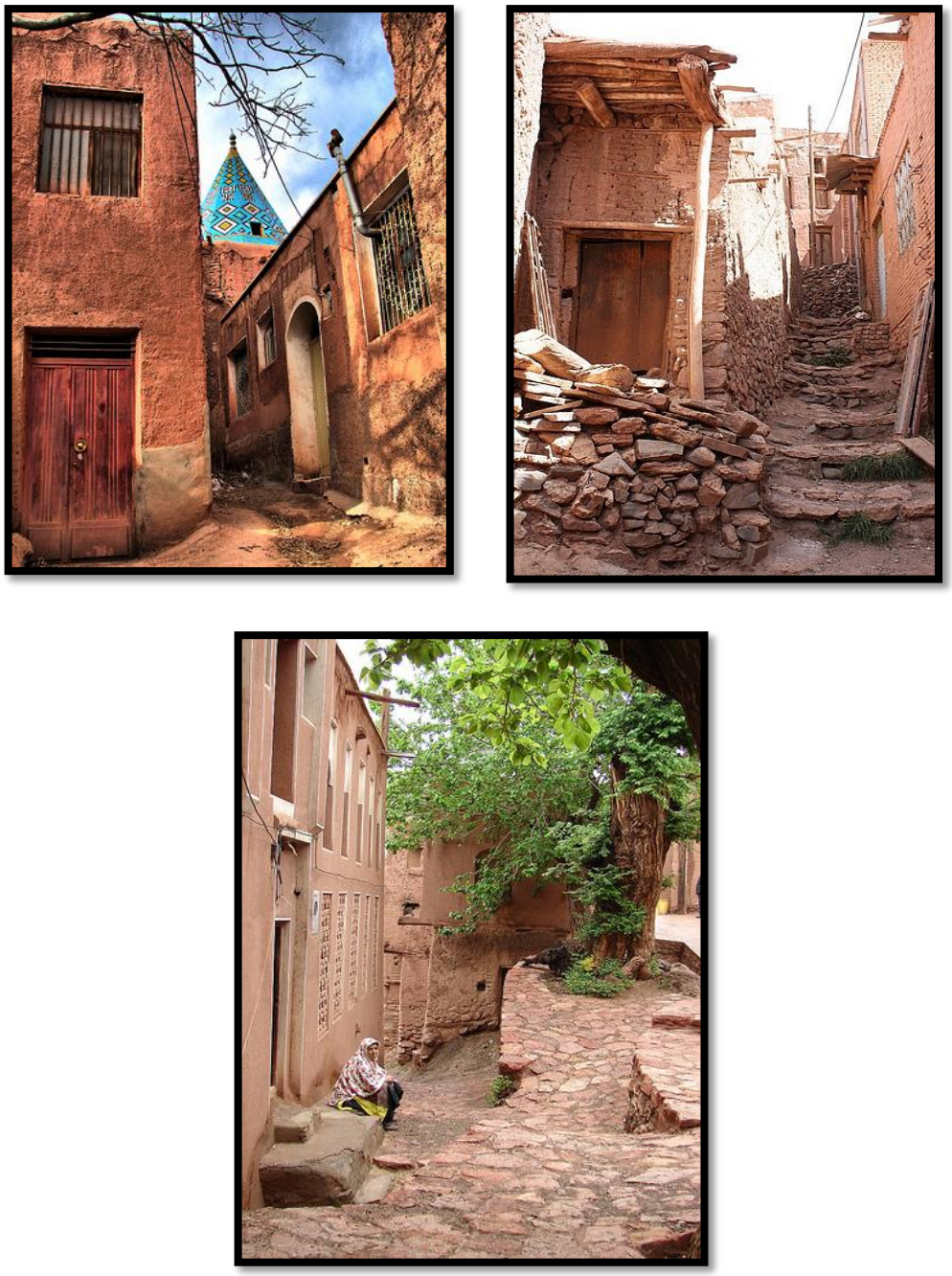


Figure 35: Connection of Pathways, Abyaneh, (www.Flicker.com)

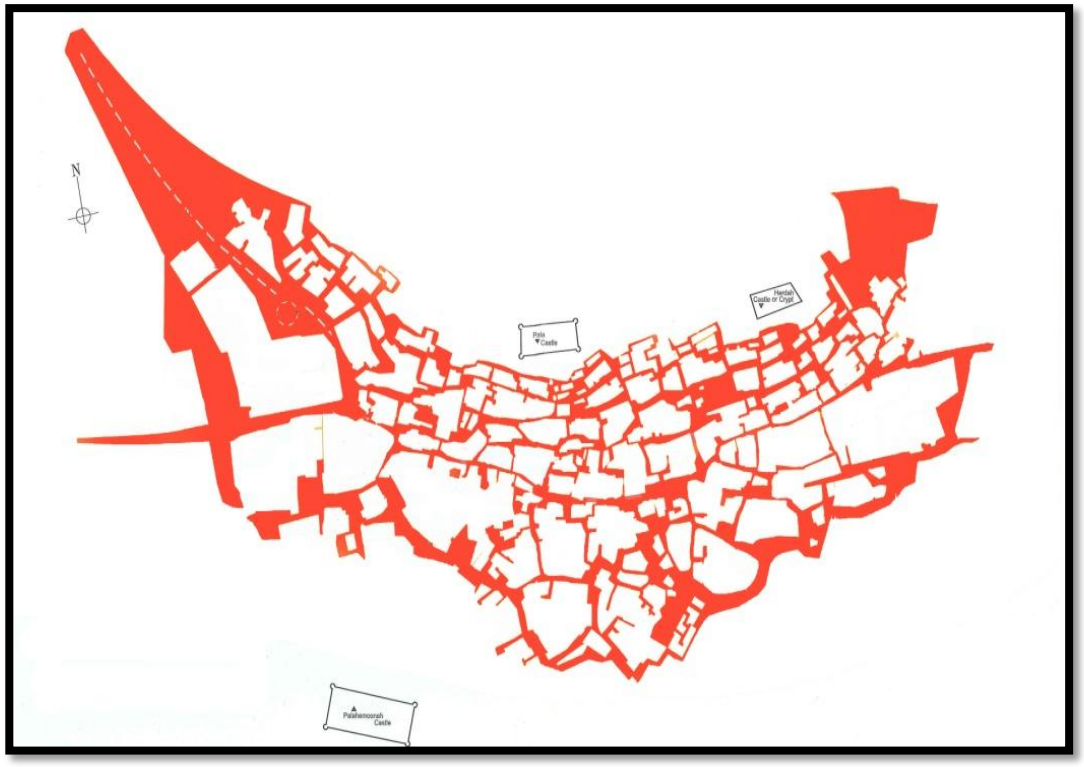


Figure 36: Abyaneh Route Map (By author)

Due to the 1982 census, Abyaneh settelment had 500 residential units which was stablished on the steep slope of this area and there is no wall make this village enclosed. Therfor, Abyaneh percived as multiple story village which has maximum foure story buildings. Some of these units have windows bay (Jumba), wich was projected to the narrow and dark sreats. (Abdali, 2008)

	Three story		Two story		One story

Figure 37: Building height In Abyaneh villages, (By Author)

Figure 38: Location of terrace and jumba in Abyaneh, (By author)

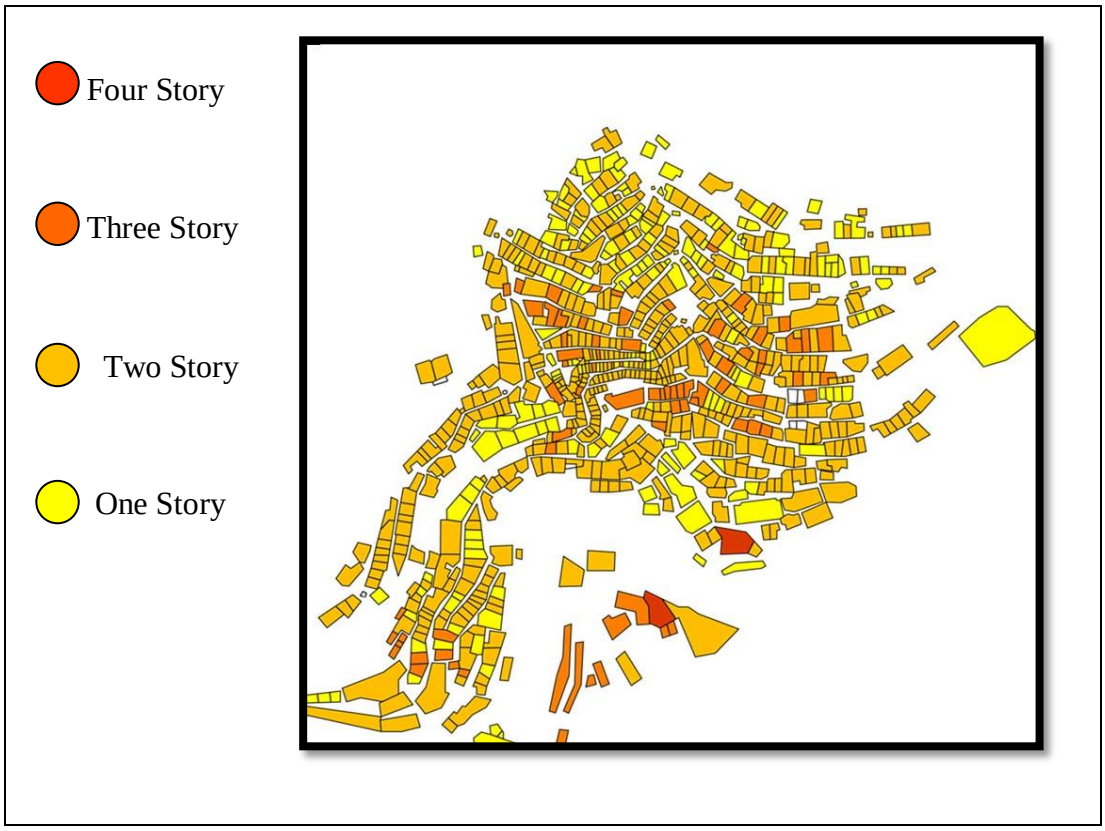


Figure 39: Building height in Masoule villages, (By Author)

Moreover, in Masouleh, houses built on top of each other because of lack of space and to get benefits of environmental issues. Therefore, houses built in height with maximum four level stories which will show in the map below ;(Fig 39,40)

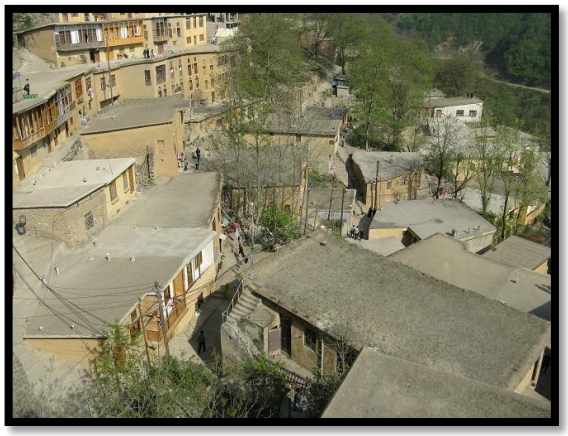


Figure 40: Ornamentation of Houses in Masouleh Village

Beside this, Masouleh' Bazaar were positioned in the centre of this village and it is extended toward many districts, therefore, it is not belong to special region. As it is mentioned before, occupations of the villagers were animal husbandry and trading. Due to the touristic factors of this, village bazaar is the heart of marketing in this village. (Fig 41)

Figure 41: Ornamentation of houses and Bazaar in Masouleh, (By author)

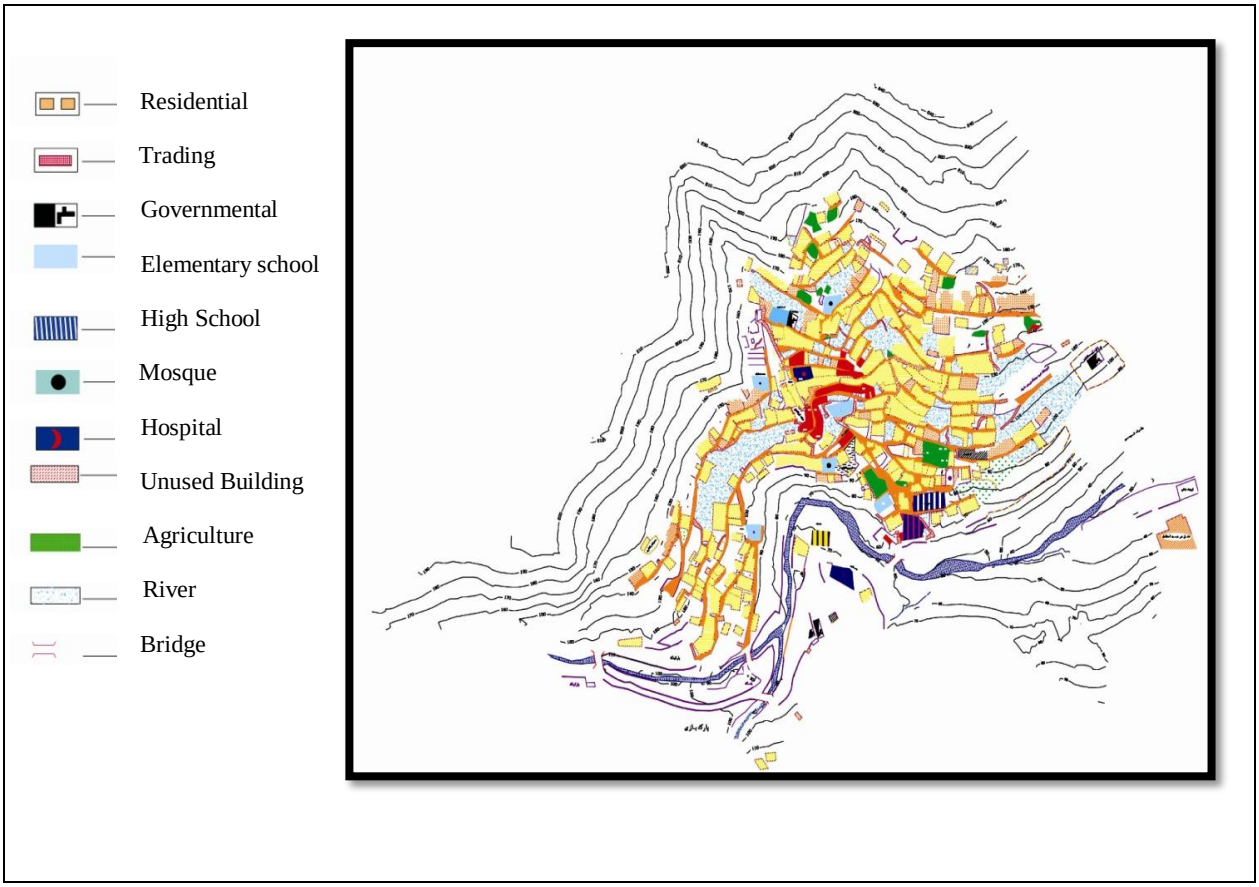


Figure 42: Land use map of Masouleh, (By author)

Furthermore, Masouleh bazaar has four level stories in different levels and last one doesn't have any function these days and it is closed. However, local people used it sailing their wholesales. Also, these level differences create a visual access between the people and this place is not only a trade center area.

n the other hand, this bazaar consists of seven parts which is: 1. Kafi Bazaar 2.Lower Bazaar 3.Devil Part 4.Tailoring part 5. Knife making parts 6.Blacksmith's part 7.Charcoal selling part. (Memarian, 1997)

Figure 43:Location, Perspective and plan organization of Bazaar in Masouleh context, (By Author)

In brief , The Identity of Masouleh's Bazaar is the heart of this village and all the activities take place under the influence of it.

