

**ANALYSIS OF ASSESSMENT CRITERIA IN LAND-USE PLANNING WITH AN EMPHASIS ON
HEALTHCARE SPACES (THE CASE STUDY OF THE CITY OF ZABOL)**

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Abstract. Healthcare services in urban areas is directly related with progress of urban communities. These centers will play a crucial role in the process of sustainable urban development by providing services to the people. So, quantitative and qualitative assessment of healthcare services in different dimensions is essential in sustainable urban development. In this direction, setting priorities based on scientific methods can be used in solving the problems of health care services and it will have a significant role in sustainable urban development by this approach. Hence, the goal of this research is analysis of assessment criteria in land-use planning with an emphasis on healthcare spaces (the case study of the city of Zabol). For this purpose, the present situation of healthcare centers in terms of compliance with the mentioned criteria is assessed. By compatible, desirability, capacity and dependence matrixes. The research method is descriptive-analytic based on documentary and library studies and field studies. The results show that Imam Khomeini Hospital in the majority of matrixes (the adaptation, Desirability, capacity matrixes) is placed in the first rank.

Keywords. Land Use, Healthcare Services, the city of Zabol, sustainable development.

1. INTRODUCTION

The first years of the twenty-first century has been associated with profound developments in human life. These developments in the context of globalization of economy and culture has affected social relations and human life and has manifested the reflection of these relationships in spatial effects especially in cities. Without a doubt, the most important feature of this century is opening new perspectives in human settlements and unprecedented concentration of population in major cities of the world (Razavian, 2002, 1). Today, living in cities, according to its complex space-physical structure, events and socio-economic activities, deepening and expanding of division of social-economic labor and the increasing cultural, leisure and social demands of citizens is related to services more than any other period and in fact, these municipal facilities and equipment which are the vital arteries of cities are the basis of each biological complex and its shortcomings and insufficiency will create numerous problems for residents (Saaedi Khah, 2005, 2). In no time and era, the issue of health and sanitation has not been considered like our time by statesmen and policymakers and community leaders and in general by human community. This issue will include not only numerous concessions to countries and communities but it will have impact on scientific regulation of organizations and healthcare activities (Dargahi, 2001,90). Since the health of every person and community depends on centers that provide his health, health care centers are centers that are directly involved in providing individual and community health. So quick, timely and inexpensive access to these centers in every community, especially in urban communities is very important and essential (Azizi, 2004, 7).

Population growth and rapid urbanization in recent decades have been followed by adverse effects such that it can be cited the uneven physical development of cities, creating marginal neighborhoods, poverty and decline of standards of living, lack of service centers, and eventually inequalities in using facilities (Hesamian, 1999, 128). Establishment of each urban element in a special physical- spatial position of the city is subordinated to the principles, rules and specific mechanisms and it will lead to the success and efficiency of the element at each specific location if it will be observed otherwise, problems may arise. The establishment of many urban elements is a function of economic mechanisms and free competition but the general urban elements cannot be released entirely to the

economy mechanisms of free market, but it is necessary to adhere to the decisions and policies based on public interest for compensating the inefficiencies of free market, public healthcare services units are among them (Yakani Fard, 2001, 16).

Urban planning and sustainable development is enhanced in the true sense when it considers to all urban aspects and areas scientifically including healthcare centers. Therefore, in this research, according to the issues and problems related to health care services in the quantitative and qualitative levels, efforts have been made to identify and assess the health criteria and indices and consequently to present the priorities for planning and managing urban sustainable desirable development, according to international experience and the present situation in the city studied.

Finally, analysis of the assessment criteria in the planning of healthcare spaces in urban development is essential. In preliminary studies and observations that were taken from the city of Zabol, suggests that users of health services of city are incompatible with the standards of comprehensive plan heterogeneously and this issue has exacerbated the problems in the city. Therefore, these problems led us to analyze the assessment criteria of health service users in city of Zabol.

1.1. The history of the research

Although the provision of healthcare services in the cities has a long history, but analysis of assessment criteria in land-use planning with an emphasis on healthcare spaces has not a long history.

