



Urban Growth Management with Urban Growth Boundaries Tehran's Greenbelt Experience

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Abstract

Increasing world population, especially in developing countries has had many serious problems. The rapid growth of urbanization and expanding urban boundaries is much faster than its population growth and infrastructure facilities development ratio. In Tehran, the capital of Iran, excessive physical growth got to be a complicated issue. Spatial chaos, lack of urban utilities, air pollution, traffic congestion, seizing agricultural land, marginalization, informal settlements, insecurity and social segregation, etc. have emerged as outcomes. This uncontrolled scattered horizontal urban growth is known as urban sprawl. However, there are dissimilarities between general view of this phenomenon in western and Iranian societies. Management and control the urban boundaries are inevitable. In order to control this growth, different policies in different countries suggested which the most important of them is the Urban Containment Policies (UCP). Greenbelt as an urban containment policy can protect the open spaces around the city from urban construction. But, due to some sort of circumstances this policy was not successful in Tehran. This paper tries to represent different kinds of urban containment policies and also introduce the experience of applying greenbelt policy in Tehran metropolitan area.

Keywords: Urban containment policy, greenbelt, urban sprawl, Tehran urban development

Introduction

The twentieth century began with a little bit over than one billion populations, 10 percent of city inhabitants, and was ended with more than six billion people, 50 percent of city dwellers (Saraafi, 2002). From a sociological point of view, urbanization in the twentieth century is a global process which not only involves industrialized world but also increasingly being brought into the developing countries (Mehdizade, 2003). Since the urban growth deals with one of the most limited human resources, land, it is one of the essential criteria in urban planning and sustainable urban development. Within the last century physical urban development in different cities worldwide has been affected by new technologies, especially in transportation. It led the cities to be expanded fast and transformed from compact into scattered widespread. But, due to unfavorable economic, social and environmental impacts followed with this model, some methods and policies for controlling urban growth and horizontal compression were implemented.

Initially, Iranian cities were slowly growing due to organic physical development. But, it has not being permanently continued. Urban sprawl became exogenous since 60s in Iran, due to rapidly increasing cities' population – rapid urbanization era. Natural growth and large number of villagers came to the cities were apparently increased. On the other hand, urban



growth form and new constructions were not following the real needs, but based on land speculations. This issue led the urban land market to be chaotic; a large amount of inner-city unfilled land to be left vacant and horizontal expansion took place (Ghrakhlou & Zanganehe Shahraki, 2009).

Today's massive sprawl is only a part of urban transformations that aimed at preparing the urban form of the cities for car use. These governmental efforts that took place between 1930 and 1960 not only changed the urban textures of the traditional and organic cities, but also influenced the life style of the urban dwellers by easing motorized travels. Nevertheless the main part of urban sprawl, particularly in the central parts of the country, took place after 1980 (Ebrahimpour-Masoumi, 2012). During the past one hundred years the Iranian urban textures have transformed from compact traditional morphologies to less compact patterns and lower population densities. The street networks have changed from curvy streets and dead-end allies in the traditional textures to semi-gridiron networks in 1950s and 1960s and complete gridiron after 1980. The population densities decreased continuously during the last decades and the length of the urban trips became longer. Today for residents living in new districts, many destinations are not within the walking distances. On the other hand the new urban planning system emphasized on motorized transportation. Thus most of the planning efforts are put on improving the quality of wide streets and highway systems, while drawing people to local centers and planning neighborhood amenities are almost forgotten (Ebrahimpour-Masoumi, 2012).

A basic idea that is targeted in the contemporary literature for limiting unsustainable development patterns like urban sprawl and its impacts is compactness. Compact urban form is repeatedly discussed as a sustainable method of urban development for reducing the environmental impacts of urban sprawl like ecological footprints (Ebrahimpour-Masoumi, 2012). However this compactness seems to diminish in the development pattern of the Iranian cities. Today most of the Iranian cities, especially the more historical ones, include a compact core. The second type of textures that are located around the core are the less compact areas that were built about the years 1940-1970. The dominant idea behind the plans of these parts was to provide streets suitable for car use. However the streets of these areas still did not have complete gridiron network, but the pattern had less compactness and population density (Ebrahimpour-Masoumi, 2012).