On the other hand, local people of Abyaneh dosn't have any special market place like Masouleh village, and theire activities are taken place in their important building of this

settlement. Therefore, this study will focus on some important building in this rural village. According to this, the three storey. ‘Harpark fire temple’ is the oldest example of those public spaces, which is loacating in the center of Abyaneh. This building apparently was dating back to Sasanid era, also it includes a ‘Chartaghi’(structure with a dome-like ceiling supported by four columns). The middle floor considered to have been Harpark’s main floor has now turned into a passageway crossed by the main alley in the village. Also, there is a short flight of staircase on the north side of the passageway, which leads to the house. Morever, the second step here also forms the base of another staircase on the left, which creats a connection to the fire place. Therefor, this holly landmark used as the public gathering space, but this building is not used anymore. (Qorbani-Zadeh, 2008, p. 50) ,(Fig 44)

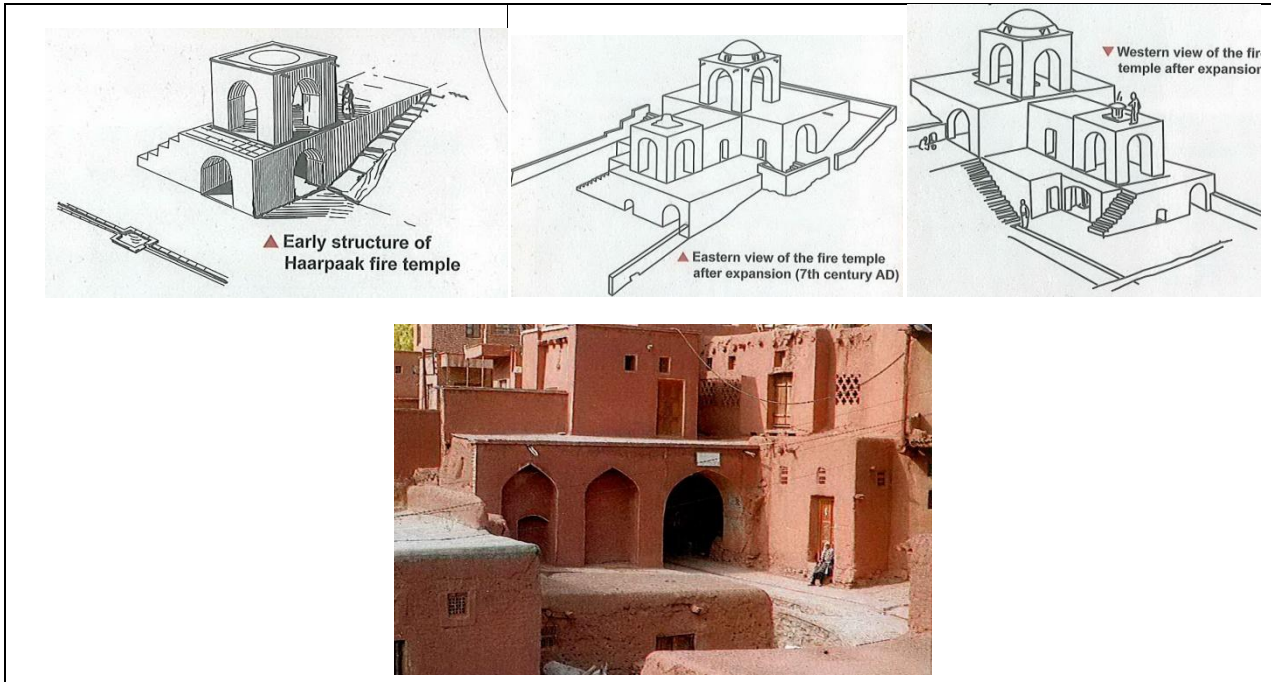


Figure 44: Harpark fire temple in Abyaneh (Ghorbanizadeh, p:54)

Morever, mosques are being the most important public areas of this settlement. In other words, the usage of temples and shrines were changed after Islamic revolution. According to this description, Hajatgah Mosque is one of the clear example, which was located near the rocky hill and flour mill.

According to Qorbani-Zadeh.M, door of this mosque dating back more than 470 years leads to the main salon (Shabestan). (Qorbani-Zadeh, 2008, p. 60)

Therefore, this place is using for many public activities and gatherings such as cermonies, mourning and funeral. On the other hand, trading was taken place in their separated shops, which located under their houses.(Fig 45)

Figure 45: Combination of the shapes and public areas in Abyaneh, (By author)

Lastly, the density of the houses in Masouleh are more than the Abyaneh case. Moreover, the effect of climate and culture is effect on this variation. Accordingly, the connection of interior and exterior of houses are much more powerful in Masouleh's case.In other words, there is a gap between indoor and outdoor space in Abyaneh haouses. Consequently, the public spaces in between the houses were getting decreased and the distance of them were increased as it shows as below ;(Fig 46)

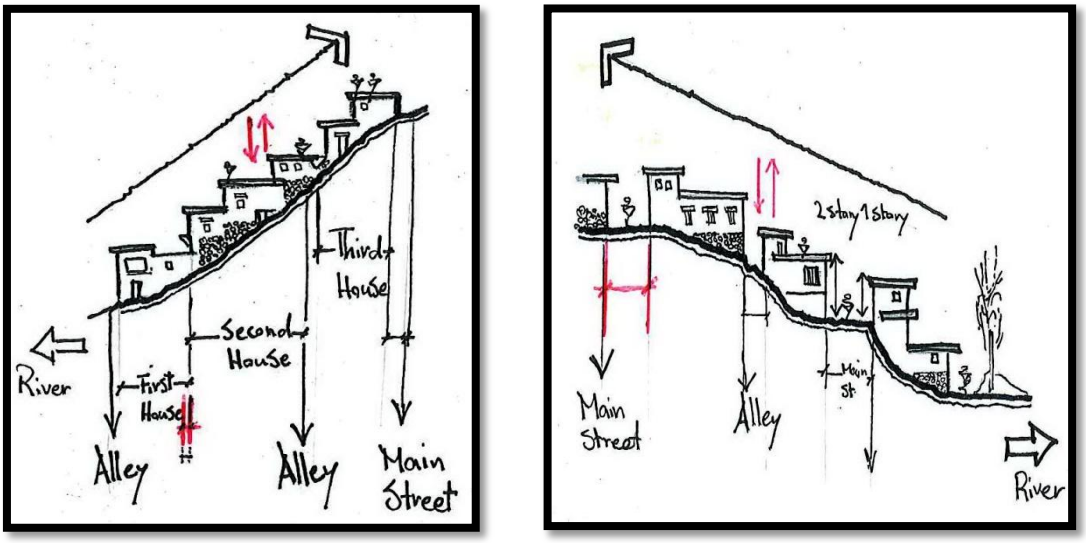


Figure 46: Combination of the shapes and public areas, Masouleh (Left) & Abyaneh (right), (By author)

4.2 Plan Organization Typology of Masouleh and Abyaneh settlements

Masouleh village has out oriented architecture as it mentioned before and it is located on the steeply hillside. This village has extraverted character and it has a direct physical and visual relation with outside space of the house. There is no courtyard spreading in height

development due to position of spaces in different levels like corridors. (Memarian, 1991)

Figure 47: Outward Orientation in Masouleh Architecture (by author)

Therefore, this case has a unique architectural style in comparison with the other surrounded villages which located in Gillan plain. Gillan province can be divided into plain and mountainous area. In the plain region, the houses originally called ‘Gaali push’or ‘Parchin’, which has direct visual relation with outside. In fact, they also have a courtyard and it used as the connector between the indoor functions of the house such as Water wells, barns and storages. The main spaces of these kind of houses consist of; forum (talaar), room (otagh) and balcony (ivan). (Ghobadian, 2006)

Figure 48: Gaali push House in Gillan Province,(Ghobadian.V ,p:25)

On the other hand, in mountainous area like Masouleh, houses built from lower level to higher level, on the skirt of the mountains. Most of the houses were built in two stories and sometimes they are one or three story.

Moreover, in the case of Abyaneh, the settlement, have extraverted character and placed on steeply slope of mountain similar to Abyaneh case. This alley lined with the large number of homes. These house were built on top of another and oriented by the sheer face of the mountains. They have indirect physical and visual relation with outside space of the house. Also, they have special space in front of each house, which is called as 'Hashti' and separated the interior and exterior of the house from each other, however in Masouleh case, both space are in close relation with each other.

On the other hand most of the villages of Isfahan province locating in lowland areas and historic Abyaneh village, which is called as 'Desert Ruby' (because of the red color of the houses), has the unique architectural style. (Shaterian, 2008)

‘Keh’ in Masouleh architecture refers to the room and house. If the room is big, they call it ‘Pileh’, which means Cocoon and if this is small one it is ‘Varoo’. Generally, one house consists of one or more than one room and the other spaces such as entrance, storage, staircase and corridor which will be analyses in this study. (Golboo, 2009)

‘Kaya’ in Abyaneh architecture refers to the house and is described as the private space, which has boundaries with the whole environment. Due to this, all the houses constructed in the specific land and most of them required spaces are exist inside them. However, In the case of Abyaneh and Masouleh, it is different and only living spaces were found in the houses. For example, the place, where locals keep their traps and their storages, is located outside of their houses. Furthermore, inhabitants of these two regions have two types of needs. The first one is the basic and essential needs of life and the other one is in relation with the livelihood.

According to this, Abyaneh village’s spaces categorized in three parts;

1- Coherent and continuous spaces in the residences for the households, which have necessary spaces for the basic needs such as: bedrooms, dining room, guest room, storages and etc. Therefore, room or “Yurt” is the most important part of the Abyaneh village, which most of the activities, to be done in it. For example in the typical house, this has one room, this place use as multifunction space and every activities happening in it. Some of the other houses, which have better economic situation, have special guest room or “Mah Ma Khoon”.

2- Shared common space between villagers, such as bakery, dish and cloth washing space, public bath and toilets.

3- Scattered areas of livelihood, which are in relation with agriculture, husbandry and industries. (Abyaneh, 2009)

Figure 49: Firewood Storage in Abyaneh, Left, (By Author)

Figure 50: Firewood Oven (kondeh) in Abyaneh, Right, (By Author)

Under this scope, houses being formed by different elements, which are not summerized in the private area of the house. In another word, some of the functions are located in the house and the rest is located in public spaces.According to this, Masouleh and Abyaneh's house have different character amongs the other rural settlements of Iran.

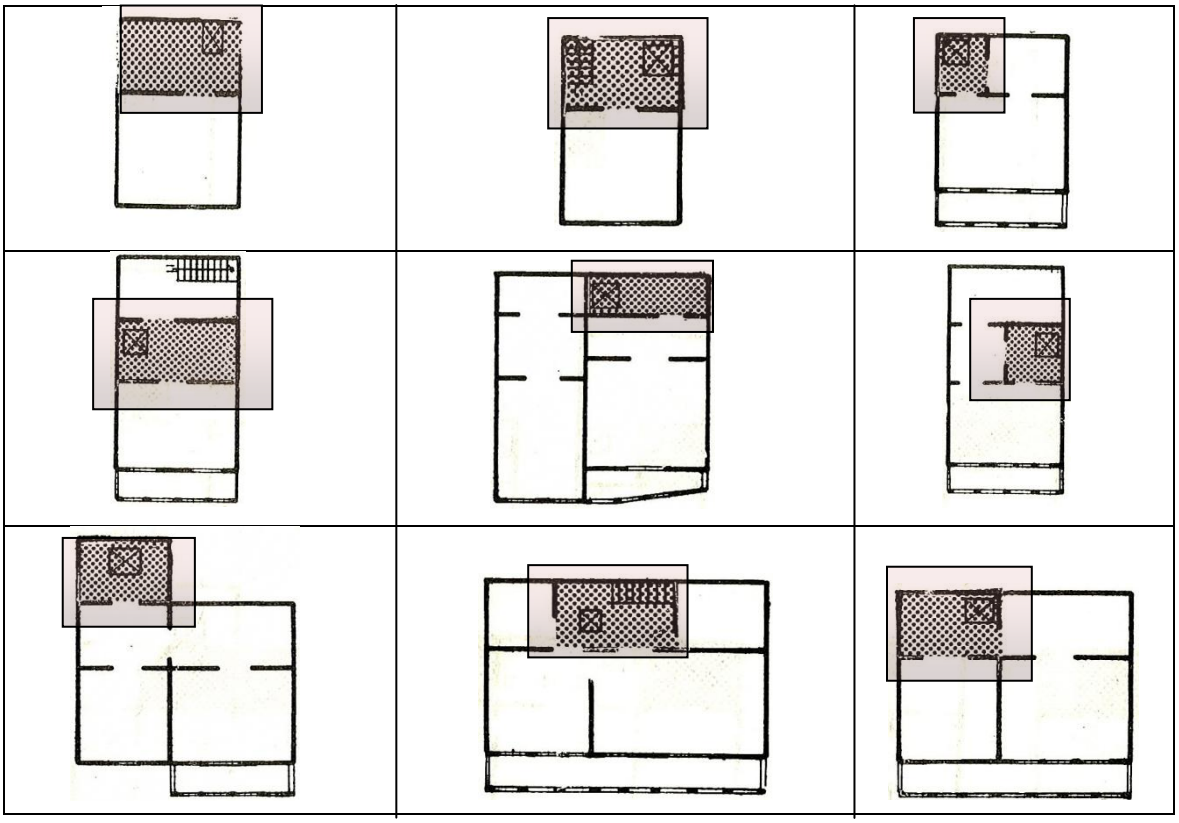
used directly effected on special features of architecture on them. Sometimes, one house has 3 entries in different parts. This happened, because of the density of the houses and lack of spaces in between of units. (Memarian, 1997)

In this context, it can be essential to consider the functions of Masouleh's houses. According to this, Masouleh houses have basic functions such as; main entrance, corridor, staircase, choghom, someh, room and hall. Therefore, main entrances of these

units, which are locating in between usually placed in the main passage and the other houses entrances are from the sides.

Moreover, corridor is another important space and has a key role in housing development in the region, which is the connector of the rooms. It works like a backbone in two or three stories houses; they located in ground floor, near the corridor, storage, toilet, staircase and stable. Also due to the plan organization of these houses, they placed in the corner or in the centre of ground floor level. Staircases located in different position in corridors. Some of them are parallel with the direction of corridors and the rest are perpendicular to them. Staircases are constructed with wooden material and they have steep incline. Sometimes, staircases have direct access to the rooms but normally they are connecting to a public space which called as 'Choghom'. (Memarian, 1997)

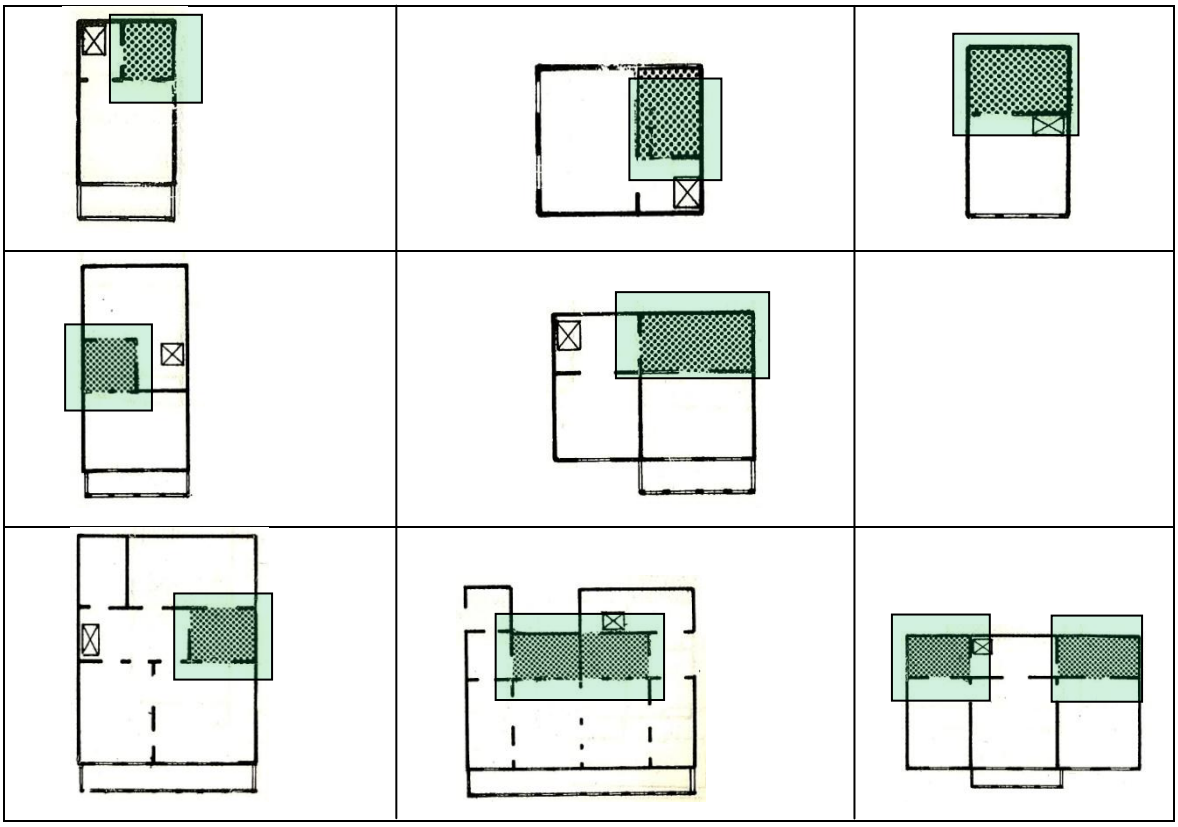
Table 4: Location of 'Choghom' in Masouleh House,(Memarian,1997 p:243)



Different Alternatives of the position of ‘Choghom’ in the house are shown in this diagram.