Shaeli in 2000 in an article entitled, the spatial distribution of health service centers in urban areas of Tehran concluded that health care centers in Tehran have no proper distribution.

Shafei in 2007, in his thesis entitled, Space-spatial organization of health services and functions related to the city of Zanzan using GIS concluded that the current location of most medical facilities in the city of Zanzan does not correspond with scientific standards. The results also show that by using Geographic Information System (GIS) appropriate facilities can be provided for analyzing the current state of medical centers and other municipal services and optimal locating of these services site

which will play a very important role in urban planning.

Meskini et al. in 2007 in article have analyzed the urban use adaptability of region 1 of Zanjan using AHP model but this research despite the fact that has considered all urban land use as a whole and complete, but it has not considered factors in adaptation. Although AHP, is one of the most common methods of multi-criteria evaluation but, as it will be discussed in detail later, in the conventional AHP, the way of human's thinking and decision-making will not be considered correctly and the degree of certainty of decision-makers and available risk in the decision-making process is not considered.

Ebrahim Zadeh and Zarei in 2012 in an article entitled analysis of the optimal locating of healthcare centers using a geographic information system (case study: city of Firuz Abad) have concluded that Firuz Abad city does not have the proper distribution of health centers.

1.2. Concepts and perspectives and theoretical principles

Numerous definitions have been proposed for land use. Dickinson and Shaw in 1977 have provided a simple definition of land use. They know the land use as an activity which has been allocated to one place. Malingrv in 1988, know the land use as the emergence of dynamic human exploitation of natural resources to meet his needs. Van Giles in 1991, has offered two definitions of land use. First, human activities on earth that are directly in contact with the ground and second, the emergence of humans on ecosystems in order to satisfy some of their needs. All of these definitions are common in both the land and human activities (Noroozi, 1997). Types of users that are discussed in evaluation studies is usually a group of types of users that are complied with physical, economic and social features of the region. Land utilization includes the main and the type of efficiency of land use. The main use of lands includes each of the main types of land use, such as Rained agriculture, irrigated agriculture, rangeland and forest or resort that referred to each of them as the main use of land (mohajer Shojaei, 1984). The term and concept of land use was discussed first in the West to maintain state control over the way of land use and property rights, but with the rise in urbanization and changes in urban and regional planning its dimensions and content became wider by the day (Mehdizadeh, 2000). Land use is inherently about all aspects of the

environment and human activities on land and the way in which the ground can be prepared for different needs and exploited from it (Razavian, 2002). Land use is the way of man's proper exploitation of nature that has been used in the past few decades by researchers, especially scientists of geography. This word shows the use of possibilities and the ability of land (Sarvar, 2005). In other definition, the land use discusses inherently about all aspects of human spatial activity on the ground and the way in which the ground can be prepared for different needs and be exploited and in particular it can be said that activities, people and places are elements of land use and have interaction with each other (Hosseini Zadehdelir and Maleki, 2007). Some groups know the land use as different proposals for use of the ground level and some others have defined it as the use of ground by humans and they also define it as the human activities on land which those activities are directly connected with the land (Best 1999).

2. CLASSIFICATION OF URBAN LAND USES

The urban land uses which forms the main body of the city and switches the location in city to meet the needs of citizens, are divided into branches to facilitate the identification and planning which contains several main branches and some sub branches. The division into the main branches differ according to the type of study and institution. In other words, the division of uses does not comply the same pattern so that was a division includes nine main branches while another division includes 17 the main branch.

Management and Planning Organization of country in the description of comprehensive plans services, have been identified 17 users as follows (The preparation of development plans, 1983).

- Residential use
- Commercial use
- Educational use
- Professional and higher education use
- Religious use
- Cultural use, tourism and catering use, medical use, hygienic use, exercise use administrative, green space, military, industrial, plant and equipment, transport and warehouses, cemetery

In the other divisions, 12 main branches have been determined as follows:

Uses of: residential, office, commercial, educational, health, recreational facilities and the passing of time, urban public facilities, urban infrastructure, industries, roads and communication

networks, natural factors within the city limits, gardens and farms.

