International Journal of Architecture and Urban Development
Vol.7, No.3 Summer 2017

A Comparative Study of Vernacular Architecture Compatible with Mild and Humid Weather in Gilan's Western Plains
(Case study: Gasht, Shalma and Gilandeh villages)

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Recieved 10.04.2016; Accepted 13.02.2017

ABSTRACT: Looking at the role of climate in indigenous settlements of Gilan, which are formed based on the Uniformitarianism principles for the environmental comfort of residents in the basic body, and stability and compromise with the natural factors, as a basic and immutable principle over time has created various species in its context based on the needs and availability of basic infrastructure. Gilan's Western plains, as a geographic split of microclimate (mild and wet), which has its own unique characteristics, in formation of variable species, according to the needs of households, in terms of population growth and vernacular materials, which is associated with the formation of a space with sustainable self-sufficiency for local residents, and in addition to optimal locating is appropriate in terms of orientation and e building elongation. Accordingly, the comparison between variable species in a microclimate (plain geography) with its own unique features will be obtained as separated assessments from body to climate framework, with deductive components which can form a native settlement, through field work on sustainable buildings in plain villages and functional analysis of samples, attached to professional population of Housing Foundation, which have special knowledge of the characteristics of rural housing related to rehabilitation and re-run today's models. Therefore, providing transparent assumptions on the challenges and principled solutions through questionnaires with derivatives percent available for population, has managed to improve the quality of the results of this study.

Keywords: *The Western plains, ecological, typology, climatic regions, settlements*

INTRODUCTION

The first performance of the home is to create shelter, a haven which provides peace for inhabitants. Village House is a safe and reliable "inner place" against "external environment" with the extent of the wild nature. Therefore, the first performance of the home is primary need of rural people. The formation of the house is affected by a variety of environmental factors of three surrounding environments which in different species are formed based on special regional and local materials of the area by natives of the area. In other hand the home may be defined as the totality of (building) elements involving components which separate the indoor of the building from the outdoor. They are made according to various criteria such as environmental, technological, socio-cultural, functional or aesthetic factors (Arce & long, 2013).

In fact, the most important characteristic of rural homes, especially (Gilan) is simplicity and harmony with the natural environment surrounding them, in such a way that, a building not only is not a waste element that is added to the environment, but is risen from its surroundings, and the stability is reached due to its exposure (Brombrozhe,1996, 23). Different methods and climatic elements are used in buildings, to provide a comfortable living condition. Such buildings act as a living organism that is inherently sustainable responding to various bioclimatic changes with a minimum waste of energy (khatibi, 2012).

In fact, relying on local materials, and the possibility of construction in Gilan, which is caused by environmental conditions, not only has led to a different appearance of the buildings in the area, but due to the abundant use of wood and plant fibers in the building, and special properties of these materials, methods of construction in Gilan is distinct from other parts of Iran. Studying traditional methods of construction in Gilan to identify a species of "architecture in harmony with nature", Leads us to full interaction of man

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and the surrounding environment, that all of them indicate Intelligent human knowledge in time with the technical limitations of construction, and the sense of respect for nature. As architectural elements and building components, all in order to build a dynamic architecture in this particular area of the building not only by benefiting from natural curran in the summer leads to climate comfort in the spring and summer, but in winter with a layer of semi-enclosed elements, such as Faken, reduces the amount of heat exchange between indoor and the surrounding environment. So understanding the traditional architecture features in the terms of heat, humidity,wind and sunlight, provides useful experiences for present design resulting gradual evolution in a long period of time. (Soltanzadeh & Ghaseminia, 2016).

Accordingly, the logic of construction and materials are selected based on potential and natural resources in the region and leads to use the local materials, combining fences, columns, headers and wooden beams and flowers used in walls, decoration by flowers and roof with four slopes are considered as individual components of a vernacular architecture, that in the passage of time has damaged stability of the building like natural disasters such as floods and earthquakes, which is considered as an effective factor among the indicator species in each region. So These lessons contribute to vernacular architecture which is the focus of many urban scientists all around the world (Indraganti, 2010).