In addition to these, ‘Choghom’ is a connecting space between functions and it has different definition. For example some, of them are small and the others are big according to the size and they have variation in shape such as corridor shape or small room and they have different position according to their usage. Generally, they are connecting with the winter room (someh).These winter rooms normally locating in behind the other rooms or halls and their size is in relation with the area of the houses. Sometimes Someh is constructing near the Chogham, in behind the room, with rectangular shape (2 x 4 m) and sometimes it is square shapes (2.40 x 2.50 m). (Memarian, 1997)

Table 5: Location of Someh in Masouleh House (Memarian,1997 p:244)



As it is mentioned before, Masouleh's houses are divided in two parts. Some of them consist of hall with bay windows (Jumba) and others are the houses with windows only on façades .These halls have semi open spaces in front, which has two or three door on it. These bay windows (jumba) have different types, therefore some of them built very simple and they have handrail and the others will shape by recessed one room. According to this bay windows have two accesses to the open space but in regular types, they have three accesses to the open spaces and also it is covered by many columns and creates a special elevation. Also these jumbas oriented to the south direction and sometimes they are the common space in between two different house and they are

separated by wooden panels. Also by increasing the width of them local people placed corridors under it and those jumbas leaning to them. (Memarian, Mamari Maskoony Irani ,Borungara, 1997)

Figure 51: Vernacular House with Jumba in Masouleh (by author)

Generally, houses build in height with maximum three stories, due to the land limitation. However, it doesn't mean that there is no simple house with only one story. In these simple houses, all the activities are same as the multiple room ones. The size of these rooms is approximately 3 x 4 m and as they are locating on steeply slope, the heights of them are around 4 m in front and 1 m in the back part. Also the interior of these building have flat floors with 2.5 m height.

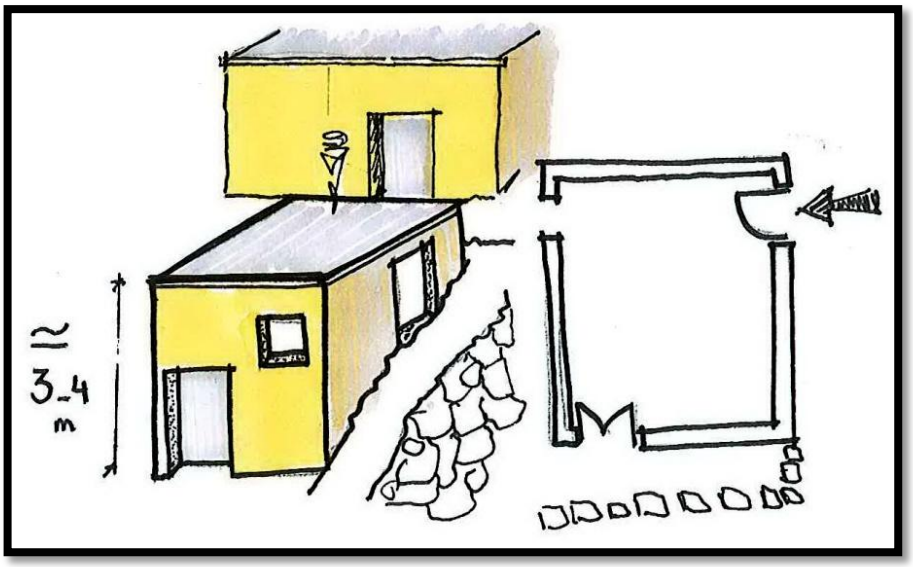
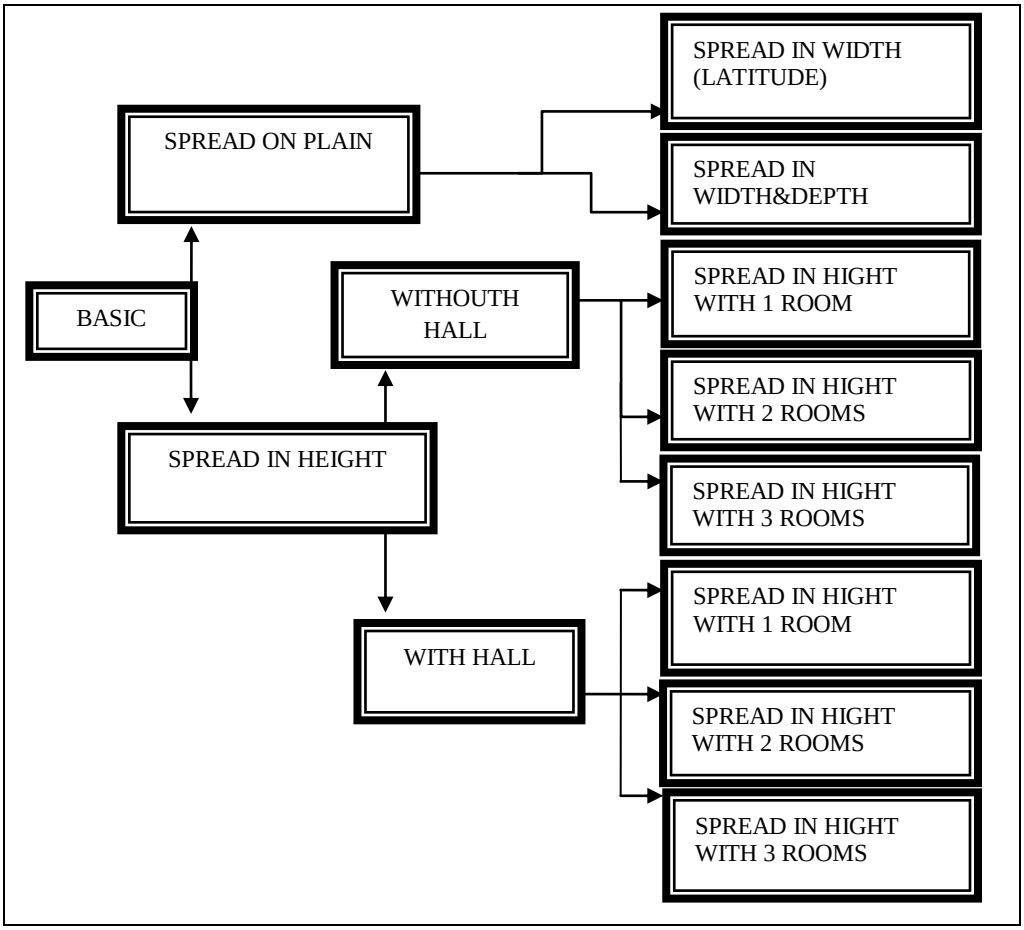


Figure 52: Masouleh house with One Room, (By Author)

According to Memarian.Gh (1991), for analyzing all houses in Masouleh village firstly he suggested to explore the houses which have only one room and developing in height. In next step, he examined the horizontal development of the houses with two rooms beside each other and finally the extension of these houses with tree story in height were mentioned by him. Under this scope, the typical typology of Masouleh village is shown in the below table. (Table 6)

Table 6: Typology process of Masouleh



Therefore, in the houses, which have only one bedroom in first floor, the other function such as: Someh, Choghom, big room, toilet and corridor placed in ground floor. Also the staircase connected these to floor together. (Fig 53)

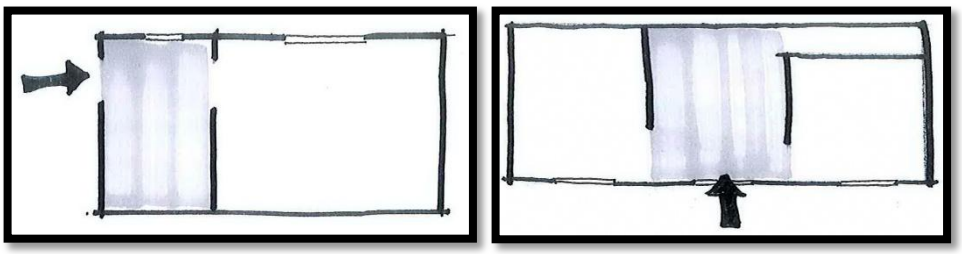
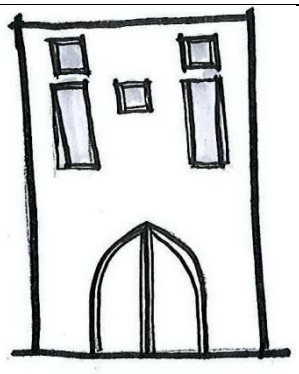
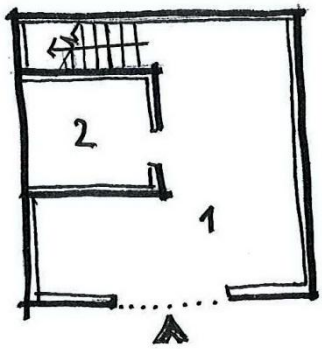
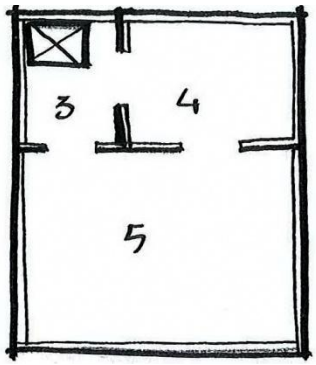


Figure 53: One bedroom house in Masouleh

Sometimes, some particular functions combine with each other. For example, the in the case below, which has an arch shape in entrance, someh, choghom and big room join together in first floor and the toilets and corridors placed in ground floor (Table 7). Sometimes according to their locations, these units have more than one entrance in different sides. For example, Nodrat house have another entrance from upper level street (Fig 54). (Memarian, 1997)

Table 7:1. Corridor 2.Toilet 3. Choghom 4.Someh 5.Big Room

		
Elevation	Ground Floor	Ground Floor

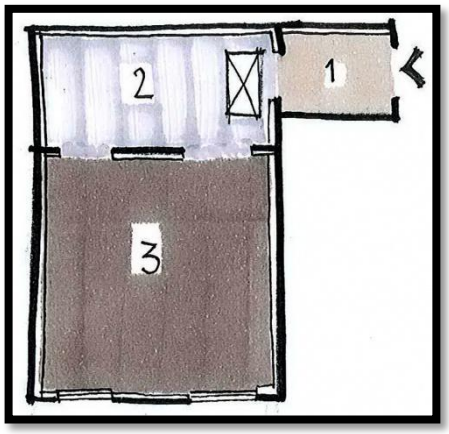


Figure 54: Nodrat house First Floor plan 1.Choghom 2. Someh 3.Big Room(by author)

On the other hand, those houses, which were built with hall and bay windows have same plan organization as above. One of the examples consists in double story house with 3 meters width, which has Choghom, Someh, hall and bay window in first floor. The number of columns is between three and six. In this case, three story houses would be available, which has hall and jumba in second floor, third floor or in both floors and the one, which has a tower in third floor for connecting to the upper level streets. (Table 8, 9)

Table 8:1 Choghom 2.Hall 3.Bay window, Jumba (by author)

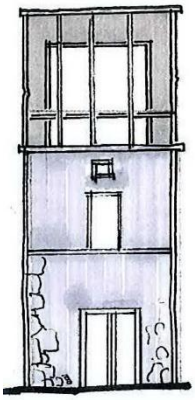
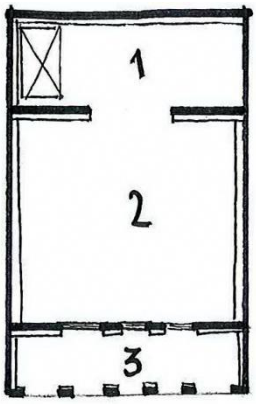
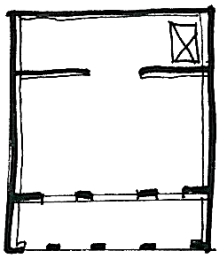
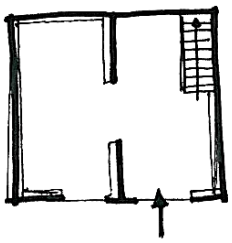
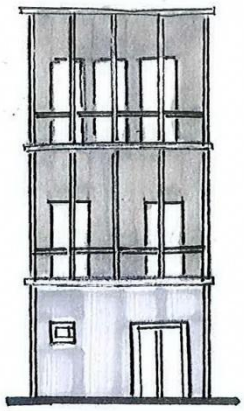
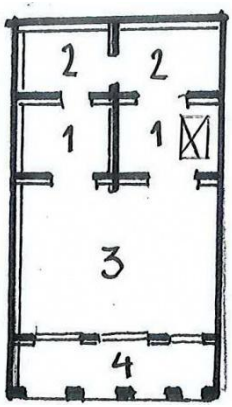
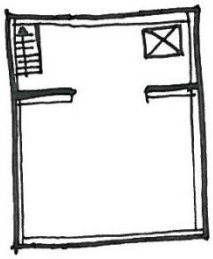
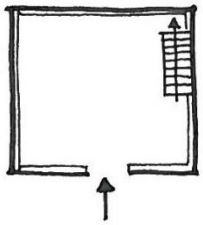
			
Elevation	Second Floor	First Floor	Ground Floor

Table 9: 1.Choghom 2.Someh 3.Hall 4.Bay window, Jumba,(by author)

			
Elevation	Second Floor	First Floor	Ground Floor

Moreover, after adding two rooms to the first floor, the space organization was changed. Generally, choghom and someh are connecting with the other rooms and bigger ones is describing as guest room. Also, the small room is changing their usage to living area and they are useful in winter. The bigger rooms have two or three windows and the small one have only one opening. (Fig 55)

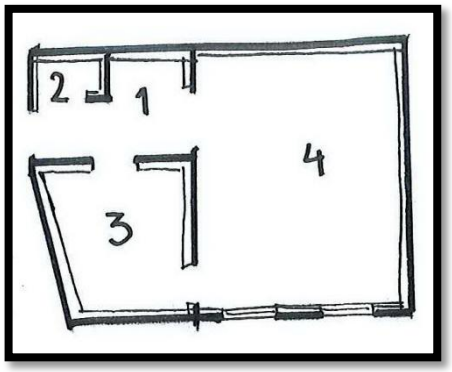


Figure 55: 1.choghom 2.Toilet 3.Small Room 4. Big Room

Table 10: 1.Corridor 2.Storage 3.Choghom 4.Someh 5.Big room, (by Mazini)

