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CHAPTER THREE

3. Results from Population Growth in Tehran

The qualitative and quantitative development of Tehran has brought with it consequences which have generally had a negative and limiting aspects, where it has increased the concentration of population on the land, destroying the ecological environment. Such factors together with its increasing demands, has created a formidable obstruction to the stability of the environment. In order to investigate the issue, it is necessary first to establish some general geographical characteristics for Tehran.

3.1 Geology

Tehran is situated within the boundary of the central Alborz mountains and its geological fault plane. The above fault plane stretching from west to east throughout Tehran exhibits specific geological characteristics in each area which includes a continuation of the Alp fault plane.

A better knowledge of this area could be obtained by a survey of the geology of the central Alborz, particularly its southern parts. Of course the surveys boundary would not only limited to Central Alborz, but would also be expanded further. Here it becomes necessary to put the boundary effecting Tehran under its coverage with respect to geomorphology, stratified identification, tectonic and petrology.

Consequently the geological boundary of Tehran will stretch from the north to its northern altitudes, east to the Se'payeh altitudes and Bibi-shahrbanu, in the south to the Arad's Heights and the Shahriar Hills and from the west to the altitudes Parandak, Robot-karim and Agh-dagh's mountains.

3.1.1 Geomorphology

The highest altitude along this fault of the rural area is situated in northern part of the city. The above mentioned altitudes, which are part of the Alborz Range, are among Tehran's highest peaks. The Alborz Mountains have created different climatic and ecological effects in the area. Such altitudes prevent rain clouds, like a barrier coming from the Caspian Sea into the central part of Iran and on the other hand, build vast and productive deserts in its southern skirts to stop the advance of central deserts to the north, such as Dasht-e-Tehran, Dasht-e-Karaj and Dasht-e-Ghazvin. (Dasht = plain)

The highest summit of these altitudes in northern Tehran is called Gholle-Touchal with an altitude of 3900 meters above sea level. After Touchal, the highest summit is Gholle-kouh-e-Se'payeh in the east of Tehran at 2200 meters above sea level. Kouh-e-bibisharbaru at 1500 meters altitude in the east, Golle-kouh-e

Arad at 1433 meters altitudes in the south and southeast of Tehran, also Gholle-kouh-e Agh Dagh with an altitude of 1400 meters in the west, consist of the highest peaks in Tehran's outskirts.

As can be observed, the highest altitudes of Tehran are located in the north and northeast of the city, decreasing in altitude towards the south and south-west. The existing deserts have the same slope, reaching altitudes starting from around 1400 meters in the northern desert of Greater Tehran, i.e. the skirts of Alborz, and with a slope of 8 to 10 meters per 1000, it stretches down to around 1000 meters to the southern outskirts of Dasht-e-Tehran.

3.1.2 Stratified Identification

In the outlying suburbs ringing Greater Tehran, there are both the very oldest sedimentary layers of the first geological formation and the newest of the most recent periods that can be seen.

The long term sedimentation in the surveyed area from earlier in geology periods towards the end of the third period must have probably been under water. With the beginning of the continental drift of the Alborz mountains in the middle of the third geological formation, this area has gradually managed to come out of the water.

From a stratified identification point of view, the existing formations reveal a clear description of the natural history of the area where outcrops can be found which relate to formations belonging to the first geological period until the fourth period. These formations increase from north to south. Formations of more recent periods could be found moving from the opposite direction, from south to north. For instance, one could point to the existence of stratified bedrocks related to the Cambrian period in the eastern mountains of Shahre-Ray and from the west to south-west of Bibishahrbanu mountains, belonging to the first geological formation. On the other hand, new alluvial fan sediments should also be mentioned, which resulted from falling rock material in the neighboring altitudes, particularly in the Alborz mountains. (1)

(1): To receive more information in greater details about each stratified bedrock of different periods, other sources such as a zonal study of the new city, Parand, Preliminary Studies, the Ministry of Housing and urbanization could be useful. Especially Chapter Three, Moldy Specifications, Page 158-163.

3.1.3 Rugosities

The area under study is part of the southern skirts of the Alborz rugosity, the continuation of the Alp mountains' large rugosity, which covers the whole north of Iran (from Azarbajejan to Khorasan). The Alborz's vigorous continental drifts and also strong volcanic activities are among the most important characteristics of the Alborz rugosity. That explains why different layers of earth are not the same, regular and prolonged, unlike what has been observed in the huge Zagros rugosity.

3.1.4 Faults

Huge rugosities generate great and small faults, usually due to unequal resistance in their different layers and also the existence of pressure. Recognition of faults' sorts and geographical regions is very important due to their direct impact upon creating and building cities and population centers. In other words, the regional expansion of a city must be controlled and limited, less it should result in living too close to faults and stratified bedrocks. Therefore in this part of the survey, discussion will only be on some of the surveyed regions' main and most significant faults which are still active and have each caused heavy and small earthquakes in the region.

3.1.4.1 Mosha-Fasham Fault

The longest fault existing in the survey region. The Mosha-Fasham fault has been observed in Firouzkouh, Damavand, Mosha Village south of Gardane-ye-Emamzadeh Hashem, stretching up to Peast-e-abali (also a favorite skiing area), Mobarak-abad, Lavasan, Afjeh, North Fasham and Shahrestanak. Such a fault has been in the form of displaced outcrops, observed rock rising and falling on top of each other and tipping over each other.

As it has pulled across the stratified bedrocks from the first and second periods onto the third period. The aforesaid fault's slope is towards the north.

3.1.4.2 North Fault of Tehran

The north fault of Tehran, comprising a large part of the Mosha-Fasham fault, branches off from the Lavasan region in a complete east-west direction. The aforementioned fault is also observed in Lashgarak, Gardane-ye-Gouchak, Niavaran, Shemiran and K'an. The continuation of this fault even stretches up to the north of Karaj and midway between mountains and dasht-e-Karaj to Ghazvin. The north fault is a reversed kind of fault, similar to the Mosha-Fasham fault and is in a form of displaced outcrops.

From the geological point of view there are good possibilities of continental drifts in the northern fault or at least the existence of fault activity, also construction pressures related to the fourth period which could still carry on. ¹

3.1.4.3 Varamin-Kahrizak Fault

This is the third largest fault distinguished in this region, which passes through the south of Kahrizak, and then moving from under alluvial fans of Dasht-e-Varamin in the southern outskirts of altitudes between Varamin and Garmsar (Kouh-e-sorkh). It has most probably continued till under the alluvial fans of Dasht-e-Garmsar. The recent earthquakes in Garmsar could have resulted from this fault activity in the region. The continuation of this fault towards the northwest probably passes from under Dasht-e-Tehran, east of Shahryar, and finally joining Tehran's northern fault in and around the Karaj region.

3.1.4.4 Short Faults

There are also other faults in the region as well as Mosha-Fasham, north of Tehran and Varamin-Kahrizak. The general direction of these faults is parallel to previous large faults or in general have the same level as the huge Alborz rugosity.

Since there are large numbers of these faults, the general ones have only been mentioned here. In eastern region altitudes, Se'payeh and Bibishahrbanu mountains, a great number of faults are parallel to each other and can be observed. The southernmost fault of these sets is in the southern surrounding areas of Bibishahrbanu mountain and the very northern one continues from the north of Tehranpars Zone to Bagh-e-Kesh to the east of the Jajroud River. Short

¹ Parand, Ministry of Housing and Urbanizationl Development, Chapter 3, Moldy Specifications, Page 164

and small faults exist there, parallel to the huge fault of Greater Tehran in the north, situated at the north of Tehran.

They arise from the high pressures originating from the Alborz Mountains to Dasht-e-Tehran and could be one of the main reasons for the building of these faults. Apart from forming large and small faults, the above mentioned stresses have also formed small anticlines and synclines, at parallel altitudes.

The limited geological knowledge available to the architects and construction enterprises of Tehran, now has combined with an unplanned city expansion, forced by an unchecked population explosion between 1966 to 1986.

3.2 Population Growth and Housing

Evidently Greater Tehran despite what it seems, does not have enough space to reside all its residents with the extent of 716.9 km². There are around 269 km² of land in Tehran as built up urban areas, in other words with only just more than 1/3 (37.5%) of the lands used by its residents. First of all, the region's disproportionate distribution must be considered. For instance, the urban public works of Tehran does not even reach 1%, whereas the industrial activities occupy a mere 1.2% of the constructed lands.

