
Ecological evaluation of landscape using Feng-shui theory at Shandiz urban region, NE Iran

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Abstract: Landscape evaluation has an important role in developing and maintaining sustainability on local, regional and global scales. For this purpose different mathematical, empirical and traditional approaches were applied including Feng-shui theory. The basis of this theory refers to the Chinese traditional knowledge, examination and evaluation of the intrinsic energies of people and places. At the present study the site analysis and the landscape evaluation with Feng-shui theory were applied using the shapes and imaginaries of the landforms in the Shandiz urban region, northeast of Iran. The unsustainable development plans along the land use changes in this region has resulted in land degradations and natural hazards. Therefore, it is necessary to explain the traditional or ecological landscape evaluation at the study area. Based on the Feng-shui method we investigated the assigning nine-lattice zones map of the study area to achieve the ecological landscape evaluation. We think this method is a useful fresh traditional method for application in Middle East area. Our results exhibited that the central cave spot and four directions at the study area had spatially adaptation on the Lo-shu tablet in the nine landscape zones. These zones revealed that the new optimal strategies based on Feng-shui variant characteristics which are the brief research outcomes of landscape evaluation.

Keywords: Landscape, Ecological Evaluation, Feng-Shui Theory, Shandiz

1. Introduction

The ecological investigating of structures, functions, and landscape forms depend on the socioeconomic, natural and cultural characteristics. Landscape ecology should play a critical role in achieving this goal of developing and maintaining sustainable landscapes and regions (Naveh, 2007; Musacchio, 2009). Gardens, parks, cities, and urban landscapes are spatial extensions of living spaces for human beings, and they need to be designed to satisfy human needs for a better quality of life in a given socioeconomic and cultural setting (Chen and Wu, 2009). For example in the East Asian countries the land form and pattern including rapidly expanding urban areas, has been significantly influenced by the nature-oriented and traditional knowledge for ecological evaluation and environmental planning named Feng-shui [or wind-water] theory (Forman, 1995). This ancient theory emphasizes the process-based

perceptual experience and holistic understanding of the natural landscape as well as its hermeneutic implications. This theory is an alternative tool for urban evaluation and is emerging as a new paradigm for achieving a harmony between humans and nature. The unity of human and nature philosophy is the ideals and practices of landscape architecture which were profoundly influenced by ancient Chinese philosophies and cultural traditions (Chen and Wu, 2009). This theory is included two main schools of Compass and Form school (Mak and Ng, 2005). The form school focuses on the relationship between the morphological features of the landscape and the movement of Qi spot while, the Compass school is based on the metaphysical speculations of cosmology as originated from I-Ching [Chinese book of exchange] which analyzes of Qi spot on landscape orientations and astrological changes (Mak and Ng, 2005). The cognitive and empirical notion of Feng-shui seems compatible with modern landscape

ecological perspectives. For instance, the notion of ecological sustainability which depends on the combination of adaptability and change in environment and human systems (Zonneveld, 1989) is consistent with the central tenet of Feng-shui theory that has a major bearing on the urban planning and landscape management in Asia (Hong et al, 2007). The Feng-shui theory not only applied in these territories because, the evidences shown this theory have been also widely applied in parts of the world such as United States of America, Great Britain and Australia. For example an analysis demonstrated that 14 out of the top 20 major cities in the world are conformed to the ideal Feng-shui model (Mak and Ng, 2005). In the present time the new techniques and multi scale data such as remote sensing, geographical information systems and spatial data on land cover/ use patterns can be used in landscape and urban evaluation by using Feng-shui theory (Hong et al, 2007). Also this traditional theory could be interpreted with new numerical models such as fuzzy approach and artificial neural network method (Chang et al, 2009). Its context may cover the entire cycle of a building environment from urban planning to interior design (Skinner, 1989). Spatially, principles of Feng-shui are similar to the concepts of landforms and networks where, mountains, rivers, residential areas, and urban regions are all landscape elements. Feng-shui is the skill and art of planning and placement of cities buildings and interior spaces used to achieve balance and harmony with nature (Henderson et al, 2003). This paper aims to explain the traditional and ecological landscape patterns for the Shandiz urban region, northeast of Iran. Iran lies in the temperate zone in the arid and semi-arid belt of the world (Mansouri Daneshvar et al, 2013). In general, the study area in NE Iran has mostly arid and semi-arid geo-climate and locally, this region has the some ecological characteristics which are related to interaction of main rivers in a basin outlet. The study area is influenced by potentials linear green spaces corresponding on the rivers. So this area is affected by new unsustainable developments with increasing the anthropogenic activities, urbanization, land use changes and degradation. These critical factors are degenerated the susceptible landscape of the study area. Above mentioned conditions necessitate an ecological management to preserve the protective landscapes. At the present study we tried to address the site analysis and the landscape evaluation with Feng-shui theory by using the shapes and imaginaries of the landforms to reach a protective plan. Therefore we focused on the form of the landscape zones derived from the landscape ecological evaluation. We wish that the method and output of this research could be used in similar semi-arid and mountainous regions. Also the present study has the potential to become one of the new papers as it offers a rare example of applying a traditional Chinese cultural theory in a Middle East country.

