



Analysis of the Impact of Physical Changes on Population Acceptance in the 22nd district of Tehran Metropolis

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Abstract

Due to the expansion of the employment market, the accumulation of wealth and job opportunities, the accumulation of facilities and services and physical potentials, the megalopolis of Tehran has allocated a very large share of immigration. The main goal of this research is to investigate the role of physical changes in the population acceptance of the 22nd district of Tehran megalopolis. The research method has a practical aspect. The community studied in this research consists of all people who live and work in District 22. Sample size In this research, 30 specialists and experts of region 22 have been selected as a statistical sample. Data analysis was done using statistical methods, including correlation analysis, regression and mean analysis, and in order to achieve the desired goal and carry out the process of detecting changes, the detection method after classification and satellite images from Landsat satellite and TM and ETM+ sensors as well as The advanced OLI sensor was used and their processing was done with Envi 5.3.1 and Gis10.7 software, and the maximum probability method (MLC) was also used for control, corrections and ground sampling. The findings and results show that region 22 has not reached the population acceptance of the detailed plan of 2012, which considered a population equal to 500 thousand people. The most important factors affecting population imbalance and extensive land use changes in the region are legal, economic and demographic. The most important factors affecting population imbalance and extensive land use changes in the region are legal, economic and demographic.

Keywords: Physical Changes, Population Acceptance, Metropolis, Tehran, District 22



Introduction

Accelerated urbanization, the ever-increasing growth of cities, increasing the population density in urban areas due to migration and the transformation of rural centers into discrete urban places and the integration of one city into another city cause the disruption of the spatial balance of population and planning, social damage and physical changes that have become urbanized and require management and physical-spatial transition [1], so that it has created many challenges for city managers and planners. Cities are like living organisms, the spatial crystallization of playing human roles in the geographical environment, the center of population and productivity, which is affected by various forces and factors [2] and this issue has caused fundamental changes in spatial and physical organization [3]. Although the speed of urbanization growth in developed countries is in a suitable and controlled situation, in developing countries the situation is different and the population growth is accelerated [4]. On the other hand, with the passage of time, extensive physical changes have taken place in the living spaces of humans in a good and bad way, so that the importance of spatial and physical changes also comes from human needs. Every human being needs to understand his surroundings and interact with them for survival and continuation of his life in the world, and basically, without understanding the surrounding environment and knowing the relationships that govern it and mutual interactions, he will not be able to continue living [5]. In general, nowadays urban interventions have brought about major transformations in the spatial structure of Iranian cities [6], and the city of Tehran is no exception.

Today, Tehran acts as an attractive pole for people as the main metropolis of population attraction, so that according to the Statistics Center of Iran, between 2011 and 2016, about 936 thousand people from other provinces of Iran arrived in Tehran. Due to the expansion of the employment market, the accumulation of wealth and job opportunities, the accumulation of facilities and services, and physical potentials, this metropolis has allocated a very large share of immigration [7, 15]. Being the capital city of Tehran has led to the concentration of political, economic, scientific and cultural affairs in this city, so that this issue has drawn the attention of many people to this metropolis and this has caused a large population to be sent out. On the other hand, due to the increase in population and the lack of sufficient capacity and facilities, Tehran's urban management has been associated with a lack of resources and an increase in demand [8], which requires planning and foresight for the sustainable development of the districts of this metropolis. In this regard, due to the importance of physical changes in the repopulation of districts, the main goal of this research is to investigate the role of physical changes in the repopulation of the 22nd district of Tehran metropolis, so that while examining the physical changes of this district, the state of repopulation of this district will also be examined. From the innovative aspects of the research, it can be pointed out that there is no similar research in this field in the studied area, and the results of this research can play an effective role in the sustainable development of the 22nd district of Tehran. The fact is that the physical tissue provides the possibility to recognize the urban identity visually, and for this reason, it is more valuable than other aspects of identity.

Theoretical foundations and research background

The physical texture and spatial-spatial structure of cities form one of the most important aspects of the city's identity; Because the formation of urban physical fabric is affected by thoughts, beliefs, activities and the level of society's culture. Therefore, knowing this part of cities can lead to knowing other social, economic and cultural dimensions. The body of the city is a sign of the progress of the city [1] and on the other hand, the spatial distribution of population and activity in the city body and how it evolves over time has always been one of the most important indicators for understanding the real relations of the city; In other words, in thinking about the structure of the city, this concept has played a basic role, so the effort to guide the future and intervene in the distribution of population and activity in different areas or parts of the city has always been one of the main topics of urban planning knowledge and is generally considered as the basis of urban planning [9].

The position of the population in development planning is important because on the one hand, the population is the driving engine of development and the advancement of all development plans relies on the population strength of countries and regions, and on the other hand, the status, livelihood and dignity of the population is the ultimate goal of all It is planning [10].

In developing and less developed countries, the rate of urbanization has created an unbalanced trend. In this way, growth and development strategies, with the concentration of metropolises and capitals, have paved the way for structural-functional changes. This trend has caused imbalance and inequality in urban systems and urbanization, which has led to polarization and economic dependence, polarization of capital, class division, along with population displacement, especially rural migrations to cities [11]. In this regard, the most important and the first theory that was proposed in the late 19th and early 20th century about the geographical movements of humans in societies are known as attraction and repulsion models. In these models, theorists generally pay attention to two categories of factors: factors that attract them to the destination area. The first theoretical explanation about the legalities of migration was proposed by Ernst George Ravenstein under the title of migration laws, so that he considers two categories of factors of attraction and repulsion to be important along with the variable of geographic distance [12]. In this regard, in European cities, features such as architecture, heritage or culture act as unique and very attractive features to attract



the population [13]. This issue shows the importance of the physical and identity characteristics of cities for populability.

In relation to the subject of the research, few researches have been done inside and outside the country, so in the researches abroad, we can refer to the researches of Al-Hazzani et al [14]. There are three types of population attraction patterns in the city of Riyadh in the morning. The first type, global attractions such as important urban centers that attract a global population such as factories, embassies and government facilities. The second type is the central areas of the city, which, due to the central location of these areas in the city, which makes them accessible, a large population travels in shorter distances and with less spatial dispersion. The third type is residential spaces, which have little attraction to attract people in the morning. Also, commercial places such as shopping centers, companies and service centers are among the important places where people tend to be there.

Vinyals-Mirabent (2019) [13] in his research under "Attractions of European urban destinations on the border between competition and unique destination image." A benchmark study of "communication practices" has pointed out that a destination's attractions are key elements of its attractiveness and play a vital role in the destination's success in demographics. Attractions such as architecture or culture have been identified as essential features of destination competitiveness and as useful distinguishing features to differentiate the destination's image from that of competitors. Also, in domestic researches, Akbari (2019) [12] in his research entitled "Mental understanding of immigrants about the attraction and repulsion of the destination and origin of migration: a case study of immigrants in the northern Khalij-e-Fars neighborhood of Tehran" has pointed out that the attraction and repulsion of a place only depends on the place itself. It does not return, but these repulsions and attractions are in connection with another place of meaning and concept, so that it is formed in the mind of a person in the form of comparison. Aminzadeh Goharrizi et al (2017) [9] in their research entitled "Explanation of structural complexities in the prospective population growth of Tehran metropolitan areas" have pointed out that the two factors of the effect of the area of worn-out tissue and the distance of the region from the employment center on population growth and population growth of the region are statistically significant. Mirzadeh Kohshahi and Abazari (2017) [10] in their research entitled "Spatial organization of cities and strategic planning of population settlement in southern coasts of Iran" have pointed out that the quality of population distribution and spatial settlement system plays an effective role in the sustainable development of regions, meeting needs, improving services, safety and has national security.

Materials and Methods

The applied research method is carried out by using the results of fundamental research in order to improve and perfect the behaviors, methods, tools, devices, products, structures and patterns used by human societies. The community studied in this research consists of all people who live and work in District 22. Sample size In this research, 30 specialists and experts of District 22 have been selected as a statistical sample. Data analysis has been done using statistical methods including correlation analysis, regression and mean analysis. In this research, in order to achieve the desired goal and perform the change detection process, the method of "detection after classification" in which pixel changes are obtained in two bands on the first and second dates and the (From-To) method It is called, it has been used. In order to do this, satellite images were downloaded from the natural resources observation database of the United States Geological Survey Organization or in short (USGS) from the Landsat satellite in three time periods (1996-2006-2016) in 10-year intervals. Here, due to the lack of images from the same sensors in the mentioned time intervals, we inevitably use the Landsat 5 TM sensor for 1998 and the Landsat 7 ETM+ sensor for 2009 and the advanced OLI Landsat 8 sensor that has been in orbit since 2015 for The time period of 2020 is used.

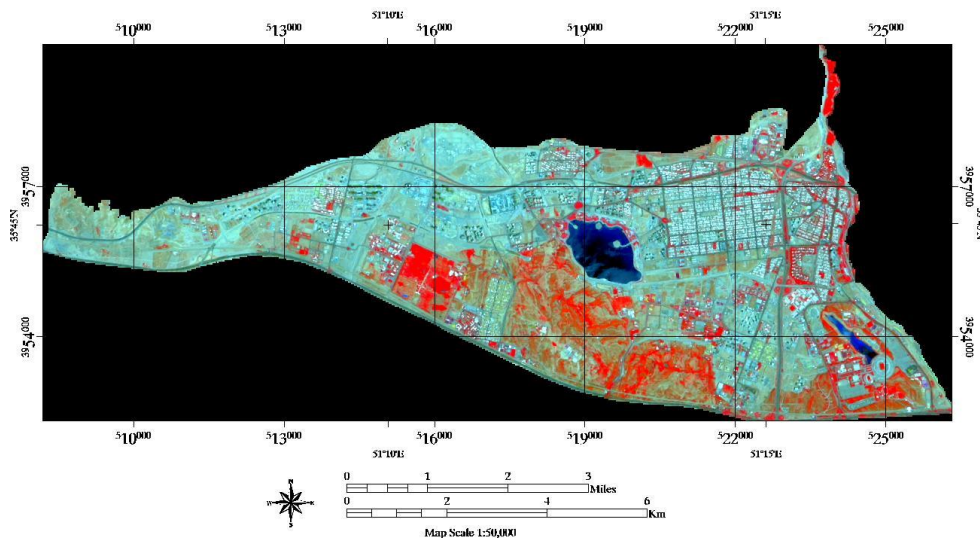


Figure 1. Landsat 8 OLI 5,4,3 composite image map of Tehran city District 22, collection date 06-27-2020

Envi 5.3.1 and Gis10.7 software as well as the maximum likelihood method (MLC) were used to control, make corrections and land sampling to carry out this part of the mentioned research.

Study area

District 22 of Tehran city, located in the northwest of Tehran, has an area of nearly 10 thousand hectares, of which about 6117 hectares are part of the service area (equivalent to 10% of the total area of Tehran city). Due to its special climatic and geographical conditions, this area is limited from the north to the heights of 1800-1400 meters of Alborz foothills, from the south to the Tehran-Karaj freeway, from the east to Kan floodway and from the west to the conservation area of Karaj city. This area is located in the eastern longitude of 25 seconds, 5 minutes, 51 degrees and 30 seconds, 22 minutes, 51 degrees and the northern latitude of 10 seconds, 43 minutes, 35 degrees (master plan of District 22, 2016: 1).

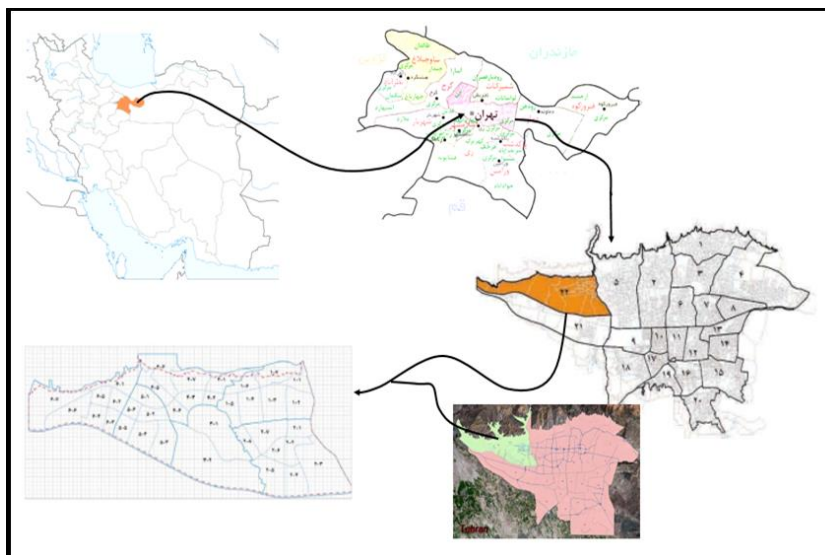


Figure 2: Location map of District 22 of Tehran

Results Discussion

According to the previously approved comprehensive and detailed plan, District 22 can have more than 600,000 inhabitants, but with the approval of the urban complex plan, stopping residential construction and allocating land to urban-extraurban service uses is on the agenda. According to the comprehensive plan of Tehran, until the task and determination of the needs of the metropolis of Tehran, the population ceiling of the district has been set at 350,000 people, which has been adjusted and increased to 475 people in the Supreme Council of Urban Planning and



Architecture. The number of residents of District 22 during the 1375 census was about 67 thousand people. According to the latest census in 2016, the current population is 176,347 people. In various urban development plans, the maximum population capacity of the district has been considered to be 970,000 people. From the physical point of view, it should be said that only about 70 hectares of the nearly 9,000 hectares of residential area and about 270 hectares of constructions, including building site and standing property. Currently, 176,347 people live in this area, which has grown by 1.42% compared to the previous period. The trend of population changes in the 22nd district of Tehran according to table (1) is as follows:

Table 1. Demographic changes of District 22 of Tehran metropolis

Year	1976	1986	1996	2006	2016
Population	31162	56020	67230	105661	176347
Growth of Population	-	9.8	1.8	4.5	1.42

Source: Tehran District 22 Municipality website, 2016

The gross population density in this area (according to the 2016 census) is equal to 9.9 people per hectare. If the residential contexts or in other words the surface of the settlements are excluded from the calculation of the meaning and non-residential areas, a better understanding of the population density situation in this area will be obtained. The level of municipal services in this area is equivalent to six thousand hectares, in which case the actual density in the studied area will be equal to 18.1 people per hectare.

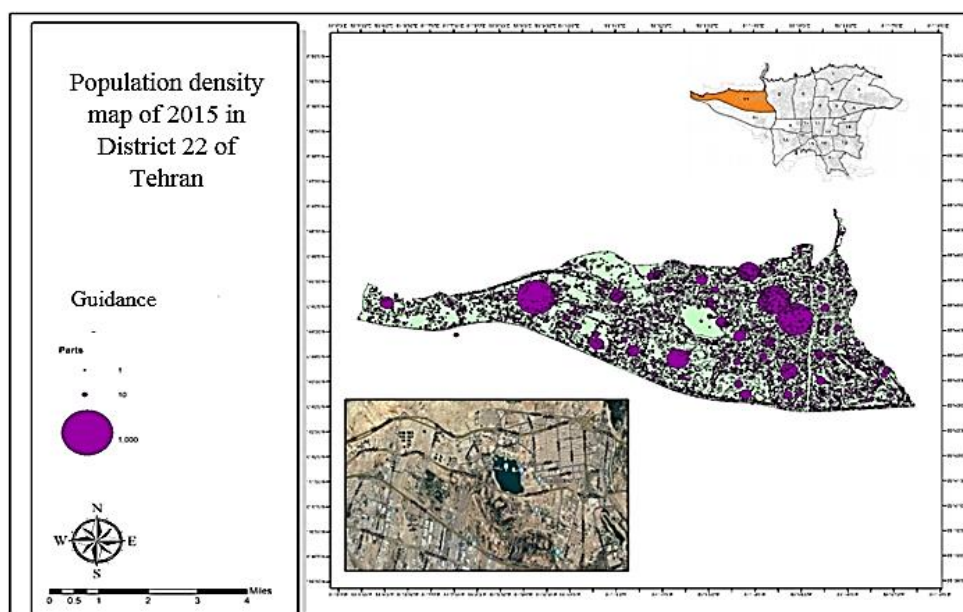


Figure 3: Population density map of 2016 in District 22 of Tehran

According to figure (3) and the census of 2016, the population of 22nd district of Tehran was 176,347 people, the size of the household was 2.3, and the number of households was 55,111. The number of male population was 89,893 and the number of female population in this district was 86,454. The size of the household decreased from 1996 to 2016 in the 22nd district of Tehran and the number of households increased in the same time period.

Table 2. Demographic changes in the 22nd district of Tehran from 1375 to 1395 in the censuses

Row	Year	Population	Annual Growth Rate
1	1996	56020	%4.9
2	2006	107820	%6.76
3	2016	176347	%4.97

The population of District 22 was 56,020 people in the census of 1996, 107,820 in 2006 and 176,347 in 2016. These figures show that the population of District 22 has been growing from 1996 to 2016, which can be justified considering

the newness of District 22. Of course, it should be noted that what is predicted in the development plans (comprehensive and detailed plan) for District 22 is more than this amount, and District 22 has not reached the population capacity of the detailed plan of 2012, which considered a population equal to 500 thousand people.

Various forces may play a role in the non-fulfillment of any urban and regional development plan and program. Of course, these factors may be different in many cities and regions. In this research, according to interviews with experts and municipal employees, the reason for the non-realization of uses was identified in three parts.

- Legal factors: Among the legal factors in the non-fulfillment of the detailed plan, we can refer to construction violations, non-implementation of urban land use laws and regulations, and unclear management of the protection area and the city's privacy. The 22nd district of Tehran is considered as an area for providing services at extra-urban, national and international levels and a hub of Tehran's entertainment and tourism in the urban and structural-strategic complex management plans. That is, the use of trans-regional services should be prioritized over other uses. But the development trends and tendencies of the district have been contrary to the previous plans. The urbanization process, despite the contradiction with the ideas of the strategic structural plan and the management of the urban complex of Tehran and its policies, one after the other by the cooperative companies, organizations and government institutions, has led to the settlement of various population groups in the district. Along with the construction of these settlements, independent permits were also given for construction outside the legal boundaries of the city, so that today, among the settlements, 22 settlements have official permits and one settlement (Azadshahr) without official permits and others are in the stage of construction, implementation or completion. or their lands have not yet been under construction. The strongest wave of construction in recent years has been related to the construction of buildings for the employees of organizations, each with the number of 155 to 2555 units, in the form of small profit groups. This process of mass constructions has caused the failure of the detailed plan.
- Economic factors: Among the economic factors in the non-fulfillment of the detailed plan, we can mention the increase in the price and the land market, the growth of the construction industry, and the issue of military properties and lands. District 22 with an area of 10,000 hectares was created with the aim of solving the service shortages of the western area of Tehran, as well as relocating a part of the population living in the dilapidated tissues of central Tehran, as well as housing a part of the population of Tehran. The expansion of high-rise building and mass building has increased the price of land in the district, and according to calculations, changes from other uses to residential (high-density residential realization percentage) is 43%. Also, the issue of ownership in the past was very complicated and unconventional due to the fact that most of the land was agricultural and the texture was rural, so that the boundaries of the separate parts are not known. Although in the proposed detailed plan, the grouping and separation of these lands have been given, but the ownership conflict with the new urban plan still remains. Also, 756 hectares of the district's lands are reserved for military use, which is supposed to be removed from the district, and the delay in this matter is one of the reasons for the non-realization of some of the planned uses of the detailed plan.
- Demographic factors: after the announcement of the detailed plan in 2000 and the official activity of the municipality of the district, the process of settling the population in the district gained more speed. So that the population reached 176,347 people from 56,020 people in 1996 to 2016, which indicates a high growth rate compared to other regions and the whole city of Tehran. Such rapid changes and transformations in the process of loading the population and its related services will put pressure on the executive goals of the detailed plan and finally the failure to realize some of its proposed uses.

In the following, the trend of changes in the area's use are presented using the indicators mentioned in the research method and related calculations.

Table 3. Comparison of area changes (in square meters) between different land uses on two dates of Landsat 5 TM image collection.

Area changes from 1996 to 2006 by type of use (based on square meters)								
Uses in 1996								
Uses in 2006	Type of Use	Water	Residential	Green Space	Unutilized	Road	Forest Area	Row Total
	Residential	0	6599700	900	1637100	3066300	530100	11834100
	Green Space	0	34200	2242800	9000	0	591300	2877300
	Forest Area	900	923400	932400	985500	168300	11736900	14747400
	Road	15300	1070100	2700	1120500	2308500	699300	5216400
	Water	173700	0	0	0	900	900	175500
	Unutilized	0	561600	369900	19723500	3049200	78885900	102590100

Area changes from 1996 to 2006 by type of use (based on square meters)								
Uses in 1996								
	Class Total	11834100	2877300	14747400	5216400	175500	102590100	0
	Class Changes	6770700	1945800	8608500	3656700	46800	90422100	0
	Image Difference	-14400	2645100	-671400	79114500	-3376800	-77697000	0

Table 4. Comparison of area changes (in square meters) between different land uses on two dates of Landsat 7 ETM image collection.

Area changes from 2006 to 2016 by type of use (based on square meters)								
Uses in 2006								
Uses in 2016	Type of Use	Residential	Green Space	Forest Area	Unutilized	Water	Unutilized	Row Total
	Residential	5063400	234000	1292400	1111500	39600	84888900	92629800
	Green Space	376200	931500	3733200	171000	0	310500	5522400
	Water	4500	630000	254700	36900	128700	175500	1230300
	Forest Area	1054800	677700	6138900	555300	0	2918700	11345400
	Road	1811700	98100	1165500	1559700	0	2128500	6763500
	Unutilized	3523500	306000	2162700	1782000	7200	12168000	19949400
	Class Total	11834100	2877300	14747400	5216400	175500	102590100	0
	Class Changes	6770700	1945800	8608500	3656700	46800	90422100	0
	Image Difference	80795700	2645100	-3402000	1547100	1054800	-82640700	0

Conclusion

District 22 of Tehran due to the location of Lake of the Shohadaye Khalij-e-fars, Chitgar Forest, Azadi Stadium, Botanical Garden, various research institutes, Olympic Village, Sharif University, Iran Mall, Hezar va Yek Shahr, etc., although it is known as a leisure-oriented and knowledge-oriented area. It is possible, however, because of its towers and skyscrapers, it is a caricatured symbol of modernity that has no compatibility with the local urban planning patterns and collective life of Iranians. Investigations show that the physical development of this area until 1992, that is, before the area entered the legal boundaries of the city, was in the form of villa housing with two to four floors. But from the 1990s onwards, and especially in the last decade, the newer development of this area has been mainly based on the construction of complexes and towers, and the municipality, by building a highway network, building uneven intersections and numerous bridges, and by prioritizing the fast movement of cars. In the region, it has practically removed the urban space from the social and human-oriented concept. According to the statistical data of Tehran Municipality, until the end of 2017, the number of residential units in this area, including units with building permits (completed or under construction), was 158,575 units. Based on this, the comparative analysis of the results of population statistics and the number of housing stock (in terms of building permits in the district) shows that there is a population capacity of 475 thousand people in District 22. Therefore, the number of residential units equal to 300 thousand people in District 22 is empty based on recent statistics and considering the residence of 176 thousand and 347 people in this district. The number of residential units included in this amount of population can be obtained from the household size index. In this case, assuming the capacity for 300,000 people and a household size of 2.3 people, more than 90,000 residential units (of course, including the statistics of building permits) are uninhabited in this area. In the end, the following are suggested to improve the population situation of the district:

- Creating job opportunities according to the ability of Tehran's 22nd district and its potential;
- Applying restrictions for the military of Tehran's 22nd district to change the uses they have;
- In various plans, trans-neighborhood and transnational roles have been defined for District 22, which can be achieved by communicating with District 21;
- Development restrictions in new constructions;
- Creating cohesion between the neighborhoods of District 22 to create better security;



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- Stopping the issuance of residential permits due to the construction of completed structures that are expected to have an overpopulation;
- Improving the role of services that were specified years ago for District 22;
- Attracting the cooperation of the municipality and the military and law enforcement forces;
- Creating a green space between Tehran and Karaj.



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