Out of 26,871.5 hectare of lands built under urban construction of Tehran, most allocations have gone towards housing. According to the information received by the Councils Computer Service Organization, 112,493,591 m² of constructed lands relate to housing and have formed 41.86% of related construction areas. But from an area construction point of view, out of 176,468,753 m² of constructed buildings in Tehran, there have been 140,548,493 m² allocated for housing, in other words with areas of almost 2/5th (79.6%) of residential constructions. Comparing these figures with constructed areas for housing, shows that density (population/area) for residential areas is relatively higher than other constructions. As in 42% of land in Greater Tehran, constructions of around 80% have been built. In other words, regarding other usage, there are only 20% constructions from 58% of lands. This is not even a desirable situation throughout the city from a scattered residential unit's point of view. In fact, particularly during recent years, residential constructions have been generally built in areas which are not exactly environmentally safe to live in. They are too close to active fault lines. Due to the proximity of the active Tehran North Fault is why earthquakes have created such great tragedies.

Bearing in mind the fact that new residential constructions have replaced private single residential houses into massive multi-story towers, the situation could even worsen. Looking at the construction of residential units throughout the city, it could well show that building such houses has been and continues to be in flagrant disregard of the fault limitations.

Map 9 illustrates the proportional situation of housing quality in different zones of Tehran. As shown on the graph, Zones 1,2,3,5,6 and 7 which are exactly those closest to the Tehran faults, have undergone housing constructions of Type 1.

Map 10 shows the share of different zones in new housing unit starts during 1980 to 1986. It is clearly shown on this graph that although during recent years in Tehran's southwest region has also attracted the attention of housing unit constructors, but nevertheless it has not stopped them constructing in the northern and north-eastern region of the city, which are exposed to earthquakes, due to faults. On the whole, the existing constructions illustrated on Map 11, indicates that there are still more desirable houses of better quality built in the northern and northeastern regions of Tehran. Furthermore, the above mentioned expansion has even harmed the important environmental sources, as according to reports from the Ministry of Housing and Urbanization Development in the survey for welfare and preservation of Tehran, it quotes:

”During recent years more than 300 hectares from farming lands inside the 5 year boundary, and 2000 hectares within the 25 year boundary, have been used for urban construction.”

Therefore, it is clear now that although expansion of Tehran to the west has been relatively distanced from the faults, but nevertheless it is not harmless either and has resulted in the loss of productive farm lands.

3.2.1 Quantitative Indexes for Housing in Tehran

Six indexes have been used in order to measure the quantitative changes of housing in Tehran. The indexes consist of:

- 1) Family households in housing buildings
- 2) Persons in housing units
- 3) Persons in a room
- 4) Room average per family household
- 5) Housing units distribution by number of households in each housing unit
- 6) Room average in housing unit

Table 79 Housing Situation in Tehran, 1966 to 1986, in Percent

	1966	1976	1980	1986	1991
Population (000's)	2720	4530	5454	6027	6476
Family Households (000's)	566	982	1320	1370	1511
Number of Housing Unit (000's)	354	665	938	1163	**
Size of household (Average number of person in each household)	4.8	4.6	4.13	4.4	
Index : Family Household / Housing	1.6	1.5	1.4	1.18	**
Person / Housing	7.7	6.8	5.8	5.2	**
Person / Room	2.03	1.7	1.6	1.4	**
Average Room in Housing Unit	3.8	4.05	3.7	3.6	**
Average Room in Possession of Family Household	2.4	2.7	2.7	3.1	**

** Figures are not Available

Source: Population and housing census in 1966, 1976, 1986 and 1991- Tehran's 1980 Population Survey, Statistical Center of Iran

3.2.1.1 Family Households in Housing Buildings

The development of a family household index in housing unit indicates the proportional welfare of this index during the past two decades, which is explained below.

In 1966, there were 160 family households in every 100 housing buildings. This ratio fell to 150 in 100, and in 1980, it decreased to even more than 140 in 100. family household density index in housing unit has declined in 1986 to 120 in every 100, which is an acceptable norm in international standards.

3.2.1.2 Persons in Housing Units

The person index in housing unit has declined from 7.7 persons in 1966 to 6.8 in 1976, 5.8 in 1980 and 5.2 in 1986. This shows that within two decades, 1.94% annually in average has been decreased from an average number of residents in housing units.

3.2.1.3 Persons in One Room

This index is also an indication to an improved housing situation in Tehran during the above mentioned two decades. The index of a person in a room has fallen from 2.03 in 1966 to 1.7 in 1976, to 1.6 in 1980, and to 1.4 in 1986.

Table 80 Housing Unit Distribution According to Number of Family Households in Percent

Housing Units	1976	1980	1986
One Family Household	70.5	73.4	86.4
Two Family Household	18.4	18.9	10.5
Three Family Household	6.8	5.4	2.4
Four Family Household	2.4	1.4	0.5
Five Family Household	0.9	0.5	0.12
Six Family Household	1.0	0.4	0.18
Total	100.00	100.00	100.00

Source: Atec consulting engineers, using results from the population and housing census in 1976 and 1986. Tehran's Statistics Results in 1980. Statistics Center of Iran.

3.2.1.4 Rooms in Possession of a Family Household

Room average per each family household has constantly increased. In 1966, every family household have lived in 2.4 rooms, whereas in 1986, there have been 3.1 rooms in possession of each family household.

3.2.1.5 Housing Units Distribution by Number of Living Family Households

This index also indicates to a relative improvement on housing proportional situation in Tehran. In 1976, the ratio of housing units occupied by a family household to the total number of houses was 70%. Ten years later in 1986, there have been over 86% of housing units with only 1 family household. The ratio of housing units with 2 family households fell from 19% in 1976 to 10.5% in 1986. During the same period, the ratio of houses with 3 family households dropped down from 7% to 2.4%. Between 1976 and 1986 only under 1% of the total housing units were occupied with just over 4 family households. In other words,

in 1986, there lived slightly above 1 million family households, independently in one housing unit and the remaining 370,000 family households sharing and living in a 2 and more family household residential units.

3.2.1.6 Room Average in Housing Unit

Room average in housing units during the above mentioned two decades, has fallen from 3.8 in 1966 to 3.6 in 1986. According to room average in housing units in 1986, the highest ratio have been among four roomed houses. In the same year, there were 13% of the total units fitted with 6 rooms and more. Instead, 4.8 of the totals have only had one room. It should be stated that the kitchen was accounted for as 1 complete room.

3.2.2 Qualitative Housing Indexes in Tehran

The criteria of Tehran's qualitative housing indexes has been observed under the framework of 2 separate indexes.

These are:

- I) Lifetime and Construction
- II) Manner of Possession

3.2.2.1 Lifetime and Construction

A suitable house as a safe shelter with minimum residential conditions, is a place that still has a useful physical lifetime, presuming it has been built with long-lasting and durable materials, which are appropriate for the climate and relative safety against natural disasters.

Due to the above explanation, the quality of around 92% of Tehran's residential units in 1986 is considered to be up to standard and of a strong and long-lasting materials.

Table 81 Distribution of Housing Units by Number of Rooms in Percent

Housing Units consisting of:	1976	1980	1986
1 room	6.0	4.9	4.8
2 rooms	18.8	18.4	20.0
3 rooms	16.1	21.0	20.7
4 rooms	23.7	27.1	26.2
5 rooms	15.8	14.4	15.0
6 rooms and more	19.6	13.1	13.3
Total	100.00	100.00	100.00

Source: Atec's consulting engineers, using 1976 and 1986 population and housing census results and Tehran's statistics results in 1980. Statistics Center of Iran.

Most of the houses in the city of Tehran had been newly built around 1966. In that year 60% of houses were less than ten years old. Nevertheless, over 25% of the housing areas of the city had been constructed with inexpensive non-lasting materials. Ten years later, in 1976, these ratios have relatively changed. 37% of the houses less than ten years of age but only 12% were built using non-lasting materials.

During the decade of 1976 to 1986, new constructions particularly in the early years of the Islamic revolution have had a tremendous spurt and once more it has increased the ratio of newly built houses to the total of existing houses.

In 1986, there had been nearly 43% of houses less than 10 years of age, 9% between 10 to 15 years, 12% from 15 to 19 years and 36% more than 20 years-old. The ratio of houses built using inexpensive and non-lasting materials and almost 20 years of age, was 6.8%.

