**ISBN** 978-93-84422-50-9
**Proceedings of 2015 International Conference on Green Buildings, Civil and Architecture Engineering (ICGBCAE'15)**
*Dubai, Dec. 25-26, 2015 pp. 73-78*

# Green Hotel: A Lesson from Traditional Architecture

Alireza Vafaee Hosseini [1], Atefeh Moghadam Ariaei [2]

[1,2]Master of Architecture, Principal, Khane Memar Toos Aria, Mashhad, Iran

***Abstract*:** *Iranian architecture adhered to certain principles, observable in traditional buildings. These principles are presented based on the attention of various levels in design. Natural element in environment is one of the vital factors that Iranian architecture focuses on. Traditional architecture in Iran had inevitably shown an intimate connection with nature, responsive to their users' requirements and needs. This paper aims to find green strategies for hotels via analyzing the green strategies in the traditional courtyard buildings and then the paper points out how these values might be used in establishing a green framework for modern hotels in Iran. According to Iranian culture, hospitality is very important, so hotels are special places in Iran. Twenty selected traditional Iranian buildings were examined in this paper. The criteria included in this study are building form, orientation, daylight sequences and details. This study reveals green strategies adopted in design for traditional Iranian buildings that may be applicable in contemporary hotel design.*

***Keywords:*** *green hotel, traditional building, courtyard, daylight*

## 1. Introduction

In traditional architecture of Iran, the presence of natural elements, such as light and wind are always apparent. The respect for these elements and their potencies to affect the design is always as a main part of a design system. The better perception of natural capacities and their specifications is useful [1]. It is clear that application of renewable energies causes less impact in the environment because they are basically more compatible with the nature of human as the user.

A great aspect of traditional buildings is its adaption to the special climate (hot and arid) of the most parts of the country [2]. Fulfilling occupant's physical and socio-cultural needs is one of the famous principles in Iranian traditional architecture [3]. In Iran, the most preferred building is one with a courtyard. In order to minimize the area affected by the solar radiation, compact forms are chosen. By arranging those forms with courtyards, shady areas can be obtained. In courtyards, with the help of water and plants for evaporative cooling, the floor temperature can be minimized by the high walls surrounding the courtyard.

A large number of these traditional buildings especially houses, have different functions nowadays, museum, handcraft exhibition for tourists and hotels. Many of traditional courtyard houses decorated for tourists as hotels. There is a strong Middle Eastern literary tradition based around hospitality. Iran, like a spiritual- cultural reality, demonstrated throughout the life of people who constantly maintained the sequence of their cultural creativity and national identity [4]. In Iran there are considerable evidences for hospitality that dates back to at least 2000 BC [5].

Here this paper attempts to analyse green strategies in twenty traditional buildings which registered in Cultural Heritage Organization and remained as a valuable building to find and establish green framework for

modern hotels in Iran. As modern hotels introduced modern facilities for more comfortable living, but departed greatly from the familiar traditional strategies that response to its cultural values and climatic situations.

## 2. Hot-Arid Region in Iran

Climate has had a great impact on the spatial arrangement in Iranian traditional buildings [6]. The hot-arid region includes most parts of the central Iranian plateau [7] (see Fig 1). In this climate, summer is very hot and arid, while winter is very cold, with less rain and snow [8]. In this region, the sky, for the most part of the year, is cloudless, while the temperature fluctuates wildly [9]. Because of this situation, architects should provide logical solutions for human comfort. Early men built houses to keep out the elements; rain, wind, sun and snow [10]. Their purpose was to provide an environment favorable to their comfort, and even survival [11].

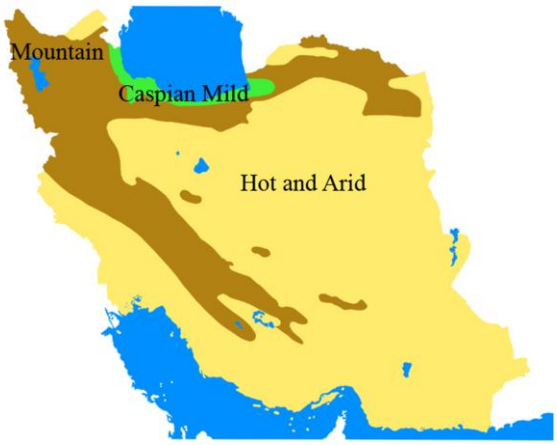


Fig 1. Hot- Arid region in Iran

### 2.1 General Characteristics of traditional Architecture in Hot- Arid Region

Hot and arid regions in Iran have warm summers and cold-dry winters. Weather has a main effect on the performance of a building, and it has forced people in the past to build their houses in response to the climate by using special techniques. Regarding these climatic features and specific problems and limitations, Iranian traditional architecture with great experiences can find logical solutions to create a pleasant life in this region [8]. This harsh climatic conditions of this region have had a high influence on the orientation and spatial organization of the buildings.