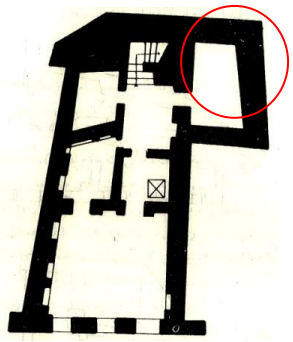
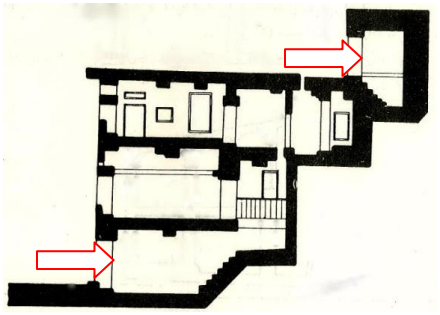
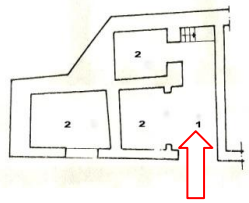
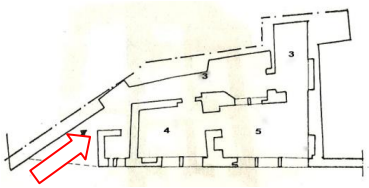
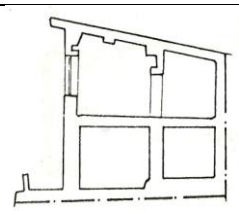
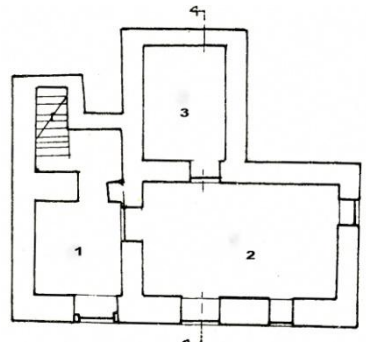
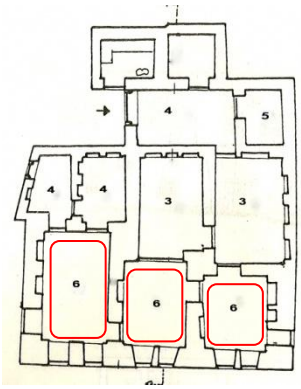
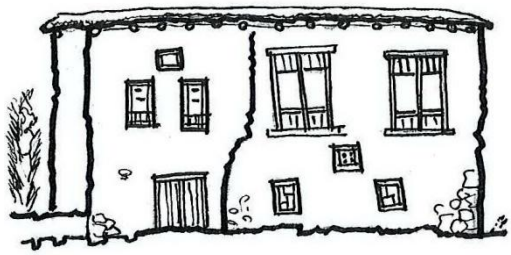
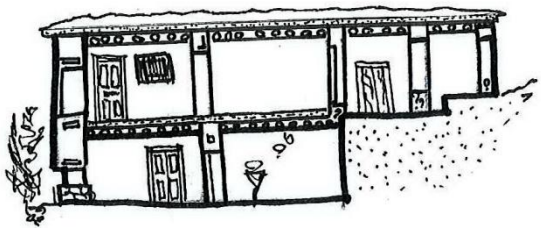
	
First Floor	Section

Table 11: Development in height and different entrances in different levels, (by Bahrampor, Mazini)

		
Ground Floor	First Floor	Section

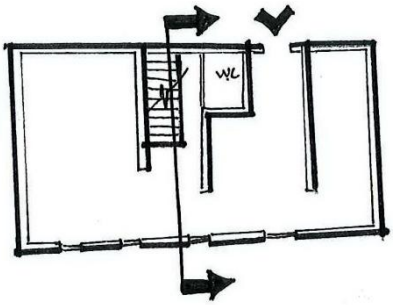
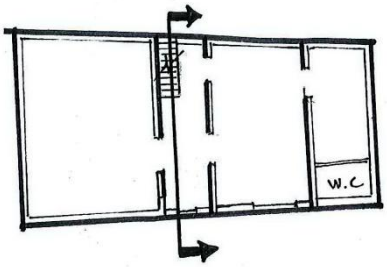
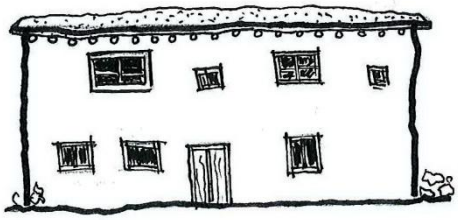
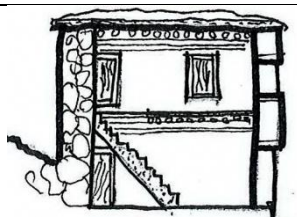
Furthermore, by adjoining the someh to one of the rooms, the general housing type of this village will appear. In some of them, the small room, corridors and toilets place in ground floor. choghom and someh are locating behind the rooms in first floor and both of them connecting to the small room. From the other hand by extending the size of building, the number of entrances will be increase from the sides. (Table 10, 11, 12)

Table 12: Shabani house, Masouleh 1.Corridor 2.Big Room 3. Someh 4.Choghom 5.Storage 6. Room, (by Rahimian, Hojat)

	
Ground Floor	First Floor
	
South Elevation	South Elevation

Also in some other cases, entrances and corridors designed in the middle of building and the other spaces organized in surrounding of them. Furthermore, buildings with tower and tree entrances in ground floor were appeared. (Table 13)

Table 13: Example of Masouleh House with Corridor in the Middle. (By Author)

	
Ground Floor	First Floor
	
South Elevation	Section

Simplicity of lifestyle is the most important character of Abyaneh houses, which is clearly visible in their small or big houses. As it is mentioned before, many activities such as; dining, resting and sleeping, take place in one room. These, process starting from one simple rooms and in special case, other spaces such as: guest rooms, winter room (Takhooneh) and summer room (Yurt Vahary), added to them. However, the most

important point of construction in Abyaneh houses is the orientation of these units, towards the Mecca direction. (Memarian, Mamari Maskoony Irani ,Borungara, 1997)

Moreover, in the summer and spring, locals have developed different solutions, for avoiding hot and cold weather. For example, usage of clay material and multifunction interior spaces such as: winter and summer rooms for interior immigration. Simplicity requires the human scale in construction of houses. Therefore, the size of rooms, doors and niches are present it clearly. (Memarian, 1997)

Rarely, it is possible to observe the existence of courtyard in some of the houses. In summery this study will point to some of them. In some cases, the entrance has direct relation with courtyards or after passing from whole building the courtyards will appear. The other units have courtyard after passing the porch (Hashti). Some units have central courtyard and built in two stories. (Memarian, 1997).

According to Gholam Hossein Memarian (1991), for analyzing all houses in Abyaneh village firstly he suggested to explore the houses, which have only one room and developing in horizontal direction. (Fig 56) In the next step, he examined the horizontal development of the houses with two rooms beside each other and finally the extension of these houses with three or four stories in height which has natural or artificial connection with each other were mentioned by him. The chart below shows the typology process of Masouleh village; (Table 14, 15)

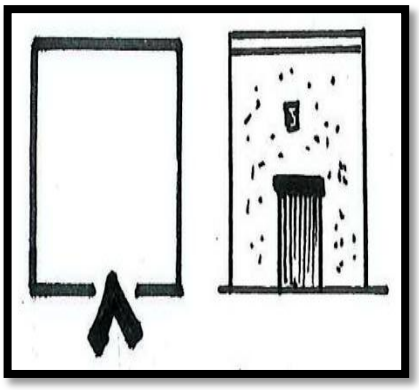


Figure 56: Basic house with one room, Abyaneh,(By author)

Table 14: Typology Process of Masouleh Village

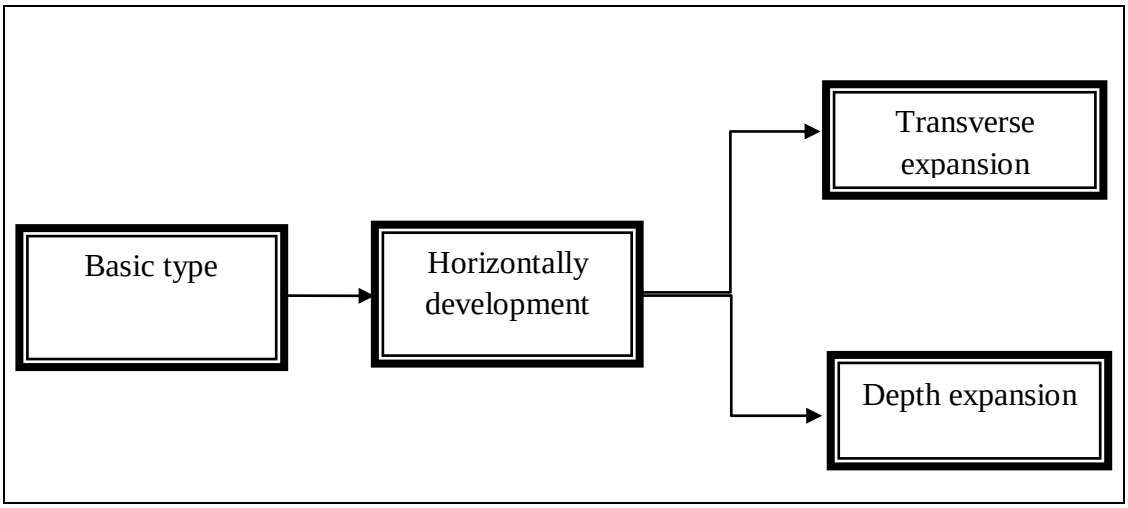
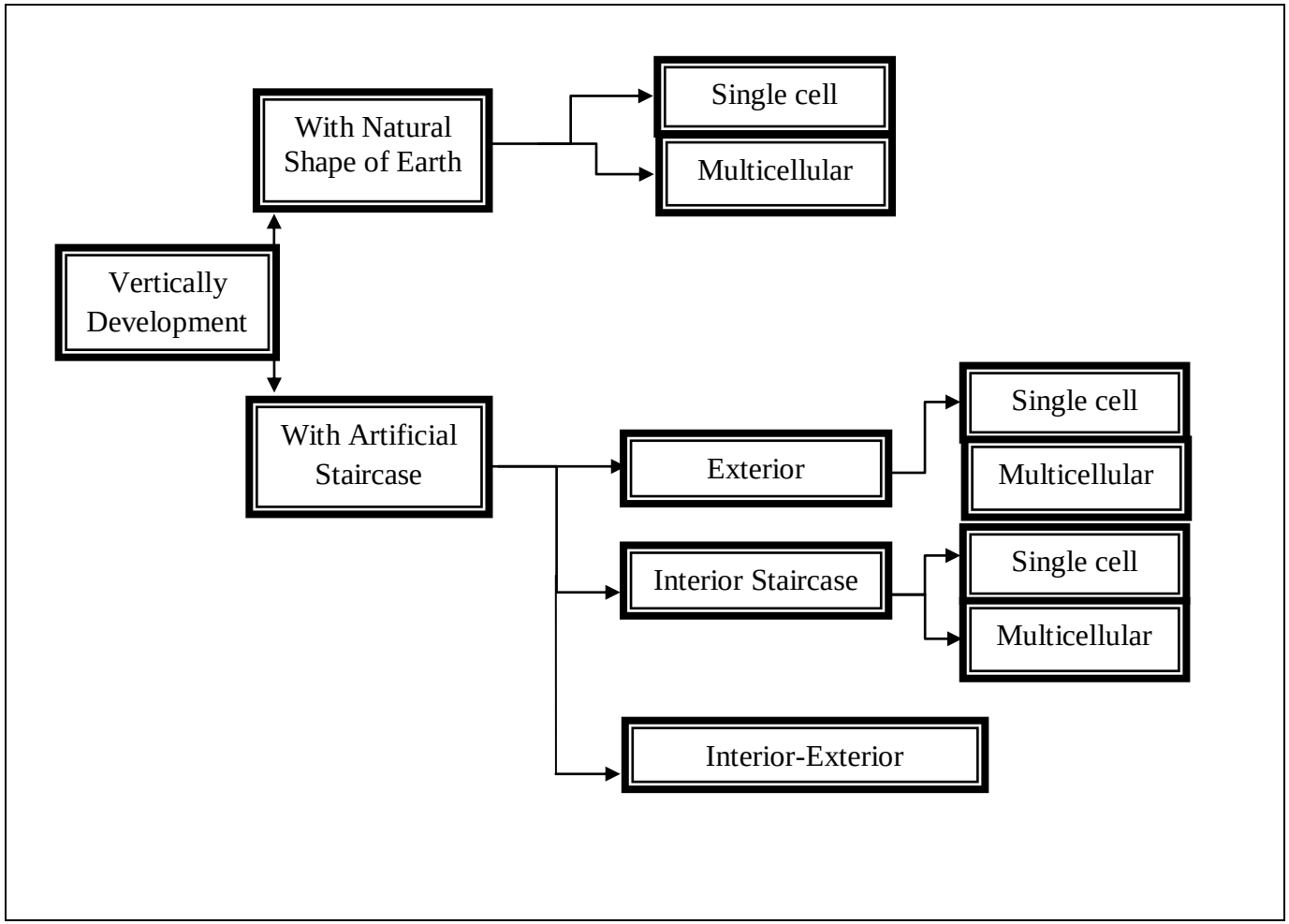


Table 15: Typology Process of Masouleh Village



Under this scope and due to the formation development of the houses, this dissertation will focus on the simple and basic house type of the village in this part.

According to the observations, the size of the initial space was 3 x 4 m and it is built in one story and all the activities of the family were taken placed in this space. Moreover, ovens where located in the open area of the houses because of the lack of space. It is also possible to observe the existence of public bakery in some districts. This village has shared toilet in between the group of small houses and has private one in the big units which is located in the ground floor. (Qorbani-Zadeh, 2008)

On the other hand, Memarian.G defined the typical house which has small entrance door 'Barika' and have big windows character. These doors have small hole, which lets the sun rays penetrates inside the interior space. Moreover, because of the job requirements (agriculture and husbandry), locals built stables (Tabula) and storages beside their houses. Therefore, this combination creates an interesting house type in this village. (Memarian, 1997). (Fig 57)

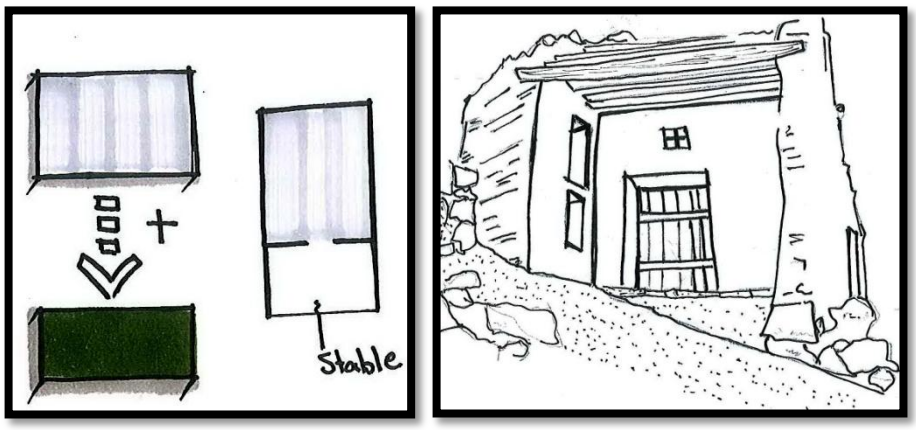


Figure 57: Location of the stable, (By author)

Moreover, these types developed on plain with different form in Abyaneh village. For example, users can be able to entering to the big room, by adding small room which has the entrance door in it. In addition, the most progressive model is the complete small room, which has been located as an attachment to the big room and both of them have connection from the outside with interior relation in between each other. On the other hand, the big room has small stone closet (Pastoo) in the heart of the mountain. (Fig 58)