These figures continued to decrease in the districts built after 1980. The urban development pattern of these quarters that are located around the previous ones contains complete gridirons and low population density. Finally a type of development has been shaped during the last three decades, which is the result of joining the villages and previously settlements outside the cities to the new urban boundaries. These areas have very dispersed development patterns. Also several cities have experienced growth along the roads to other cities. These places also have low density and compactness. Many of the sprawling areas that were mentioned as the fourth type are unplanned (Ebrahimpour-Masoumi, 2012).

Research Method

This study uses a descriptive and qualitative approach to explain the different policies to aim the urban containment, and later on to discuss about greenbelt experience in the most



populous town in Iran, Tehran. Afterwards, it tries to distinguish between the origins of so-called urban sprawl in Iranian cities and western contexts as a main reason to encounter with the issue. Then, in order to achieve the research objectives which is to explain the reasons for (in author's belief) Tehran's greenbelt unsuccessful experience, library research and comparative analysis was applied.

The general characteristics of the western sprawl are derived from western definitions which has been taken based on what happened in a different geography than Iranian ones. On the other hand, the specifications of the Iranian sprawl came from mostly unplanned massive population growth. These topics are believed to be different in the western urban sprawl, and the reasons and explanations are presented separately in a dedicated section. In addition, in order to demonstrate more clearly the aerial photos of physical development during the years and the last greenbelt plan of Tehran are presented.

Urban Containment Policies (UCPs), definition and history

No definition of urban sprawl has been universally accepted yet. However, several researchers have tried to clarify this phenomenon. For example, Bruckner defines urban sprawl as the excessive spatial growth of cities (Woo, 2007). In an urban sprawl pattern, both residential and nonresidential developments occur in a noncontiguous way outward from the central city. Nonresidential development includes shopping centers, retail outlets along major transportation corridors, industrial and office parks, and scattered industrial and office buildings (Woo, 2007).

Physical UCPs, in contrast to other tools, may significantly affect urban areas, including the growth and location of population and economic activities, because they directly limit the physical size of communities (Woo, 2007). An urban growth boundary is a line on a map used to mark the separation of rural land from land on which growth should be concentrated. The concept can be traced at least as far back as the 16th Century when England's Queen Elizabeth I decreed that no building could be constructed within three miles of London's city gates. This decree thus created a greenbelt between the City walls and new development (Abrams & Noonan, 1995). In order to promote sustainable development and environmental protection, states and local governments have adopted policies designed to deal with urban sprawl, including the establishment of physical containment policies (Woo, 2007).

Different types of urban containment policies

Three types of urban containment policies are identified in Figure 1: Greenbelts, urban growth boundaries, and urban service boundaries (Woo, 2007). A greenbelt refers to a physical area of open space—farmland or other green space—that surrounds a city or metropolitan area and is intended to be a permanent barrier to urban expansion. Greenbelts are typically created through public or nonprofit acquisition of open space or development rights, although they may be enforced by strict regulation of private property (Bengston & Youn, 2006).

In contrast to greenbelts, an urban growth boundary (UGB) is not a physical space but a dividing line drawn around an urban area to separate it from surrounding rural areas. Zoning and other regulatory tools are used to implement an UGB. Areas outside the boundary are

zoned for rural uses, and inside for urban use. Unlike greenbelts, an UGB is typically drawn to accommodate expected growth for some period of time, and is periodically reassessed and expanded as needed (Bengston & Youn, 2006).