There is also a division that includes 9 main branches and covers the following cases:

Residential, light industry, heavy industry, transportation and utilities, commercial, services, culture and leisure, manufacturing, mining resources, land and water areas (Saedinia, 1999).

2.1. The study area

Zabol is located at north of Sistan-Baluchistan province in 13 ° 31 of north latitude and 29 ° 61 of east longitude (Figure 1). The area of Zabol within the range of approved detailed plan is over 2084/52 hectares (1328.8 hectares of urban net land and 755.7 hectares of the gross urban land) that is 0/13 percent of vastness of the city. According to the detailed plan, city of Zabol is divided into 5 districts and 38 neighborhoods. The first district has seven neighborhoods, the second district has 12 neighborhoods, and each of district three and four has 6 neighborhoods and district five has 7 neighborhoods.

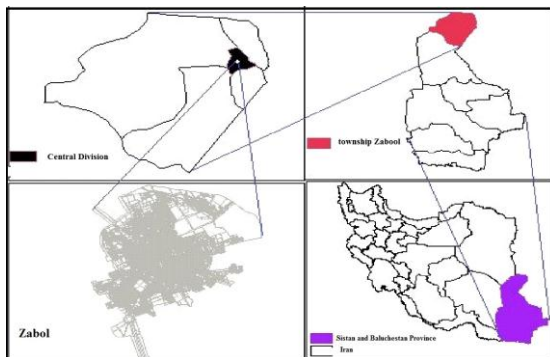


Figure 1. The study area

2.2. Land use pattern in Zabol

In the city of Zabol as you can see in Figure 2, most use are related to residential use which has occupied %28.87 of total city. After that educational use and commercial user are then ranked at the next places.

In this research, among the healthcare uses of the city of Zabol, we have chosen 3 healthcare centers and have studied them based on locating criteria of urban land use and they have been investigated pathologically.

Emergency Center: this center is located at district 3 of city of Zabol and this center compared to other centers is less old and has a less space.

Imam Khomeini Hospital: The center has an urban and even an ultra-Urban function but it is located outside the legal range of the city.

Imam Ali clinic: this center is located at district 2 of Zabol and it is one of old health centers of Zabol.

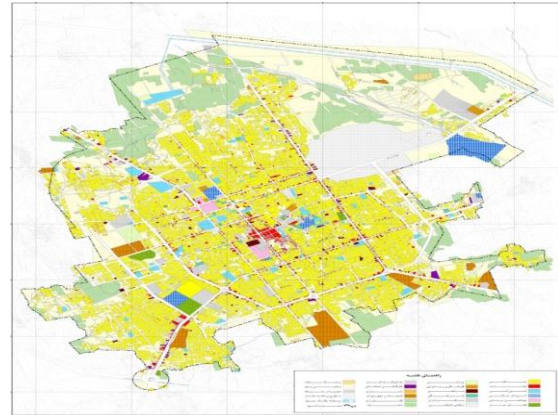


Figure 2. The city of Zabol land uses, source: Municipality of Zabol

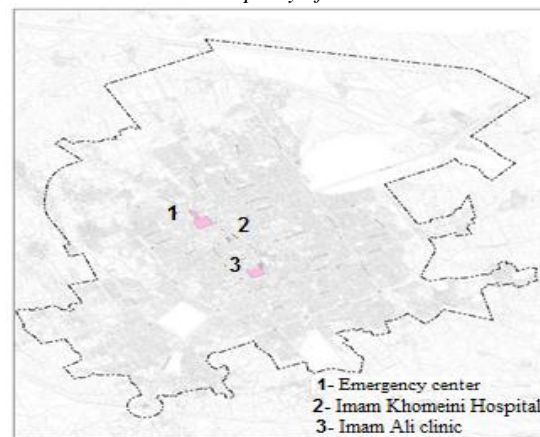


Figure 3. The distribution of health centers in Zabol

Table 1. The Health care use level of city of Zabol

Total use Level in city (square meters)	75589
Per capita (square meters)	0/52
The relative contribution of the city (square meters)	0/36