Iranian architecture adhered to certain principles, observable in traditional buildings [12], the point that is currently absent. Iranian architecture principles are presented based on the attention of various levels in design. Natural element in environment is one of the vital factors that Iranian architecture focuses on [1]. These principles have influential roles in traditional buildings, with some of them being specified for houses, for example; inward looking.

#### a. Having Courtyard

There is an inner courtyard and all the spaces surrounding it. Courtyard is a social space with an environmental function [13]. Fulfillment of user's needs and respect of their beliefs are one of the primary principles in Iranian architecture. Iranians emphasizes private life, so building special houses has gone to inward-looking shapes. Although in most part of Iran this item has a climatic role, the first step demonstrate the behavioural manner of Iranians (see Fig 2).

**b. Inward looking, Closed and Surrounded**

Most of the traditional buildings are introverted or inward looking (see Fig 2). All of the spaces were also arranged around an open courtyard that formed the link between different areas of the house [14].

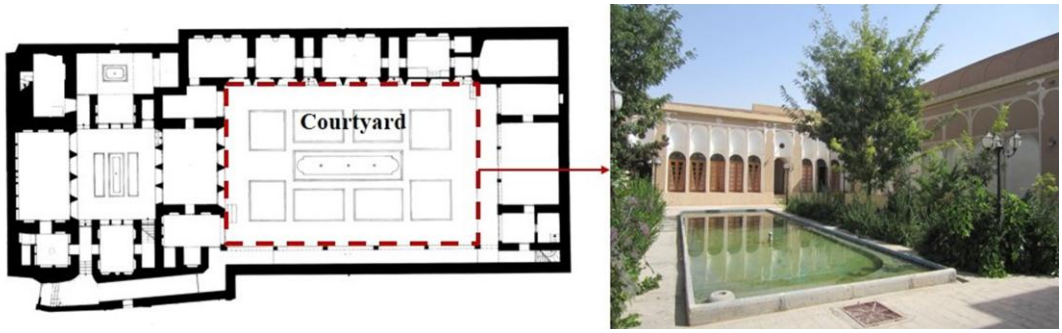


Fig 2. Courtyard in traditional building, Hot-arid region of Iran

**c. Floor of Buildings**

In most traditional buildings, there is a difference between the level of buildings and streets. The advantages of this lower level can be described as follows:

-After sitting some parts of the buildings on the ground, heat exchange will be limited and temperature fluctuation will be reduced.

-The building will be more resistant against earthquakes [8].

This difference in level can be seen in traditional houses as well. After the main door, entering spaces are designed to be lower than the streets, and finally, the courtyard is the lowest space in this path.

## 3. Building Orientation

Topography is a necessary parameter that determines the architecture of the hot and arid area in Iran. In this region, traditional buildings are molded according to the slope of a hill of the city; and due to the sun, wind and weather, they are oriented in two distinct directions. Owing to the characteristics of sun and wind in this region, the North East- South west and North West-South East (see Fig 3) are suitable position for orientation in order to maximize summer and winter room's usage, as well as service rooms at the east façade (receiving west daylight) acting as a buffer zone for the heat [3].

Most of traditional houses are formed along an orientation which is near to the orientation of north to south. This allows the house to be divided into a part in the north and a part in the south of the house.