Urban service boundaries also consist of a line drawn around a city or metropolitan area, but they are even more flexible than UGBs. An urban service boundary delineates the area beyond which certain urban services such as sewer and water will not be provided. They are often linked with adequate public facilities ordinances that, as described above, prohibit development in areas not served by specific public services and facilities. Some metropolitan areas using urban service boundaries use tiring systems that attempt to direct public infrastructure into new areas in a particular sequence (Bengston & Youn, 2006).

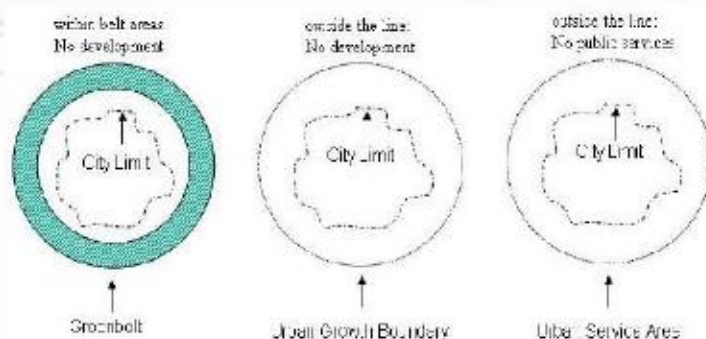


Figure 1: The shape of urban containment policies (Woo, 2007)

Table 1 also presents comparison of different containment policies. Pendall, et al., 2002 describe greenbelts as the "tightest" containment strategy, because greenbelts are primarily used for the permanent protection of open space and natural resources (Woo, 2007). Change in boundaries is uncommon, even under high development pressures. Greenbelts form a band of protected natural and fragile lands. South Korea and England have a long history of using greenbelts, but only a few cases can be identified in U.S. cities. Unlike greenbelts, UGBs are often re-evaluated periodically and then changed if necessary (Woo, 2007).

Table 1: Comparisons of different urban containment policies (Woo, 2007)

	Characteristic	Purpose	Tightness
Greenbelt	New developments are <u>not allowed</u> within the belt area	The <u>permanent protection</u> of open space or natural resources	Tightest (Change in boundaries is uncommon)
Urban Growth Boundary	New developments are <u>discouraged</u> beyond the boundary <u>with some</u>	Protecting agricultural land and open space, and curbing urban sprawl	Moderately Tight (boundaries are reviewed periodically)



exceptions

Urban Service Area (Boundary)

New developments are allowed beyond the boundary without provision of services

Minimizing the costs of public services with a service boundary

Least tight (more flexible changes in boundaries)

Urban Sprawl in Tehran

Tehran has passed the various stages of urban development significantly faster than normal rate and in a very short period of time. Urbanization progress in Tehran began with the foundation of Safavid era in 16th century (Ghafaari, 2003).



Figure 2: Location of Tehran in Iran

In figures Figure 3 to Figure 10 Tehran's development between 1890 and 1995 is shown (Ghafaari, 2003). In 1785 coincides with Qajar era, Tehran became the Iranian capital for the first time, and a new octagonal shape wall for town was built from the map of Paris. Within 31 years from 1890 to 1920 the overall area was not significantly changed. But in 1920, the area became more than 24 km² and population passed 210 thousand inhabitants. Tehran has destroyed its wall between 1932 and 1937 and urban development was pulled outside the town borders for the first time. In these years, Tehran's population became over than 310 thousand inhabitants which 20 percent of them were living outside the city walls (Ghafaari, 2003).