Table 82 Distribution of Housing Units in Tehran with Respect to Material Durability in Percent

	1966	1976	1980	1986
Long - lasting *	74.8	88	91.5	93.2
Semi - lasting **	20.9	8.0	5.0	
				6.8
Non - lasting ***	4.3	4.0	3.5	
Total	100.00	100.00	100.00	100.00

* Long - lasting : steel structure & concrete, brick & steel

** Semi - lasting : brick & timber, concrete block, stone & timber, timber

*** Non - lasting : raw brick & clay, raw brick & timber, other

Source : Atec's Consulting Engineers, using 1966, 1976 and 1986 results from population and housing census and Tehran's statistics results in 1980. Statistical Center of Iran.

Table 83 House Lifetime in Tehran (in 1000 units)

Construction age	1966		1976		1986	
	Number	%	Number	%	Number	%
Less than 5 years	116	32.7	100	15.0	174	15.0
5-9 years	95	26.8	146	22.0	325	28.0
10 years plus	143	40.5	419	63.0	664	57.0
Total	354	100.0	665	100.0	1163	100.0

Source: 1966 and 1976 results from population and housing census, Statistical Center of Iran.

3.2.2.2 Housing Possession

From 1966-1986, the percent of house ownership has shown a rapid increase, but instead the number of tenants has fallen in absolute numbers in the recent decade. In 1966 there had been around 48% of house owners among families living in Tehran. The ratio increased in 1976 to 53% and in 1986 to around 63%. Therefore, in the past 20 years, the ratio of tenants to the whole number of family households in Tehran fell from 43% to 37% in 1976 and to less than 25% in 1986. It is also necessary to add that during 1976 to 1986, the number of tenant households has decreased in absolutely figures. Also the number and ratio of family households, which live in free-of-charge council houses in lieu of public services, have increased. In 1986, there were more than 12% of families in this group.

3.2.3 Conclusion

To sum up, from the aspect of qualitative and quantitative indexes, a typical housing unit in 1986 in Tehran had been a property less than 10 years of age and able to house a family of 4.4 people in 3.6 rooms (2.6 rooms plus the kitchen). Considering the average area of a room, connected spaces and joint residential properties, it is then concluded that in 1986 the average foundation of a house in Tehran has been around 117 m². With ground coverage of 60% , such units ground area would be 130 m², assuming it being built as a single-unit and in one and a half floors.

3.2.3.1 Comparative Survey on Housing Situation in 20 Zones of Greater Tehran

The 20 zones are not comparable from the aspect of the housing situation and relative qualitative and quantitative indexes. In this section, housing qualitative and quantitative situations in different zones have been compared with each other, combined with average housing situations throughout the city of Tehran. Such comparisons have been accomplished using contemporary surveys on the calculated qualitative and quantitative indexes for 1980 and 1986.

Table 84 Housing Possession in Tehran According to Family Household, 1966-1986 (Number of housing units in 1000's)

Housing Possession	1966		1976		1980		1986		1991	
	No.	%	No.	%	No.	%	No.	%	No.	%
Property	271.6	47.9	520.8	53.0	766.6	58.8	862.5	62.9		
Mortgaged & Rented	242.5	42.9	362.7	37.0	405.2	31.1	337.0	24.6		
Other	51.9	9.2	98.2	10.0	130.7	10.1	171.0	12.5		
Total	566.0	100	981.7	100	1302.5	100	1370.5	100		

Source: Atec's Consulting Engineers, using 1966, 1976 and 1986 population and housing census results and Tehran's statistics results in 1980. Statistical Center of Iran.

It is essential here to mention that so far, there has been no evidence of statistics published about the housing situation in the 20 zones of Tehran prior to 1980.

Tables 85 and 86 show statistics about different zones. Table 87 contains the housing indexes situation in the 20 zones comparing both the whole city of Tehran and with each other for any given year. Table 88 and 89 illustrate these 20 zones from the housing indexes aspect and the relative situation of each, in comparison with Greater Tehran in 1980 and 1986.

Table 85 Housing Density, Possession and Durability of Houses in Greater Tehran's 20 Zones, 1980

zone s	family in a house	person in a house	person in a room	average room possessed by a family househol d	ratio of a single family househol d to total houses	average room in a house	ratio of long- lasting houses	propertie s	possessio n of rented and mortgage d	othe r
1	1.1	4.4	1.1	3.6	90.5	3.6	92.6	56.2	25.2	18.6
2	1.1	4.2	1.04	3.8	95.5	4.1	98.9	62.2	27.6	10.2
3	1.1	4.3	0.9	4.1	90.9	4.6	98.8	56.4	29.2	14.4
4	1.2	5	1.5	2.9	86.3	3.4	99.0	68.8	20.2	11.0
5	1.2	3.9	1.0	3.2	84.1	3.8	95.3	64.1	22.2	13.7
6	1.1	3.8	0.9	3.9	96.8	3.9	98.5	48.7	36.7	14.6
7	1.3	4.9	1.2	3.3	80.5	4.2	96.2	58.2	32.7	9.1
8	1.4	5.9	1.6	2.6	69.0	3.7	98.9	67.5	30.5	2.0
9	1.5	6.2	1.8	2.4	67.1	3.5	97.9	52.2	33.5	14.3
10	1.5	6.4	1.5	2.7	60.0	4.2	94.0	58.4	34.5	7.1
11	1.4	5.2	1.3	2.9	71.7	4.0	73.1	50.1	38.9	11.0
12	1.8	6.9	1.6	2.3	56.4	4.2	55.4	46.5	44.0	9.5
13	1.3	5.2	1.3	3.1	78.9	4.0	96.6	58.4	31.3	10.3
14	1.4	5.8	1.6	2.7	69.5	3.7	92.9	58.9	28.5	12.6
15	1.5	6.6	2.0	2.2	61.9	3.2	84.3	67.7	25.1	7.2
16	1.7	7.4	2.2	1.9	53.5	3.3	87.8	56.0	33.0	11.0
17	1.9	8.5	2.3	1.9	44.0	3.6	94.3	56.4	36.4	7.2
18	1.5	6.2	2.2	1.9	63.8	2.8	97.5	66.7	24.2	9.1
19	1.4	5.5	2.2	1.9	70	2.6	93.4	73.2	16.7	10.1
20	1.5	6.4	2.8	1.5	65.5	2.3	87.6	64.0	23.0	12.5
Tota l	1.4	5.8	1.6	2.7	73.4	3.7	91.5	58.8	31.1	10.1

Table 86 Housing Density, Possession and Durability of Houses in the 20 Zones of Greater Tehran, 1986

zone s	family in a house	person in a house	person in a room	average room possessed by a family househol d	ratio of a single family househol d to total houses	average room in a house	ratio of long- lasting houses	propertie s	possessio n of rented and mortgage d	othe r
1	1.06	4.3	1.1	3.8	94.8	4.1	93.9	59.2	22.0	18.8
2	1.04	4.3	1.1	3.8	97.0	4.0	99.0	65.4	23.0	11.6
3	1.04	4.1	1.0	3.9	96.0	4.1	98.8	61.5	24.3	14.2
4	1.1	5.1	1.5	3.2	91.0	3.5	99.4	66.4	20.1	13.5
5	1.1	5.2	1.3	3.5	90.1	3.9	98.5	67.8	18.1	14.1
6	1.1	4.0	1.1	3.9	97.6	4.0	98.6	52.9	30.6	16.5
7	1.1	4.4	1.1	3.3	91.5	3.7	96.5	57.1	29.0	13.9
8	1.1	4.6	1.4	3.2	93.3	3.4	99.1	63.9	23.7	12.4
9	1.2	5.6	1.5	3.1	82.8	3.7	98.2	57.3	23.3	19.4
10	1.3	5.3	1.4	3.0	77.0	3.9	94.5	61.0	26.5	12.5
11	1.2	4.7	1.2	3.3	84.8	4.0	73.7	55.5	31.0	13.5
12	1.4	6.7	1.3	3.1	76.8	4.3	55.8	52.8	32.8	14.4
13	1.1	4.9	1.3	3.4	88.7	3.9	99.5	64.2	22.4	13.4
14	1.1	4.8	1.3	3.3	91.5	3.7	94.0	59.3	21.0	19.7
15	1.3	6.1	1.8	2.6	77.2	3.4	89.5	63.2	23.2	13.6
16	1.3	6.2	1.7	2.7	76.0	3.6	88.9	61.6	24.9	13.5
17	1.4	6.6	1.9	2.6	72.0	3.7	95.3	60.8	27.2	12.0
18	1.3	6.5	2.1	2.5	79.9	3.2	98.3	68.4	23.1	8.5
19	1.3	6.8	2.3	2.3	77.9	3.0	96.0	68.6	21.4	10.0
20	1.3	6.0	1.8	2.7	80.0	3.4	90.8	63.8	23.1	13.1
Tota l	1.18	5.2	1.4	3.1	86.4	3.6	93.2	62.9	24.6	12.5

Table 87 Housing Density Index, Possession and Housing Durability in Greater Tehran's 20 Zones, 1980 and 1986, (The City of Tehran = 100)

zones	family in a house		person in a house		person in a room		Room in a house		room possessed by a household		ratio of single-unit household		properties		possession of rented and mortgaged		ratio of long-lasting housing units		other	
	80	86	80	86	80	86	80	86	80	86	80	86	80	86	80	86	80	86	80	86
Tehran	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
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17																				
18																				
19																				
20																				

3.2.3.2 Housing Quantitative Indexes in the 20 Zones of Greater Tehran

The 20 zones of Greater Tehran have been discussed here comparatively from the viewpoint of family density in the house, persons in one-housing unit, persons in a room, rooms in one house, average rooms in possession of one family household and distribution of housing units according to the residential household.