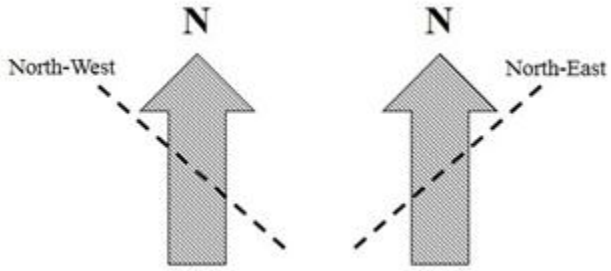


Fig 3. Building orientation in hot-arid region of Iran

## 4. Courtyard and Daylight design strategies

The traditional architecture of Iran has been a subject of scrutiny for decades, and via such researches, many mysterious tricks are discovered, with architects utilizing them to create meaningful spaces. Besides its functional aspect, day lighting was important in traditional architecture, due to its spiritual and decorative aspects. Day lighting was integrated with other elements of architecture, and remains inseparable from it.

Natural light is the primary source of lighting in a building, due to the lower costs and its permanent status. Different spaces in traditional houses have unique response towards daylight [15].

The courtyard model provided various functions for the residents and its users. Many scholars in Iran have displayed this model as an appropriate solution to the functional, climatic, social and cultural needs of the Iranian people. Climatically, courtyards acted as efficient micro-climate controllers and important element to distribute daylight, as all of the rooms and spaces surrounds the courtyard [16].

The pool inside the courtyard is a transparent element, which plays an important role in light reflection and passing the light to the internal layers of the house [15].

## 5. Methodology

The main aim of the paper is to find the green framework for modern hotels in Iran, after analysing twenty case studies (traditional buildings). The data and findings in this study are derived from two phases. In the first phase, the author had a trip to hot- arid region of Iran for providing the documents of these buildings. The documents were taken from the Cultural Heritage Organization in Iran from the best traditional buildings that remained. The focus of data collection was only on buildings that registered in this organization as valuable traditional buildings. Most of these buildings were traditional courtyard houses, mosques, palaces and schools.

In second phase, the author had a trip to different cities of hot- arid region to have a direct observation and all the principles about Iranian traditional architecture that are mentioned in this article were tested in twenty buildings and the results are shown next part. These factors were analysed: building form, orientation and daylight strategies.

## 6. Results and Discussion

After analyzing twenty traditional buildings in hot- arid climate, most of the Iranian architecture principles are confirmed. All the strategies which examined in this paper are match with culture and Iranian beliefs, the point that miss in modern buildings nowadays.

### 6.1 Building Form

- All these houses have inner rectangular courtyard and other spaces surrounding the yard.
- The courtyard plays a vital role in providing cooling atmosphere for other rooms.
- In courtyards, with the help of water and plants for evaporative cooling, the floor temperature can be minimized by the high walls surrounding the courtyard.

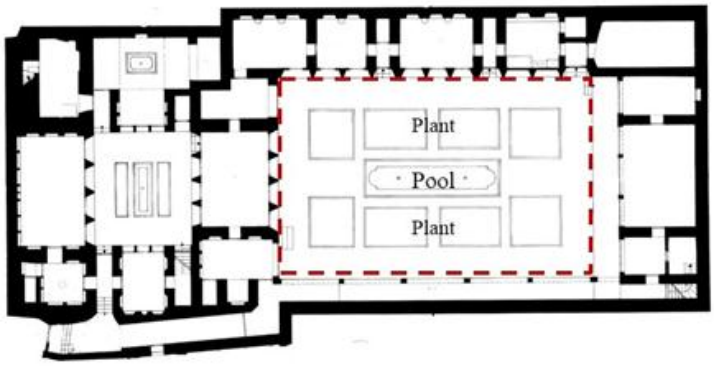


Fig 4. Inner rectangular courtyard

### 6.2 Building Orientation

- All of these traditional buildings had a specific orientation, due to the sun, wind and weather. Because of this direction, in all four season in Iran, all the rooms and spaces can be used (see Fig 5).

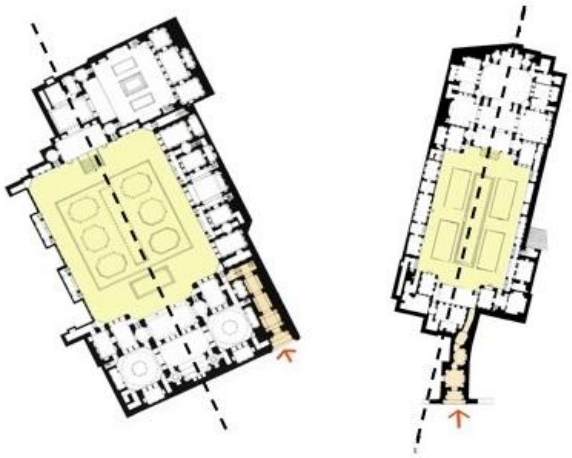

Fig 5. Traditional buildings with correct orientation

### 6.3 Daylight Strategies

- Each opening in a traditional building consists of many details that play an important role in optimizing daylight.