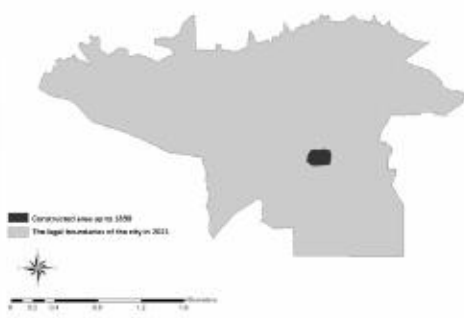


Figure 3: Tehran in 1890 (Ghafaari, 2003)

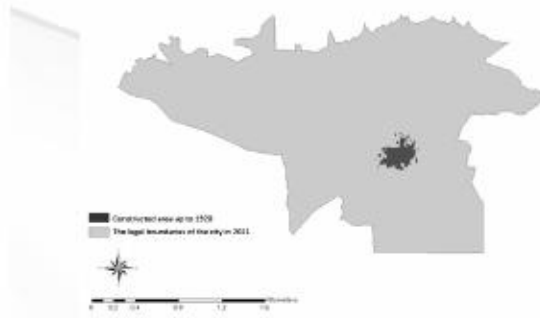


Figure 4: Tehran in 1920 (Ghafaari, 2003)



Figure 5: Tehran in 1940 (Ghafaari, 2003)

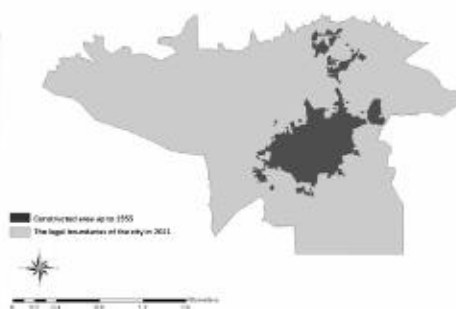


Figure 6: Tehran in 1955 (Ghafaari, 2003)

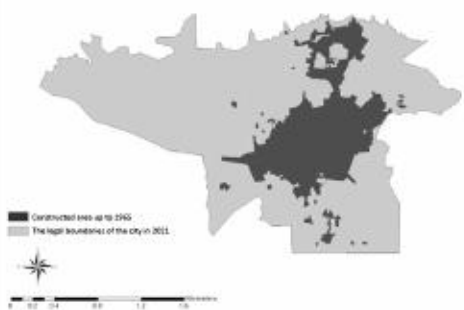


Figure 7: Tehran in 1965 (Ghafaari, 2003)

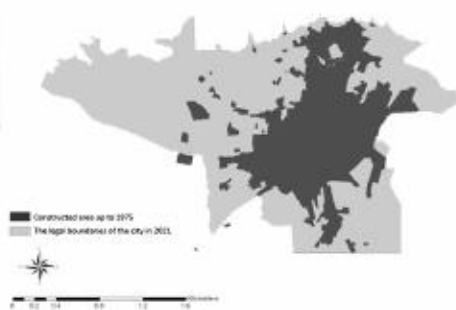


Figure 8: Tehran in 1975 (Ghafaari, 2003)



Figure 9: Tehran in 1985 (Ghafaari, 2003)



Figure 10: Tehran in 1995 (Ghafaari, 2003)

Tehran's physical growth never stopped. But, between 1975 and 1985 the growth rate from 5.2 in the previous decade fell to 2.9. This decline happened due to immigration restrictions into Tehran (Ghafaari, 2003). Figure 11 shows a sort of effective factors in that time. UGB functions were considered scientifically within these years in Iran. However, excessive physical growth continued then again. Now, Tehran with more than 8.3 million inhabitants and an area about 730 km² is the eighteenth most populous and 27th largest city in the globe (United Nations Population Division, 2009)