3. THE RESEARCH METHOD

The research method is descriptive-analytic based on documentary and library studies and field

studies. First, field studies have been done to collect data from the study area and to evaluate the land-use planning with an emphasis on health care spaces based on their locating criteria, field studies were conducted from 3 healthcare centers (Emergency Center, Imam Ali Hospital, Imam Ali clinic) and after data collection, data analysis was conducted and to achieve the research goals, locating criteria of all healthcare centers in four matrixes of compatibility, desirability, capacity, dependence were studied and finally the healthcare centers of study were ranked.

4. THE RESEARCH FINDINGS

In qualitative assessment, we analyze the healthcare centers based on locating criteria of urban land and they will be studied in four compatible, desirability, capacity, dependence matrixes.

4.1. The compatibility matrix

In this type of matrix, two adjacent types of users should be coordinate with each other and create no trouble for each other and even in some cases, help each other. For each activity due to its characteristics, its sphere of influence and impact should be defined. They can work side by side and have activities together if:

- They have not adverse effects on each other.
- They should be located outside the sphere of influence of the other. In this case, the neighboring land uses will be compatible.

Table 2. Regulations and criteria of establishment of health care centers in the vicinity of other land uses

incompatible adjacency	relatively incompatible adjacency	Indifferent adjacency	Relatively compatible adjacency	Totally compatible adjacency
Industrial	Historical	Higher Education	Sanitary	offices
Urban Facilities	Religious	Market	Catering	Barren lands
Airport	Cultural	Residential	schools	Telecommunications
Animal husbandry river	Water resource	commercial	Barren land	gardens
Passenger terminals	For Sport	agricultural land		Forests
Military Exhibition	Residential under construction			Open spaces
	Transportation			Public green space
				Parking
				fire station

Table 3. Assessment of compatibility matrix, health care centers and other land uses

The adjacent land uses					Healthcare centers
educational	Administrative	commercial	transportation	Commercial-Residential	The adjacent land uses
schools	Most organizations	Commercial complex	A neighborhood with a high speed	Low density	Emergency Center
Relatively compatible	Completely compatible	Indifferent	Relatively compatible	Indifferent	User Status
-	-	Barren land	transportation	Open spaces	The adjacent land uses
-	-	-	High speed	Extensive	Imam Khomeini hospital
-	-	Completely compatible	Relatively compatible	Completely compatible	User Status
Transportation	Higher education	Administrative	Commercial	Residential	The adjacent land uses
A neighborhood with a high speed	University	Bank	Shop	Low density	Imam Ali clinic
Relatively compatible	Indifferent	Completely compatible	Indifferent	Indifferent	User Status

Table 4. Standards of health care centers and comparison with the study area

The current status of health care centers in study area	standards of location of situation health care centers	Healthcare centers
1. It is inappropriate 2. The position of land has been regarded 3. The slope of land %2 4. Access are totally regarded 5. Facilities and equipment are regarded 6. Pollution is relatively observed 7. adjacent residential, commercial, administrative and religious land use	1. At least 25,000 square meters of land 2. Position: it should be close to the center city area 3. Slope of the land: it should be built in flat land 4. Access: it should be on first class arterial street 5. Installations and equipment (water, electricity, telephone, gas, sewer) 6. Pollution: it should be no noise in place of production (at least one kilometer away from industrial annoying centers) 7. adjacent land use	Emergency Center
1. It is desirable 2. The position of land has not been regarded 3. The slope of land %5 4. Access are not totally regarded 5. Facilities and equipment are regarded 6. Pollution is relatively observed 7. adjacent residential, commercial, administrative and religious land use	1. At least 25,000 square meters of land 2. Position: it should be close to the center city area 3. Slope of the land: it should be built in flat land 4. Access: it should be on first class arterial street 5. Installations and equipment (water, electricity, telephone, gas, sewer) 6. Pollution: it should be no noise in place of production (at least one kilometer away from industrial annoying centers) 7. adjacent land use	Imam Khomeini Hospital
1. It is inappropriate 2. The position of land has been regarded 3. The slope of land %2 4. Access are totally regarded 5. Facilities and equipment are regarded 6. Pollution is relatively observed 7. adjacent residential, commercial, administrative and religious land use	1. At least 25,000 square meters of land 2. Position: it should be close to the center city area 3. Slope of the land: it should be built in flat land 4. Access: it should be on first class arterial street 5. Installations and equipment (water, electricity, telephone, gas, sewer) 6. Pollution: it should be no noise in place of production (at least one kilometer away from industrial annoying centers) 7. adjacent land use	Imam Ali clinic

