

Discerning sprawl factors of Shiraz city and how to make it livable

1. Introduction:

Iran territory has now been directly affected by urban land-uses which are shaping landscapes in cities and around them. The city of Shiraz is one of the Iranian cities par excellence. It was one of the most important cities in the medieval Islamic world and was the Iranian capital during the Zand dynasty (1747-79). Particularly it has expanded enormously and its great old structure is complemented by massive new urban developments.

As 21st century has started, Shiraz residents find themselves fleeing many problems of sprawling the city. Between 1956 and 2006, Shiraz population become more than eight times from 170,656 to 1.44 million.

The rural areas, natural and agricultural land and also open spaces in and around Shiraz cannot be essentially come to stop unless anti-sprawl efforts come to pass.

To better understand the role and possibilities of planning and design, this study try to find the sprawl factors of Shiraz city.

The goal of this paper is to provide a significant improvement to the environment and quality of life in Shiraz. While each city of Iran is unique with its own geography, history, culture and climate, this paper will identify sprawl factors of Shiraz city applicable to many other cities. So, the objectives of this study can be written as: (1) to study the concept of sprawl city; and (2) to present guidelines of the anti-sprawl management of Shiraz city.

To accomplish this purpose, this paper is organized as follows; after this introductory part, the situation of the investigated city is introduced in Section II, being followed by the explanation of the sprawl factors of Shiraz city in section III, study results are presented in Section IV and finally the conclusions will be in section V.

2. Investigated city:

Shiraz, one of the most beautiful, historical cities in the world, is the center of Fars province in the south of Iran. It is located at longitude 32-52'E, latitude 29-37'N and 1,540 meters above the sea level. It is 895 kilometers away from Tehran. Shiraz now is honor to have the cradle of royal civilization of the world and of Persian history.

Shiraz has moderate climate. There are lush gardens all over the city that moderate its atmosphere. According to the 2006 census, Shiraz's population stands 1,442,842 having increased from 170,656 in 1956. Table 1. shows trends of Shiraz population from 1921 to 2006.

Table 1: Trends of Shiraz population from 1921 to 2006

Year	Population Number
1921	about(85000)
1956	170659
1966	269865
1976	425813
1986	848289
1996	1053025
2006	1442842

Source: Shiraz Central Statistical Office

Shiraz is the place of new jobs, recreational facilities and beautiful buildings that attract many migrants. In this fifty years Shiraz are experiencing migration of rural people and small cities. Shiraz is plagued by environmental problems, waste, and pollution that deplete natural resources, damage the environment and reduce the quality of life of its citizens.

Shiraz has two different structures, old and modern. The old structure consists of different gates and districts at different times. The modern structure has been chiefly set up around the old districts in suburbs. A major network of new streets suitable for vehicular traffic seems to have been the main intention behind all changes in the city. Fig. 1 shows the map of Shiraz.