2. Material and Methods

2.1. The Study Area

The study area includes the framework of Shandiz urban region which located in the northern part of Binaloud mountainous zone, Northeast of Iran (Fig.1). The topographical features are dominated by mountains and hills from 1250 to 1500 meter a.s.l. The study area locates between latitude from 36° 21' 30" N to 36° 24' 55" N and longitude from 59° 16' 25" E to 59° 20' 32" E with total area of about 18.35 Km². This region is geographically backed to mountains and surrounded by enfolded hills, and belted with rivers in front. The rivers named Zoshk and Kang are crossed on two linear hydrological sub-basins that are locally appeared two temperate air masses along. The study area climatically is characterized by mean annual precipitation of 249.2 mm and mean minimum annual temperature of 8.1°C. The main land use practices at the study area are semi-compact pasture lands and gardens. The pattern of settlements at the study area is varied between valley-villages to sprawl urbanization which are concentrated at Shandiz city. This city is quickly developed in one decade (1999-2009) from 589 ha to 1340 ha while, is quietly populated in same time-period from 4000 to 7000 people.

2.2. Feng-Shui Theory as an Analytic Approach

Feng-shui theory is included a set of empirical principles that integrated biophysical landscape features with cultural traditions and religious beliefs to guide the practice of selecting and designing dwelling and burial spaces (Hong et al, 2007). This theme is consisted with the central tenet of Taoism, a celebrated Chinese philosophy, which asserted that human beings should harmonize with the rhythms of nature. In this theory universe is seen as the result of the interplay between energetic spot of the earth, atmosphere, and people. The theory is included two main schools of Compass and Form school. Compass school is primarily based on the use of Luo-Pan, also called as Feng-shui compass. In this school the practice is composed of the elements of time in space and their direct reference to the astrological and other symbols (Xu, 1990). On the other hand, the Form school first observed the landscape formation and terrain then determined the best location and orientation for a layout (Chen and Nakama, 2010). The Form school has concentrated more on the analysis of a site by observing its geographical shape and landform imaginary. So, the analysis has been conducted based on five geographical factors, respectively, termed as Mountain, Sand, Cave, Water and Direction (Xu, 1990). Feng-shui theory stems are divided to Yin-Yang dualism, the Five-Element theory and Eight-Trigram theory. Yin-Yang dualism is the conceptual basis for both the Five-Element and Eight-Trigram theory (Chen and Wu, 2009). The Five-Element theory further articulated how the five essential elements comprising the world are related with

each other and how they can be arranged properly to achieve sustainability. Eight Trigrams is commonly related with more components that make up the world is popularly called Octagon Ba-Gua tablet (Fig.2a). In this regard the nine-lattice map of Lo-Shu tablet is in the combination of the Ba-Gua tablet. The sketch of ideal Feng-shui model based on form school is explained the relationships between the key elements of the five geographical shapes and factors as the basic practical system after the nine-lattice zones (Fig.2b).

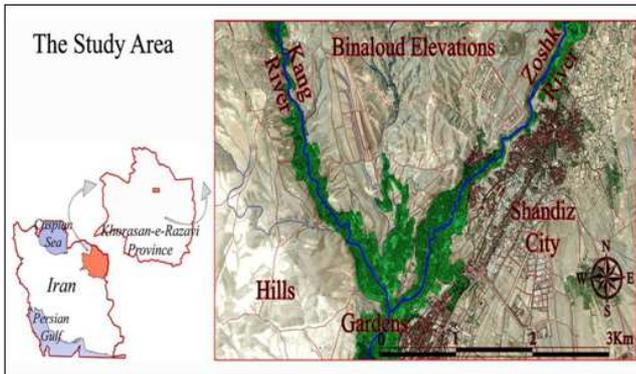


Figure 1. The position of the study area

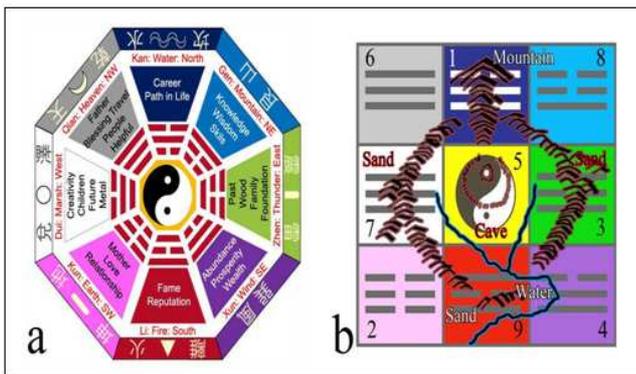


Figure 2. a) Eight-Trigram of Octagon Ba-Gua tablet, b) the key elements of the five geographical shapes and factors after the Lo-Shu nine-lattice zones