4.2. Desirability matrix

In the desirability matrix relationship between the site (the location of the user) and type of activity is considered. This means that each land is suitable for a particular use. So in this matrix, we analyze the relationship of health care centers with the land where they are located.

Table 5. Assessment of the desirability Matrix of health centers in Zabol

H	G	F	E	D	C	B	A	Indices
Adjacent land uses	Pollutions	Installations and equipment	Access	Physical properties	The slope of land	The position of land	Land size	
□	□	□	□	□	□	□	□	Standard sample
▣	▣	▣	▣	▣	□	□	▣	Emergency center
▤	▤	▤	▤	▤	▤	▤	▤	Imam Khomeini hospital
▥	▥	▥	▥	▥	▥	▥	▥	Imam Ali clinic

Desirability matrix Guide:

Totally desirable □

Relative desirable ▣

Relative undesirable ▤

Totally undesirable ▥

4.3. Capacity Matrix

In this matrix we want to conclude whether the land uses have been established based on their scale and activity area with different levels of physical division of the city and we will also want to conclude that each one of healthcare land uses has a specific place and action area in physical division of the city.

Table 6. Capacity Matrix of healthcare centers in Zabol

Country	Region	City	Area	Neighborhoods	The sub neighborhoods	Neighborhood unit	Standard
□	□	□	□	□	□	□	
-	-	■	□	□	■	■	Emergency center
-	-	□	□	■	■	■	Imam Khomeini hospital
-	-	■	□	□	■	■	Imam Ali clinic

Capacity matrix Guide:

Totally appropriate □

Indifferent ●

Relative appropriate ■

Relative inappropriate ■

Totally inappropriate ■

Imam Khomeini hospital which has a total certain functional area is beyond the region in spatial-physical division of Zabol but emergency center and Imam Ali clinic with their little area are among neighborhoods centers in the physical divisions.

4.4. Dependence matrix

This matrix is to study the land uses which are located beside each other instead of being incompatible and be a reason of inconvenience with each other, they can be chain dependent to each other. So the study healthcare centers should be dependent to communications, green space, and the regional use center, firefighters to provide more and better services for citizens and avoid the following proximity and be independent to them.

- Air pollutants (industry, terminals, etc.)
- Audio pollutants (highways, airports, railways, etc.)
- Environmental pollutants (sewage, slaughterhouses and animal husbandry)

Table 7. Assessment of the dependence Matrix of healthcare centers

Independent land and remote uses			Dependent land uses			Indices
Air pollutants	Main pollutants	Audio pollutants	Fire fighter services	Green space	communications	
■	■	□	□	□	□	standard
■	■	■	□	□	□	Emergency center
■	■	■	□	□	□	Imam Khomeini Hospital
■	■	□	□	□	□	Imam Ali clinic

Dependence matrix Guide:

Totally appropriate □

Relative appropriate ■

Relative inappropriate ■

Totally inappropriate ■

5. CONCLUSION

Having a healthy and productive life with a long life time combined with acceptable quality and free of disease and disability is a public right and the government is responsible for it and it is the prerequisite for achieving sustainable development. For achieving this goal, School of Islam and the Constitution of the Islamic Republic of Iran has emphasized to provide appropriate facilities to ensure physical, psychological, social and spiritual health at all stages of the life chain and they are human natural and basic needs.