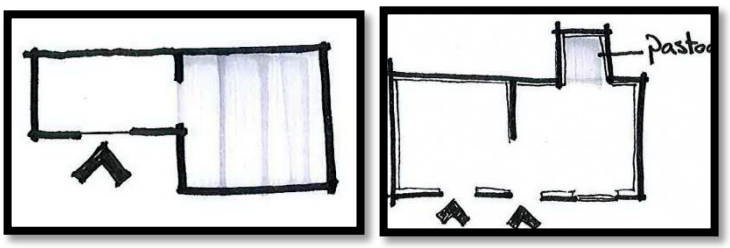
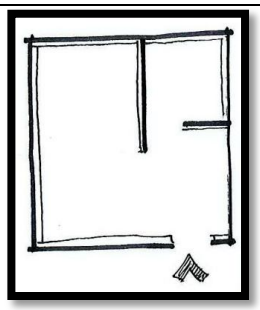
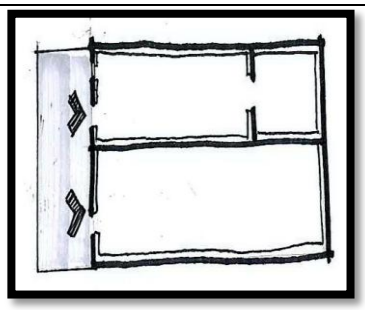
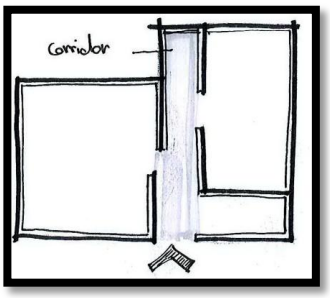


Figure 58: Development on flat topography, Abyaneh, (by author)

Due to depth expansion some of these rooms have indirect connection with the Balconies.Therefore, shared doors and balconies are the connector's elements. Sometimes, the corridors placed after the main entrance, which connects the exterior and interior spaces of the houses or may were located in the middle of building and connecting the rooms and storage with each other. (Table 16)

Table 16: Integration of Abyaneh house, (By Author)

		
Division of spaces	Balcony	Corridor

Furthermore, the lack of buildable plots and natural character of Abyaneh forced the locals to develop their settlements on the skirts of mountainous, therefore the simple house with one room, convert to double story units with two rooms. According to this, first floor used for storage or stable and first floor used as living area. Also, there is no stair case inside these types and for going to the first floor locals should climb the steep path which is located near the building. (Fig 59)

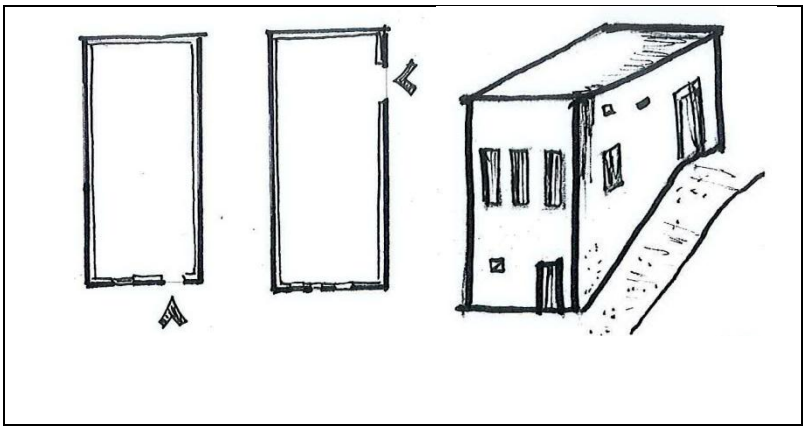
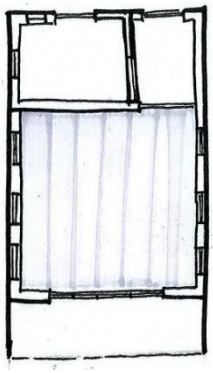
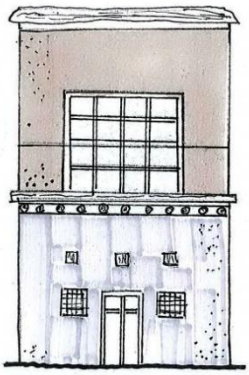
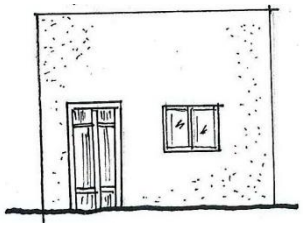


Figure 59: One room house in Abyaneh,(By Author)

Moreover, inhabitant placed another space in front of the main entrance and changed the place of stable in the other formations. Also some of the Abyaneh houses have balconies and they were constructed by some beams, which are seated on the extended beams of the building. (Table 17)

Table 17: Two storey house with vertical development, Abyaneh, (By Author)

		
Plan	South Elevation	North Elevation

In addition, some of the other houses of this village were developed in horizontal direction and have two connected room in their ground floor. Also they have alternative access to the first floor from the behind side. (Fig 60) Moreover, the most developed form of these house have long corridor, which connecting the storage, central hall, room and stair case with each other. From the other hand few rooms have window and from the central hall, they are providing their lights.

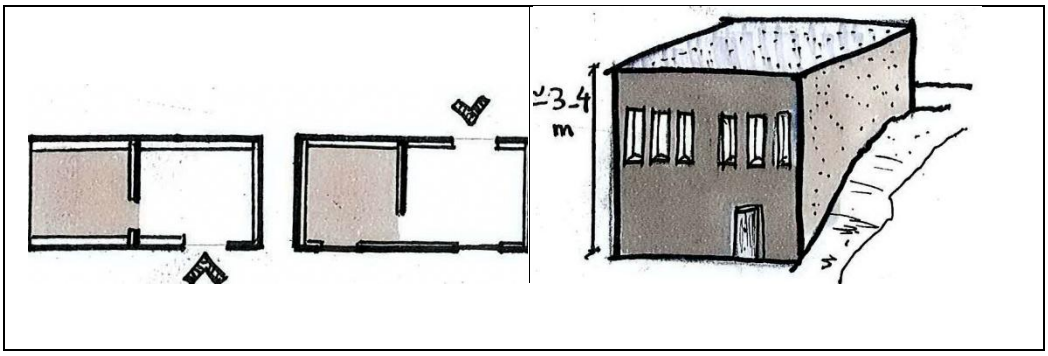


Figure 60: Development in width, (By author)

Furthermore, many houses were constructed in parallel to the topographical characteristics of the site, and create a unique form. The opening of entrance door is locating on the topography and the middle rooms are bigger than the others. (Fig 61)

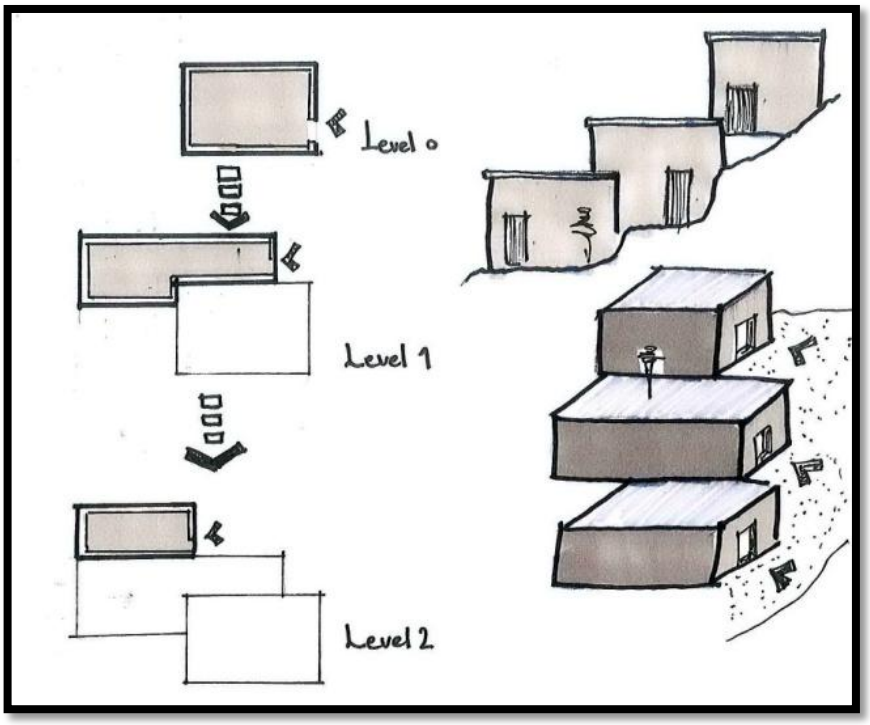


Figure 61: Usage of topography in Abyaneh, (By Author)

For making connection in between different levels, locals were using the natural form of the land. Sometimes, because of the sharp slope of the lands, they were not able to use the existing form of it. Therefore local people used staircases in different place of their houses such as; interior or exterior spaces. The most simple type of them have few risings and one landing, in front of the main door and the entrance of ground floor (stable) was located in the other side of buildings. Moreover, the other format has 'L' shape structure and also they have a big landing and entrance door of ground floor placed under it. (Fig 62)

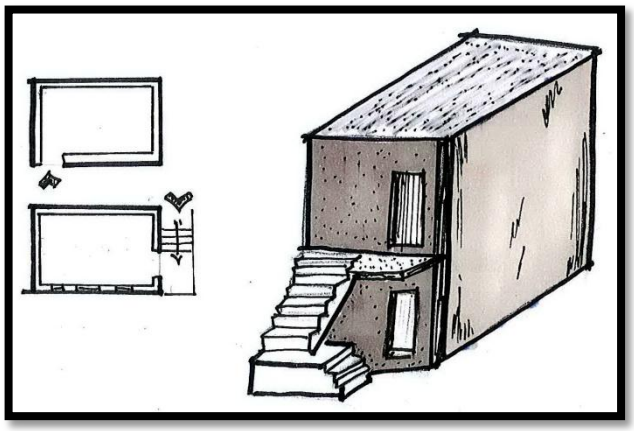


Figure 62: Usage of staircase in Abyaneh house, (By author)

But also, the interior staircase is not only acting as a connection element in between different levels as well. Therefore, natural slope of the land conducting people to the first floor and the door entrance locating near the pathway. door, there is a corridor which has interior staircase, to the ground floor. Also in some cases, theses interior staircases are locating after the main entrances and have accessibility to the first floor which being formed by winter and summer rooms and balconies. In addition to this,

these staircases have different form such as spiritual or L shapes and locating in different zoning of the houses. (Fig 63)

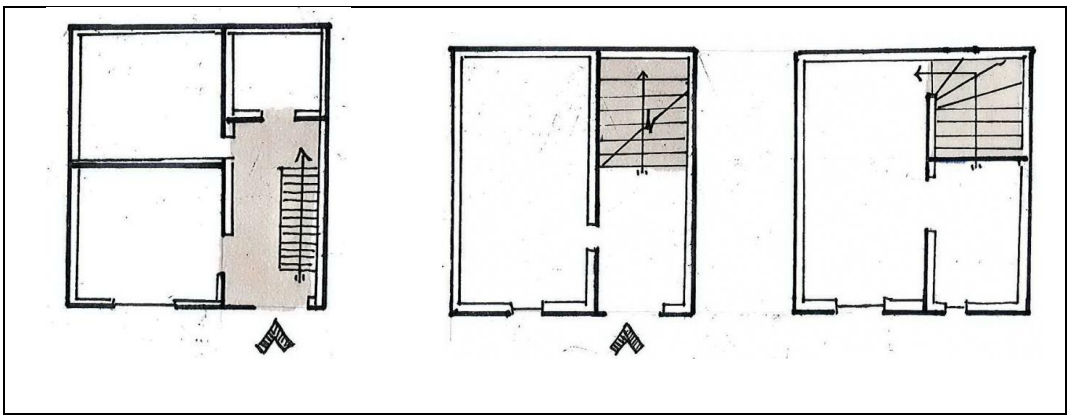


Figure 63: Different type of staircase in Abyaneh, (By Author)

Lastly, the most common type of expansion is transverse development in horizontal and vertical direction of Abyaneh housing construction. According to this the entrance spaces are usually locating in the centre axes of the building and connecting the other spaces and stair case with each other. For example in the following case, the summer room was located after the spiral staircase with big a balcony. (Fig 64)

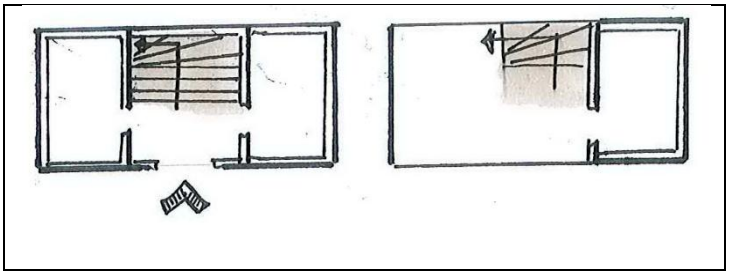


Figure 64:Transvers development in plan of Abyaneh, (By author)

After analyzing the basic type of Abyaneh housing typology, this dissertation will focuses on the two and three storied units, which were being formed from them. These houses consist of staircase, corridors, summer room, winter living room, summer living room and balconies.

As Memarian.G mentioned, that Shafiei house, which is locating in the center of Abyaneh, is one of the useful example of this type of housing construction. The heads and stone benches are the part of main entrances and create an inviting atmosphere for this space. More ever, veranda (Hashti) was placed after the entrance door, and dividing the interior spaces. The basement floor of these houses connected to the ground floor with two staircases and also they have an outdoor access to the first floor. The space development of this house is visible in surrounding of central corridor. Also, staircase has connection with terrace (Mahtabi) in first floor and also, this floor has one small room with two small balconies and one big room. Also the ground floor consists of some room. (Memarian, 1997)

4.3 Typology of Forms

Before investigation, the form of the building it is necessary to recognize the shape of building, because of the term of ‘shape’ is used to introduce two dimensional elements however, ‘form’ is used for representing three-dimensional objects. Also, shape has only focus in figure appearance of components such as width and length. Moreover, as Ching(1996) Mentioned “Shape as the characteristic outline or surface configuration of

particular form and principal aspect by which we identify and categorize forms". (Ching, 1996, p. 34)

According to him, "Form is the primary identifying characteristic of a volume. It is established by the shapes and interrelation of plans that describe the boundaries of the volume". (Ching, 1996, p. 28)

Furthermore, Ching defined the volume as "A plane extended in a direction other than its intrinsic direction becomes as a **volume**". (Ching, 1996, p. 28)

Morever, as he mentioned in another part of his book (Architecture: Form, Space and order): "Numerous, examples of clustered housing form can be found in the vernacular architecture of various cultures. Even though each culture produced a unique style in response to differing technical, climatic, and socio cultural factors, these clustered housing organizations usually maintained the individuality of each unit and a moderate degree of diversity within the context of an ordered whole". (Ching, 1996, p. 68)

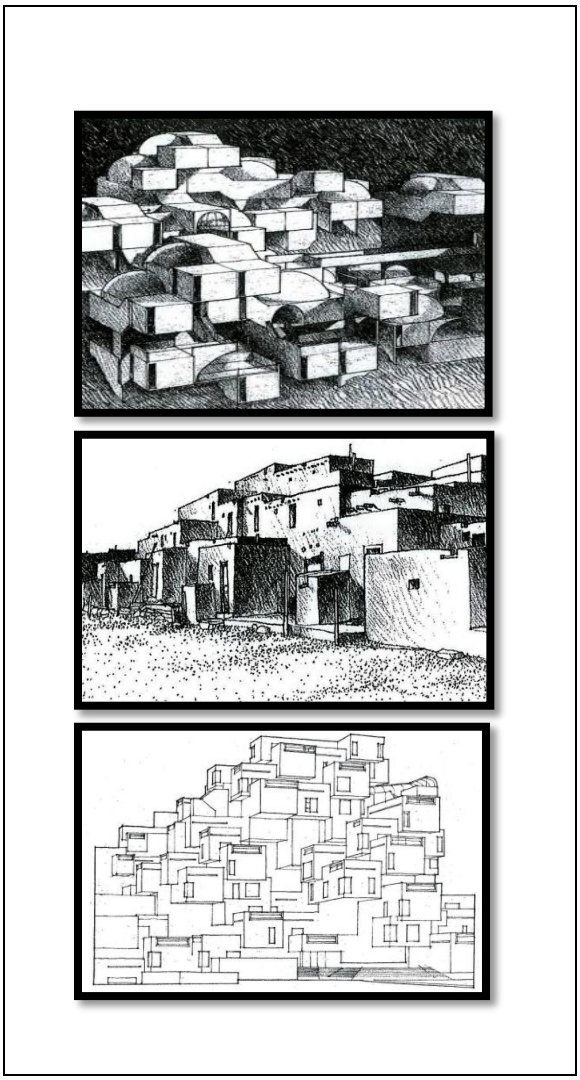


Figure 65 : Typology of forms concept,Clusters, (Ching, p: 68)

Under this scope, in Masouleh and Abyaneh villages, the typical houses has cubic forms.