3.2.3.2.1 Family Households in Housing Units in the Twenty Zones of Greater Tehran

Family household density in 20 zones has varied between 1.1 to 1.9 in 1980 and 1.04 to 1.4 in 1986. The average to such index for the city of Tehran had been 1.4 and 1.18 in 1980 and 1986 respectively. The above mentioned figures illustrates the relative improvement of family density in a house. Nevertheless, from this point of view 20 zones have not experienced similar situations. Surveys show that:

In 1986 the family household density in only 10 zones (1,2,3,4,5,6,7,8,13 and 14) had been less than 1.8 or in a lower level than the average density for the whole city. Therefore the above zones had been located in better areas, compared to other zones (group a). The average density was between 1.2 and 1.4 for zones 9 and 11 which is almost near the density throughout the city of Tehran (group b). In six zones (10,15,16,18,19 and 20) the family household density has been around 1.3 which is higher than the average density of Tehran (group c). The family household density in zones 12 and 17 have been in an unsuitable situation of around 1.4 (group d).

The development of the relevant indexes in 1980 and 1986 compared to Greater Tehran show that there has been no change in the relative situation of 11 zones (1,2,3,4,5,6,7,9,11,16 and 17) and Zones 1,2,3,5,6 and 7 have had the best situation. During these years the relative situation of Zones 8,13 and 14 have been improved comparing with the towns average. Instead there has been a fall in Zones 10,12,15,18,19 and 20.

3.2.3.2.2 Persons Per Household

Person density for Greater Tehran in 1980 and 1986 had been 5.8 and 5.2 respectively. In 20 zones, person density has varied between 3.8 and 8.5 in 1980 and 4 to 6.8 in 1986. These figures also indicate a relative improvement of the housing situation in recent years. The comparison of figures for person density per house in the 20 zones of Greater Tehran will show that:

In 1986 there were 8 zones (1,2,3,6,7,8,11 and 14) with a person density of between 4.0 and 4.8, which was quite lower than the average density of Tehran of 5.2 (group a). At the same time, person density for Zones 4,5,10 and 13 had been between 5.1 and 5.2, almost close to density throughout the city of Tehran (group b). In three zones of 9,15 and 20 the above density has reached between 5.6 and 6.1, higher than the average of Tehran (group c). Person density in the

five other zones (12,16,17,18 and 19) had been around 6.2 to 6.8, much higher than the average of Tehran (group d).

During 1980 and 1986 the relative situation of four zones (8,10,11 and 14) have been improved, with respect to person density in comparison to the average. There have been no changes in the relative situation of 11 zones such as 1,2,3,5,6,7,9,13,15,16,17 and 20 and the relative situation of five zones (4,5,12,18 and 19) which has fallen to a lower limit.

3.2.3.2.3 Number of Persons Per Room

The change in person density per room during 1980 and 1986 for the 20 zones has been quite extensive. In 1980, the minimum and maximum to this field in 20 zones had been 0.9 to 2.8, respectively and 1.6 for Greater Tehran. The figures for 1986 were between 1.0 to 2.3 with an average of 1.4.

As observed for the above years, the person minimum index in a room has not changed much but an improvement has occurred in the maximum index. Nevertheless on the whole, these figures indicate a relative improvement to person index in a room throughout the city of Tehran. The comparison of figures for persons in one room in 20 zones show that:

In 1986 the average person density per room of 10 zones (1,2,3,5,6,7,11,12,13 and 14) had been between 1.0 and 1.3, quite lower than the average of 1.4 before (group a). In four zones (4,8,9 and 10) the average person density had been around 1.4 to 1.5, almost close to average (group b). Zones 15,16,17 and 20 had a density of between 1.7 and 1.9, higher than the average of Tehran (group c). The two zones of 18 and 19 contain a person density of around 2.1 to 2.3 which were relatively unsuitable in comparison to the average (group d).

During 1980 and 1986, the relative situation of three zones (12,14 and 20) have improved with respect to person density in a room in comparison with the average of Tehran. On the other hand, the relative situation of zones 18 and 19 had dropped. There have been no changes in the relative situation of 15 zones of 1,2,3,4,5,6,7,8,9,10,11,13,15,16 and 17.

3.2.3.2.4 Rooms in Use From Family Households

The figures for rooms used by a family household in the 20 zones have also had an extensive field. The average room used by a family household in Tehran for 1980 and 1986 had been 2.7 and 3.1 respectively. In 1980 such field has had from a minimum of 1.5 to a maximum of 4.1 from all 20 zones under its coverage. In 1986 minimum and maximum figures were 2.3 to 3.9. The above mentioned figures all indicate to a relative improvement on room index in possession of a family household throughout the city. The comparison of 20 zones in this matter indicates that:

In 1986 the number of rooms possessed by a family household for zones 1,2,3 and 6 had been between minimum of 3.8 and 3.9 quite higher than the average figure for Tehran (group a). Seven zones such as 4,5,7,8,11,13 and 14 have had rooms between 3.2 and 3.5, almost more than the average figure for the city of Tehran (group b). There were from 3.0 to 3.1 number of rooms possessed by a family household in three zones (9,10 and 12) which was slightly close to the average of Tehran (group c). The remaining six zones of 15,16,17,18,19 and 20 had rooms between 2.3 and 2.7 which was lower than the average number for Tehran (group d).

In 1980 to 1986, the relative situation of two zones (8 and 14) has improved comparing with average of Tehran, considering the number of rooms in possession of a family household. During the above years there had been no changes in 17 zones of 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 16, 17, 18, 19 and 20. The relative situation has only dropped in one zone (15), comparing with the average number for Tehran.

3.2.3.2.5 Distribution of Housing Units to Family Households

The spreading distribution of housing units according to the number of family households in different parts of Tehran is quite noticeable. As in 1980, the ratio of a single family household to the total houses in 20 zones had been between a minimum of 53.5 and a maximum of 95.5. The range of this ratio in 1986 was said to be from a minimum 72.1 to a maximum 97.6. The average discussed ratio for the city of Tehran in 1980 and 1986 had been 73.4 and 86.4 respectively. The above mentioned figures indicate a relative improvement on the housing situation and benefiting quite a number of family households from the advantage of living in inadequate houses. Surveys and statistics from the figures and distribution of housing units according to the family households show that:

In 1986, the ratio of single family households in the seven zones of 1,2,3,6,7,8 and 14 had been between a minimum 91.5 and a maximum 97.6, higher than the average ratio for Greater Tehran (group a). In three zones (4, 5 and 13), the above ratio was from a minimum of 88.7% to a maximum of 91%, almost the same ratio for all the citizens of Tehran (group b). The ratio in four zones (9, 11, 18 and 20) was at a minimum of 79.9 and a maximum of 84.8, which is smaller than the ratio for Tehran (group c). The surveyed ratio in six zones had been quite low, lower than the whole city. The ratio of single family households to total houses in the six zones of 10, 12, 15, 17 and 19 had been between 72% and 77.9% (group d).

During the years 1980 to 1986, the relative situation in all zones had changed in comparison with the average number of single family households to the total of houses throughout the city of Tehran. The surveys show that for Zones 7, 8 and 14, there had been an improvement in this situation for the three zones. During the same years there were no significant changes in the relative situation of eleven zones (1,2,3,6,9,12,13,16,17,18 and 20). There had also been a fall in six zones (4,5,10,11,15 and 19).

