

# ANALYSIS OF THE LAND USE IN ZONE THREE OF ISFAHAN CITY, IRAN

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## Abstract

Equitable access to land uses and optimum use of land is an essential element of sustainable development and social justice. One of the challenges on the way of today's cities is the lack of suitable locations for urban activities which made urban life difficult. In general, land and space is a public source of life and public wealth and is considered as a commodity which we should use in line with public interests. It should be monitored and evaluated, which is a duty of land use planning. Land use planning has spatial and location organization and urban activities according to the needs and wants of urban community on its agenda. The aim of the present study is to investigate spatial distribution of urban land use in Zone Three of Isfahan city and determine the deficiencies and problems of its uses. Arc GIS software was used for descriptive and factor analysis and land studies. The result of the study shows that Zone Three of Isfahan has different uses with a cross-regional role which created problems in the city. And also, most of the uses in the region lacks suitable homogeneity (such as educational, hygienic, recreational, sports uses and etc) and the uses aren't distributed optimally in the region.

**Keywords:** Planning, Land use, Sustainable development, Zones three of Isfahan.

## 1. INTRODUCTION

Land use generally deals with all spatial aspects of human activities in land and the way surface of the earth can be prepared and exploited for different uses (Robin, 1989: 19). Planning of urban land use, location and spatial organization and functions, is based on wants and needs of the urban community and it forms the core of urban planning (Saeednia, 1999: 13). In other words, urban land use planning is a series of targeted activities aimed at improving built environment and provides, to the possible extent, wants and needs of urban community. These activities include conduction systems regarding the fitness and spatial capacity and compatibility of various activities for deployment in space (Pour Mohammadi, 1998:1). Cities are as the industrial centers of human civilization (Kuhkan, 2002:1). Each activity in the city requires certain places and spaces that can be realized in the space coordinates, format or location (Hossein zadeh Dalir and Maleki, 2007:66). Today, some disorders are created, as a result of unplanned urbanization, in characteristics of land use which is of high importance in improving the quality of urbanization and regulation of land use (Farhood et al, 2009: 1). In fact, without land use planning, we can't achieve the optimal model of life in cities (Ziarai, 2002: 15). The ultimate land use

planning aim is to create a kind of "ecological balance" and "social justice" in the process of city development (Mehdizadeh, 2003: 286). In the current urban planning procedure of our country, organizational principles and methods are based on the same old functional models of urbanization which suffer from clear deficiencies and bottlenecks both in terms of ownership and economy of the land and methods of formulating urban development and land division (Mehdizadeh, 1998: 70). The hasty growth of Isfahan began from 1961, during which most of the agricultural lands and wooded groves used for urban infrastructure which eventually led to heavy traffic of old and historical centers of the city (Mashhadizade Dehghani, 1999: 456). This problem exacerbated when following the comprehensive plan in the early 1971, the urban spaces were filled and agricultural lands were located in the zones where urbanization was going to take place. This has led to rampant speculation and rises of their price. The consequences of which is widespread growth of the city without using any criterion (Ibid, 457). Due to location of the city on zone three, much of the focus of facilities in the city is on this zone, and there are a great many of the major business functions (marketing), large and well-known hotels, many of its major trade centers, governmental organs and institutions with large-scale urban and extra-urban and regional functions, located in this zone. With regard to this, region 3 has special position in Isfahan and imbalances in correct and reasonable distribution of per capita uses and user density is seen in this zone. So the continuation of this process will cause many problems for the city. Geographically this problem can be posed, prevented and solved. Thus, the analysis of land use in the region and provision of a suitable and reasonable plan can prevent problems in this metropolitan zone.

## 2. METHODOLOGY

The combination of research methods, descriptive, analytical and predicative was used in the study. Arc GIS and AutoCAD software were used for content analysis of the strategic models (IFAS, EFAS, SWOT), as well as data analysis and Planning design.