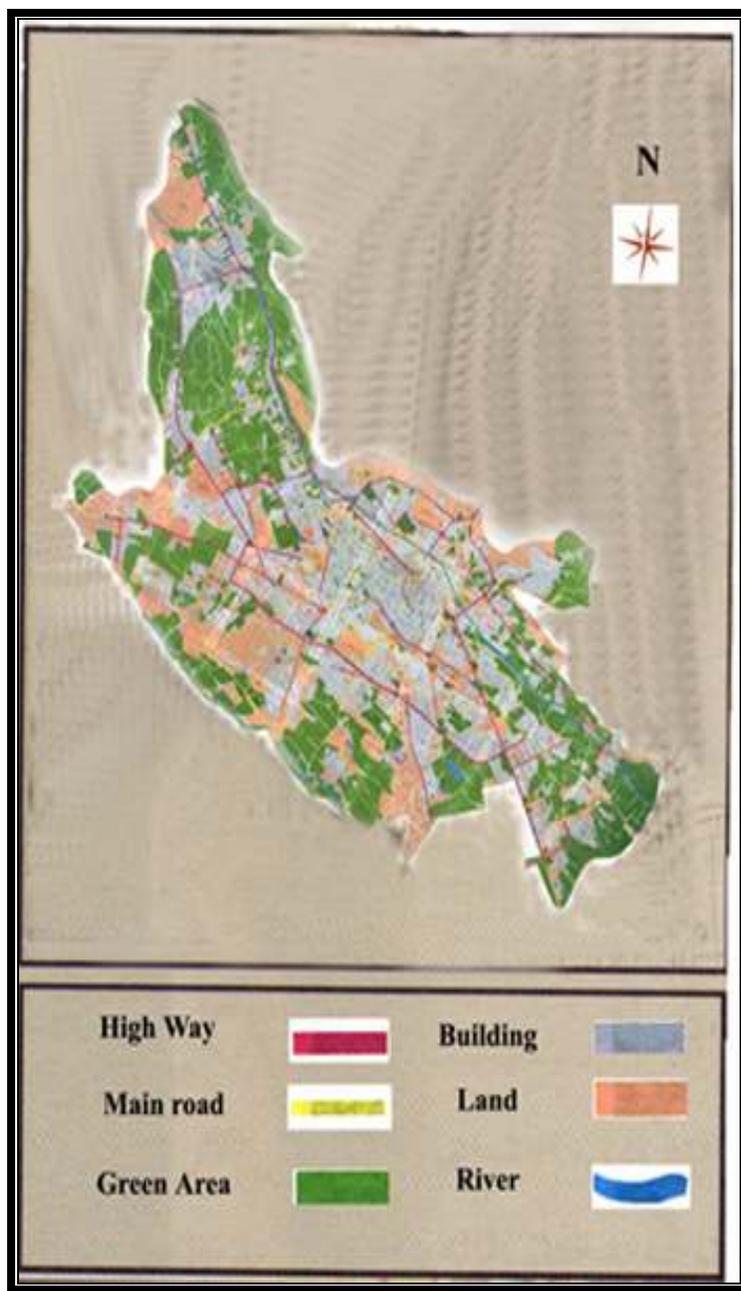


Figure 1. Shiraz map in present time

Trends of Shiraz statistics data, since 1921, show that Shiraz has expanded by 46 times, whereas the population has grown by only 15 times. It shows that Shiraz has become much less compact. The average annual expansion of built-up areas is about 200 ha/year. The growth of Shiraz city in recent 80 years has occupied on former agricultural land and Rural areas specially, agricultural lands which have been ideal for its expansion. It has displaced agricultural activity to less productive areas. Many villages around shiraz have joined to it and they are not as cultivated area anymore. The map below shows the distribution of rural areas around Shiraz in 1900.