2.3. Data Processing

At the present study based on Feng-shui method we investigated the assigning nine-lattice zones map to achieve the optimal strategies for the ecological landscape evaluation of the study area (Fig.5). Data process scaled after digital elevation model (DEM) derivation and terrain Google satellite images. Philosophically, all of the Feng-shui theory characters are applied point-by-point in the selected region but necessarily in this study we considered the geographical positions after the present elevation trends instead of traditional Chinese directions. In Feng-shui theory front usually referees to hills in south and back means mountains in north. While in the NE Iran we selected the back of the site upon the southern Binaloud elevated areas and the front of the site faced to northern gardens and flat hills of Mashhad Plain.

3. Results and Discussion

3.1. Analysis of the five Geographical Factors

Feng-shui is based on the understanding of the landscape, the land profiles, the sources of rivers, the terrain, etc. The analyses are based on five geographical factors, namely Mountain, Sand, Cave, Water and Direction. First factor is Mountain that means the mountain ridges and represents the topography of the site. The second is Sand that means the enfolding hills, rough lands or plantations that represents the surrounding environment and protects the Cave center from disturbance or winds. Cave as the third factor named Feng-shui spot of basic energy namely Qi or Chi that means the niche and best location for a site including an open area. Cave is called land spirit and is interpreted along with the natural phenomena of climate change and crop growth (Whang and Lee, 2006). Fourthly, Water represents water flow through a site and finally Direction is included four orientations of the left (Eastern Blue Dragon), the right (Western White Tiger), the back (Northern Black Tortoise) and the front (Southern Red Bird). The optimization of cave is dependent upon active flows of energy, material, species, and information as well as the harmonious interplay between mountains and streams the two elements of Feng-shui (Hong et al, 2007). According to the results the selected cave center of the study area is located between the two main water flows of the region that named Kang and Zoshk rivers. This center is a real concaved land which is covered by gardens and scattered settlement (Fig.3a). As well as this center are protected by the gardens and plantations namely Archang area (Fig.3b). Geographically this cave center is placed on southern part of Shandiz urban region. According Feng-shui Analysis the Shandiz city is located in the left of the cave while in the right side are existed the hills of Dizdar. These hills dominantly are protected the cave against the local wind flows. Back and front of the cave are restrained by elevated Binaloud Mountains and Archang gardens respectively. These elements and forms are shown based on terrain Google map of the study area (Fig.4).

3.2. Ecological Evaluation of Landscape in the Study Area

Feng-shui theory can be use to evaluate the landscape and plan of the residential areas. For achieving to good green place in ecological evaluation of a study area this theory considers including a good green landscape, rich water and abundant trees and bushes (Yuan and Liu, 2009). An abundant garden especially near of energetic spots is a symbol for good Feng-shui. An energetic spot is a place which made the ecological axis of connections. In the study area the Archang gardens in the front of cave center should be protected as a first strategy. A traditional landscape might also serve purposes for ecotourism and environmental education (Chen et al, 2008). On the other hand it is necessary to prevention of spatial development at the back of cave center which is reached to mountains and it must be forbidden to residential settlement in this elevated area. To

improve the landscape elements is proposed to add the waved water space. The location of Shandiz city at the left side of cave center is provided the chance of developing to the healthy place which could be has interaction among the highlands, garden spaces, valley of rivers and the cave center. From Feng-shui aspect it has the suitability for traditional and commercial functions. Finally the hills in right side of cave center have the role of wind breakers that is flowing dominantly at the study area. The spatial adaptation of the study area on the Feng-shui tablets (Lo-Shu and Ba-Gua) was revealed nine-lattice landscape zones according terrain image (Fig.5).



Figure 3. a) A Panorama vision of the Cave center between Mountains, Hills and Shandiz city, b) A part landscape of the Cave center protected by gardens



Figure 4. Adapting the Feng-shui five elements on the landscape forms of the study area based on terrain Google map

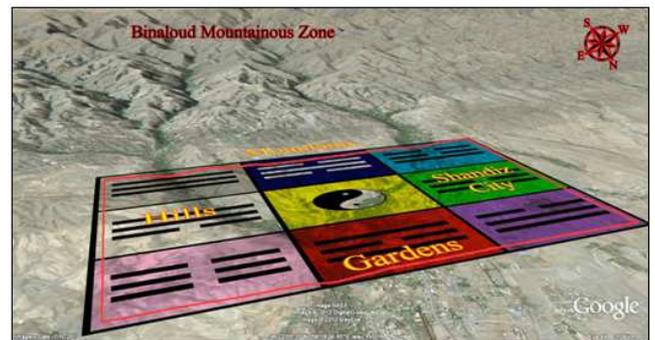


Figure 5. Adapting the Feng-shui nine-lattice landscape zones on the study area based on terrain Google map