## 3. STUDY AREA

Isfahan is a beautiful city in the center of Iran. The geographical situation of this city has long influenced the shaping of its particular culture. Religious inclinations and attitudes in this city, as in most cities in Iran, are ranked highly. The new urban structure of the city of Isfahan consists of 14 districts, each with its own municipal authority, which is connected directly to the main municipality (Fig1). The major touristic districts of the city are concentrated in districts 1 and 3, which are both in the center of Isfahan.

Zone three of Isfahan city, is one of 14 municipalities, with a total zone of 11,817,250 square meters, is divided into five regions and 19 districts. The city is limited on the north to Sorosh Street, on the North-West to Madras Street, on the East to Bozorgmehr Street, on the South to ZayandehRud River, and on the West to ChaharBagh Abbasi Street (Information Base zone of zone three of Isfahan).

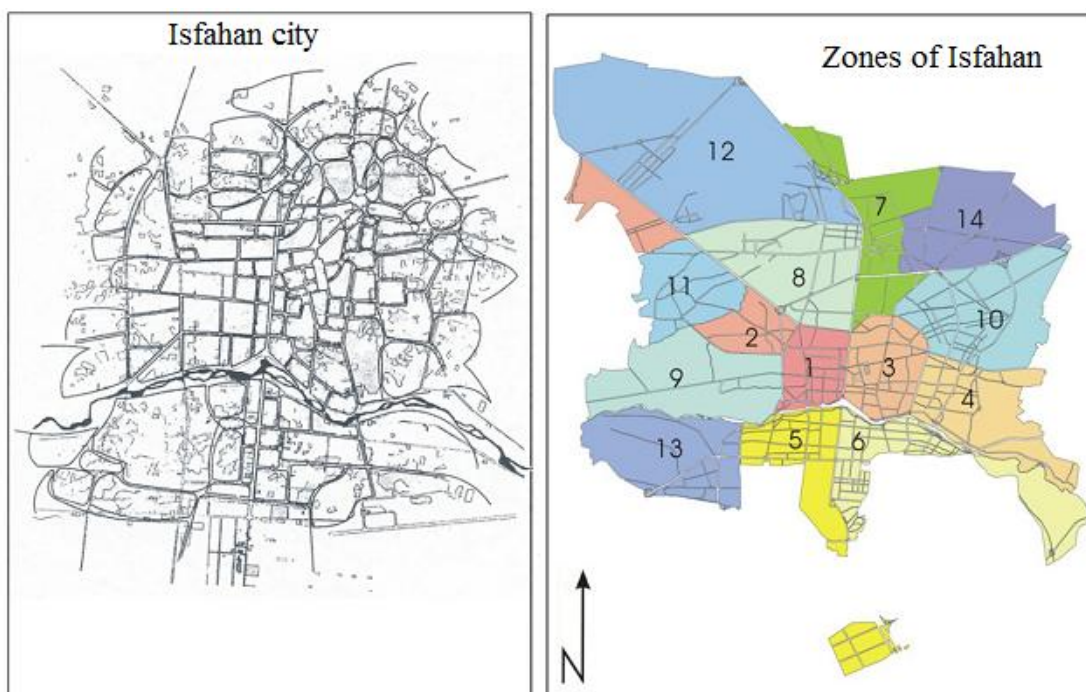


FIGURE 1 - THE MAP OF STUDY ZONE IN ISFAHAN CITY

### **Residential Uses**

The most important part of city is the place human beings live and has major role in the use level in a way that in small cities more than 60% and in large cities more about 40% of city is covered by residential uses ( Saeedinia, 1999: 94). In residential uses we should consider following:

Residential zones are to be away from dangerous zones such as streams and faults, flooding zones and places where there are incompatible industrial activities. They should be built near the green open spaces and close to recreational zones (PoorMohammadi, 2003: 95).

Residential per capita in different countries varies from 20 square meters to 70 square meters. The residential land per capita in different countries is considered to be from 44 to 88 square m. The current residential housing per capita varies in different cities of Iran. The average per capita residential land in Iran is between 20 to 50 square meters (Shiah, 2001: 173). The per capita obtained for Zone Three of Isfahan is 33/84 square meters which is close to international standards and is far more than the Iranian cities standards.