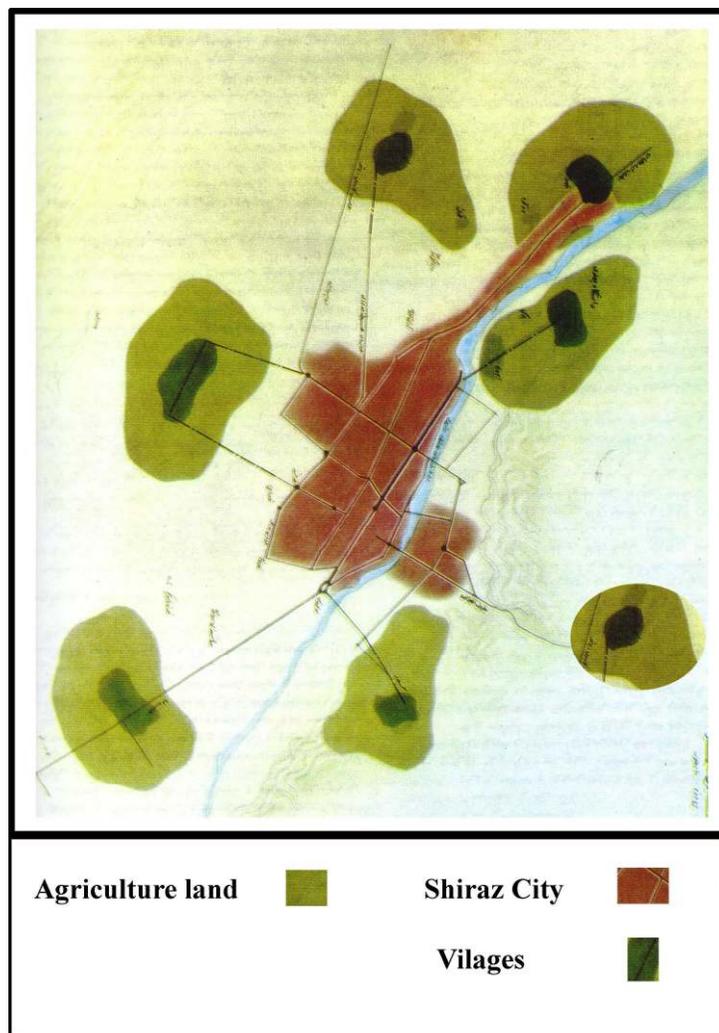


Figure 2. The distribution of rural areas around Shiraz in 1900.

3. The factors in sprawling Shiraz city:

It is apparent that new policies and tools are necessary to control urban expansion so that urban areas can develop in a more sustainable manner. However, in order to define which sustainable urban planning strategies should be adopted, it is essential in the first place to fully understand the factors that made the sprawl of Shiraz city.

There are different ways to measure sprawl. One way is discerning sprawl in terms of the actual amount of rural land that is lost to urbanization. Second way is to focus more on the style of the conversion of rural land to urban use than on the amount of the conversion. When the land use for the average resident increases, it is named Per Capita Sprawl and it causes the urbanization of surrounding rural land.

For calculating per capita land consumption, equation one can be used.

$$a = A / P \quad (1) \quad \text{where:}$$

a = area of urbanized land for the average resident

A = Area of total urbanized land in a city and its suburbs

P = Population of that city and its suburb

The land used per person is the total land area divided by the total number of people. This is the inverse of population density, which is the number of people per unit area of land. When per capita land consumption goes up, density goes down; when per capita land consumption goes down, density goes up. Table 2. shows per capita land consumption of Shiraz from 1921 to 2006.

Table 2: Shiraz per capita land consumption from 1921 to 2004

Year	P.C.L consumption(m/p)
1921	about 47
1971	127
1991	153.8
2004	151.7

Source: Calculation by author

Approximately two major factors have been suggested in the urban land expansion:

a. Population growth.

Table one in section two shows trends of Shiraz population from 1921 to 2004. Shiraz population grows are based on different reasons:

- Fertility rates can be the major cause of population growth in Shiraz
- Migration from small cities and rural areas to Shiraz
- Local and national government actions such as public subsidies for the infrastructure that supports businesses, new housing developments and new residents

b. Factors combine to create growth in per capita land consumption.

Economic factors

- Economic growth
- Globalization
- Rising living standards
- Price of land (High land prices in the city made people to seek lower prices in the more peripheral areas.)
- Poor tax system
- Availability of cheap agricultural land (The price of agricultural land is lower than the price of land in the housing zones.)

Housing preferences

- Number of people per household (decreasing from 8.7 to 4.3 in 30 recent years)
- More space per person (increasing from 45.7 to 70.6 square meters per person in 30 recent years)
- Consumer preferences for size of houses
- Number of family per house (decreasing from 1.7 to 1.2 in 30 recent years)

Inner city problems

There are negative aspects such like these factors issues of the inner city

- Poor air quality
- Noise
- Traffic
- Small houses
- Social problems

Transportation networks such highways, streets and mass transit

- Private car ownership (increasing from 0.3 car to 1.1 car per family in 30 recent years)
- Availability of roads(Development of transport networks and construction of new roads between Shiraz and other villages and cities have aggravated the Shiraz city sprawl. New roads and highways have attracted new development along the line of the improved transport links.)
- Cheap price of gasoline (about 10 cent per letter)
- Poor public transport