Health as a basic human right is accepted by all governments of the world. Primary health care must be comprehensive, accessible, and acceptable to the people and it should be implemented with their participation and with the payable price for the community.

Urban planning and sustainable development will be enhanced at the true meaning when it considers all dimensions and urban fields including, health care centers scientifically. Therefore, in this study, according to the issues and problems related to provision of health services in the quantitative and qualitative levels, efforts have been made to identify and assess criteria and health indices according to global experience and the situation in the study city and consequently the priorities for planning and managing desirable sustainable urban development will be presented.

In most cities, the lack of appropriate space allocation and optimum site selection of services and physical elements of the city, especially health services (hospitals and clinics) and factors affecting the location of these centers, have increased urban problems for citizens.

Hence, the goal of this research is analysis of assessment criteria in land-use planning with an emphasis on healthcare spaces (the case study of the city of Zabol). For this purpose, the present situation of healthcare centers in terms of compliance with the mentioned criteria is assessed. By compatible, desirability, capacity and dependence matrixes. The research method is descriptive-analytic based on documentary and library studies and field studies.

- Prioritizing health centers in city of Zabol according to compatibility matrix Imam Khomeini hospital will be ranked in first place with 66 percent total compatibility and 33 percent relative compatibility.

Emergency center will be ranked in second place with 20 percent total compatible land use and 40 percent relative compatible and 40 percent indifferent land use.

Imam Ali clinic will be ranked in Third place with 20 percent total compatible land use and 20 percent relative compatible and 40 percent indifferent land use.

- Prioritizing health centers in city of Zabol according to desirability matrix

Imam Khomeini Hospital will be ranked in first place with 50 percent total desirability and 25 percent relative desirable and 25 percent relative undesirable.

Imam Ali clinic will be ranked in second place with 25 percent total desirability and 25 percent relative desirable.

Emergency center will be place in third place with 25 percent total desirability and 62.5 percent relative desirable and 12.5 percent relative undesirable.

- Prioritizing health centers in city of Zabol according to capacity matrix.

Imam Khomeini hospital and Imam Ali clinic will be ranked in first place with 20 percent total appropriate and 20 percent relative appropriate and 60 percent total unappropriated.

Emergency center will be ranked in second place with 40 percent relative appropriated and 20 percent unappropriated and 40 percent total unappropriated.

- Based on dependence matrix, emergency center is ranked in first place and Imam Khomeini hospital is ranked in third place.

6. SUGGESTIONS

- In the field of hospital services, organizing can be the perfect way to balance the transmittal of services. So that the surplus services of regions 2 and 3 can be transferred to regions facing with deficiency.
- It is necessary to distribute healthcare services considering the demographic changes and the radius of service and facility performance is as an effective factor in assessing spatial justice.

- Prevention of focus of health care facilities in areas where conditions are suitable and prioritizing of planning should be for areas where there are in low level of facilities.
- The need for specific regulation of locating hospitals and clinics in the city and in collaboration with institutions responsible for monitoring its implementation.
- Finally, the proper places on the map below is recommended for health care users in the city of Zabol.

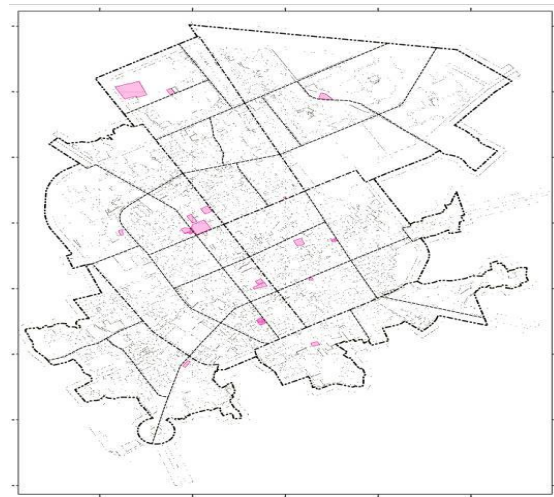


Figure 4. The proposed map of suitable locations for healthcare use in Zabol

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