### **Commercial Uses**

It includes the private offices and retail and wholesale services in the sub-neighborhood, neighborhood, region, city level (market and malls) The biggest shopping malls and commercial markets is located in urban zones 1 and 3, which attract people to buy, and in some months of the year, before the holidays, are a wonderful gathering of people and cars, heavy traffics.

Commercial uses create a lot of traffic in the zone. The average commercial urban per capita regarding each city, considered to be about 5 square meters (including open spaces, communication and parking), given that this per capita is the minimum requirement for commercial buildings. In average, commerce per capita can be 3 to 5 square meters. In particular, the per capita is different according to the role and function of the required number of commercial properties. The obtained per capita for Zone Three is about 66/5 square meters which is higher than Iranian standards but compared to international standards (12 square meters) is very low.

### **Tourism and Hospitality**

Isfahan with its historical places and its capacity to attract tourists caused the uses to be located in the zones 1 and 3. It includes major historical places, hotels and motels which are separate.

The comparison of the two zones shows that, although there are more hotels and motels in zone1, the land devoted to it is less than zone 3. The use is 16252 square meters in zone1 and 94104 square meters in zone 3.

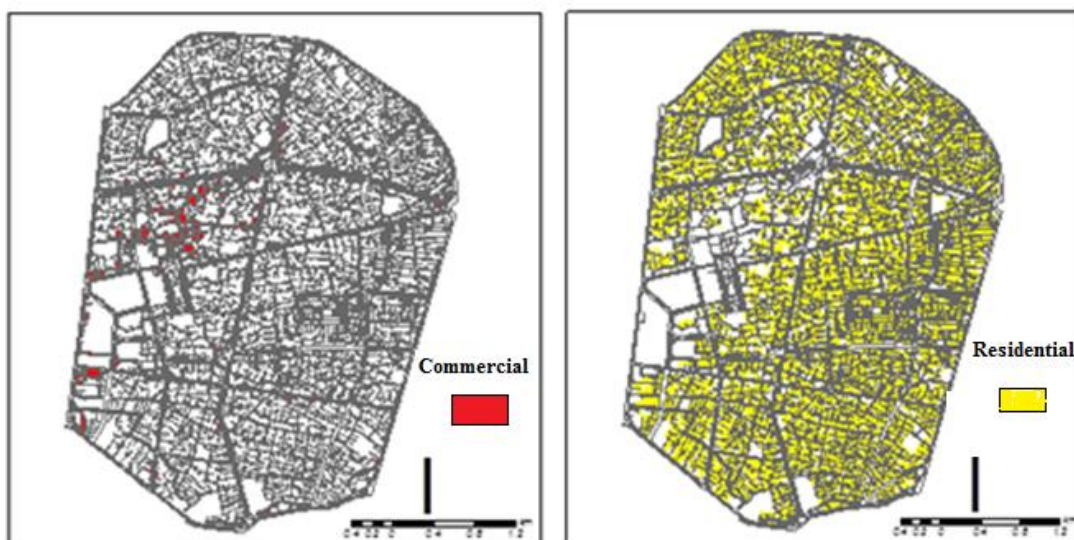


FIGURE 2 - THE MAP OF RESIDENTIAL AND COMMERCIAL USERS THREE ZONE ISFAHAN

**Training use**

Kindergarten should be located next to residential and educational neighborhoods ( primary level ), green spaces ( game of children ) and it should not have any direct access to any type of network (excluding off streets , sidewalks, or deadlocks) and primary, secondary and high schools should be located close to green spaces and cultural institutions and sport fields which is not observed in the Zone and many educational facilities and even primary schools has been located near the main streets. Most of the schools have no close access to green spaces and the use of sports fields was contractual for schools which are located far away. The total educational standards is 4.4 square meter for each urban residents (Shiah , 2001: 175 ). In Zone Three, the per capita of educational is about 1/86 square meters which are much lower than the standard.

**Cultural uses**

Cities are foundation and manifestation of cultures and a place for cultural growth and ethnical civilization. Cultural uses in different levels of the hierarchy of service, has its own characteristics. Variety of cultural uses are as follows : library, auditorium, museums, publications , exhibitions, monuments , tombs of famous and academies (Razavian , 2002: 154).The per capita of cultural uses in Zone Three of Isfahan is 1/88 square meter.