3.2.3.2.6 Number of Rooms Per House

The different zones in Tehran have significant differences to each other, with respect to number of rooms per house. Such differences could be observed in statistics for both 1980 and 1986. The range of these differences vary from a minimum of 2.3 to a maximum of 2.6 rooms per house for 1980 and from a minimum of 3 to a maximum of 4.3 in 1986. The average figures for the city of Tehran in 1980 and 1986 had been 3.7 and 3.6, respectively. Statistical comparative surveys for the number of rooms per house for the 20 zones show that:

In 1986 the average number of rooms per house for six zones (1,2,3,6,11 and 12) had been between 4.0 and 4.3 which was considerably higher than the average of 3.6 for the city of Tehran (group a). In seven zones (5,7,9,10,13,14 and 17), the average had been from a minimum of 3.7 to a maximum of 3.9, more than the average for the whole city of Tehran (group b). The reports say that the average number of rooms per house for the four zones of 4, 8, 15 and 16 had been generally lower than the average of Tehran, a figure of between a minimum of 3.4 and a maximum of 3.6 (group c). In three other zones (18, 19 and 20), the surveyed average had been quite lower than the average for Tehran, which has been reported between a minimum of 3 and a maximum of 3.4 (group d).

During 1980 and 1986, changes occurred in the relative situation of the different zones, as to the number of rooms per house as follows:

14 zones (1,4,5,6,9,11,12,14,15,16,17,18,19 and 20) show an improvement in the relative situations in comparison to the average of Tehran . Instead, the relative situation of four zones (3,7,8 and 10) has fallen. Therefore , there were no changes in two zones (2 and 13), compared with the average for the city of Tehran.

3.2.3.3 Housing Quality Indexes in Greater Tehran

In this part of the discussion, the 20 zones of Tehran have been surveyed with a view to the ratio of long lasting houses to the total houses and the way by which they were possessed.

3.2.3.3.1 The Condition of Building Substance

Long lasting durable housing stock is defined as those houses which are constructed with either steel foundations, concrete, brick/steel, or stone/steel materials. The ratio of long lasting houses to total houses in Tehran in 1980 and 1986 had been around 90% to 91.9% respectively. These ratios were not the same in different parts of Tehran. The above mentioned ratios had been from minimum 55.4% (Zone 12) to a maximum of 99% in 1980 and from a minimum of 55.8% (Zone 12) to a maximum of 99.5% in 1986. Statistical surveys illustrate that:

In 1986 the ratio of durable housing to total housing had been more than 89.5% in all zones except 11 and 12 (group a). In Zone 11, the ratio was 73.7% (group c) and 55.8% for Zone 12 (group d).

During 1980 and 1986 the ratio of durable housing to total houses in all 20 zones of Greater Tehran, except Zone three, had increased. Thus, there has been a relative improvement in 19 zones of the housing situation. Nevertheless, in 1986, the two zones of 11 and 12 were in a substandard situation from this point of view. There were around 26% of houses from Zone 11 and 44% from Zone 12, constructed with inferior materials which is quite alarming. The ratio of long lasting durable houses in Zone 3 has been similar for the years 1980 and 1986.

3.2.3.3.2 Housing Ownership

In 1980, there was 58.8% home ownership, and in 1986, 62.9%. Should the possession of home ownership be regarded as an advantage, there has been a relative improvement in this matter. Nevertheless, in 1980 the range of house ownership in the 20 zones was between 46.5% and 73.2% and a minimum of 52.8% to a maximum of 68.6% in 1986. Statistical surveys show that:

In 1986 the ratio of home ownership in five zones (2,4,5,18 and 19) had been more than 65%. For eight zones (3,8,10,13,15,16,17 and 20), the ratio was between 60% and 65% and between 55% and 60% for the remaining six zones (1,6,7,9,11 and 14). Such ratio had been less than 55% (52.8%) for Zone 12. Zone 19 had the highest ratio in home ownership. In this zone 68.6% of total houses were counted with respect to procedures of property ownership.

During 1980 to 1986, the ratio of property ownership to total houses has increased in fifteen zones (1,2,3,5,6,9,10,11,12,13,14,16,17 and 18). On the other hand there has been a fall in six zones (4,7,8,15,19 and 20). Increase or decrease of this ratio could indicate a change in the number and percent of non-owned houses such as rental, mortgaged and others.

3.2.3.4 Conclusion

Having combined the obtained results from the comparative surveys, the relative situation in the 20 zones could be observed in a positive light as to Tehran's housing advantages. Table 10 and 11 illustrate the relative situation of each zone for 1980 and 1986. These tables show that:

I In 1980 According to Housing Indexes

There were six zones (1,2,3,4,5,6 and 7) which had the best and highest standards in comparison with the average (group a).

Six zones (4,8,10,11,13 and 14) had a similar situation with the average (group b).

Three zones (9,15 and 19) had a lower standard than average (group c).

Five zones (12,16,17,18 and 20) had an unsuitable and much lower standard than the average (group d).

II In 1986 According to Housing Indices

There were nine zones (1,2,3,5,6,7,8,13 and 14) which have had the best and highest standards compared with the average (group a).

The situation of two zones (4 and 11) was higher than the above nine zones yet was still better than the average for Tehran (group b).

Two zones (9 and 10) have had a similar standard with the average of Tehran (group c).

Seven zones (12,15,16,17,18,19 and 20) had a lower standard than the average and were placed in the lowest category (group d).

III In 1980 and 1986

A comparison of the relative standards in Greater Tehran's 20 zones show that during these years no significant changes in 14 zones have occurred (1,2,3,4,5,6,7,9,11,12,16,17,18 and 20). At the same time the relative situation of three zones (10,15 and 19) had fallen, whereas there had been an improvement in the other three zones (8,13 and 14).

Graphs 1 and 2 illustrate the relative standards of Tehran's 20 zones in 1980 and 1986

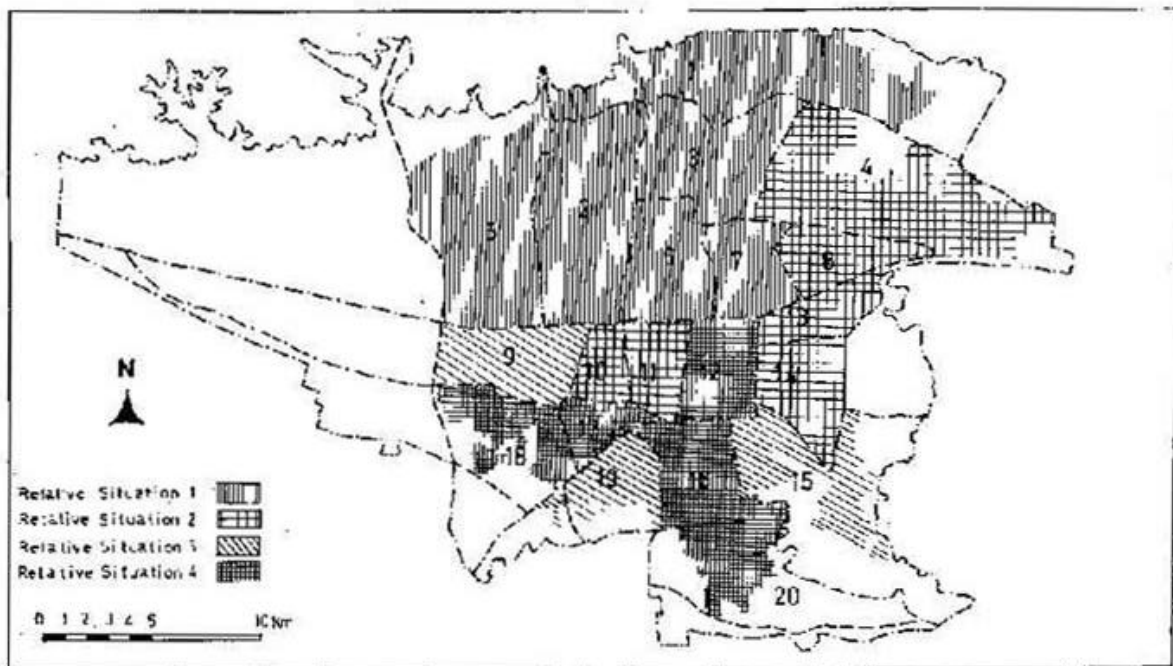
Table 88 Housing Index Groupings in the 20 Zones of Greater Tehran, 1980