Also, the ceiling is not that much high and all the roof is flat in this village. Public building, like; Mosque, schools, Bath-house and bazaar have different roof forms such as; curved masonry roof.

According to typology of the form, which was discussed before, Masouleh and Abyaneh house will be defined as cubic and rectangular prism forms. (Fig 66)

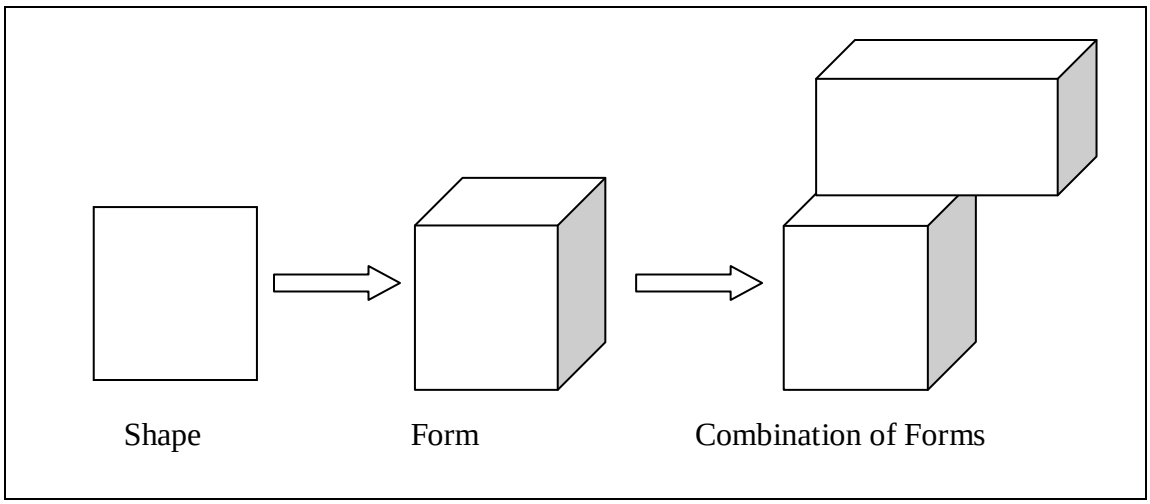


Figure 66: Typology of forms, (By author)

The cube form, enclosed the maximum amount of volume with the minimum amount of surface area, and it will be material efficient form in the comparison with the other shapes. (Oliver, 1997)

“Because of their flat sides and roofs, individual cubic forms may be easily joined both horizontally and, in some cases, vertically, resulting in dense groupings of structurally interdependent, visibly interlocked building. In these cases, a cubic form may serve as basic unit, or ‘cell ‘to be repeated in a dense building complex of several levels. The flat roofs of the cubic form may be used as outside terrace providing additional living, working or storage stage.” (Oliver, 1997)

In Masouleh and Abyaneh, The buildings have been built into the mountain’s skirt and they are interconnected. In other word, they are vertically and horizontally connecting

with each other. Therefore, Roofs act as courtyard and pedestrian areas similar to streets. Due to these intersections, many new functions have been appeared in between public and private spaces. For example shared open and semi open spaces of these houses.

4.4 Typology of Elevation

The elevation formation of vernacular house forms, generally is providing valuable information about the physical, social and cultural characteristics of the context.

Moreover as Paul Oliver (1997) mentioned; categorization of elevation's typology should start from the shape of the buildings. From the other hand, shapes are effect on the volume of the building such as form of the wall and roofs .Therefore, the shapes of buildings beside each other represent a recognizable image which can identify the building environment. (Oliver, 1997)

Furthermore according to Alberto Saldarriaga Roa, "Ornament should not be taken as a significant element in elevation typologies." But in some cases such as Masouleh village, ornamental elements such as doors and windows become a part of elevation images in their shapes and composition. (Oliver, 1997)

Also façade characteristics of houses are in direct relation with the plan organization of them. As it mentioned before, Masouleh houses classified under two groups which, the ones that include halls or without halls. According to this, the differentiation of these two types is clearly reliable from their façades. The one, which have one to three simple windows are the unit which doesn't have any halls and the other group has bay windows on their facades.

Figure 67:One, Two and Three side windows in Masouleh (By author)

On the other hand, Abyaneh's buildings are constructing in maximum three stories, which have storage and stable in the lower level and the other functions placed in the higher levels. Therefore, this organization is clearly recognizable from their elevations. Lower façades, have small and limited openings. Moreover, these façades have directly in relation with the environment. Therefore, the location of the entrance doors, single and triple doors and also the color of the building are the effective elements in creation of these adoptable façades.

In addition to this, material characteristic, combination of vertical and horizontal structural elements, rectangular form of spaces and plan organization of the functions effect on the houses elevations. (Memarian, 1997, p. 428)

The cultural variations and climatic factor are effect on the shapes and construction techniques of openings. These openings are directly effect on the elevation of this village. Also, these open and semi open formations, are created a visual connection in

between interior and exterior of the context with each other. Moreover, because of the religious ideology of Abyaneh people, the numbers of openings were decreased.

Figure 68: Basic windows type in Abyaneh (www.flicker.com)

Moreover, in Masouleh and Abyaneh settlements, doors have different size and they make with one or two doorpost, according to the human scales. In some houses, the average widths of doorposts are 1.70 cm and the heights are 1.67 cm. However, the width of normal houses is approximately 70 cm and their height is around 1.70 cm. Also windows have different variety according to their size, and decorations. Also, these doors have different hand-grip, for recognizing the gender of the guests. This directly reflects to their Islamic beliefs and culture. (Fig 69)

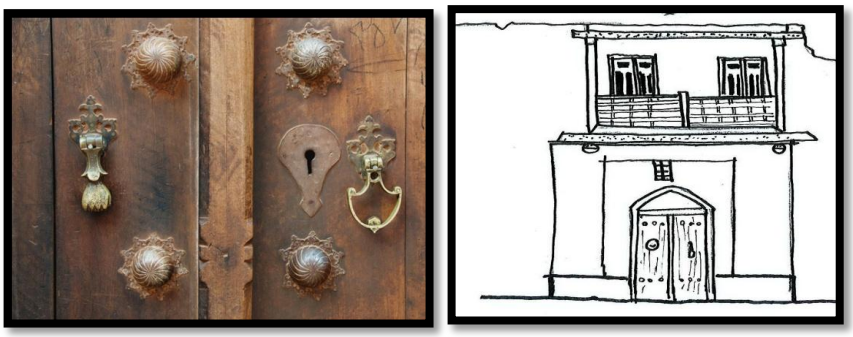


Figure 69: One of the door type in Abyaneh (www.flicker.com)

In addition, local people made them with one, two or three side opening and there is a small window on top of each. These windows are used for natural ventilation. They have different types of wooden grid system which, conduct the wind flow to the buildings. From the other hand, the red color of these buildings creates a unique character in this settlement. (Memarian, 1997, p. 428)

Figure 70: Another door type in Abyaneh, (By author)

In addition, Masouleh buildings generally were adjoined in order to minimize heat loss through external walls in the winter or heat transfer in summer. Similar to the region of the central plateau such as Abyaneh, the traditional houses of this region have inward oriented and have a central courtyard. However, here the rooms on the northern sides of houses were bigger and more important. This was because of the usage of residents from solar radiation in the winter and also getting warmer in the southern sides. Since the summers are relatively short and not very hot in those regions, the northern rooms of houses (winter residence) would be used in the summers as well.

On the other hand, some other factors such as construction material, details and ornamentation, openings and skylines are the effective elements in creation of elevations. This dissertation, will analyze two example of elevation in Masouleh and Abyaneh village to make it more clearly as below ;(Table 18, 19)

Table 18: Elevation Analysis of Residential House in Masouleh, (By Author)

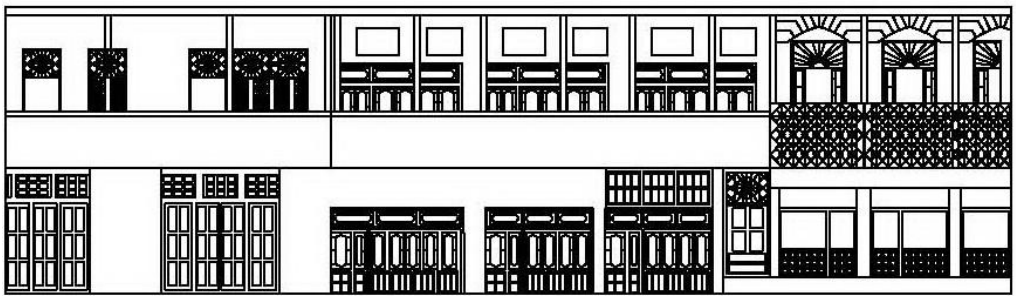
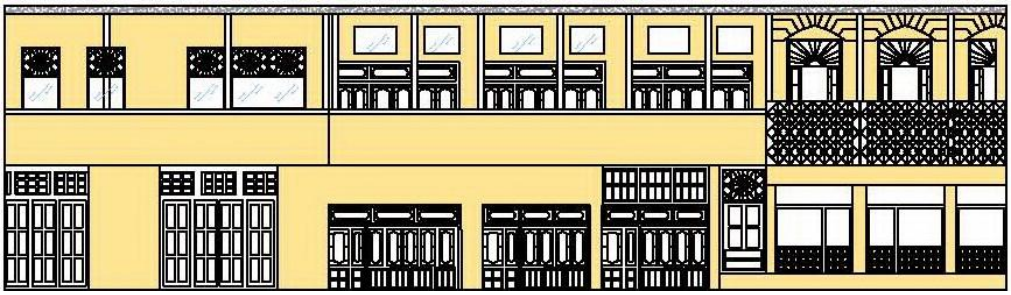
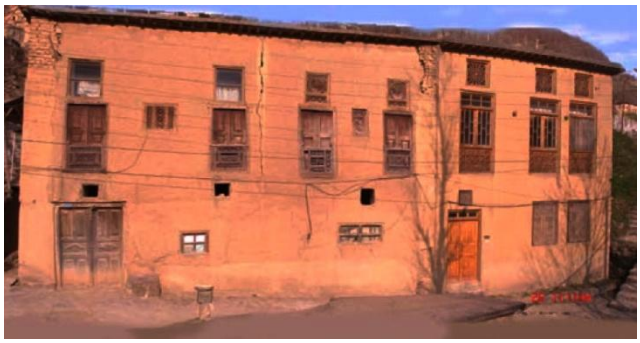
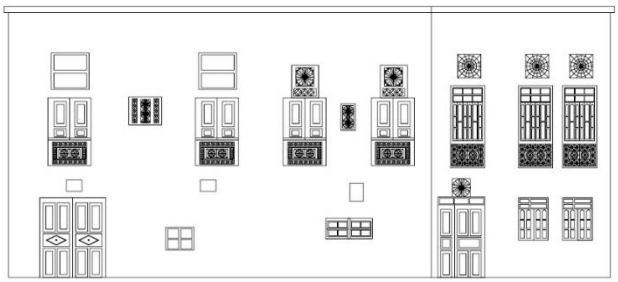
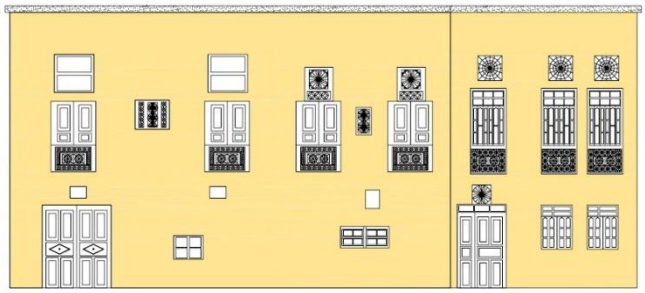
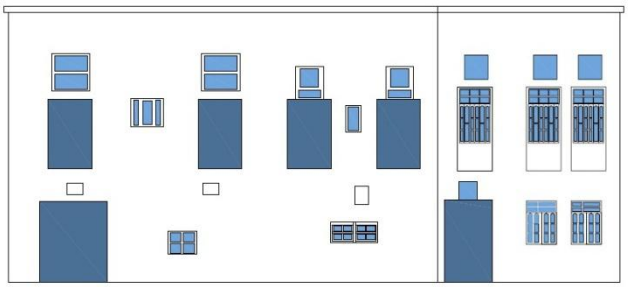
Elevation	
Detail & ornamentation	
Material	
Opening & Windows	

Table 19: Elevation Analysis of Residential House in Abyaneh, (By Author)

Elevation	
Detail & Ornamentation	
Material	
Opening & Windows	

Openings and windows were made by wood and also they have complicated geometric shapes which came from symmetries ideologies .Moreover, these ideologies effect on

many factors and functions formation. For example, they attached two different ring belts on their entrance door for recognizing the sexuality of their guests. Also, usage of colored windows in some cases (Orsi) for providing privacy and sacred atmosphere was usual in this village.

Figure 71 : Windows Ornamentations Examples in Masouleh, (By Author)

4.5 Construction Techniques, Materials and Structure System

Construction techniques and Material are the two important factors, which are directly affecting the building of the villages. Therefore, the usages of abundant building material are effect on vernacular house form. On the other hand, quick look to the history is expressing the usage of locally available material in the construction of the

shelters. According to this definition, “it can be indicated that locality is important in the building process of vernacular architecture. The uses of local material with locally developed construction techniques are common in all vernacular environments.” (Oktay, 2006)

This concept is also mentioned by Aran’s definition (2000) as; “During the selection of indigenous building materials from natural environment, the builder is primarily concerned with whether they can e easily carried to the building site, if they can be worked by means of tools available to him, and if they can be easily joined together”. (Aran, 2000)

In addition to this, the construction technique is in direct relation with available material in the nature. This available material used to determine the construction technique. For example, if the Masouleh village, which is locating on the hilly mountain, whereas stone is the accessible material of this region, therefore the houses will be constructing with stone masonry techniques.

Under this scope, according to the natural resource of the Masouleh and Abyaneh village, the construction materials include the combination of stone, mud brick and wood which all are predominant.

However, the use of earth is observed in this region and the buildings seat on the massive piece of stone. The local people of Masouleh, never break these massive stone pieces because they encompass the large amount of natural source of water and it is working as a barrier for the foundation. Likewise, local people were built the buildings

in two or three story, on the gentle slope of this area, which was adapted to the natural topography of this area. (Oktay, 2006)

Moreover, local people of Masouleh used a gray soil, which is available in this district and it calls ‘Foosh’, as thermal and moisture isolation of the roofs. Whatever people walking on this soil, the density of it will increase and the quality off the isolation will get better. Therefore, inhabitant use roofs of building as a public passage. (Memarian, 1997)

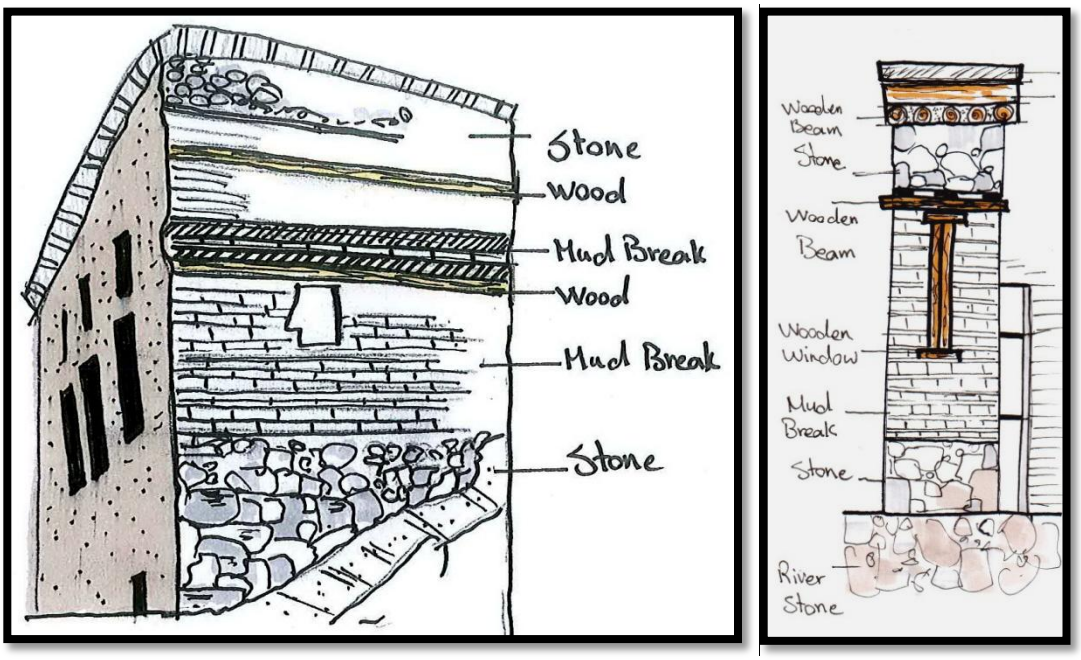


Figure 72: Usage of Abundant Material in vernacular Masouleh Haouse, (By Author)

In addition to these, yellow mud brick, which was used in the elevation of the houses, is clearly visible in Masouleh case. This yellow color will help the adoptability of the houses and nature with each other and seem that this architecture is a part of nature.