MATERIALS AND METHODS

Due to the climatic conditions play a decisive role in shaping the Vernacular architecture features of rural areas, identifying rural different species and monitoring of case examples based on the geographic area defined in terms of harmonic and climatic characteristics based on the basic climate is considered as one of the essential reasons for doing this applied research. The use of evaluations based on key issues with the aim of adaptability of utility in expert view on the most important theoretical content has been considered as a field project based on the analysis of rural settlements typological in geographic areas of the Western plains of Gilan as the field method of research. Accordingly, this applied research is considered as a descriptive- analytical, which has been mixed with the data collection methods, including documentary and field methods. Raw data were collected via interpretation and descriptive methods and relying on available deeds and documents and field studies and then valuable aspects of using nature in vernacular architecture in Gilan's Western plains were deduced from analyzing the text content-here architecture works is considered as text (Alipouryani & Nouri,2011). for this purpose, first, theoretical descriptions are described by referring to literature and library resources, which briefly the climatic characteristics of the Gilan's architecture and exclusively plain areas have been described. In the study population, active architectural experts in the geographic area of research have been recruited as the project's past and current executives by the Rural Housing Foundation and who have adequate familiarity with unique characteristics of rural housing architecture. Also the statistical population of the study is 100 people who answered the questionnaire.

Based on geographic boundaries, and division of microclimates from the perspective of basic climate (mild and wet), they have been approximately divided into the four coastal areas, mountains, foothills and plains, which each of them will be divided into and western and eastern areas and exclusively central in the plains area in terms of broad geographic reach (Taleghani, 2009). The Western plains of Gilan, in terms of geography, has numerous urban and rural areas, which according to research focus on the nativist; villages of Gasht, Shalma and Gilandeh in the city of Fuman, Talesh and Shafat,were considered as examples of the scope of research in selection of examples of Native Housing Index.

The Basic Configuration of Housing of Native Villages in Gilan

The architecture of Gilan has been considered less with a surprisingly different structure. It sounds like architecture of this area from the material used to form the whole building under the influence of the surrounding environment(Sajjadzadeh et al.,2016).in Gilan geographic reach, which air humidity and rainfall is very high, rural housing should not only meet human needs related to shelter, but must include climatic comfort relatively. As such, residential building must be constructed in such a way that reduxes moisture in the environment over human tolerance to have proper temperature and humidity conditions. In this area, because of moderate temperatures in many times of the year, reduced air humidity provides comfort because discomfort in summer is felt due to high relative humidity of the air at all times a day. So, wind can move easily in order to repel moisture around the body and the human environment. This need has led to build rural-residential buildings roofed with transparent layers and with a lot of openings in external walls (Khakpoor, 2004).

The relationship between the building and the environment is considered as the most obvious aesthetic features of Gilan rural buildings, which is rooted in geography, cultural issues and style life in Gilan. The lack of tangible boundary between inside and outside has given to it different effects compared with the central regions of Iran. In fact, the traditional Gilan rural-rich architecture of the form, is based on the precious experience of the past, and based on needs and in harmony with environmental factors have emerged(Sajjadzadeh et al.,2016).

Architecture Gilan Plain Regions

In different parts of the plains of Gilan where the climatic characteristics cause a particular kind of architecture, outward-oriented architecture, regardless of the contradictions and complexities of construction technique, and variations in the utilization of local and available materials, we're seeing similarities in the scheme of this type of architecture, the majority of similarities in these buildings include:

1. The existence of the porch and hallway in a four-walled

Table 1: Geographical scope of the case studies the central plain of Gilan (Source: wikiroosta,2016)

“Shalma Village “home Mosavi	“Gilandeh Village “home Mosavi zadehe	“Gasht Village “home Mohtasham talab
		
Mosavi home” located in the village of” .Shalma, is the city of Shafat	Mosavi zadehe home” located in the vil-” .lage of Gilandeh, is the city of Talesh	“Mohtasham talab home” located in the vil-lage of Gasht, is the city of fouman.