The quality of urban planning and zoning

- Size of public facilities such as schools, hospitals and government offices
- Weak land use planning
- Poor enforcement of existing plans

Behavioral factors

- Shopping behavior (Before, the wholesale shops were in main bazaar and most of the other shops were small and they were not far from residential areas. Most of the people purchase their goods from the shops that were near them.)

4. Study Results:

This section is devoted to the results of the study. Over a 80-years period Shiraz examined in this study sprawled out over an additional 18,200 hectares. An average of 104.7 meters changed of land consumption per resident for all housing work, retail, recreational, transportation and other needs from 1921 to 2004. In last 80 years more than 3000 hectares of farmland and other rural space were covered over by the asphalt, buildings and subdivisions of suburbia.

Population growth is a powerful determinant of sprawl. Shiraz population statistics shows that population growth rate was 4 percent from 1956 to 2006. It shows that there may have been some combination of both population growth and per capita land consumption growth. The question here is how much of the increased total consumption of land is related to per capita change in land consumption and how much is related to the increase in Population Growth. Table 3. shows land consumption growth Compared with Population Growth in different years.

Table 3: Shiraz land consumption and population growth from 1921 to 2004

Year	L.C Growth(%)	Pop. Growth(%)
1921 to 1971	5	2.8
1971 to 1991	6	5
1991 to 2004	2.2	2.5

Source: Calculation by author

Of the 18,200 hectares of increase in land used from 1921 to 2004, 68.2% of the land used growth is related to the growth in land consumption by sprawl. And 31.8% of the land used is related to Population Growth. Shiraz urbanized Areas eliminated the most rural land over the five decades. If the rates of agricultural land loss that have prevailed in recent years be continued to 2044, Shiraz will have lost too much of its cropland.

4. Concluding Remarks

This study examined sprawl for Shiraz city. The results show that Shiraz residents are using more and more urban land. It shows that the development of land is twice as fast as Shiraz population is growing. The development of economic activities associated with decreasing attractiveness of living in the centre of cities and historical district and the low price of agricultural land compared to already urbanized land with the development of transport network, is the main causes of expanding Shiraz city.

Sprawl increases the length of trips between home and work place and the cost of transportation has increased due to increase the distance. Also the cost of the Infrastructures and utilities has increased due to expansion of Shiraz city.

The major recommendation of this paper is urging for an effort to a more objective understanding of the cities before any planning or design endeavors. This is not only a lesson for the city of Shiraz, but a general guideline that has to be adopted for all urban designers and planner that are dealing with similar issues elsewhere. To fight sprawl needs Smart Growth movement by trying to change some of the plans that affect consumption and behavioral factors.

The most important question is: what could be done to accommodate population growth without urban sprawl? The most important task in designing a historical city like Shiraz is to determine how much of the past should be preserved and how much can be used to enable the city to cope with the needs of modern life .

Anti-sprawl programs depend to the belief that the new Shiraz residents be settled within the existing urban boundary, so Shiraz could have stopped its sprawl. It means:

(1)The unutilized land inside the boundary should be used for new construction for different activities.

(2) Compacting forms of urban development by coordinating urban policy

(3) Increase the level of apartment buildings.

(4) Forbidden the immigrants and the existing residents from moving to outside the city and encourage them to remain inside Shiraz boundary and.

(5) Motivate the children to continue living with their parents even they marry.

(6) To turn private lands into publicly-owned and protected natural areas.

(7) Establish tax for unutilized land in existing urban boundary

To perform these recommendations, it needs the government control, personal sacrifice, voluntary lifestyle change and loss of personal freedom. Also, the responsibility of Shiraz city councils is the direct control over Shiraz planning.

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