**Religious uses**

Religious use is recognized as a sub-branch and the subset of massive cultural uses ( Razavian , 160 : 2002). The religious use consists of mosques , tak-yeh ( a place where passion – plays are represented), the shrine and the holy places of religious minorities .The per capita for this type of land use in Zone Three is 1/42 square meter.

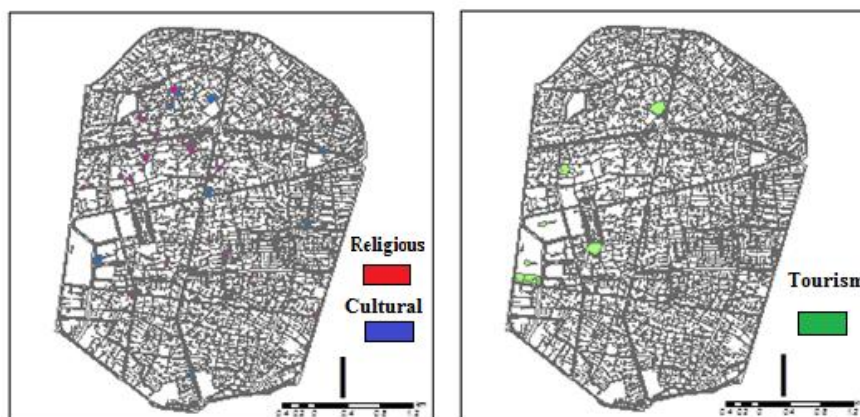


FIGURE 3 - THE MAP OF RELIGIOUS, CULTURAL AND TOURISM USE THREE ZONE ISFAHAN

**Hygienic – Therapeutic use**

Hygienic – Therapeutic uses consist of hospitals, clinics, health care centers, medical centers, pharmacies, rehabilitation centers, and etc. The most important hospitals in Isfahan are located in Zone Three and One; these two Zones have the highest share of the therapeutic uses and they make heavy traffics. Therefore, patient's visits and the location of hospital in these zones made a lot of traffic and it is essential to build parking lots in these zones. The total per capita of health facilities is 1/12 square meters for each person. Zone Three with the per capita of 1/12 square meter is suitable in this regard.

**Administrative – disciplinary uses**

The Lands of administrative – disciplinary uses include all of the administrative (government and administrative bodies, and revolutionary institutions and other related centers related to public utility organizations and foundations) and disciplinary buildings.

The central office of many organizations and government agencies is located in Zones One and Three. 46 administrative- disciplinary units are located in Zone One and 67 of administrative – disciplinary units in Zone Three which allocated 7.0 % and 8/1 percent of the land to themselves, respectively. Because of the large number of administrative centers in these two zones during the time shifts, traffic tie-ups is caused and in some streets , the traffic problems is made because of the administrative time shift interference with schools time.

Depending on the type and number of offices, it will be offered the 5.1 square meters of per capita for a variety of administrative uses .The per capita of administrative and disciplinary in Zone Three is 3/22 square meter that is higher than the standards.



FIGURE 4 - THE MAP OF HEALTH-MEDICAL AND ADMINISTRATIVE USE THREE ZONE ISFAHAN

**Sport uses**

Sport Centers (pool, Gymnasium, etc) and open spaces are called Sport uses (Poor Mohammadi, 2002: 33). These spaces are constructed in populated zones of sport preferably and must have access to a network of pedestrian crossing as possible and should be away from residential zones as well. The per capita of sport in Zone Three is 0/3 square meter.

**Green Space use**

These spaces include parking , weltd and islanded green spaces , private and non- private green spaces (Vazin ,95 : 2005 ) and the uses in this zone consists of parks and public parks , Zayanderood riverside , historical gardens and the passage of parks. In 2007, the green belt of Isfahan was 13,394,272 square meters and the total zone of parks was 11,893,709 square meters .The per capita of green space in Zone Three is 3/1 square meters per which are very low compared to international standards.