Zones	f.h.h. in a house	Person in a house	Pers in a Room	Room In a House	Room possessed by a f.h.h.	Ratio of single F.H.H.	Ratio of house W.G.Q.M	Total 'a'	Total 'b'	Total 'c'	Total 'd'	Total Points	Rel. sit.
Tehran	b	b	b	b	c	b	a	1	5	1	0	21	2
1	a	a	a	b	a	a	a	6	1	0	0	27	1
2	a	a	a	a	a	a	a	7	0	0	0	28	1
3	a	a	a	a	a	a	a	7	0	0	0	28	1
4	a	a	b	d	b	a	a	4	2	1	0	24	2
5	a	a	a	b	b	a	a	5	2	0	0	26	1
6	a	a	a	b	a	a	a	6	1	0	0	27	27
7	a	a	a	a	b	b	a	5	2	0	0	26	1
8	b	b	b	b	c	c	a	1	4	2	0	20	2
9	b	c	b	b	c	c	a	1	3	3	0	19	3
10	b	c	b	a	c	c	a	2	2	3	0	20	2
11	b	b	a	b	b	b	c	1	5	1	0	21	2
12	d	c	b	a	c	d	d	1	1	2	3	14	4
13	a	b	a	b	b	b	a	3	4	0	0	24	2
14	b	b	b	c	c	a	a	1	4	2	0	20	2
15	b	c	c	c	b	c	b	0	2	5	0	16	3
16	c	d	c	c	d	d	b	0	1	3	3	12	4
17	d	d	c	b	d	d	a	1	1	1	4	13	4
18	b	c	c	d	d	c	a	1	1	3	2	15	4
19	b	b	c	d	d	c	a	1	2	2	2	16	3
20	b	c	d	d	d	c	b	0	2	2	3	13	4

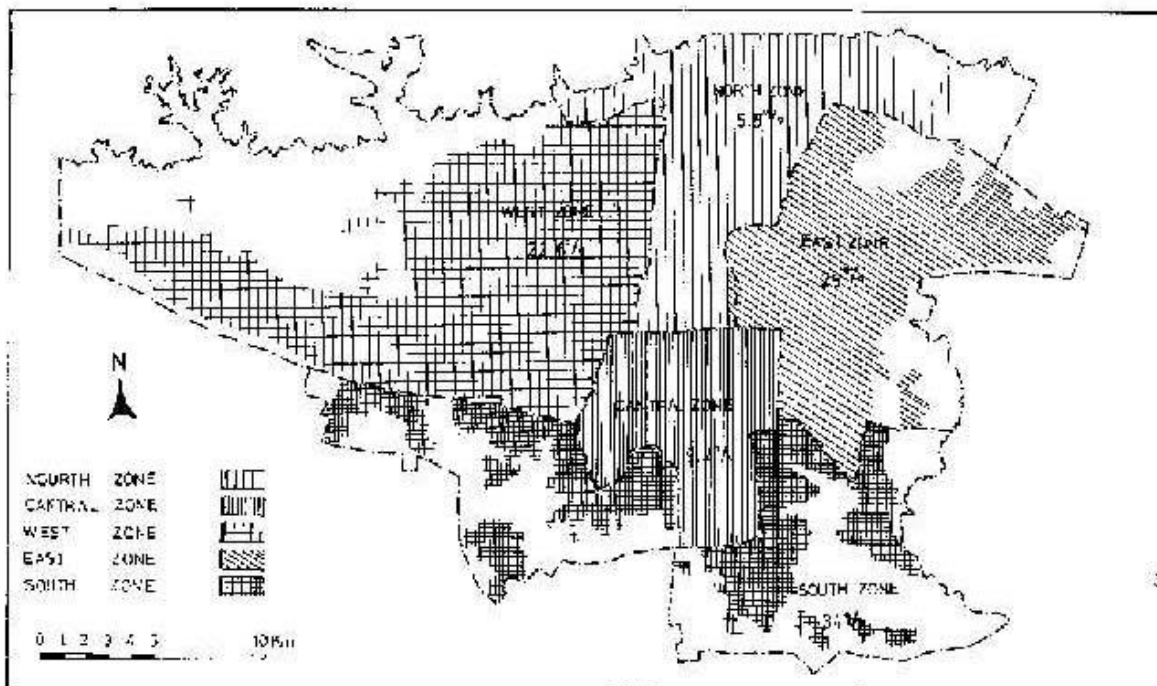
Table 89 Housing Index Groupings in the 20 Zones of Greater Tehran, 1986

Zones	f.h.h. in a house	Person in a house	Pers in a Room	Room In a House	Room possessed by a f.h.h.	Ratio of single F.H.H.	Ratio of house W.G.Q.M	Total 'a'	Total 'b'	Total 'c'	Total 'd'	Total Points	Rel. sit.
Tehran	b	b	b	c	c	b	a	1	4	2	0	20	3
1	a	a	a	a	a	a	a	7	0	0	0	28	1
2	a	a	a	a	a	a	a	7	0	0	0	28	1
3	a	a	a	a	a	a	a	7	0	0	0	28	1
4	a	b	b	c	b	b	a	2	4	1	0	22	2
5	a	b	a	b	b	b	a	3	4	0	0	24	1
6	a	a	a	a	a	a	a	7	0	0	0	28	1
7	a	a	a	b	b	a	a	5	2	0	0	26	1
8	a	a	b	c	b	a	a	4	2	1	0	24	1
9	b	c	b	b	c	c	a	1	3	3	0	19	3
10	c	b	b	b	c	d	a	1	3	2	1	18	3
11	b	a	a	a	b	c	c	3	2	2	0	22	2
12	d	d	a	a	c	d	d	2	0	1	4	14	4
13	a	b	a	b	b	b	a	3	4	0	0	24	1
14	a	a	a	b	b	a	a	5	2	0	0	26	1
15	c	c	c	c	d	d	a	1	0	4	2	14	4
16	c	d	c	c	d	d	b	0	1	3	3	12	4
17	d	d	c	b	d	d	a	1	1	1	4	13	4
18	c	d	d	d	d	c	a	1	0	2	4	12	4
19	c	d	d	d	d	d	a	1	0	1	5	11	4
20	c	c	c	d	d	c	a	1	0	4	2	14	4

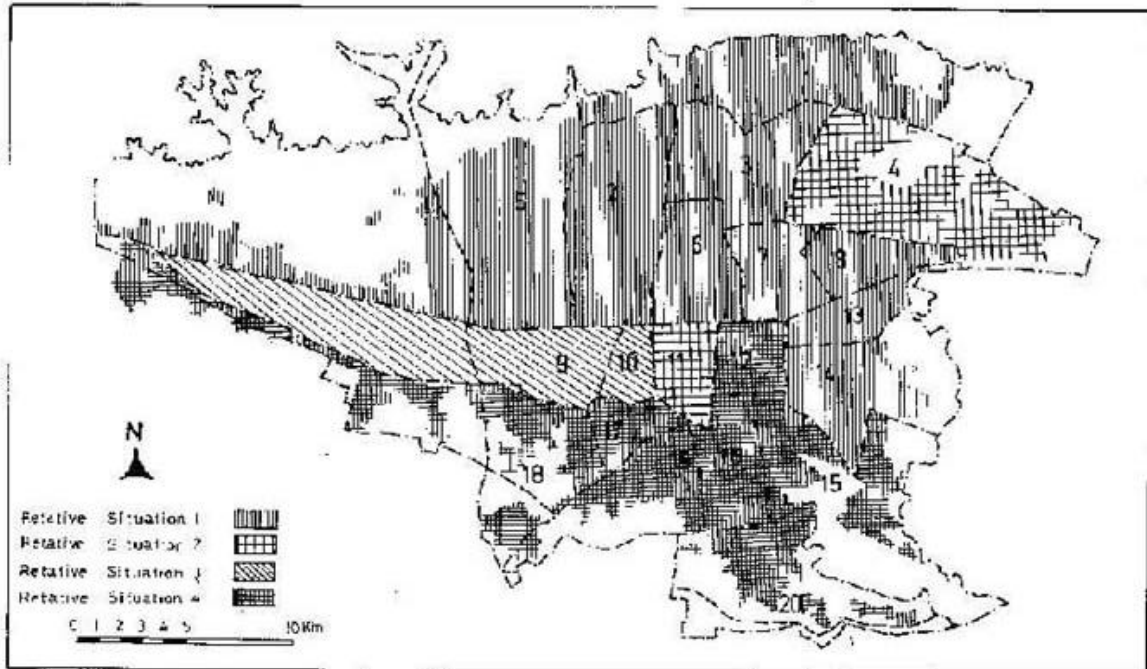
Map 9 The Relative Standard of Housing Quality in the 20 Zones of Grater Tehran, 1980



Map 10 Zones Share of Construction Housing Units, 1980 and 1986



Map 11 The Relative Standard of Housing Quality in the 20 Zones of Grater Tehran, 1986



3.3 Population Growth and Education Facilities

The city of Tehran basically encounters a shortage of social services. In a city with 12% of the entire country's population, only 519 schools at the primary, secondary, or college level exist. Due to the shortage in education possibilities and the increase in students, an increase in the number of students in each class has occurred, and resulting in a fall in the quality of education. The increase during 1981 to 1991 was such, that even the rising number of students in each class could not contain the flood of Tehran students. Therefore schools were forced to operate in shifts. According to statistics from the academic year of 1988-1989, published by the Education Department of Teheran County, 1308 educational centers existed throughout the county, operating 1167 schools (89.2%) in two shifts (2 in one day) and 34 schools (2.6%) in 3 shifts (3 in one day). Based on the same report, there were also six schools (7.7%) operating in normal shifts which are classified as private schools, accepting only a limited number of students.