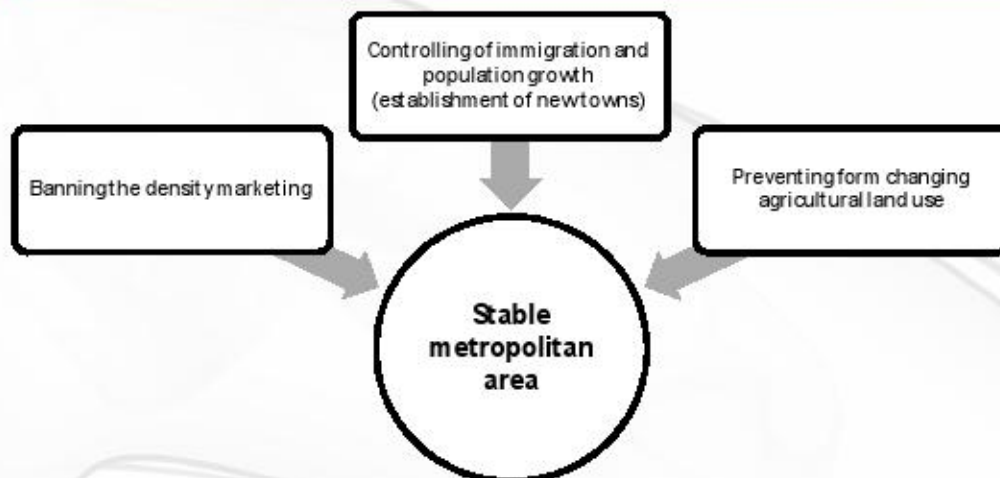


Figure 11: Effective factors to Tehran growth control in the years of war (Ghafaari, 2003)

Greenbelt implementation in Tehran

Using greenbelts as an UGB in Iran was considered in the same time as US – a western strategy for controlling urban sprawl and later, as an Iranian strategy for enhancing climate conditions.

The results of the first arguments (mid 70's)

Southern Greenbelt of Tehran was the first greenbelt strategy to soften the polluted weather of Tehran, and not mainly to control the urban sprawl in the capital. It was planned by Environmental Studies Center of University of Tehran in the mid 70's. The greenbelt area contained about 43km² and had a thickness of 1km. Below, the most significant features of that plan are listed (Ghafaari, 2003):

- Green ribbons were embowed.
- These green ribbons could be irrigated using the fresh water of Jajroud and Karaj rivers flowing along the greenbelt edges.

This plan had never been implemented due to absence of governmental planning strategies and also suburban sprawl or informal developments (Ghafaari, 2003). However, this kind of urban sprawl can hardly be called "suburban" or "development" (Ebrahimpour-Masoumi, 2012).

The second plan (1980)

The second greenbelt plan for Tehran has been presented and legislatively debated in the planning council by the end of 1980. The planning council's claims were as follows (Ghafaari, 2003):

- Greenbelt should be deep enough to be able to confront against the population growth and town spreading in both inside and outside directions; it should not be worn out and gradually transformed into the green-islands and regional parks.
- Greenbelt should be constantly continued.



- First priority should be given to the vacant and wastelands. For later priorities, agricultural lands should be first become the government property.
- However, agricultural land uses should not be changed to other usages.
- In case of violation of this act, municipality should take the land tenure and plants it.

In the following years, particularly in 1986, Tehran greenbelt issue has been followed more legislatively; in addition to the south parts of the town, it also included the western and eastern edges. Due to legislation by Council for Supervisory on Tehran's expansion, Tehran greenbelt set to be done by cooperation between Ministries of Energy and Agriculture under supervision of municipality (Ghrakhlou & Zanganehe Shahraki, 2009). At that time, the general objectives of Tehran's greenbelt were prepared as follow (Saraafi, 2002):

- Preventing from the uncontrolled and discordant form of Tehran's growth.
- Air filtering and create proper microclimates around the city to prevent the dust and pollution from industries surrounded the town.
- Due to rising groundwater levels in the south part of city, try to use up that resources in order to lower their relative level by greenbelt ribbons irrigating in that area.
- Economic planting with fruit and non-fruit trees.
- To create new promenades for residents, especially for those who live in south parts of Tehran

These objectives followed by relevant organizations mostly with considering the last items, and not seriously the first one. The government dedicated an amount of 1.5 billion Iranian Rials for implementation the forest, grassland and watershed projects to The Ministry of Agriculture and also to The Forests and Grassland Organization (Islamic Consultative Assembly, 1985).