FIGURE 5 - THE MAP OF GREEN SPACE AND RECREATION- SPORT USE THREE ZONE ISFAHAN

**Industrial and service use**

Industrial spaces can be divided into various parts; most important of them include heavy industry, light industry and handicrafts. For the use of industrial position within or near to cities, the public facilities and urban installation should be improved in industrial zones.

The weather pollution should be controlled when necessary. Streets should be developed for more access uses and parking facilities should be provided (Razavian 2002:182). Per capita of industrial and services uses in the zone is 42/1.

### **Urban facilities and installations**

Urban installation include: water, electricity, telephone, sewage... ( Poor Mohammadi, 2002: 33) , and the urban facilities include fire stations , markets, cemeteries , and sometimes elements such as mortuary and slaughterhouses , and etc ( Vazin,:2005: 92) .The typical installations for water , sewage , electricity, gas and telecommunications in two zones ( 1 and 3 ) has been distributed. The per capita for urban installation and facilities in this zone is 0/94 square meters, which is very low for the standard (2/75 – 8 square meters).

### **Passages**

The use of passages or roads and communication networks are the most important and sensitive public spaces in a city. The most important element that forms the junction of roads and communication spaces and urban is passages ( Razavin, 1381: 189 ). Usually between 1/25 to 1/30 of urban per capitass is related to roads and communication networks. Isfahan Zone Three with the enjoyment of 25/74 square meters per capita, in this respect, is appropriate.



FIGURE 6 - THE MAP OF INSTALLATIONS- EQUIPMENT AND INDUSTRIAL USE THREE ZONE ISFAHAN

## **4. AN ANALYSIS OF USES IN ZONE THREE OF ISFAHAN BY USING STRATEGIC MODEL**

SWOT is an analysis and strategic planning tool that is often used in participatory planning approach. To succeed in doing SWOT approach, it is required to have a good understanding of the current condition and trends. SWOT analysis consists of two main components as follows: a) internal factor analysis summary (IFAS): which is characterized by the strengths and weaknesses of the current condition:



Strengths: The existence of wide range of valuable historic buildings, concentrating on urban centers (markets, government offices, commercial services, etc), the ability to recover a wide variety of distressed, abandoned and uncultivated zones to provide inter- regional and trans-regional services, allowing optimum utilization of land with a building density in some parts of the city center which helps to use the opportunities and combat threats.

Weaknesses: internal conditions or any internal defects which reduce the competitive of the region or the ability to use opportunities.

The table of internal factors analysis summary shows a way to organize the internal factors and their classification into two categories of strengths and weaknesses (Hekmatnia, 2006: 289).

The study gives a weight of zero to one to each of the strength and weaknesses of internal factors, in the first row, in such a way that sum of the weights should not exceed one .In the grading rows a score from one to five is given, according to the importance of each of them, and the last row of the table shows the multiplied weights and the grading.

Since sum of the weighted scores is higher than 3/5, it indicates that the city is influenced by internal factors (strengths and weaknesses).

TABLE 1 - INTERNAL FACTORS ANALYSIS SUMMARY, ISFAHAN THREE DISTRICT OF TERRITORY USE (IFAS)

Internal factors	weight	grading	Weighted score
Strength:			
1) A range of valuable historic buildings	/1	5	/5
2) The focus of activities in urban centers (markets, government offices, commercial services, etc)	/1	4	/4
3) Ability of retrieval of broad levels of old, abandoned, and uncultivated old constructions in order to provide services for regional and cross-regional	/2	4	/8
4) The possibility of exploitation of land with increasing building density in some parts of the region	/4	4	/4
Weaknesses:			
1) Domination of low-density residential users for the system of land using	/1	3	/3
2) Lack of green spaces and open services in a quarter scale	/2	4	/2
3) Fine-woven and illegible constructions	/1	2	/2
4) The extent of passages and their inefficiency because of the narrowness.	/1	3	/3
Total	1		3/7

Source: The author studies

B) External factor analysis summary (EFAS), which is described by unknown threats and opportunities:

Opportunities: any situation or external features which is demanded by the subject.