The rise in students during the above mentioned years was caused by the rapid development occurring in family planning schemes during the early years of the Islamic revolution. The efforts made at birth control had all been abandoned and abolished. However such phenomena follows a general policy and its hesitation

towards any program and policy existed already before the Islamic revolution. Accepting the above idea as a general notion and encouraging youngsters to marry and have a family on one hand, together with granting facilities and short term loans on the other hand, had caused an increase to both the fertility level and the percentage of married women to the total number of women aged 15 to 49.

The existence of these two factors were enough reason for the rising number of births during these years. Although other factors such as the start of the Iraq War and the decline in life expectancy were also reason enough to have more children. However, having published the results of the 1986 nationwide population and housing census and observing the situation of population age, the level of fertility in the society was recognized and necessary warnings were delivered by demographic experts. A special seminar was even organized under the auspices of the Plan and Budget Organization about the formation and unpleasant consequences of continuing such a high fertility level. But nevertheless, in order to recognize the dimension of this problem, none of these actions and warnings were as effective as the visual observation of the rise in students, whose results were seen in a few years time.

The gradual decline of the student increase in the lower school grades and a rising increase in the higher grades, show that following the "baby boom" of the eighties, such phenomena lasted only a few years and has been halted during recent years. Nevertheless, the fact remains that especially for girls, who entered their period of fertility after finishing their education and terminating high school. Despite the fall in fertility level, having a large number of women in early years of marriage together with the country's early child-bearing pattern, would cause a flood of newborns.

Even in the present circumstances in which the number of students has slightly fallen, there are around 1.5 million students. Only 58,000 teachers and administration clerks are responsible for their education. Notwithstanding, there has only been 1% of built spaces in the city of Teheran allocated for education and less than 1% for various other educational activities. Not only the shortage of educational facilities is a glaring deficit in comparison with the number of students, but the unsuitable distribution of such limited facilities also add to this problem. As is shown from the existing statistics, more than 11% of educational services in Tehran are in Zone 6. It means that in some other zones of Greater Tehran, the share of educational services falls to less than 5%.

Distribution of educational space is even worse than this. There is 21.5% of built educational space situated in Zone 6 of Tehran, whereas the share of Zone 10 is only 1.1% and Zone 13 with 1.2%.

The rapidly increasing share of other sections during the recent years, is the reason a low education share from total urban services as well as from total built spaces in the city of Tehran exists. As in recent years due to a rapid population growth, demands for urban services have increased and attracted the investment

and cash. Therefore it has caused an acceleration of activity in profitable parts of the private sector. However, the government has taken some actions in reply to this situation in order to attract private investment to pour capital in the education section. For instance, it has allowed the private sector to establish non-profit primary, secondary and college level schools. Although some conditions have been established in order to obtain these licenses, it has been an effective way of attracting private investment to this need.

Table 90 Land Area and Educational Buildings in the City of Tehran, 1991 (unit: in hectares)

	Land Area			Under Construction Area			Total Construction Area		
	total	educational	educational percentage to total	total	educational	educational percentage to total	total	educational	educational percentage to total
zone 1	2046.8	17.0	0.8	463.6	4.6	1.0	932.9	9.0	1.0
zone 2	1930.5	12.9	0.7	578.3	3.7	0.6	1346.0	8.6	0.6
zone 3	1266.6	18.2	1.4	502.7	6.6	1.3	1152.2	13.3	1.1
zone 4	2441.3	10.4	0.4	903.3	2.9	0.3	1498.4	5.5	0.4
zone 5	3303.2	9.5	0.3	404.8	2.0	0.4	803.2	3.7	0.5
zone 6	1013.6	20.4	2.0	467.3	25.5	5.5	1475.5	36.8	2.5
zone 7	818.8	13.5	1.6	437.0	4.9	1.1	1074.9	11.7	1.1
zone 8	776.8	7.1	0.9	427.7	2.8	0.7	872.8	6.6	0.8
zone 9	2885.1	16.8	0.6	553.8	4.6	0.8	1009.4	8.3	0.8
zone 10	508.2	2.5	0.5	297.5	1.0	0.3	639.1	1.9	0.3
zone 11	612.8	5.0	0.8	341.7	2.3	0.7	826.9	5.8	0.7
zone 12	859.1	16.6	1.9	473.2	5.9	1.2	1024.2	15.2	1.5
zone 13	476.6	2.6	0.5	246.6	1.0	0.4	527.8	2.0	0.4
zone 14	846.0	14.3	1.7	424.7	4.1	1.0	885.6	9.3	1.0
zone 15	1512.2	15.1	1.0	528.9	3.0	0.6	878.3	5.1	0.6
zone 16	916.7	9.2	1.0	353.8	3.3	0.9	627.1	7.0	1.1
zone 17	517.6	4.2	0.8	280.9	1.5	0.5	512.3	3.4	0.7
zone 18	2270.9	29.2	1.3	420.6	6.2	1.5	658.3	8.4	1.3
zone 19	544.9	7.3	1.3	205.4	1.8	0.9	297.3	3.6	1.2
zone 20	1207.8	16.5	1.4	383.0	3.8	1.0	608.0	5.9	1.0
Totals	26871.5	248.6	0.9	8763.1	91.2	1.0	17646.9	171.1	1.0

the difference in totals is due to rounding off numbers.

Table 91 Distribution of Educational Services in Greater Tehran, 1991

Zones	share of each urban zone from total population (%)	area of educational spaces (m2)	share of each zone from educational spaces (%)
zone 1		9.0	5.3
zone 2		8.6	5.0
zone 3		13.3	7.8
zone 4		5.5	3.2
zone 5		3.7	2.2
zone 6		36.8	21.5
zone 7		11.7	6.8
zone 8		6.6	3.8
zone 9		8.3	4.8
zone 10		1.9	1.1
zone 11		5.8	3.4
zone 12		15.2	8.9
zone 13		2.0	1.2
zone 14		9.3	5.4
zone 15		5.1	3.0
zone 16		7.0	4.1
zone 17		3.4	2.0
zone 18		8.4	5.0
zone 19		3.6	2.1
zone 20		5.9	3.4
Totals	100.00	171.1	100.00

3.4 Population Growth and Health Care Facilities

Tehran in many aspects, particularly in health care issues, operates its services on a national scale. Therefore calculating health contribution and the residing population in the city is in fact an overestimation in health factors. Nevertheless according to the recent existing statistics, there are 11,746 of Tehran's residents acquiring their medicine from a single pharmacy and 887 people for each treatment center (doctor surgery, health clinics, etc.)

The shortage of these contributions does in fact complicate further with its unsuitable distribution throughout the city. Statistics show that over 36% of health services operate in the urban area of Zone 6.

Of all Tehran's constructed lands, there are only 4% allocated for health care, and the share of health constructions to the total is even less than that (0.36%). In fact, only 63.5 hectares out of a total of 17646.9 hectares in Tehran is used for health care services. Although the share of health care use from total buildings in the city is under a lot of fluctuation, nevertheless health care construction in none of Greater Tehran's 20 zones reaches even to 1% (of all buildings). In fact it sometimes does not exceed 7% (Zones 12, 18 & 20). In some zones (5 and 13) this percentage is even less than 0.01% of all buildings (see table 14).