Figure 73:Yellow Colour on Elevation of Masouleh House, (By Author)

On the other hand, usage of white soil (Hook Espi), red soil (Hook soor) and yellow soil (Hook Zara) create a nature friendly atmosphere in Abyaneh settlement. Moreover, elevations consist of stone plinth and adobe and coated by red, yellow and white soil. (Memarian, 1997, p. 428)

Figure 74:Red Color on Elevation of Abyaneh House, (By Author)

As in mentioned before, these buildings are projected from the skirt of the mountains and seat on the steep topography. Therefore, the connection of the buildings and earth is very significant in these regions.

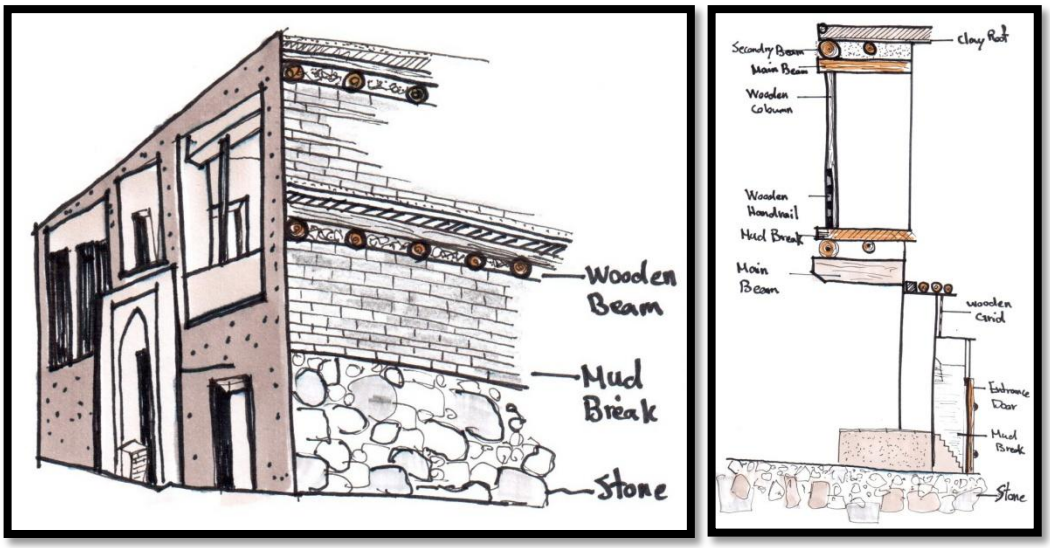


Figure 75: Usage of Abundant Material in vernacular Abyaneh Haouse, (By Author)

As Oliver. P (1997) mentioned, "The footing is the lowest part of a wall's foundation which can be rock hardpan, sand, and gravel, clay, loam and other soils and the object of the footing is to distribute the weight of a building. The bases of structures are in variably made wider than the superincumbent mass to increase the stability by distributing the load over an area sufficiently." (Oliver, Encyclopedia of Vernacular Architecture of the World, 1997, p. 374)

According to this description, in Abyaneh and Masouleh houses, stone was used either as foundation or base course of the adobe or stone walls. From the other hand these types of walls, are the most strong form of mass walling among the other load bearing types.

Moreover, in the case of Masouleh walls, usually built by stone corps up to the first floor and after this level it will be continue by mud bricks. The size of blocks is 80x30x30. Also they put scaffold in different distances (approximately 1 meter) for spreading the forces, which applying from the roof equally.

On the other hand, In Abyaneh village, most of the walls constructed by adobe material and the thickness of them are around 60-80 cm, in the first stories and it decreased in the higher level. Also, locals dig the ground (40-50 cm) to achieve a hard foundation and after that, they put stone pieces inside it. This foundation will come 50 cm higher than ground level. Therefore, this foundation, preserve the building against humidity and random impact of various factors. (Memarian, 1997, p. 331), (Fig 76)

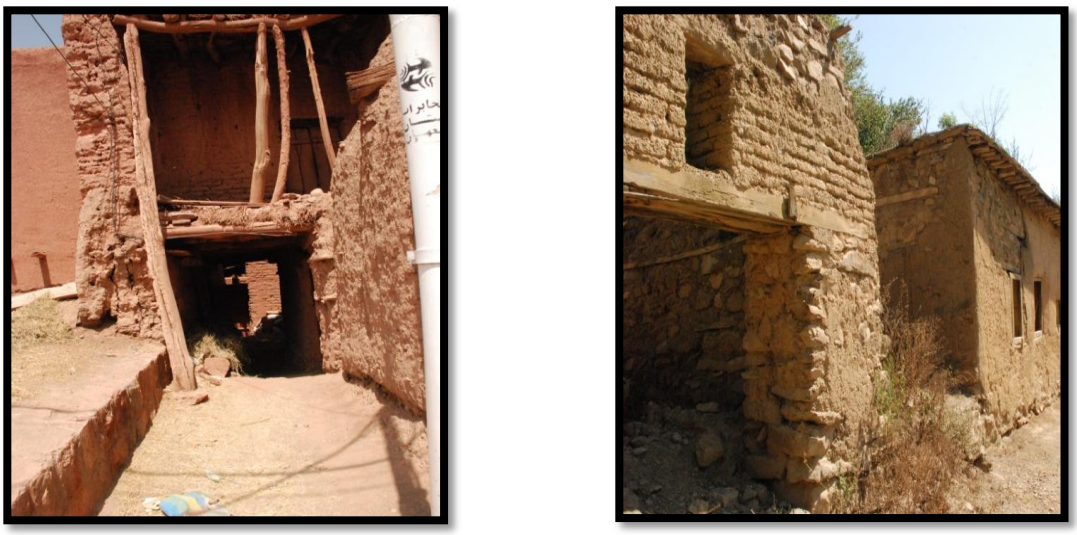


Figure 76: Wall construction; Abyaneh (left), Masouleh (right), (By Author)

Moreover, in Abyaneh village, inhabitants have another method of roof construction in their residential units. After finishing of walls construction, they are locating sub-series beam on top of those walls and connecting them with clay and mud. In next step, pile driving will perform on top of the sub-series in each 25-30 cm. finally they cover them by wooden boards and straws. (Fig 77, 78) (Memarian, 1997, p. 331)

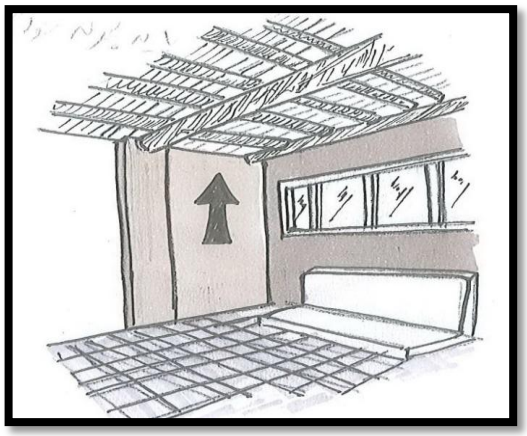


Figure 77: Usage of Wooden Beam (Jarin and Kaleileh) in Coffee house, Masouleh, (By author)

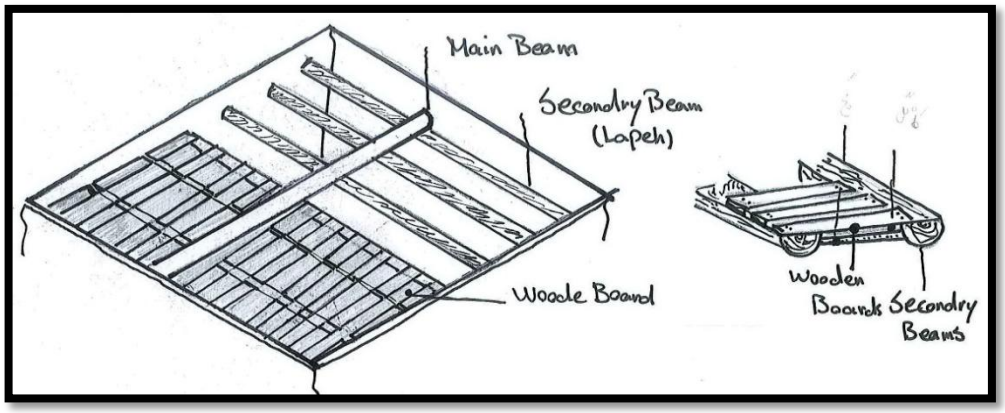


Figure 78: Roof details, Abyaneh, (By Author)

As it mentioned before, rural settlements have direct relation with nature and because of natural disasters, local people construct their building in the response to them. Moreover, the structure system of their units should be adoptive with their situations. Therefore this part will focus on the structure system of Masouleh and Abyaneh villages.

Roof as a covering element have a key role in creation of the rural settlements and also it will define a shape of them. From the other hand ,they have different verity in shape and

forms such as pitch, gable, hipped or lantern roof, but this investigation will focuses on the flat roof which is clearly visible in the Masoule and Abyaneh cases.

Moreover, Oliver.P (1997), in another part of his book mentioned, “Flat roofs are the simplest roofs to construct, with beams of timber or palm laid with their ends on supporting walls. Frequently, a wall plate, or timber beam, runs the length of the wall to distribute the loads exerted by the crossbeams. With the beam ends inserted into the wall and with some measure of wall above them, the transverse beams are kept in tension, and some gain a measure of structural advantage by extending through the wall.” (Oliver, 1997, p. 347)

Under this scope, after finishing of walls construction, local peoples of Masouleh put load bearing beams which called ‘Jarin’ on top of those walls which made by wood, and they located them, parallel with the direction of walls .They have 40 cm thickness and they are placed in the elevations which have many openings. (Memarian, 1997, p. 236)

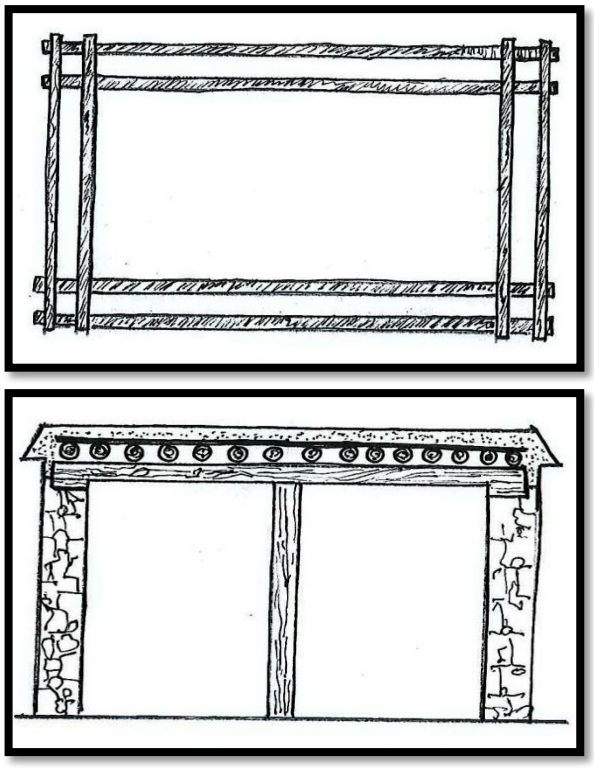


Figure 79: Wooden beams (Jarin and Kalileh) structure (Left), Different Material in Vernacular House, (Right), Masouleh, (By author)

In addition to these, they use another beams, near the walls and parallel to the Jarins which named ‘Kalileh’. Sometimes, they use two Jarin when the width of the rooms is getting increase. After that, they fix secondary beams on top of Jarins in each 20 cm they called them as ‘Vardeh’. In next step they put wooden panels with round section, on top of those beams .Finally they covered those panels by wild ferns .These plants use as water isolation. Soft mud or ‘Foush’ is the final covering material of the roofs and they will create a gentle slope for controlling the rain water. (Memarian, Mamari Maskoony Irani ,Borungara, 1997, pp. 232,236) In Addition, one of the Coffee house In Bazaar have this structure system and it is clearly visible as below;

From the other hand, some of the other buildings of this village have indirect roof construction technique. It means, after establishing columns by inhabitants, they put capitals on these columns. Therefore, after putting the wooden platforms and straws, they cover them with bushes. Finally, they cover these roofs by the mud mortar which has 20-30 cm thickness. Generally this type of structure is visible in the wide span and public building of this village such as ‘Jamee mosque’. (Fig 80)

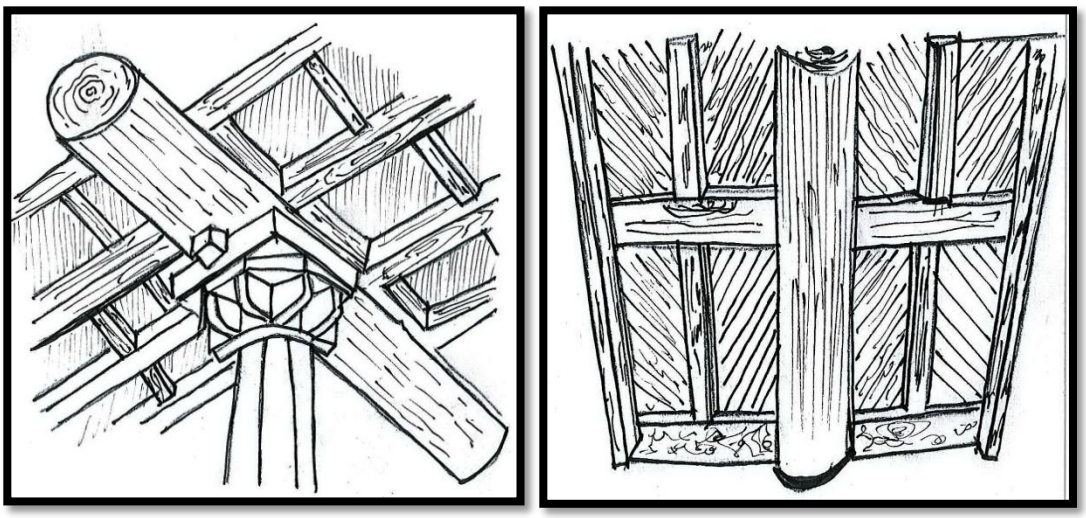


Figure 80: Roof details, Abyaneh, (By Author)

Chapter 5

DISCUSSION

In the previous chapters, the term ‘vernacular architecture’ has been described by considering many different parameters. This dissertation started by describing the general expression of vernacular architecture. It is followed by looking into Iranian vernacular architecture according to geographical and climatic factors with analyzing and comparing the Masouleh and Abyaneh villages, which are located in the skirt of mountains of Iran. Physical factors with a special focuses on environmental factors, have been considered during analyses in both villages. In sequence, **morphology, typology and topology** of Iranian vernacular housing in general have been studied. According to this, types and characteristics of these houses were varying due to the change in this mentioned criterion.