Threat: is a challenge of unfavorable procedure or the external conditions that are influenced on the subject position as unfavorable (Eftekhary and others, 2006: 7). External factors affecting territorial use of Isfahan Zone Three: The study gives a weight of zero to one to each of the external opportunities and threats in the first row so that sum of their weights not to be greater than one.

According to importance of each score, it has been given the score from one to five in grading row, and the last row of the table, there has been the weight and grade which are multiplied.

Since the sum of the weighted scores is higher than 5.3, it indicates that Isfahan Zone One, has been affected by external factors, opportunities and threats.

TABLE 3 - EXTERNAL FACTORS ANALYSIS SUMMARY OF LAND USE OF ISFAHAN ZONE THREE (EFAS)

External Factor	Weight	Grading	Weight score
Opportunities:			
1) Attraction of more tourism , entertainment and cultural activities in the three Zones	/2	5	1
	/1	4	/4
2) Focusing more on the use of trans-regional uses	/1	3	/3
3) providing development and complete infrastructural for top attraction activities	/1	4	/4
4) focusing more on provincial offices and the headquarters of the regional			
Threats:			
1) flight away creditable activities from the city centers and competing centers settlement	/1	4	/4
	/1	3	/3
2) Distribution of urban centers functions in various regions	/1	3	/3
3) citizens tend to settle in marginal zones Pattern	/2	5	1
4) The model of peripheral development and cities and new settlements instead of the revival of old constructions in the zone.			
Total	1		4/1

Source: The author studies

## 5. CONCLUSIONS

Urban land use planning, spatial and location organization of urban activities and functions are based on the wishes and needs of the urban population and forms the core of urban planning. The rapid growth of Isfahan began from 1961, during which most of the agricultural lands and wooded groves used for urban infrastructure which eventually led to heavy traffic of old and historical centers. Since Zone Three is located in the central district of Isfahan, there have been many historical and cultural activities, commercial, famous hotels, and several major businesses, central administrative bodies and institutions with a broad range of extra- urban and even urban and regional scale, in an interconnected order is placed within this zone. In other words, the potential of Zone Three is very high in attracting jobs and business travels, with commercial, cultural and service use which causes crowd in original axis of the Zone. Considering the issues mentioned our hypothesis is confirmed (there is a meaningful relationship between uses and urban problems in Zone Three). But the obtained per capita for Isfahan Zone Three is 84/33 square meters which is close to the international standards and also is much more than the standards of Iranian cities. In this zone, due to the suitable location of Zone Three and having the position in recent years, the residential uses have been transferred to the business uses. The average annual business uses can be offered from 3 to 5 m. Because of the role and function of the city, the number of required commercial properties is different. Due to the position of Zone Three in the city center and the settlement of its business units, the business per capita is (5/66 square meters) which is close to the Iran standards. In recent years the share for commercial in this zone is significantly increased in Iran, but compared to international standards (12 square meters) is very low, The total educational per capita relative to urban resident is 4/4 square meters. In the Zone Three, the obtained per capita of educational uses is about 1/86 square meter which is much lower than the standards. However, regarding religious use and the role and the importance of mosques and religious services, the distribution of mosques and religious places in the cities and urban zones, it is necessary to build sacred places in an adequate size. 5 to 7 square meters can be offered in this regard. The per capita should be devoted to 20,000 inhabitants. According to the obtained per capita (1/42 square meters) in Zone Three, it seems to be suitable for the zones population.

Another feature of the Zone Three is its Hygienic – Therapeutic units. The most important hospitals are located in this Zone and Zone one. These two zones have the highest share of the therapeutic uses and these uses have the crucial role in creating the traffic. There is heavy traffic in most of these zones because of the physician visits assistance and patients meetings; therefore it is necessary to build enough parking lots. The total per capita for health care installation is 1.7 square meters for everyone.