**Table 92 Land Area and Health Constructions in Greater Tehran, 1991
(unit = hectares)**

zones	land area			under-construction area			total construction area		
	total	health care	percent of health care to total	total	health care	percent of health care to total	total	health care	percent of health care to total
zone 1	2046.8	11.3	0.6	463.6	2.7	0.6	932.9	5.6	0.6
zone 2	1930.5	3.1	0.2	578.3	3.1	0.5	1346.0	7.1	0.5
Zone 3	1266.6	6.0	0.5	502.7	2.0	0.4	1152.2	4.8	0.4
Zone 4	2441.3	2.3	0.09	903.3	0.9	0.1	1498.4	2.7	0.2
Zone 5	3303.2	0.3	0.009	454.8	0.15	0.03	803.2	0.27	0.03
Zone 6	1013.6	4.7	0.5	467.3	2.3	0.5	1475.5	8.6	0.6
Zone 7	818.8	1.5	0.2	437.5	0.55	0.1	1074.9	1.6	0.15
Zone 8	776.8	1.5	0.2	427.7	0.6	0.1	872.8	1.3	0.15
Zone 9	2885.1	7.8	0.3	553.8	1.5	0.3	1009.4	2.4	0.2
Zone 10	508.2	1.8	0.4	297.5	0.6	0.2	639.1	1.3	0.2
Zone 11	612.8	3.2	0.5	341.7	1.4	0.4	826.9	3.6	0.4
Zone 12	859.1	9.1	1.06	473.2	3.9	0.8	1024.2	7.6	0.7
Zone 13	474.6	0.1	0.02	264.6	0.06	0.02	527.8	0.1	0.02
Zone 14	864.0	1.4	0.2	424.7	0.7	0.2	885.6	1.0	0.1
Zone 15	1512.2	3.2	0.2	528.9	0.95	0.2	878.3	1.4	0.2
Zone 16	916.7	10.2	1.1	353.8	1.8	0.5	627.1	3.2	0.5
Zone 17	517.6	1.3	0.25	280.9	0.6	0.2	512.3	1.3	0.25
Zone 18	2270.9	27.6	1.2	420.6	2.9	0.7	658.3	4.8	0.7
Zone 19	544.9	2.0	0.4	205.4	0.4	0.2	297.3	0.7	0.2
Zone 20	1207.8	5.4	0.45	383.0	2.0	0.7	608.0	4.1	0.7
totals	26871.5	103.8	0.4	8763.1	27.06	0.30	17646.9	63.5	0.36

As it is shown in Table 92, most health care establishments with respect to construction areas, are situated in Zone 6, which is only 8.6 hectares. In fact, it forms 13.5% of all health care institutions under construction. In Zone 13, there have been only around 1000 m² for health care purposes built. Should each room's area be considered as only 20 meters, with respect to communication corridors and health care and treatment services, it does not exceed 50 rooms.

Naturally, when it comes to human needs, health care is a high priority. It has attracted the attention of both managers and a large amount of the government budget financial sources of the society. But due to the rapid population growth during the past years, investment has been attracted first to more pressing priorities such as food and housing. Secondly investment has moved towards other necessary social needs, i.e. treatment of patients, but with fewer possibilities of long-term investment to strengthen the foundation of health care in the society.

Table 93 Land Area of Health Care Facilities in Greater Tehran in Hectares

Zones	under construction area of health care establishments (hectares)	share of each urban area from total construction of health care establishments (%)
zone 1	5.6	8.8
zone 2	7.1	11.2
zone 3	4.8	7.6
zone 4	2.7	4.3
zone 5	0.27	0.4
zone 6	8.6	13.5
zone 7	1.6	2.5
zone 8	1.3	2.0
zone 9	2.4	3.8
zone 10	1.3	2.0
zone 11	3.6	5.7
zone 12	7.6	12.0
zone 13	0.1	0.2
zone 14	1.0	1.6
zone 15	1.4	2.2
zone 16	3.2	5.0
zone 17	1.3	2.0
zone 18	4.8	7.6
zone 19	0.7	1.1
zone 20	4.1	6.5
total	63.5	100.0

3.5 Population Growth and Sewage Facilities

Tehran from the beginning of its formation as a village with a small population to reaching its position of being known as Darol-khalafeh, the capital, has not experienced a problem of water shortage. In those days, Tehran's water consumption was covered by the springs and waters from the surrounding rivers. These rivers consist of the Darband River, Darakeh, Dar-abad and two other streams running through the city. Even after 1787 A.D. when Tehran was made the capital with an ever increasing population, no such problem of water shortage existed.

It could be said that the first signs of water shortage in Tehran became apparent after the 1920 coup d'etat. Due to this, a new aqueduct 53 km long was built in 1931 and supplied water to Tehran until 1961.

In 1986, whereas the whole area of Tehran reached 541 km², there were only 240 km² covered by the water supply. It is to be reminded that population growth in the country as well as the city of Tehran had reached its maximum during the same period. Therefore, it is noted that the drinking water supply in Tehran could not even meet the water consumption of this population on its own. In 1983, the

Regional Water Company of Tehran had estimated the gross intake of citizen water consumption at between 200 and 250 liters. Existing statistics show that total water production in 1986 had been 550 million m³ of which 480 million m³ was supplied by the Karaj and Jaj-roud Rivers and the remaining through the drawing of water from deep wells. According to an estimation from the Tehran Regional Water Company, until the year 2004, the above company would be able to supply a maximum of 773 million m³ of water from mostly subterranean sources. There were also new sources such as the dams on the Lar, Taleghan, and Chalus River tributaries and the northern rivers of Tehran. Assuming a complete implementation of the Tehran Regional Water Company's plans on the drawing board, the accurate projections would not exceed more than 773 million m³ in any case.

Should this figure be added to the current production figure of 550 million m³, water production for Tehran-e-Bozorg (the Greater Tehran) would reach a maximum of 1323 million m³. Having not ignored the fact that the above mentioned production is not only intended for the city of Tehran but it must also service large cities such as Karaj and Islam-shahr. Therefore this problem should not only be seen narrowly as Tehran's, but as a regional water supply resources problem. Total water production planning will have to include the populations of Tehran-e-Bozorg, including Karaj, Islam-shahr, Tehran's suburban cities, as well as municipalities being newly formed according to the plans by the Ministry of Housing and Municipal Development.

Based on the above information, it is wise to say that the scale of water production could be the most important factor which limits the population in not only the city of Tehran but for the whole area of Tehran-e-Bozorg. To meet projected needs will not be easy and requires suitable and carefully planned investment.

Surveys on the status of water consumption typically disregard the issue of sewage. This is a significant component of any water consumption policy, with wide consequences for the region's ecology. Therefore water policy should always be considered together with sewage planning. Water supply solutions need to incorporate methods of sewage disposal, with the goal of recycling and reusing ground water several times over. Otherwise it will result in what Tehran is presently encountering. The sewage now being produced by Tehran's citizens, due to an inadequate sewage system wholly inappropriate for the current population of the city. More than 98% of sewage seeps back into the ground water reservoirs under Tehran. There are notable figures available on this issue.

Out of 541 km² of the whole area, there are only 7.35 m² water coverage of sewage canals and the rest of the city dispose their waste products through absorbent wells. According to the existing statistics from 1986, out of 550 million m³ of consumed water in the city of Tehran, there are around 412 million m³ water is disposed through sewage.

Due to surface coverage of sewage canals, more than 98% of the above mentioned sewage (404 million m³) enters into the Tehran ground water, where it therefore increases the pollution. At the present time more than 95 million m³ of water is being extracted annually from the underground water reservoirs of Tehran, in order to prevent the flooding in southern areas. Nevertheless, 309 million m³ are still being added to the volume of the underground storage reservoirs in Tehran.

According to the future planning of the Tehran Water and Sewage Company, it has been decided that until the year 2007, another 480 km³ has to be included within the sewage system. Therefore and assuming the implementation of the aforesaid plan, by 2007 there would be a total of 487.35 km² of Tehran's surface with modern sewage canals. Therefore and based on criteria related to 1986, there would be only around 40 million m³ of water entering from sewage into Tehran underground water reservoirs. Under the circumstances there could be hope in saving and prevent flooding in southern areas of Tehran after the year 2011. Having even totally accepted this suggestion, it must be added that in the mentioned programs, only the filled part of the glass has been mentioned! The unfilled part is as such, that by 2011 i.e., in 20 years time, around 500 million m³ of water would annually enter through sewage as well as other similar amounts through atmospheric deposits. This could overflow a huge part of the southern lands by 2011. Therefore the remaining lands must be saved, emergency and short term plans may perhaps become necessary.