Developing and maintenance of open spaces and greenbelts in Tehran, due to conserve the open spaces in central parts and also agricultural lands and water resources protection in south of Tehran, is an essential point in later regional plans of capital. But the role of air conditioning was always the most important expectation (Center of Planning and Architecture Studies of IR, 2003). Tehran's greenbelt should improve environmental overall quality and reduce the pollution, especially air pollution, and provide the recreation space for residents. It also can be a barrier to prevent the spread of uncontrolled town growth (Figure 12).

In 2003 and due to the large number of problems which city was faced to, mostly because of the high population and pollution, Tehran greenbelt objectives were represented in two major points as follows – the set of goals which consists until today (Ghafaari, 2003):

- Preventing from soil erosion, more safety against flooding, improving the weather condition in city, preserving the water resources and watershed management
- Preventing the town from uncontrolled physical growth

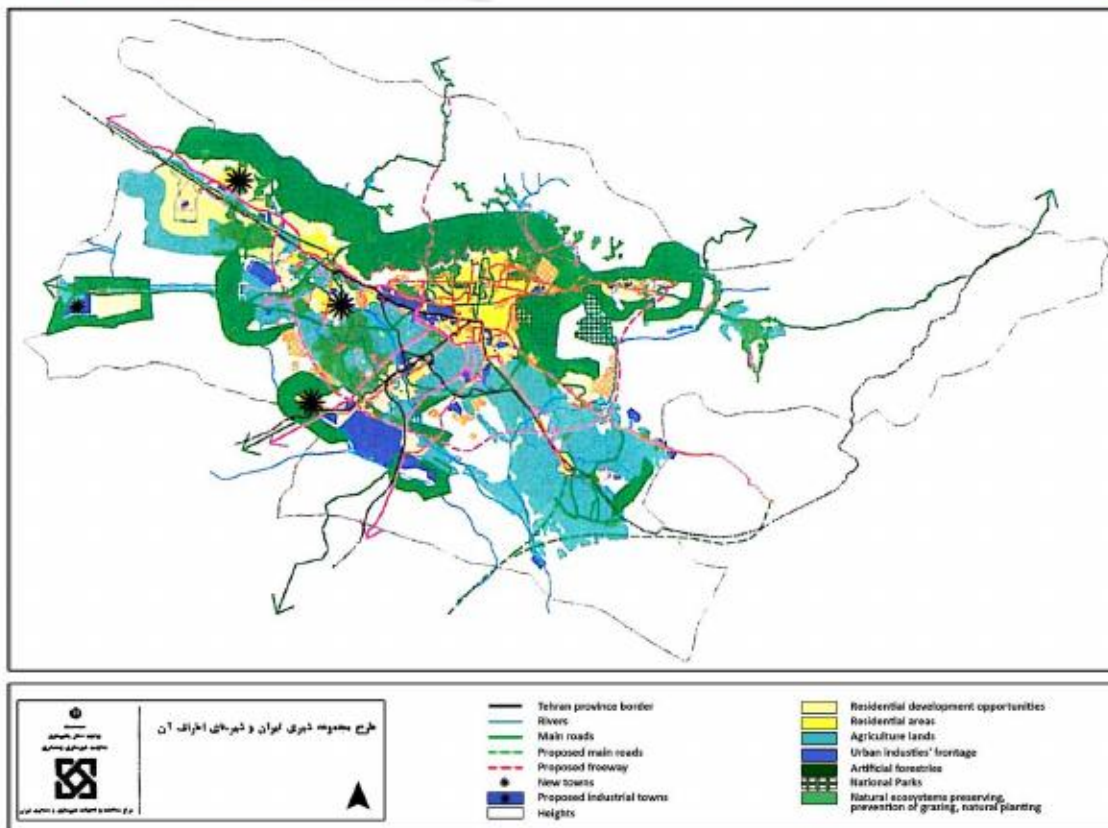


Figure 12: Proposed greenbelts for Tehran (Nezami & Others, 2002)