Table 1. Proposed the analytic results of optimal strategies and tactical functions after the basically Feng-shui variant characteristics

Basic Feng-shui characteristics					Analytic results			
Lo-Shu Numeral	Colors	Shapes	Traditional Directions	Attributes	Study Area Landforms	Optimal Strategies	Tactical Functions	
1	Dark Blue	Undulating	Back (N)	Dangerous Rapidness	Mountains	Protective	Waved Water Space	
2	Pink	Triangular	SW	Yielding Energy	Hills	Natural	Pine Plantation	
3	Green	Rectangular Columnar	Left (E)	Excitation	Urban	Spatial Development	Commercial Exhibition	
4	Purple	Rectangular Columnar	SE	Penetration Flexibility	Urban	Spatial Development	Transportation	
5	Yellow	Square	Cave (Centre)	Evolution Equilibrium	Gardens	Protective	Eco Touristic Education	
6	Silver	Round Mounded	NW	Strong Energy	Village	Natural	Eco Touristic Sport	
7	White	Round Mounded	Right (W)	Pleasure Stagnation	Hills	Natural	Pile Plantation	
8	Blue	Undulating	NE	Resting, Immobility	Village	Spatial Development	Residential	
9	Red	Triangular	Front (S)	Dependence Radiance	Gardens	Protective	Gardens	

These zones are inspired the analytic results of optimal strategies and tactical functions based on Feng-shui variant characteristics which are derived from ideal Feng-shui evaluations (Table 1). This table is computed the nine-lattice zones consisting of colors, shapes, directions and other spatial attributions. On this basis the optimal strategy and tactical function for the cave center of the region is protective area and eco-touristic activities such as education

and meditation respectively. So the cave is located between the two main rivers and is covered by gardens so this zone should be protected area without a portion land use change. This zone has a meaning of evolution and equilibrium thus must be preserved the relational identify with introduce the color and shape designs in interior eco touristic space. Color and shape designing the interior space of the each site are essential to take the advantages of them intrinsic energies,

balance and complement. In this manner the analytic results for the other directions are defined. For example is proposed the protective scheme with the fulfilled water wave space for the elevated area in back of the cave, which can be provided climatically a good quality in the region. In the front of cave is recommended the conservative gardens due to protect the energetic spot of the study area.

In the left of the cave placed on the Shandiz city is offered to spatial development in the excitation type as commercial exhibitions or other businesses. As a result the table 1 is the compact research outcomes which are applied in the landscape analysis and evaluation. In recent years the Shandiz urban region is prospered of international tourism site which affected on the spatial planning and development on this region. This touristic planning without the sustainable viewpoint is modulated many modern projects of different resorts and mixture land uses in large scale. These plans along the land use changes have resulted to land degradations and natural hazards such as soil erosion and landslides. Therefore it has been necessary to explain of traditional and ecological landscape evaluation in this region and same cases where decreased the impacts of abnormal development. The Feng-shui theory could be shown the sustainable and ecological vision of the study area where the Shandiz city properly developed with preservation of the good green gardens and blue rivers qualities. In general application of this theory it could be adapted on the settled regions located in outlet of the watersheds in Iran or in similar geo-climate regions.

4. Conclusions

At the present study due to focus on the form of the landscape units based on Feng-shui method we investigated assigning five geographical elements of the study area and adapting them on the eight trigrams tablet achieving the optimal strategies for the ecological landscape evaluation. On this basis firstly the central cave spot and four directions are exhibited and finally the spatially adaption of the study area on the Feng-shui are revealed the nine-lattice landscape zones. In this manner the analytic results for all the zones are defined. The optimal strategy and tactical function for the cave center of the region is protective area and eco touristic activities such as education and meditation respectively. In the back of cave laid on elevated mountainous area is proposed the protective scheme with the fulfilled water wave space which can be provided climatically a good quality in the region. In the front of cave is recommended the conservative gardens due to protect the energetic spot of the study area. In the left of the cave placed on the Shandiz city is offered to spatial development in the excitation face as commercial exhibitions or other businesses and on the hills in the right side of the cave is proposed pile plantation against the wind flows. The present study tried to address the site analysis and the landscape evaluation with Feng-shui theory by using the shapes and imaginaries of the landforms to reach a protective plan. Our results revealed that the

Feng-shui traditional method is the useful approach for the ecological evaluation in same geo-climate ecosystems in Iran.

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