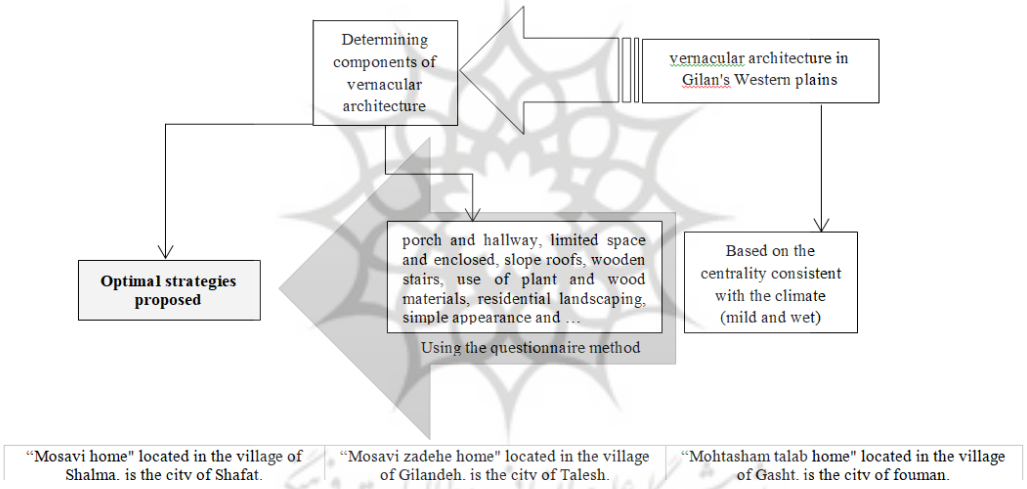

Fig. 1: Diagram of research structure

building that most biological environments.

2. Get the limited space and enclosed in the heart of the monument and surrounded by a hallway and porch for winter time.

3. Four roof slope and steep slope roofs.

4. Multi-layer being the main views and spaces with a maximum porosity in the outermost level.

5. The height of the residential parts of the getting off the ground.

6. Placement comfy wooden stairs without an intermediary style that the relationship between the grounds and the supply of housing.

7. The mass use of plant and wood materials and uncoated amood.

8. Sophisticated communication within and outside the building and even residential landscaping.

9. A simple appearance and be not conformed dwellings each area and avoiding abundant luxury oriented and decorating (Tahbaz & Jalilian, 2011).

The four characteristics of the dwellings of the plain Gila can be distinguished from includes the following items:

The height of the Earth's surface to protect it against moisture in the ground.

Fans with steep slope.

The existence of one or more of the aisle and the porch in views.

Construction of houses based on vertical plan common build dwellings that central in Iran (Making room on the horizontal inner courtyard) is different. (Taleghani, 2009).

The Evaluation of Architectural Typology in Gilan Province in the Region of Plain

With regard to studies conducted on architectural typology of this area, six types of architecture were identified in the area. After these studies, it was found that houses were being built

with a maximum of two storeys. In terms of number of storeys, the types include a one-room (the so-called colonizer which encompasses the poorest class of rural community), two-room and three-room house and two types of four-room and six-room houses. The difference in spatial organization of the mentioned types has its roots in the economic situation, social base and livelihood of its inhabitants (Yaran & Mehranfar, 2013).

A Look at the Geography of the Western Plain of the Gilan

The cultural - architectural sphere of the Gilan western plain includes parts of the cities Fuman, Talesh and Shafat. The houses of the area are generally built either in the direction of East or with a little rotation from East to South and this is due to the use of maximum sunlight and air flow. The used materials are indigenous as other rural areas of Gilan and available materials are used. The walls in this region are mainly the combination between the "Chineei" [1] "Zegali" [2] and completely Zegali. Because of the abundance of straw in the area,"Kolosh"[3] is used as Zegal in the walls. In fact, all the art of living in the Gilan plain can be summarized in coping with difficult climatic conditions such as annual rainfall by almost 1280 mm, the humidity between 70 to 90 percent and temperature fluctuation between * 20 and * 37 (Farajolah rad, 2008).

RESULTS AND DISCUSSION

The selected examples in the geographical domain exclusive from the research scope (Gilan western plain) is considered as the most prominent autochthonous buildings in the villages of the area that has been explained by complete and optimal field studies. These are examples of rural settlements in which the combination of construction techniques and the implementation of stratiform, adobe and "Azgemiee"[4] walls and wooden pillar and beam system covered by a ceiling made of stubble (rice stalk) has been used.