Discussion

According to the previous section, it seems that Tehran's greenbelt was not successfully able to act as an UPC. It is determined that environmental aspects of greenbelt have surpassed its containment role – from following the greenbelt issue mostly by environmental related organizations instead of planning agencies, to considering it just equal with urban green spaces in various plans (Kaviani, et al., 2012). Substituting the expectations from greenbelt has origins in its main objectives and implementation in Tehran. As an UCP, greenbelt could not control Tehran sprawl – if we would be certainly address what is going on there as "sprawl".

Differences between the Iranian and Western urban sprawl

Writing about differences between these two contexts, which are coming from two geographical places, does not fit into this paper and needs a separated study. But since it has a key role, it will be discussed a few within the following paragraphs.

Five aspects of general characteristics of urban sprawl are sub-urban development, single-use developments/zoning, street network, accessibility, and commercial strip development (Ebrahimpour-Masoumi, 2012). The basic differences between the Iranian and the western urban sprawls are that the western sprawl is basically caused by suburban development with zoned single-use areas that contain disconnected streets. Such an urban morphology results



in very low connectivity and accessibility. Large commercial strips are mainly designed for personal car travels. Very few of these characteristics are seen in the areas of the urban Iran that are introduced by the scholars as sprawled (Ebrahimpour-Masoumi, 2012).

Suburban development is a basis for urban sprawl in North America and Australia, and large-scale, single-use developments outside the urban areas are patterns that contribute to urban sprawl in Europe. However, there has been no or little organized effort for planning typical suburbs on the edge of the Iranian cities like the ones that are seen in western cities (Ebrahimpour-Masoumi, 2012).

In many cases in Iran the sprawling areas are the result of lack of control on the land uses (Figure 13). Such defragmented constructions cannot be called development because no intention is seen behind the growth style of these areas. Good examples of such places are the unplanned constructions along the intercity roads. Roads oriented to outside of Tehran in the west, southwest and eastern parts have these characteristics. Such growth has not been foreseen in the master plans so they have nothing in common with planned development but they are just the outcome of fast urbanization and lack of strict control (Ebrahimpour-Masoumi, 2012).

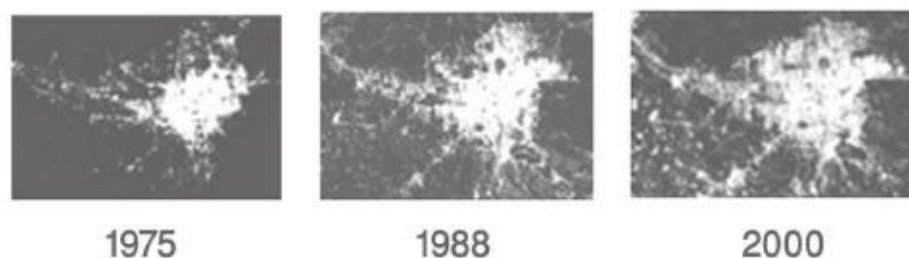


Figure 13: Tehran Urban Growth Graph between 1975 and 2000 (Barati, et al., 2010)

In addition, the urban development plans in Iran have not been influenced by zoning laws. Therefore zoning is obviously not a cause for the form of fast outward development in the country. Many new residential districts that have recently built in the periphery of the cities have insufficient facilities like retail and shops, public spaces, green spaces, local recreation amenities and so on. This has made many neighbourhoods mainly contain residential function and have little mixing of uses (Ebrahimpour-Masoumi, 2012). The question remained is: "Are the Iranian cities experiencing urban sprawl or is it the contemporary pattern of the urban natural growth?"

Mission of Tehran greenbelt as an Urban Containment Policy

The main mission of Tehran greenbelt policy which was protecting open spaces from urban constructions gradually shifted out. And, improving the air quality of capital has been strongly followed by greenbelt plans to decrease the air pollution effects as a substitution (Ghafaari, 2003). However, air pollution is a result of human activities concentration. And, this concentration in Tehran is the result of failed policies of controlling urbanization rate and population explosion. Although, greenbelt is known to be an UPC but, lack of well-coordination between immigration controlling policies, as an exogenous factor and



greenbelt policy as an endogenous factor, is the major probability in Tehran's greenbelt policy failure.

Within the 80's and during the Iraq and Iran war, another policy for controlling the excessive growth of large cities in a regional scale was noticed in Iran – new towns policy. This policy was followed by government more intensively after the imposed war, mostly because of multiple functions of them in that time. It seems, by successfully settlement of new residents in the first Iranian new towns greenbelt's main role, as a barrier for controlling city's growth, has been weakened and substituted by creating green space and parks. Since, the approach to use greenbelt strategy for Tehran, by creating a large number of parks and green areas within the city until 2000, was blurred (Ghafaari, 2003).

Seemingly, new towns could have balanced the forces that affect the greenbelts' functions by taking the regional factors into account. As greenbelt's effect of growth control has been ignored, new towns issue looked like to be as secondary places for localized spreading of metropolitans. The two separate policies were following in an uncoordinated way (Kaviani, et al., 2012).

Conclusion

As the rapid growth of urbanization in the last decades was not commensurate with equipping the urban spaces and infrastructure development, the excessive urban physical growth and sprawl has become an important issue. However, greenbelt as an UCP successfully applied in many examples of western cities, but after 40 years it has not been a prosperous policy in Tehran. As an origin, the fast outward urbanization of the Iranian cities that is recently called urban sprawl has basic differences with the urban and suburban sprawl of the North American, West European and Australian cities (Ebrahimpour-Masoumi, 2012). There is strong need for research on differentiation between normal growth and urban sprawl as a priority before applying physical growth policies (Ebrahimpour-Masoumi, 2012).

According to what is discussed in previous sections, excessive growth in Tehran has been influenced by four general forces:

- Rural-urban immigrations
- Weaknesses of comprehensive plans
- Government role
- Land speculations

Low income in rural areas significantly increased the immigrations to big cities, and high costs of rent in cities attracted new comers to settle in the margins. However, the culture of one-storey and single-unit housing along with other factors accelerates expansion of the city (Azizi, 2004). Failure to meet the anticipated results in urban comprehensive plans, especially about estimated population, triggered the surrounding areas to be considered within the city boundaries. In this case, poor coordinating between two different planning scales, urban and regional, is obvious (Ghafaari, 2003).



By emerging of the first new towns around big cities and bringing the role of population absorption to them, prospective of greenbelts limited to the environmental aspects in Iran – urban containment turned to be a far objective. New towns in Tehran province were relatively a successful experience which could prepare a considerable condition for Tehran greenbelt to be established. To talk about new towns strategy in Iran needs several books and does not fit into this paper. But due to lack of conformity between urban containment policies and regional policies, new town strategies could not meet the prospected results of Tehran's containment.

Government by intervening in land market, as well as the other factors, had a big influence on urban sprawl. In the past years, government by giving the ownership and assigning the marginal lands, often separated from the body of the town, caused the horizontal expansion intensively (Athaari, 2000). Eventually, other phenomenon such as leapfrogging and speculations could make sprawl more intensive in Tehran.

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Acknowledgements

I would like to acknowledge Ms. Elham Arab in Shahid Beheshti University who helped me to collect the main information. Without her assists it was unlikely to be done. I am also grateful to my supervisor, Professor Stefan Sedentop, the head of the Regional Development Planning Institute at Stuttgart University, who encouraged me to pursue this topic and spent extra time helping me to achieve a clearer approach.