With regard to the location of Zone Three in city center and also the placement of more units of health therapeutic, the per capita (1/12 square meters) is relatively good. About the administrative use, the number and the type of office is different in another countries; and also the way of distribution and the type of office units and even their branches are different with each other. Depending on the type and number of offices, 1/5 square meters per capita can be offered for a variety of city bureaucracy. The obtained per capita of administrative and police district in Zone Three is 3/22 square meters which is higher than the standards. About the green space use, Isfahan Zone Three has allocated a minimum per capita and minimum extend toward the rest of the zones. In 2007, the per capita in Zone One was 3/1. The per capita of installation and facilities in Zone Three was /94 square meter for every one which is lower than the standard (8 – 2/75 square meters. Roads connect the various urban facilities and therefore their importance in the city is impressive. Usually between 25 / to 30 / of per capita there has been allocated to roads and communication networks. Because Zone Three is located in the center of the city, then this zone is appropriate with the per capita of 25/74 square meters. However, it should be noted that many of the existing passages is used for the metropolitan function. In general, about the spatial distribution of land use in the zone, it is said that most of the uses has not been located basically and scientifically and also in many other cases they have a low compatibility with each other. As we mentioned above, we conclude that the land use in the Zone One is not homogeneous.

### **Suggestions**

1) Decentralization of some municipal services in the zone 2) The creation of traffic limitation in the zone to reduce congestion and crowded city streets leading to the region. 3) Optimal distribution and appropriate urban services in the zone. 4) Allocation of per capita for unbalanced urban uses in the zone. 5) Increase in the green space, recreational, educational per capita and giving priority to them. 6) The necessity of reconstruction and use of the old and dilapidated spaces within the zone properly and rationally. 7) Removing and bringing out some industrial workshops and allocating them according to the user's requirements. 8) Allocation of the vacant lands to the users 9) Protection of the ancient and historical land uses, it should be avoided to build in those spaces or provide the landscape. 10) Projects that are developed for the construction and also the development operation which is done by municipal, people are better with commands as well. Because people know what they need in each zone. Of course, this case should not be confused with the influential factors interfering with personal benefits.

### **REFERENCES**

Chapin, F. Stuart (1972) "Urban land use planning" Second edition, University of Illinois.

- Consulting engineering Bavand(2002). Esfahan Detailed studies.
- Drabkin, h (1989) "Policy and urban growth" Pergamum press, London.
- Farhoudi, R, and et al (2006). Khaf city pattern for analysis and assessment of land use, journal of geography and development, volume 8.
- Hekmatnia, H. Mousavi,M(2006). The application of model in geography with emphasis on rural and urban planning, publication of Elm Novin Yazd.
- Hosseinzadehdalir,K. Maleki,S(2007).Analysis land use changes in master plan, journal of Geography and rural development, vol8. Mashhad, Iran.
- jhon,R (1993) Introduction to town and country planning eight impressions UCL Press limited, London.
- Kohkan,R(2002). Detection of changes in land use with use remote sensing. Masters thesis, university of kharazmi.
- Mashhadizadehdehaghani, N (1999). An analysis characteristic of urban planning in Iran, University of Science and Technology.
- Mehdizadeh, J(2001). Land use planning, transformation in theorizes and methods, Journal of urban management, volum4.
- Mehdizadeh, J(2002). Tehran strategic development plan, center for architecture and urban studies,Iran.
- Pourahmad, A and seifddini, F (2009). Analysis land use in central zone of Amol city, journal of Human geography research, Volume 46, university of Tehran.
- Pourmohammadi, M(1998).Urban land use planning, masters lecture notes, University of Tabriz.
- Pourmohammadi, M(2002).Urban land use planning, Samt publication, Tehran.
- Razavian,M(2002). Managment of urban development, publication of payvan –e now, Tehran.
- Razavian,M(2002). Urban land use planning,Publication of Monshi, Tehran.
- Saeidniya, A (1999). Urban land use, green book, volume 2. Publication of municipalities, Tehran.
- Shieh, E (2000). Introduction on the basic of urban planning, publication of university of science and technology.
- Vazin. G(2003). Urban settlement, planning techniques, publication of derakhshesh.
- Ziyari, K(2002). Urban land use planning, publication of university of Yazd.