The proportions of buildings in the facade and plan is noteworthy aesthetically that it responses residents' biological functions properly. These cases are also visible even in the proportions of the rooms and its relationship with layout of instruments inside them. Other indicator of buildings is harmony with the climatic conditions such as the use of air flow through creation of open bodies in building storeys and sufficient slope of ceiling to prevent moisture penetration and seasonal rainfall on main body of the building. In such an environment, the construction of the building should be carried out with precision techniques to resist the building against moisture penetration (Ansarmanesh & Nasrollahi, 2014).The provision of autochthonous materials can be considered to be another significant feature of buildings. The use of materials such as wood, mud and straw which can be found abundantly in the region and with the ability to absorb in the environment, has been very economical and environmentally friendly.

One of the most important factors in field evaluation of residential types of a region is the physical study of a building that gives direction to components such as height, dimensions and size, levels of the building, geometry and form, proportions and dynamism of the form. Additionally, the implicit comparison in the form of columnar tables explaining minor differences and macro similarities of an autochthonous structure in a similar geographic range will be achieved.

The consideration of climatic criteria on content analysis of the formation of a residential building in local habitats which involves: consumable materials, semi-open seating spaces, orientation of original facades and the factors

influencing the control of accommodation of structure and context in an approximate comparison form on three selected samples with regard to the witness and field accounts have been obtained in the form of a columnar table3.

According to the results of this research, the architecture of the area as a function of residential units is desirable and provides a climate suitable for residents of this area. The emphasis on local materials and construction facilities in the region due to different environmental conditions is not only the appearance of the buildings in the area. But due to the extensive use of wood and vegetable fibers in the building and special properties of these materials, construction methods in Gilan are distinct from other parts of Iran. Now, according to the questions related to indigenous components in relation to climate assessment, the most important research strategies can be elaborated (Table No.4).

The Analysis of the Field Functions

One of the supplementary stages of descriptive content of the selected case examples in geographic sphere of Gilan western plain is the presentation of variable hypotheses that have been obtained in the form of a questionnaire by a five-part transaction percent. The aim of problem statement to people present in the field plan is replication to the strategies that offer desirability level of its opinion to the researcher with regard to its expertise view on existing and constructing structures of rural housing. It is consequent of the field survey through the assumptions and

Fig. 2: different species of the western plain of the settlements based on number of rooms. (Source: Taleghani, 2009)

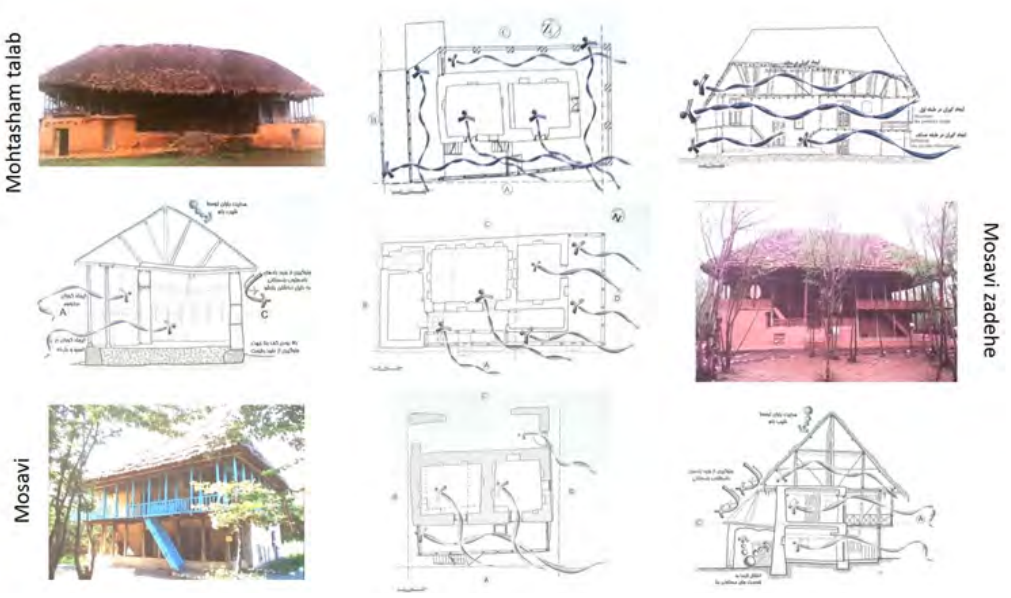

Fig. 3: Visual analysis of internal and external space communication system case examples (Source: Taleghani, 2009)

Table 2: comparison of the western plain of the index of the physical structures in Gilan

Houses	Floor count	Altitude	Dimensions plan	Building level	Geometry and building form	Proportion and scale buildings	Dynamic buildings form
Mousavi Zadeh	2 floors	7/70 m	7/60*16/30m	-ground level -half a floor - first floor	- Rectangular and cubic volume of building plan with four sided roof - Four-sided roof with the formation of the double pyramid form in a column in the middle of the two end and that at the base of the larger in the level.	- Rooms and other spaces is quite in accordance with the scale of the human - The rooms are almost rectangular. The layout in a way that any object or tool has its own specific location - Main building façade in its three components of the Golden proportions and $\sqrt{2}$.[5]	Repeat columns in the main facade and combine it with the stylish slabs and the shape of the tape fence underscores horizontal lines will be considered to create dynamism in the building
Mohtasham talab		8m	7/50*20m				
Mousavi		9/30m	11*10/30m	-ground level -first floor			Being built on the floor two layers of terser, kotam ,verkotam and walls creates the shadow room, circulation around the motion path and the possibility of building a horizontal and vertical direction, there are two rows of columns on the first floor and also form the premises of important factors in the dynamics.

Table 3: comparison of the climate component of the western plain of the index structures in Gilan

Factors affecting climate being compatible with building	The main facade orientation	Open half spaces (Location of porch)	Consumable materials	Houses
-The orientation of the axis of rotation with 25 degrees, according to the South, towards the East (better use of sunlight and seasonal winds) -Porch and half floors to create airflow helps Curran and the space between the ceiling and the porch shade temperature is reduced -Residents living in the transmission indoors in cold seasons due to the minimum opening in the central core for heat dissipation -Sloping roof for downpour -On the ground floor of a higher exposure to moisture penetration	To the south, 25 degrees toward the East	South East-North-East	-The use of different wood native to the area -Application of the stone in the Foundation and Koluseh (wooden soil-resistant base) -The interest savings from the clay on the walls -The use of straw (rice stem) in the roof and walls lined	Mousavi Zadeh
-The orientation of the East, Convenient to use the sun's seasonal winds to create Curran - The direction of the establishment of the planned building with wide and open with an elongated and narrow form, Curran and the possibility of natural ventilation in summer winds to a favorable winds. - Korser, kotom and verkotom in Eastern and southern factions that have taken place in the summer to make the air flow and the Curran and helps the mediator to have outside air adjustment -Create drop-down and the lack of a minimum window in the building to avoid the waste of the heat in the winter				Mohtasham talab
- The orientation building facing Southeast (the use of solar light and seasonal wind) - Ground open space as a place to create shade, reduce temperature and air temperature difference with the vicinity of warm air coming out. The orientation of the building in the direction of the winds of the summer and the formation of the favorable winds of Verkotam (first floor side view porch) facing to the Northeast causing Curran in the building. - To cope with rain, sloping roof and in the northwest part of the winter wind direction, Fakon (along the roof) was built.	The Southeast	South East-North-East and in the North-Western wing rated Fakun(The roof of the bulge ahead to prevent rain penetration)		Mousavi

presuppositions made in the form of research purposes.
A periodic field visit has been formed from content of the raised questions which have a hypothetical role, derived from special rural housing improvement projects provided by the Housing Foundation Organization under the supervision of HFO experts in the form of content
description, approximately 100 people participating in the project field have been used as statistical population. It has been presented on desirability of their views by proposed strategies as the following bar graph with the aim of investigating the status of spaces designed and implemented in the past and today.
The most important strategies which have been proposed in response to questions raised as a principled solution include the following items :

Benchmarking the type of layout and separation of private and public spaces of local habitats

Taking into account the practical and scientific strategies to maintain residents' environmental comfort in cold and heat seasons with minimal or no use of electrical appliances.

The use of a combination of affordable and durable structures in order for stability of building in natural challenges either floods or earthquakes.

The change of attitudes in functional principles of a building in terms of spatial layout of variable storeys

Replacement of autochthonous materials derived from the raw materials available in the region in order to change local businesses such as agriculture in the path of industrialization

Evaluation of local and regional indexes as original patterns in the provision of a variety of affordable residential species within the compatibility of built fabric and natural environment.

CONCLUSION

With regard to brief studies and applied analysis on variable species in a microclimate of basic architecture, Gilan plain area is optimal as performance of native habitats and it has being provided perfect climate conditions for residents in the area. The reasons for the suitability of Gilan plain architecture and its compliance with climate of the region can be cited as follows:
The building proper orientation considering local prevailing winds and natural light, existence of balcony and terrace, proper shading and ventilation around the building and connection with nature, the importance of a semi-open space with the ability to transform into a closed space by the help of flexibility of walls for use in all seasons, flexibility, space, maximum use of light and natural ventilation, sloping and two-shell roof for ventilation, two-shell floor for the use of natural ventilation and establishment of artificial ventilation systems and building height above the ground, paying attention to the size of openings, angle of building and place of opening relative to the direction of wind for more favorable ventilation, enjoying, collecting and storing rainwater, paying attention to open access (nature) and the integration of building with it, the existence of tree besides the building for shading in summer and prevention of cold in winter, paying attention to the proportions

Table 4: questions based on the Aboriginal component in the evaluation of climatic

No	Reasons and needs to build a native habitat harmony with the climate
1	About how classify and locate areas of public services to habitation As a compatible approach to climate exchange air flow You agree with the miniaturization of structures in architecture today?
2	According to an old pattern in how the location and scale of the original openings Indigenous residents of the settlements in order to maintain comfort in cold and warm seasons Can be achieved without the use of heating and cooling equipment?
3	The use of local materials in the interior and exterior building coverage area with new model combines a body structure for greater rigidity Can be a useful approach to localization the growing settlements in the region?
4	Taking into account access and service spaces such as porches volume in the body, according to the arena of the key elements of extroverted introvert Flexible changes structures on the heterogeneity of comfort with a central courtyard resident's artifact energy is more effective?
5	Flexibility in how the spatial layout of each floor plan with variable functions for each function In the synchronization needs of today with yesterday on the formation of local bodies is the influence?
6	The use of industrial materials rather than artificial processing of local materials For example, cover the roof using rice stalks in the past and today, with new materials such as straw or clay Which has considerably architectural configuration of the damage cannot be considered as modern localization?
7	Using software architecture modeling in order to evaluate the local index to optimize the physical-spatial patterns, especially walls, openings and roof In order to reduce wasted energy and alternative materials selection persons The with local dynamics can be long-term strategy in the residential elements of the drawing area?
8	Taking into account climatic factors such as wind direction, solar radiation, rainfall and... As the most important component of the formation of local settlements by not using local materials Can be used to comfort the residents as a space to achieve harmony with the climate?
9	Repetition using models and indicators of sustainable settlements in the region And the composition and evolution with changes to the preservation of the local environment, to what extent will help?

Fig. 4: analytical evaluation of the level of compliance than expert opinions questions

and the old patterns, the use of traditional materials combined with the updated manufacturing technology (insulation) and the application of new appropriate materials inspired by the concepts of the past, an appropriate response in accordance with the culture, traditions and economy of the region, taking advantage of the past construction principles (construction system) and application of a light space separator wall such as taking advantage of Azgemic wall construction system using resistant wood and autochthonous materials and thatch insulation between them are among the principles observed in Gilan Province plain areas.

ENDNOTES

1.The wall construction system in which the mud that have been flattened by hand, is cut off square shapely with dimensions of approximately 20 cm in 20 cm and overlaps wetly.

2. The wall construction system in which one or two side of columns are covered by thin branches of trees or straw and the space between branches is mudded.

3. Rice stalk

4. Nefar wall in the local dialect

5. One of the architectural ratios that was used in ancient times and this is √2 ratio whose application continues in architecture to this day. The rectangle which is drawn using this ratio is called √2 rectangle. Its length to width ratio is 1.414.

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