- All the openings abide by the aforementioned rules, which are beautiful lattice wooden frame, with colorful glasses decorating the façade surrounding the courtyard.

-The layering of spaces is designed correctly, and abides by the rule for dragging light into inner spaces of traditional house.

## 7. Conclusion

As it can be concluded from the consequences of the case study, there are many different ways for using natural elements in designing buildings. The traditional architecture of Iran is enriched by various green strategies that may be adopted in modern hotel design in Iran and enhance the quality of design in them.

Although it is not possible to repeat all the traditional strategies for contemporary buildings, but it is possible to drag suitable strategies from them that is practical for modern layout. It seems that these methods are so simple, but by observing them, users will understand fine and graceful changes in their buildings.

Hot- arid region of Iran have the majority of tourists, so we need more hotels in this region. By adopting these green strategies in new designs, it would be more grateful for visitors and new buildings will be compatible by climate.

## 8. References

[1] Vakili-Ardebili, A., & Boussabaine, A. H. (2006). Quality concept in Persian precedent architecture: A lesson in eco-building design. 23th International PLEA Conference, Geneva, Switzerland.

[2] Ayvazian, S. (2005). Light in Traditional and Islamic architecture of Iran, Architecture& Urbanism magazine, No. 78/79.

[3] Pirnia, M. K. (2005). Introduction to Islamic Architecture in Iran (Vol. 10). Iran, Tehran: Soroosh Danesh.

[4] Nasr SH (2003) Iran and Its Eternal Culture. Javedan Kherad (Eternal Wisdom). Tehran: Soroush, 1: 459-481.

[5] O'Gorman, K.D. (2007). Iranian hospitality: a hidden treasure, journal of contemporary Hospitality, 9(1), p. 31-36. J.

[6] *Memarian, G., & Sadoughi, A. (2011). Application of access graphs and home culture: Examining factors relative to climate and privacy in Iranian houses. Scientific Research and Essays, 6(30): 6350-6363.*

[7] Daniel, E. L. (2006). Culture and customs of Iran, Greenwood Publishing Group.

[8] Ghobadian, V. (1998). Climatic Analysis of the Iranian Traditional Buildings. Tehran: Tehran University Publications.

[9] Soflaee, F. (2005). Environmental Analyzes of Courtyard in the Sustainable Architecture of Hot-Aired Region. Paper presented at the Printed in Proceeding of International Conference of Kerpic Network,ITU, Turkey, Istanbul.

[10] Bemanian, M. R., & Moradchelleh, A. (2011). Residential Architecture of Bushehr, Connector of Introversion and Extraversion in Architecture. World Applied Sciences Journal, 13(7): 1643-1648.

[11] Fathy, H. (1986). Natural energy and vernacular architecture: principles and examples with reference to hot arid climates, Chicago: University of Chicago Press.

[12] Pirnia, M. K. (2007). Architectural styles in Iran (Vol. 5). Iran, Tehran: Soroosh Danesh.

[13] Meir, I. A., Pearlmutter, D., & Etzion, Y. (1995). On the microclimatic behavior of two semi-enclosed attached courtyards in a hot dry region. Building and Environment, 30(4): 563-572.
http://dx.doi.org/10.1016/0360-1323(95)00018-2

[14] Nabavi, F., Yahaya, A., & Goh, A. T. (2013). Daylight Design Strategies: A Lesson from Iranian Traditional Houses. Mediterranean Journal of Social Science, 4(9).
http://dx.doi.org/10.5901/mjss.2013.v4n9p97

[15] Arjmandi, H., Tahir, M. M., Usman, I. M. S., Utaberta, N. & Sharif, R. (2010). Application of Transparency to Increase Day Lighting Level of Interior Spaces in the Dwelling Apartments in Tehran – A Lesson from Iranian Traditional Architecture, Journal of Design+Built, 3: 41-55.

[16] Bahadori, M. (1978). Passive cooling systems in Iranian architecture. Sci. Am. (United States), 238(2).
http://dx.doi.org/10.1038/scientificamerican0278-144