In this manner, Iran is mountainous country as it is mentioned before. Hence, there are plenty of variations in **topography, climate and geographical** issues among these mountainous region and due to the analysis of **Masouleh** and **Abyaneh** villages. However, it differs from the rest with its special location and richness in the topographical features. Moreover, finding and observation show that, vernacular Iranian houses in these regions, are climatically responsive house, which were built by considering the sun path, wind direction and existing temperature. On the other hand,

inhabitants of these areas were aware of the climatic characters and they knew how to deal with these issues.

Under this scope, the vernacular case studies of Iran which, located on steep topography, projected out from the mountains. From the other hand, both villages have extroverted character as it is perceived.

In addition to this and according to the **climatic** aspects, Iran has four different climatic regions which has special character that reflects it into vernacular architecture. Due to the analysis, it is clear to claim that both cases located in the border of these climatic divisions, therefore, these two villages have multi-climatic character and this description, and it directly affects on their orientation.

Moreover, **Environmental values** and **daily lives** are very important issues in the formation of these houses as it can be understood from the general description of the vernacular house types. Therefore, environmental values, space uses and design characteristics of vernacular houses will directly influence the formation of the housing units and they are going to be discussed in order to identify these context.

Furthermore, **topography** is another important and axial environmental factor which has the key role in creation of these settlements. Both villages are located on the steep topography, which have differences in the slope angle. Moreover, generally on the steep topography, main passage and secondary passage are shaped according to the natural factors; it means that topography dictated the limits of developments in these regions.

As it is observed, when the topography becomes sloppier, then the density or compactness of the houses increased correspondingly. On the other hand, **cultural**

factors such as; **religion and beliefs**, **economy**, and **social structure** had effective impact on the density of these rural settlements.

In addition to these, all of those mentioned factors were influenced on the **basic design principle and design elements** of these rural settlements. In general, houses are composed of rectangular units in various dimensions, which are located on top of each other and create a hierarchy in between the units and nature. Moreover, it could be perceived as the repetition of the nature. In other words, it could be claimed that, formation and orientation of the units and adaptation with the environments were one of the comprehensible example of nature friendly design, in Iranian vernacular architecture.

In addition to all these, adaptation related with location and orientation, also houses constructed with simple **plan organization**, according to the inhabitant's requirement. As it is mentioned in analysis part, they are being formed from one simple room and they integrated in vertical, horizontal direction. Usage of some shared facilities such as bathroom, toilets, bakery and etc; was another design characteristic of these two villages. Categorizing of functions such as; private and public areas was clearly visible in those built environments.

Also, flexibility of the plan organization was another important character of those rural houses. Usage of winter-room, summer-room, bay windows and balconies obviously, prove these facts. These spaces were developed in a way to provide comfortable atmosphere for both in summer and winter periods.

Moreover, another climatic precaution was obtained by the thick walls and they act as heat insulators. According to this, **material and construction techniques** were other

important factors in creation of vernacular houses. Due to the mountainous characteristic of these settlements, stone was a common building material in these regions. Also, some of the houses built with sun-dried (adobe) but the foundation of all houses were made of stone.

On the other hand, timber, is the other frequently used building material in Masouleh and Abyaneh. Especially in the roof structure, windows and doors were constructed by these abundant materials. Also wooden materials, have proper adaptability with the climatic characteristics of these areas. In addition, load bearing walls is the only structural system for the vernacular Iranian houses with 5 -6 m span.

Finally, this dissertation discussed about the **urban form and special relation** of these two villages as the most special character of them. As it is mentioned before, the arrangement and extroverted orientation of the unit from one hand and limitation of the spaces from the other, created a dense atmosphere in these two cases. Therefore, the interrelation of the interior and exterior spaces is one of the most important topics which is still on the agenda of the scientists. These hybrid spaces are the connector of the living, working and leisure spaces in reality. In addition to this, in these spaces were isolated from each other in the past. Generally, houses have separated are for their living and working. Therefore, this is the new achievements of contemporary sustainable architecture, which was visible in some rural settlements in the past.

Therefore, the result of these findings, are going to be comparatively discussed in different scales such as; plan organization, streets relationships, material and construction techniques and etc.

The table below compares the main characteristics of vernacular architecture, in Masouleh and Abyaneh;

Table 20: Comparison in between Masouleh and Abyaneh characteristic, (By Author)

Vernacular Architecture	**Masouleh**	**Abyaneh**
Location &Geography	In the boarder of Northern Coastal & Mountainous and High Lands	In the boarder of Northern Coastal & Mountainous and High Lands
Topography	Very steep (∠ 60-70°)	steep (∠ 45-60°)
Climate	Temperate and Cold	Hot and Dry
Plan Organization	Extraverted, Vertical & Horizontal development, Variation of Shared Spaces.	Extraverted, Vertical & Horizontal development, Limitation of Shared Spaces.
Economy &Family types	Animal husbandry, Hands crafts, trading.	Animal husbandry, Agriculture.
Façade	Simple and flat elevation, Variation of opening toward south direction with Balconies.	Recessed elevation, Variation of opening toward south direction, with Jumbas.
Construction Techniques	Mud brick, Stone, Wood. Load bearing wall	Adobe , Wood, Load bearing wall
Structure	3-5 m Spans	4-6 m Spans
Culture and religion	Zardosht & Islam	Islam
Urban Pattern and spatial relationship	Very Dense housing development with direct accessibility of indoors & outdoors facilities.	Dense housing development with indirect accessibility of indoors & outdoors facilities.

Moreover, various methodologies shows various perspectives where makes a difference.

As the result of these analyses, the below guideline will summarize the useful, points which can provide a view for the future housing developments in topographical areas:

-Orientation of the house toward south (or south-east) direction.

-Creating more openings especially in the south façades.

-Designing minimum or no opening on the north (or north-east) façades.

-Locating openings on the opposite walls, in order to use natural ventilation.

-Providing semi-open spaces in between the houses.

-Providing shared spaces in between the houses.

-Designing in relation with the topography.

-Considering the demands and everyday needs and of the users.

-Using natural, local and recycle building materials which have adaptation with climatic features.

Through all discussions, it can be said that, the case studies demonstrate a number of ways in which appropriate traditional architecture can be achieved on sensitive sites. Equally importantly, they show that most of the excuses offered for failing to achieve high design standards in such places are not valid. The general, most important lesson from all the studies is that all successful solutions depend on allowing time for a through site analysis and building analysis and careful character appraisal of the context.

Under this scope, some key terms such as specific physical appearances, cultural attributes, traditional way of life and environmental conditions are the formation of vernacular architecture in Abyaneh and Masouleh.

Chapter 6

CONCLUSION

Without any doubt, Iran is a mountainous country in comparison with its neighbors. In general, cities of this region are located in between the mountains. In addition, the populations of the cities are getting increased nowadays; therefore, new inhabitants of these cities already started to settle in these specific surroundings, which are located in the steep mountainous regions. According to these limitations and due to the result of the findings which have been discussed in Masouleh and Abyaneh villages, the necessity of the staircase housing in contemporary architecture, which has rooted in the history, is clearly visible.

In contemporary architecture, cities are considered and constructed with separated functions. Also, the borders between public and private, work and home, inside and outside, spaces are sharply identified. (Zanjanian, 2010)

Usage of public spaces such as; balconies, roofs and courtyards, as architectural elements are defining the boundaries between inside and outside. Therefore, representing the public spaces within private buildings is an ideal way to generate hybrid spaces. For example the courtyard of a residential complex could be used as a public plaza. (Zanjanian, 2010).

In other words, this hybrid space will act as a multifunction space in these cases. This description, has the quality of all known spaces that have experienced by human beings, during their life's and collects them together as a single spatial entity.

According to this description, Masouleh and Abyaneh Villages are the two fine traditional examples of such urban fabrics which were discussed before. Buildings have been built into the mountain and are interconnected. Courtyards and roofs both serve as pedestrian areas similar to streets and public spaces. It is popularly known as "The yard of the above building is the roof of the below building". (Zanjanian, 2010)

In addition, the lack of natural energy resources has a very significant role in recent developments. Therefore, adaptation of the new built environment according to the climatic factors which have been considered in terms of the usage of natural environment, air ventilation, sun saturation and etc, is another major factor in appearance of staircase housing.

Besides, recent house development is filling a gap between users and their cultural traits in Iran. Unfortunately, isolation of the people from each other, according to separation of their living facilities, is one of the most effective reasons on creation of these gaps. Staircase housing, is providing an appropriate social and cultural relationship in between the users.

Also, due to the sequence of time, as one of the important concerns, the way of life of the people changes, and technology in the construction field develops parallel to the time. Therefore, these changes should be considered while developing new proposals in addition to the consideration of existing fabric.

In this perspective, as the vernacular staircase houses were developed by considering the cultural attributes of the societies and environmental characteristics of this region, with no doubt, learning from these staircase houses are valuable for future housing development.

Iranian staircase vernacular architecture, with different geographic and climatic characteristics exhibits a distinguishing vernacular pattern from the rest of the Iranian rural architecture. These studies also lead to a number of more specific conclusions as below;

- With skill and care, it is possible to accommodate old traditional uses.
- High environmental standards can help generate a successful vernacular architecture.
- Sensitivity to context and protecting the natural environment, parallel with preserving the cultural values, and the use of traditional materials are binding with contemporary architecture and functional relationships.
- Socio-cultural values influence daily lives, and they have a great impact on traditional plan layout of houses in both villages.

Immigration of the new generation of locals to the city centers is one of the important problems, which are directly related to their expectations from their lives. According to this, the traditional life style and lack of technological facilities are the most significant factors, which affect on the immigration of these people. Therefore, by considering these facts and proposing new solutions such as; providing internet access and using new

material and construction techniques, this problem will be solved easily. On the other hand, conservation of these villages is another significant point, which affected on these immigrations.

As the result of these discussions, it might be said that, nature friendly design, culturally respective and sustainable environmentally creat the main character of this type of staircase housing which can also be designed in the contemporary architecture of Iran by learning from the vernacular architecture of Masouleh and Abyaneh, with respect to the traditional notions.

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APPENDIX

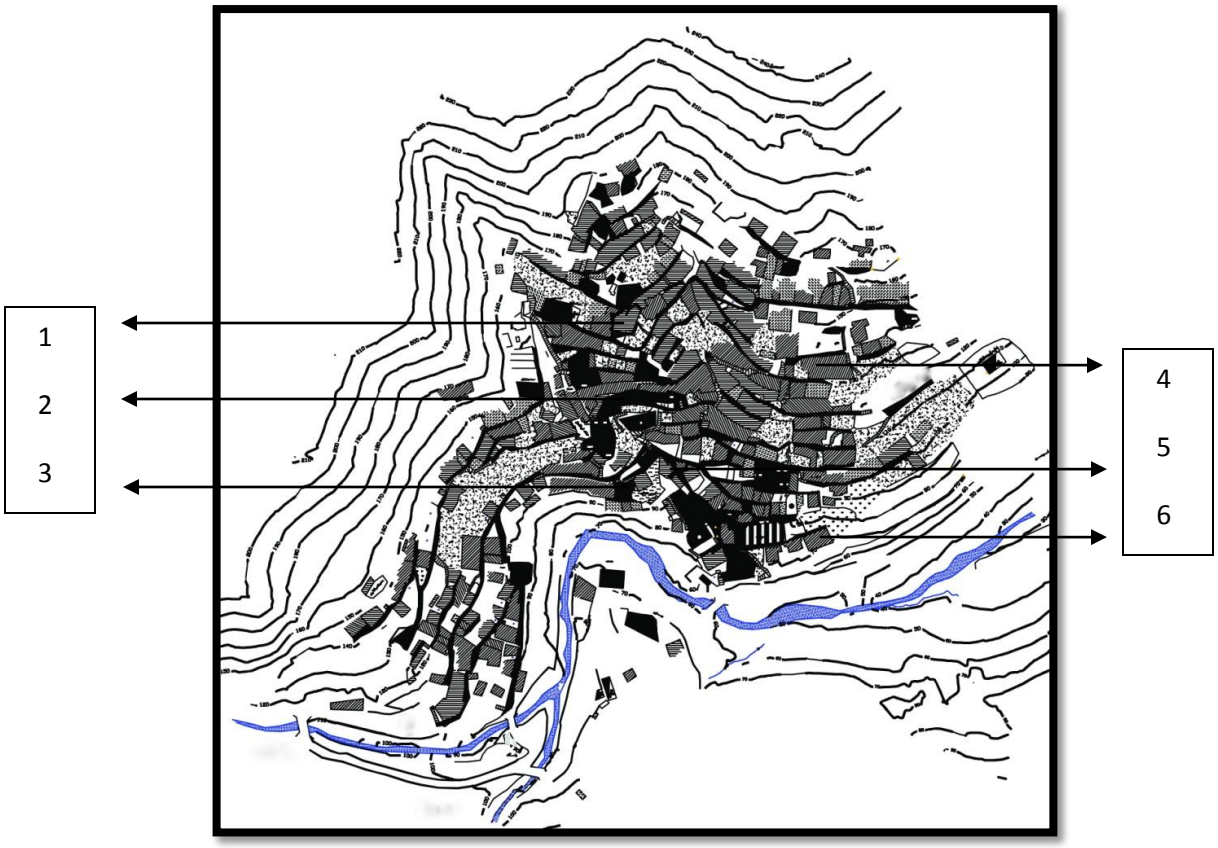
Appendix A:

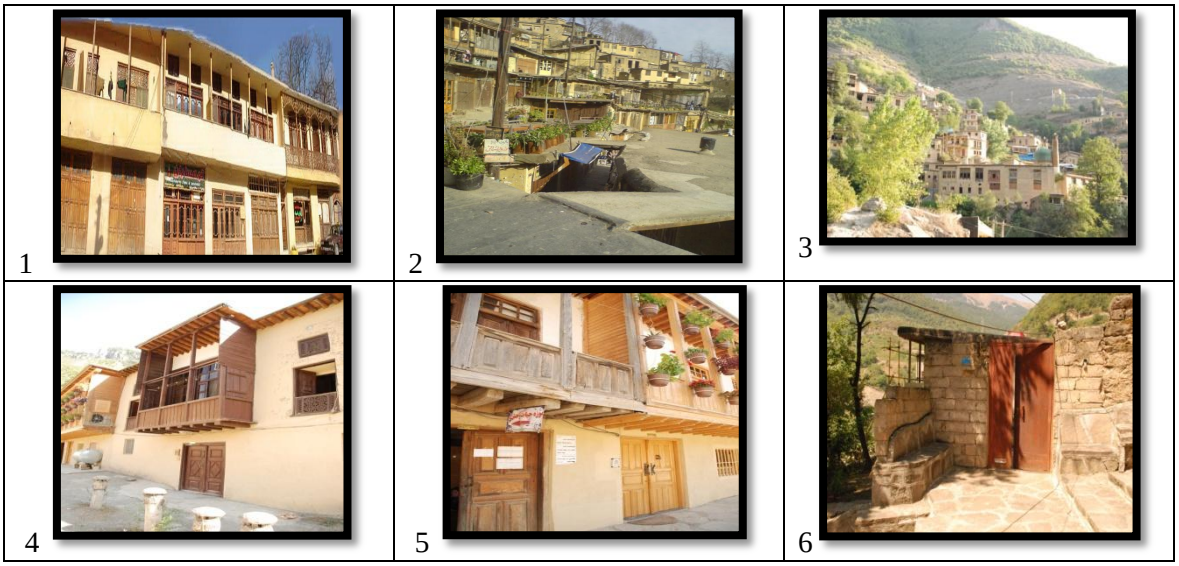
List of Foreign Phrases:

Persian	Description
Hashti	The entrance space of the house
Choghom	Winter room
Someh	Special room which is mostly suited at the back part of the bedroom or living room
Orsi	Large windows with colorful glass pieces
Koloon	Doorknob
Keh	House in Masouleh dialect
Kaya	House in Abyaneh dialect
Eyvan	Roofed semi open space usually closed on three sides and open on the fourth which appears on the edge of a courtyard
Rood	River
Moarragh	Wooden hand craft which is using in windows and doors.
Matbakh	Kitchen
Talaar	Balconey
Tarme	Corridor

Appendix B:

Location of the Masouleh houses in the map:





Location of the Abyaneh houses in the map: