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**RECENT URBAN GROWTH AND CHANGE IN THE  
SPATIAL STRUCTURE OF IRANIAN CITIES:  
THE CASE OF TABRIZ (1966-1991)**

By

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and Research, University of Ottawa, Ottawa,  
as a partial requirement of the Degree of  
Doctor of Philosophy

Department of Geography  
University of Ottawa

December 1995



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## Abstract

This study addresses the process of recent urban growth and change in the spatial structure of the City of Tabriz, Iran over the period 1966-1991. The main objectives are to see how the recent rapid urban development in Tabriz has changed its spatial form and activity patterns and what are the main social and environmental implications of these changes. The research is mainly based on data obtained from various Iranian government agencies combined with additional field work and interviews carried out for this research. Population density model and location quotients (LQ) method are used to analyze the recent change in the population density and land use pattern in Tabriz. An impact analysis is used to assess the social and environmental implications of these urban changes. ARC/INFO, a GIS software, is employed to illustrate the spatial structural changes and part of the spatial analysis in this study. The following results are obtained from this study:

- 1) Natural population growth and rural-urban migrations caused by land reform, mechanization of agriculture and inappropriate government policies are main factors of recent rapid growth in Tabriz.
- 2) A dramatic increase in the number of motor vehicles, the decline in the average household size and government interventions have been the major factors for the rapid physical expansion and the overall population density decline in Tabriz over recent decades. However, due to topographic reasons, orientation of main transportation network and zoning policy, the change

in density pattern among different areas of the city varies substantially. Whereas the city centre and east-west peripheries, occupied mainly by middle or high income groups, have experienced population density decline, the northern and southern fringes, occupied mainly by low income groups and squatter settlements, have increased their density.

3) The examination of the spatial distribution of land uses reveals a higher degree of concentration and significant change in the geographical location of urban activities within the city. The comparison of the LQ among land uses between 1966 and 1991 shows that educational, industrial and health care land uses are becoming more polarized, whereas transportation and residential land uses, because of their higher proportions compared to the existing developed urban land, are relatively less concentrated. In terms of geographical location, there has been a strong tendency for shifting the industrial activity, public organizations, government and some commercial (especially services) activities from the city centre to the peripheries.

4) The recent urban growth in Tabriz has been associated with the loss of good agricultural lands around the city, residential expansion into hazardous geographical locations and the decay of buildings in the historical sector. Major social implications include more physical segregation among residential groups and the unequal distribution of public services among them.

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Nooreddin Azimi

Ottawa, Ontario

December 1995

## Table of Contents

Abstract	ii	
Acknowledgments	iv	
List of Tables	ix	
List of Figures	x	
<b>Chapter One</b>	<b>General Introduction</b>	<b>1</b>
1.1	Introduction	1
1.2	Research Objectives	4
1.3	Basic Hypothesis	8
1.4	Justification and Need for the Study	8
1.5	Introduction to the Study Area	17
1.6	Organization of Chapters	20
<b>Chapter Two</b>	<b>Literature Review</b>	<b>23</b>
2.1	Introduction	23
2.2	Urban Land Use Concept	23
2.3	Theoretical Background on Urban Land Use	24
2.4	The Historical Development and Urban Change in Iran	40
2.4.1	Ancient Cities	41
2.4.2	Islamic (Pre-modern) Cities	44
2.4.3	Modern Cities	50
2.5	Conclusion	53
<b>Chapter Three</b>	<b>Methodology</b>	<b>55</b>
3.1	Introduction	55
3.2	Data and Information	55
3.2.1	Data Sets	55
3.2.2	Data Collection	56
3.2.3	Data Sources	57
3.2.4	Validity of Data	59
3.3	Methods and Techniques	60
3.4	Comments on Data Limits	65
<b>Chapter Four</b>	<b>The Historical Development of Tabriz</b>	<b>67</b>
4.1	Introduction	67
4.2	Tabriz in the Ancient Period	68
4.3	Tabriz During the Islamic Era	72
4.3.1	The Early Period	72

4.3.2 The Mongols Era	74
4.3.3 Tabriz After the Safavids	79
4.3.4 The Spatial Structure of Tabriz in the 19th Century	83
4.4 Tabriz During the First Period of the Modern Era	85
4.5 The Impact of Historical Development On the Present Spatial Structure of Tabriz	91
4.6 Conclusion	99
<b>Chapter Five</b> <b>Recent Urban Growth and Population Density     Change in Tabriz 1966-1991</b>	101
5.1 Introduction	101
5.2 Recent Population Growth and its Main Factors	101
5.3 Impact of Rapid Growth on Population Density Patterns	108
5.3.1 Population Density Decline over Time 1966-1991	109
5.3.2 Population Density Change Within the City	123
5.4 Conclusion	135
<b>Chapter Six</b> <b>Patterns of Urban Land Use Change in Tabriz 1966-1991</b>	137
6.1 Introduction	137
6.2 The Overall Land Use Change	137
6.3 Change in the Spatial Distribution of Urban Land Uses	143
6.3.1 Change in Residential Land Use Pattern	144
6.3.2 Change in Transportation Land Use Pattern	151
6.3.3 Change in Industrial Land Use Pattern	156
6.3.4 Change in Educational Land Use Pattern	158
6.3.5 Change in Commercial Land Use Pattern	160
6.3.6 Change in Government Land Use Pattern	165
6.3.7 Change in Public Organization Land Use Pattern	167
6.3.8 Change in Health Care Land Use Pattern	168
6.3.9 Change in Recreational Land Use Pattern	171
6.3.10 Open Space Land Use Pattern	173
6.3.11 Under Construction Land Use	174
6.3.12 Agricultural and Vacant Land Use Change	174
6.4 Conclusion	177
<b>Chapter Seven</b> <b>The Social and Environmental Implications of the Recent     Urban Growth and Land Use Change in Tabriz</b>	186
7.1 Introduction	186
7.2 Loss of Agricultural Lands	187
7.3 Expansion of Residential Areas in Unsafe Geographical Locations	190
7.4 The Decay of Historical Sector	192
7.5 Social Segregation	199
7.6 Unequal Distribution of Public Facilities	208
7.7 Conclusion	212

<b>Chapter Eight</b>	<b>Summary and Conclusions</b>	214
8.1	Introduction	214
8.2	Summary	214
8.3	Discussion	220
8.4	Areas for Further Research	223
<b>Bibliography</b>		227
<b>Appendices</b>		248
Appendix 1:	The Areal Distribution of Urban Land Use in Tabriz in 1966 (in hectare)	249
Appendix 2:	The Percentage Distribution of Urban Land Use in Tabriz in 1966	250
Appendix 3:	Urban Land Use Location Quotients among Different Zones in Tabriz in 1966	251
Appendix 4:	The Areal Distribution of Urban Land Use in Tabriz in 1991 (in hectare)	252
Appendix 5:	The Percentage Distribution of Urban Land Use in Tabriz in 1991	253
Appendix 6:	Urban Land Use Location Quotients among Different Zones in Tabriz in 1991	254

## List of Tables

1.1	Population change among Iranian cities 1956-1991	14
4.1	The estimated population of Tabriz between 1000 and 1900	83
4.2	Population growth in Tabriz compared with other large cities in Iran	86
5.1	Population growth in Tabriz between 1956-1991	102
5.2	Factors of rapid urban growth in Tabriz and Iran	103
5.3	The value of manufacturing products in the province of East Azarbaijan 1982-1986	108
5.4	Change in the built-up area and population density in Tabriz 1966-1991	111
5.5	Change in the number of motor vehicles in Tabriz in the 1966-1991 period	115
5.6	Change in the household size in Tabriz 1966-1991	118
5.7	Change in the distribution of household size in Tabriz 1966-1986	119
6.1	General land use change in Tabriz between 1966 and 1991	139
6.2	Comparison between recent urban land use change in Tabriz and Ottawa-Carleton	142
6.3	Main public housing projects carried out in Tabriz during the 1970s and 1980s	148
6.4	Land use change in traditional bazaar of Tabriz 1960-1993	164
6.5	The change in the LQ rate among urban land uses in Tabriz, 1966-1991	178
7.1	The extent of the loss of agricultural lands in Tabriz between 1966 and 1991	188
7.2	Distribution of school population among main residential groups in Tabriz in 1986	205
7.3	The employed population of main residential groups in Tabriz by major occupational groups in 1986	206

## List of Figures

1.1	World Urban Population Growth, 1970-2020	2
1.2	Population Growth of Iran, 1900-1991	10
1.3	The Growth of Urban Centres in Iran, 1956-1991	12
1.4	Population Change Among Iranian Cities, 1956-1991	13
1.5	The Future Trend of Population Change in Iran, 1970-2020	15
1.6	The Location of Tabriz and East Azarbaijan in Iran	18
1.7	The Location of Tabriz Shahrestan in the East Azarbaijan Province	19
1.8	Urban Growth in the Province of East Azarbaijan, Iran, 1956-1986	21
2.1	Generalized Land Use Patterns of Cities	26
2.2	Concentric Land use Zones Generated by the Bid-Rent Curves for Retailing, Industries and Residential Land Uses	30
2.3	Generalized Models of Land Use in Third World Cities	37
2.4	The Spatial Structure of a Typical Ancient City in Iran	45
2.5	A Typical Iranian City During the Islamic Period	51
3	Zone Boundaries in Tabriz, 1966 and 1991	64
4.1	The Historical Development of Tabriz, Iran, 8th century B.C.-1966 A.D.	70
4.2	The Location of Tabriz on One of the Silk Roads	71
4.3	A Drawing of Tabriz by a Turk Traveller, 14th Century A.D.	77
4.4	Estimated Population Growth of Tabriz, Iran, 1000-1900	82
4.5	Tabriz in 1880 A.D., The Central Part	84
4.6	The General Social Status of Residents in Tabriz, 1966	90
4.7	An Inside View of Mozaffarieh Arcade of Tabriz Bazaar, 11th Century, Rebuilt in the 19th Century	93
4.8	An Inside View of the Dome of Sheikh Kazem Arcade, the Highest Dome in Bazaar	93
4.9	The Amir Arcade Front Door (under repair)	96
4.10	An Interior View of the Masjid Jamih (Friday Mosque), 11th Century	96
4.11	Alishah Mosque (Ark-e-Tabriz), Early 14th Century	97
4.12	An Interior View of the Ostad and Shahgherd Mosque, 14th Century	98
4.13	The Blue Mosque Front Door 15th Century	98
5.1	Population Density Decline in Tabriz Over the Time, 1966-1991	112
5.2	Built-up Area in Tabriz, Iran, 1966	113
5.3	Built-up Area in Tabriz, Iran, 1970	113
5.4	Built-up Area in Tabriz, Iran, 1978	113
5.5	Built-up Area in Tabriz, Iran, 1991	113
5.6	The Comprehensive Plan's Proposal for the Expansion of Tabriz, 1966-1991	117
5.7	Existing Road Network in Tabriz in 1966 and Constructed Roads by 1975	122
5.8	Existing Road Network in Tabriz in 1987	122
5.9	Population Density Patterns in Tabriz, Iran in 1966 and 1991	126
5.10	Distance and Population Density Relationship in Tabriz, Iran, 1966	128
5.11	Distance and Population Density Relationship in Tabriz, Iran, 1991	129

6.1	Residential Land Use Change in Tabriz	145
6.2	Proposed Density and Land Use Patterns by the Master Plan of 1966 in Tabriz	147
6.3	The Location of Public Housing Projects in Tabriz, 1972-1985	150
6.4	The Location of Site and Services (Amadesazi) Projects in Tabriz, 1982-1987	152
6.5	Transportation Land use Change in Tabriz	154
6.6	Street Patterns in Tabriz 1991	155
6.7	Industrial Land use Change in Tabriz	157
6.8	Educational Land use Change in Tabriz	159
6.9	Commercial Land use Change in Tabriz	162
6.10	Government Land use Change in Tabriz	166
6.11	Public Organization Land use Change in Tabriz	169
6.12	Health Land use Change in Tabriz	170
6.13	Recreational Land use Change in Tabriz	172
6.14	The Spatial Distribution of Open Space Land use in Tabriz, 1991	175
6.15	Distribution of Under Construction Land use in Tabriz, 1991	175
6.16	Agricultural and Vacant Land use Change in Tabriz	176
6.17	The General Land use Pattern in Tabriz, 1966	180
6.18	The General Land use Pattern in Tabriz, 1991	180
7.1	Conversion of Orchards to Urban Uses in Tabriz, 1993	189
7.2	The Northern Fault Line and Its Branches in Tabriz, 1991	191
7.3	Residential Developments on Hazardous Geographical Locations in Tabriz 1993	193
7.4	Residential Development on Unstable Soil in the East of Tabriz, 1991	194
7.5	Examples from Early Building Defection Built on Unstable Soil in Tabriz	195
7.6	Deterioration of Buildings in the Historical Part of Tabriz, 1993	197
7.7	Quality of Housing Units in the Historical Part of Tabriz Compared with That of the City, 1993	198
7.8	The Distribution of Typical Residential Areas in Tabriz in 1991	201
7.9	Housing Quality Among Residential Groups in Tabriz, 1986	202
7.10	Literacy Rate Among Residential Groups in Tabriz, 1986	204
7.11	Distribution of Major Land Uses Within Residential Groups in Tabriz, 1991	207
7.12	Distribution of Public Facilities Among Residential Groups in Tabriz, 1991	210

## Chapter One

### General Introduction

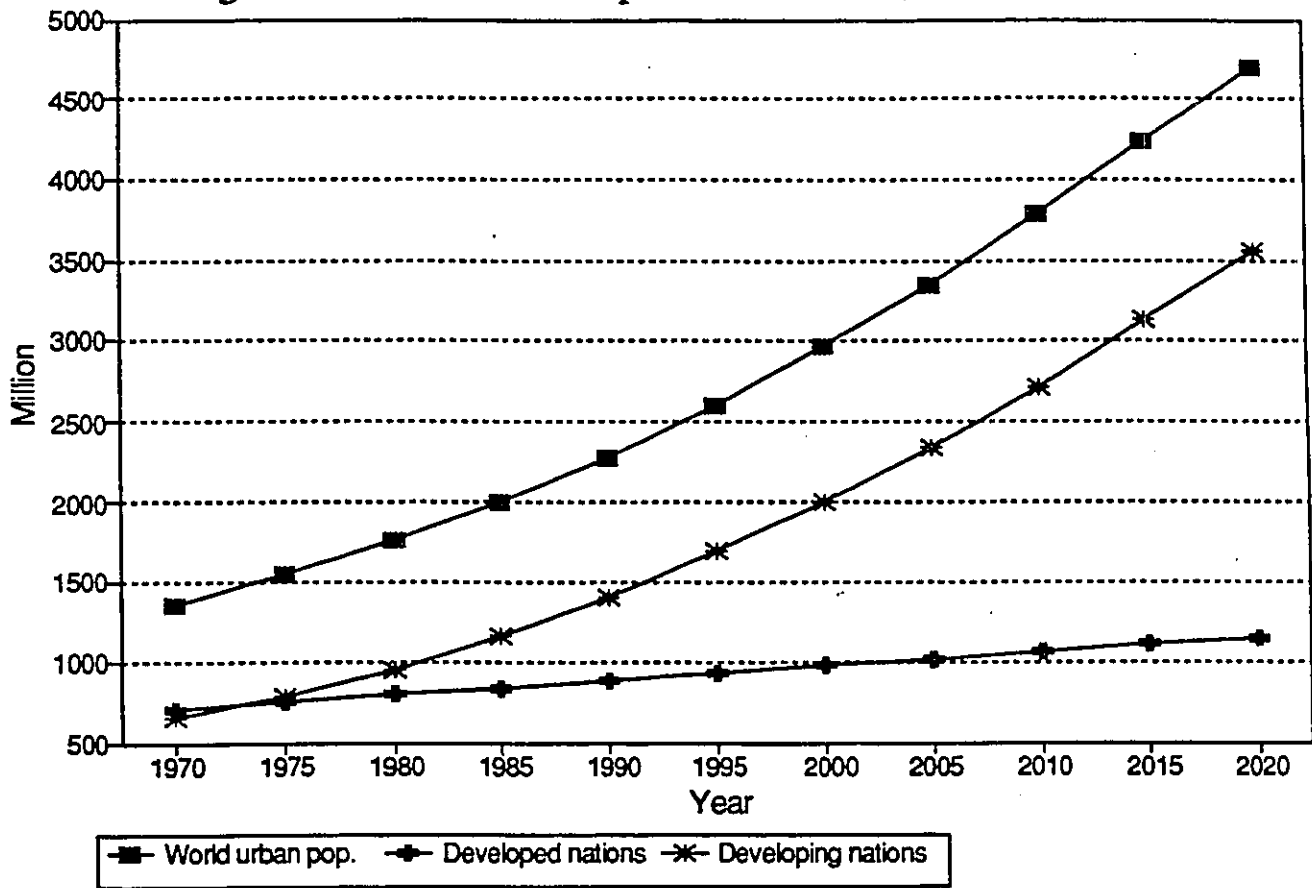
#### 1.1 Introduction

Urbanization, a phenomenon wherein an increasing proportion of a country's population live in cities, has received considerable attention from social scientists during the second half of this century. The problems emerging from this population increase and attempts to deal with them have been the major concern of urban researchers since the 1950s (Bourne, 1971). For the Third World, the warning has begun as its urban populations have started to increase rapidly (Qadeer, 1983:vi). With the failure of most attempts by planners and urban managers to control rapid urban growth in developing countries, now whether the Third World will be able to control and guide the process of urbanization remains in doubt (Devas and Rakodi, 1993:1)

Because of the dramatically increasing trend of urban population growth in developing countries which will continue in the coming decades, Third World Cities (TWCs) likely will face wider urban problems. According to the United Nations' (UN) estimation, the world's urban population will likely increase from 2.3 billion in 1990 to 4.7 billion in 2020. A staggering 90 percent of this increase will occur in the developing world (Fig. 1.1). Such a dramatic increase in urban population in developing countries poses a huge challenge to those responsible for the management of urban development and the provision of services (ibid).

Drawing on data from Iranian cities, this study assumes that the failure to manage urban growth in most developing countries, as declared by Devas and Rakodi (1993), is partly because of the

Fig. 1.1 World Urban Population Growth, 1970-2020



Source: UN, 1993, Table A.2

inadequate understanding of urban spatial structure. Perhaps, it is for this inadequate understanding that, in many cases the plans employed to guide urban growth in TWCs are very weak and inefficient (Devas, 1993; Douglass, 1989; Aguilar, 1987;). The inadequate understanding allows planners to utilize western criteria of planning, mostly unmatched with real local needs and capabilities, for future development of TWCs (Devas, 1993).

The existing geographical literature on urban structure of TWCs has mainly focused on the economic and social aspects; however the issues relating to urban land use have not been addressed seriously. The present literature is primarily concerned with residential or socio-economic structure; but, the totality of urban land use and its changing patterns have not been seriously dealt with (Kivell, 1993). The proper understanding of the patterns of urban land use change will provide a more substantial basis for better prediction of the future urban change (Doucet, 1970).

It is from this point of view that this study aims to examine the patterns of urban land use change in one of the large Iranian cities (Tabriz) in order to contribute to a better understanding of the urban structure in Iran, in general, and in the city of Tabriz in particular. It then tries to evaluate the main social and environmental impacts of this change in Tabriz. It is, perhaps, through a better understanding of the urban structure that we can plan better for the future and ultimately reduce our urban problems.

## **1.2 Research Objectives**

As mentioned, the main objective of this study is to gain a better understanding of the change in the spatial structure of the City of Tabriz through examining its recent urban growth and change in urban land use patterns over the period 1966-1991. It tries to describe the extent of change in population density and activity patterns in this city and explain the main underlying factors. To establish the background in which the recent urban change must be studied, the study will review the historical development of Tabriz from its earliest time until 1966 (the beginning of study period). After examining the recent land use change, the major social and environmental impacts of this urban change will be discussed briefly. The objectives have been divided into four separate questions the answers to which comprise the main body of analysis in this study. These questions and their relevance to each other are briefly discussed.

- 1) What important factors have influenced the historical growth of Tabriz and to what extent are their influences represented in present spatial structure?**
- 2) What has been the process of recent growth in Tabriz and how has it influenced population density patterns in this city?**
- 3) What are the patterns of recent urban land use changes in Tabriz and what are the main causal factors?**
- 4) What are the main social and environmental impacts of recent growth and land use change in Tabriz?**

Guelke states that "there is need for historical understanding in geography, because human activity on the land is a product of historical experience" (1982:2). In this respect, and to arrive

at the recent land use change in Tabriz, the first part of study (question 1) deals with the historical background of urban development in this city in order to see what important factors have influenced its growth or decline in the past and to what extent their impacts can be observed in the present spatial structure. Like other old cities in Iran such as Esfahan, Shiraz and Mashhad, Tabriz has been influenced by various historical events the impacts of which can still be seen in the present structure. The research is going to see, for instance, how the geographical location, political events, economic role, Islamic culture and natural disasters, in general, have influenced the development of Tabriz in the past. Such an understanding can help us in obtaining a broader perspective on the future growth of the city.

After reviewing the historical background of urban development, the second part of the analysis (question 2) deals with the process of recent population growth and its impact on density patterns in Tabriz. To identify the extent of overall land use change and estimate the space needed for future growth, there is a need to understand the process by which urban population evolves over time (Chapin, 1970:181). Since the population growth has a direct spatial implication, studying the overall density figures and change in population density over time is significant to establish a guideline for allocating land and facilities for future needs of urban development (Gad, 1970:1; Niedercorn and Hearle, 1964).

The second part of the study will first examine the process of population growth during the recent decades and discuss the main underlying factors. It is going to see what socio-economic, technological and political factors have influenced the recent population growth in Tabriz and

how these factors are related to those of identified as important causes of rapid urban growth in developing countries. To understand the spatial impact of population growth, the research will then look at the population density change and physical expansion in Tabriz during the study period to see how the city has spread out in its geographical location. The examination of population density change and its patterns within the city enables us to see whether or not the patterns of density change comply with the general findings in this respect, e.g, a decrease in population density in cities over time or a decrease in the population density from city centre towards periphery as it has been proved to be the case in most North American cities (Korcelli, 1982; Newling, 1971). This understanding of the change in population density pattern can provide insight for assessing the extent of the space required for future urban growth in Tabriz.

Since in cities, land surface is the location of various activities (Chapin and Caizer, 1979:4), understanding the patterns of urban land use and its change over time helps to clarify the future prospects of the nation's urban areas (Niedercom and Hearle, 1964). Related to this postulation, and having discussed the population density change in section two, the third part of the analysis (question 3) is concerned with the patterns of land use change in Tabriz over the 1966-1991 period. The research will examine how the main classes of urban lands have transformed, what have been the major causal factors and how the spatial distribution of different categories of urban lands have changed within the city over the recent decades. This examination would provide us with a substantial basis for predicting the subsequent changes in the city of Tabriz.

Like many other TWCs, the recent rapid population growth and physical expansion in Tabriz has

resulted in the emergence of a number of new problems. The fourth part of the analysis (question 4) therefore, is going to look at the social and environmental impact of this recent growth in Tabriz. Understanding these effects and their causal factors can help us in recognizing the weak points of recent policies regarding urban development. This may help in establishing appropriate policies for future development and reducing the existing urban problems in this city.

### **1.3 Basic Hypothesis**

With respect to the above questions, the main goals of this study are: first, to identify the impact of recent urban growth on population density pattern over the last three decades; second, to examine the patterns of recent urban land use change in Tabriz and analyze their causal factors; and third, to identify the social and environmental impacts of urban change in this city. With respect to these main objectives the following hypotheses are postulated:

- i) The process of recent rapid growth in Tabriz has resulted in overall population density decline, however, different patterns of density have emerged within different parts of the city.
- ii) The recent urban change in Tabriz has led to a higher degree of specialization of activities and significant change in the geographical location of different land uses within the city.
- iii) Recent rapid urban growth in Tabriz has been associated with spatial segregation among residential groups, uneven distribution of public facilities and the emergence of new environmental problems.

#### 1.4 Justification and Need for the Study

There is a long history of urbanization in Iran, the origin of which goes back thousands of years. During this long period, many cities have been built in different parts of the nation, some of which have been destroyed by historical events like wars and natural disasters, while others have survived until today<sup>1</sup>. For centuries, Iranians have managed to create their own cities, and organize them according to their culture and tradition. Along with gradual modification over the time, in general, Iranian cities have seen two main changes during their history. One was when Muslims conquered Iran in the mid 7th century<sup>2</sup> through which the mainly administrative and socially segregated pre-Islamic cities were altered to primarily commercial and more homogeneous Islamic cities with a strong presence of religious institutions in administrative and political life (Soltanzadeh, 1986; Ashraf, 1974). For a long time, from the beginning of the Islamic period until early this century, except for variations in socio-economic conditions, the structure of Iranian cities in different parts of the country, more or less, evolved similarly (Soltanzadeh, 1986).

The second important change in Iranian cities began early this century and was intensified after the 1960s. This trend coincided with the major political shift of the 1920s by which the government changed from the Gajars to the Pahlavi regime. This political shift marked the beginning of the "modernization" or "westernization" era in the recent history of Iran (Hosamian

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1 For more on the history of urbanization in Iran see, Soltanzadeh (1986, 1983) and Lockhart (1960).

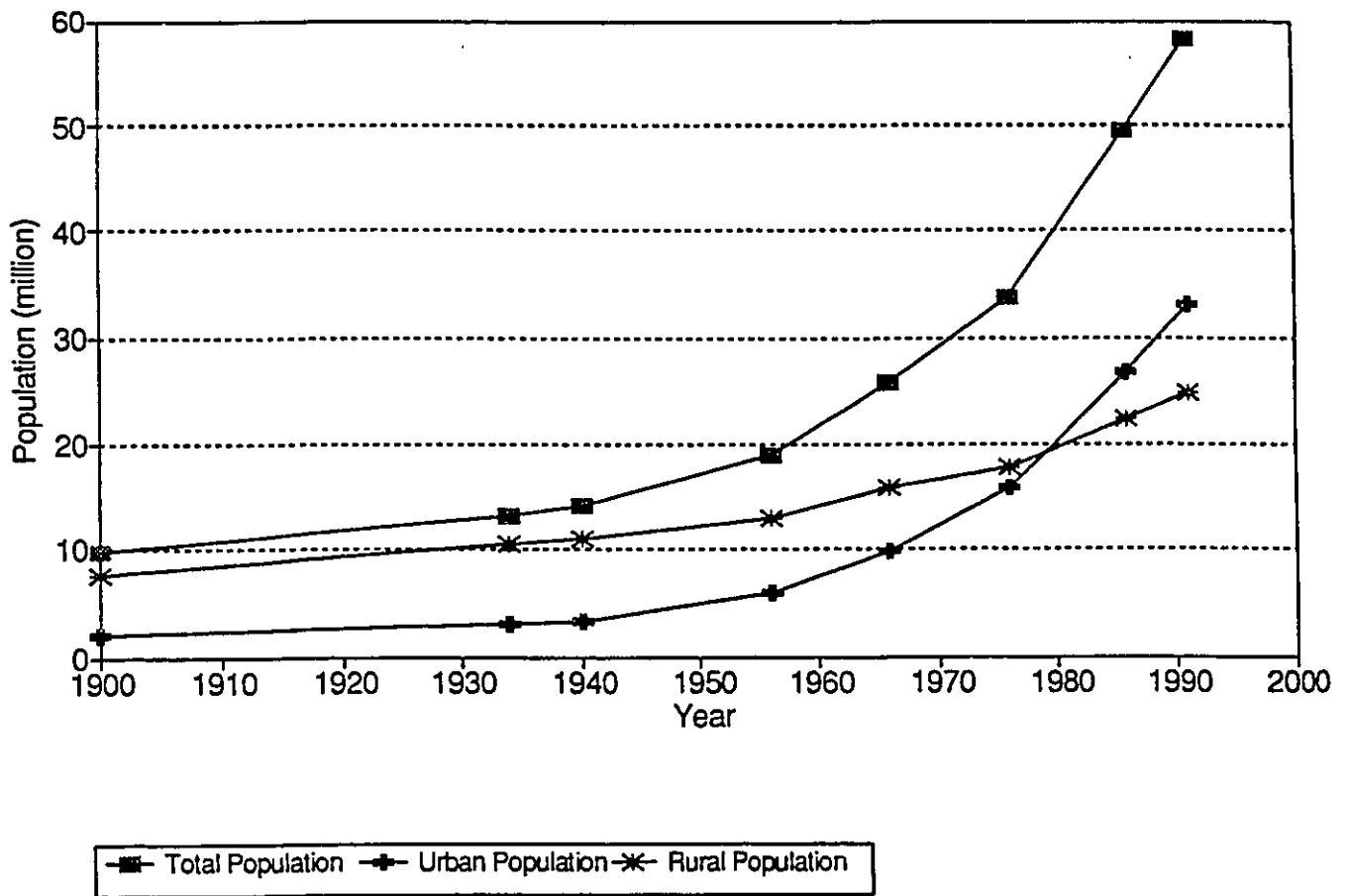
2 It should be pointed out that after Islam emerged in Mecca (in Saudi Arabia) in 608, and created an Islamic state in 621, the surrounding region soon fell in the hands of the Muslims and later they managed to conquer other areas. Around 640-42, after several battles, Muslims managed to defeat the Sasanid dynasty in Iran and take over the country.

et al, 1983; Soltanzadeh, 1986). This shift led to the introduction of Western technology and linked Iran to the world economy. The modernization process and its intensification after the 1960s has had two important effects on Iran's urban society: a) a considerable increase in the degree of urbanization as a whole, by which Iran changed from a rural society during the first half of this century to a predominantly urban society by the 1980s; and b) an internal structural change through which the slowly growing and compact traditional city has changed to the rapidly growing and more extended city of today.

Urban population in Iran and its proportion from the total population during the 20th century, especially after the 1950s, has been constantly increasing. In the beginning of this century (1900), the urban population of Iran was estimated to be about 2 million and constituted 20.6 percent of the total population (Bharier, 1972). In 1956 (the first general census held in Iran) 5.9 million people or 31.4 percent of the total population were living in cities. Since then, the number of urban dwellers has rapidly increased in the country, reaching 9.7 million (38 percent) in 1966, 15.8 million (47 percent) in 1976, 26.8 million (54.3 percent) in 1986 and finally 31.8 Million (57 percent) in 1991 see Fig. 1.2. There was an average annual growth rate of 1.9 percent during 1900-56, 5.0 percent in 1956-76, 6 percent in 1976-86 and 3.5 percent in 1986-91 periods.

Urbanization in Iran, particularly over the past four decades, has been associated with a rapid increase in the number of cities and the concentration of population in large cities. In terms of

F.g. 1.2 Population Growth of Iran, 1900-1991



Sources: Bharier, 1972; S.C.I., 1991

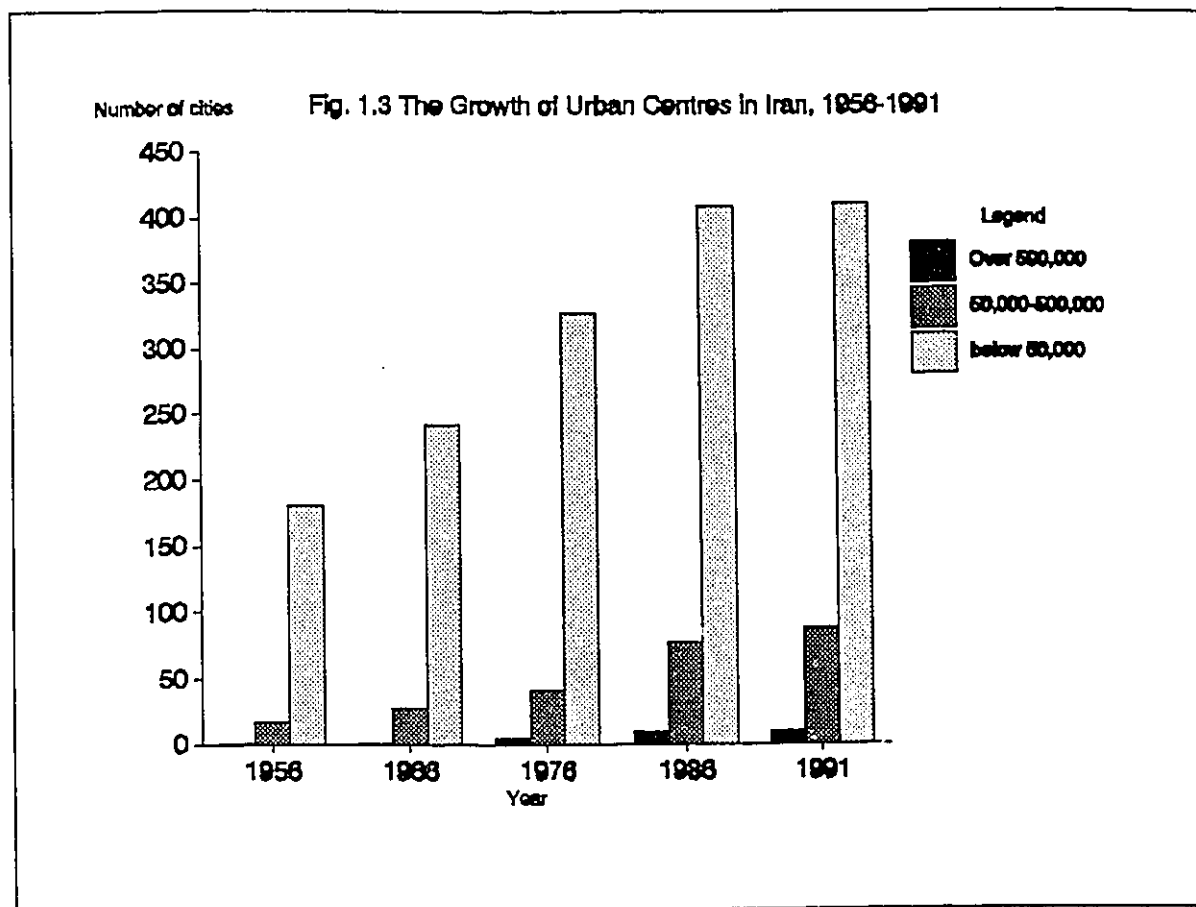
number, while there were only 199 cities in Iran in 1956, this increased to over 500 in 1991<sup>3</sup> (Fig. 1.3). In terms of growth, while large cities (over 500,000) contained about 26 percent of urban population in 1956, their share increased to about 45 percent in 1991, meaning an annual growth rate of 6.5 percent between 1956 and 1991. On the other hand, the share of population living in small cities (below 50,000), has decreased from about 39 percent in 1956 to 19 percent in 1991. This confirms the increasing trend of population concentration in large cities. During this period, the proportion of the population of middle sized cities (50,000-500,000) has remained almost unchanged ( Fig. 1.4; Table 1.1).

Like other Third World Nations, the recent rapid population growth in urban areas of Iran, especially in large cities, has resulted in the emergence of new problems. And, despite the government's attempts at management and provision of services since the 1960s, these problems have increased (P.B.O., 1991). Today, problems such as housing shortages, congestion, expansion of squatter settlement, insufficient public services, pollution, are common in most large Iranian cities.

To deal with these problems and control the rapid growth, urban planning has been exercised in most large and middle sized cities of Iran since 1965. Although planning efforts, through the

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3 There are two definitions for a city in Iran. One is that of the Ministry of Internal Affairs which says any community which has municipality is considered as a city. The second, is the definition of the Statistical Centre of Iran (S.C.I.) which defines the city based on minimum number of residents in each place. Before 1986, the minimum number of population for a city was 5,000, however, after 1986 general census it has increased to 10,000. Since the results of the general censuses have considered the city as a place where has municipality, therefore, the term of the city in this study goes with first definition.



Source: Zanjani and Rahmani, 1990; Tofiq, 1993

implementation of master plans, have altered the structure of many cities, these efforts in many cases have not been successful in controlling the rapid urban growth and providing even urban development (Amirahmadi and Kiafar, 1993). Therefore, urban problems, especially in most large cities, have been increasing during the recent decades which has raised the concern of both local and national authorities to deal with.

Today one of the main urban problems in Iran is coping with the rapid urban growth especially in large cities so that they do not become overcrowded and do not overuse their natural resources,

Fig. 1.4 Population Change Among Iranian Cities, 1956-1991

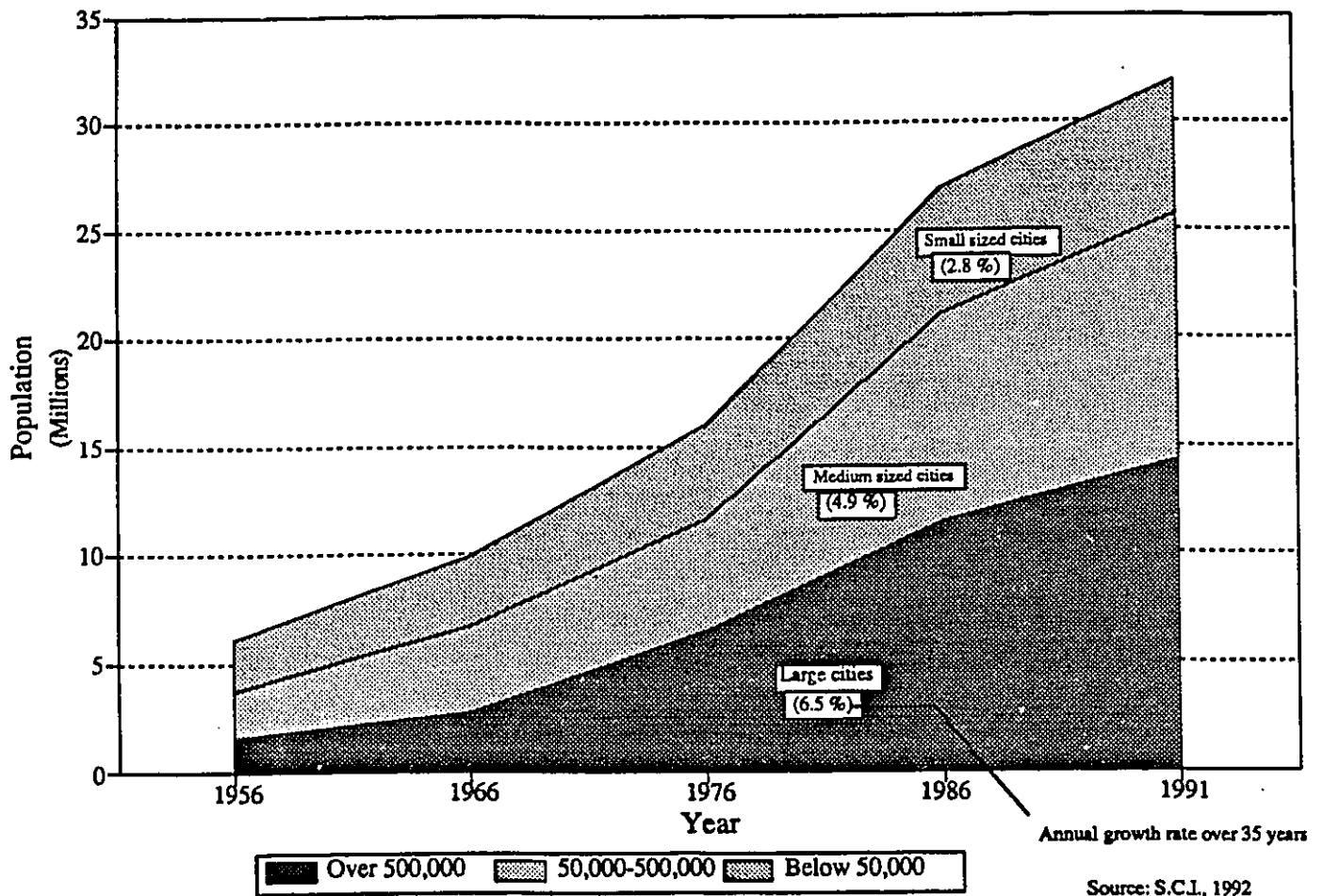


Table 1.1 Population change among Iranian cities 1956-1991

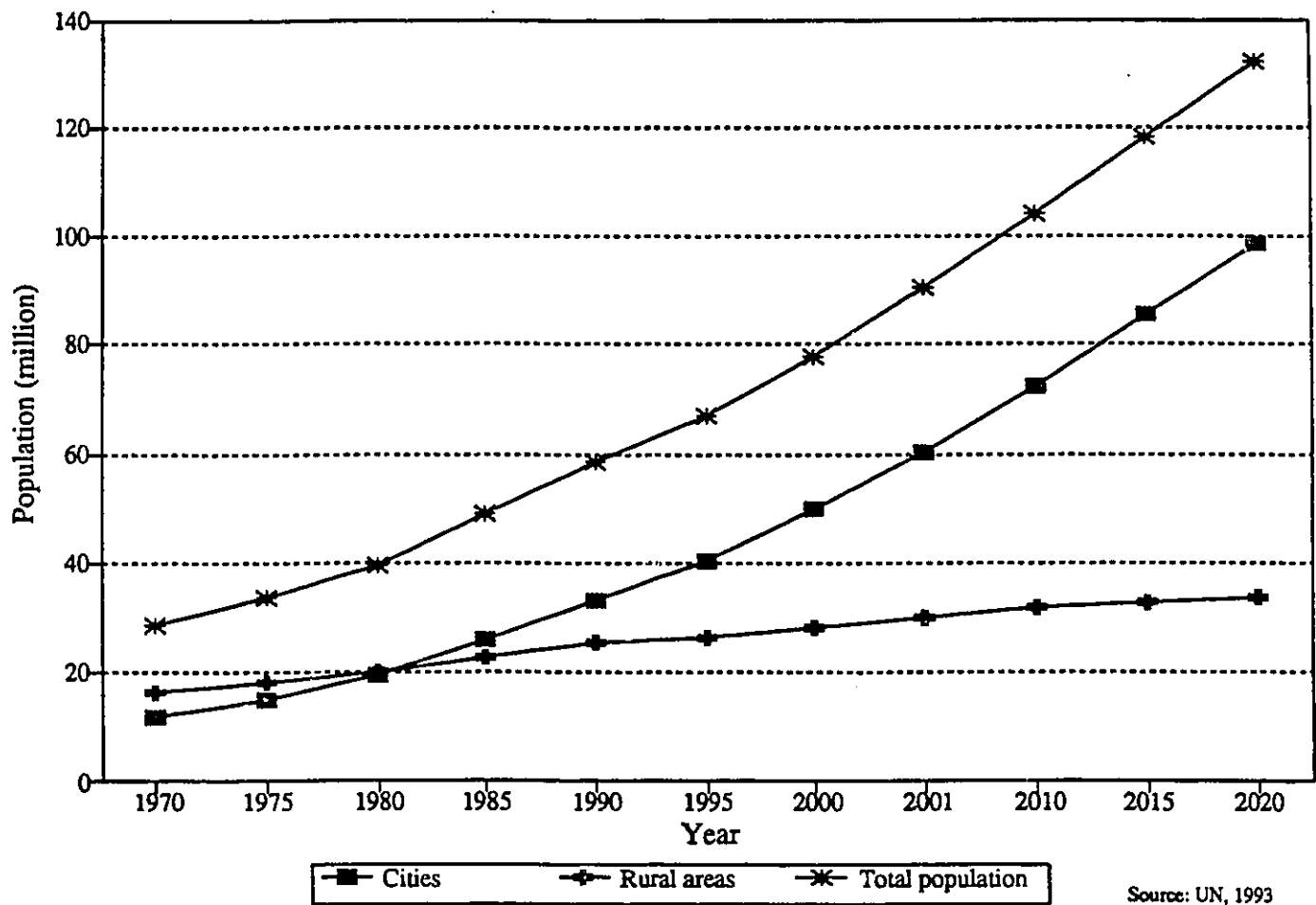
City class	1956	1966	1976	1986	1991
Large cities Over 500,000	1,560,934 (26.0 %)	2,719,730 (27.8 %)	6,457,479 (40.7 %)	11,416,760 (42.5 %)	14,245,794 (44.7 %)
Middle sized cities 50,000-500,000	2,122,564 (35.4 %)	4,015,188 (41.0 %)	5,029,763 (31.7 %)	9,716,636 (36.2 %)	11,395,603 (35.8 %)
Small sized cities Below 50,000	2,317,177 (38.6 %)	3,056,066 (31.2 %)	4,367,438 (27.6 %)	5,711,165 (21.3 %)	6,194,706 (19.5 %)
Total (%)	6,000,675 (100.0)	9,790,984 (100.0)	15,854,680 (100.0)	26,844,561 (100.0)	31,836,598 (100.0)

Source: S.C.I., 1992

meanwhile improving or, at least, maintaining the quality of life in them as well (Mohammadi, 1990:1). The reason for this concern can be understood from the UN assessment of the future urban growth in Iran. According to the UN (1993), while 45 million will be added to the population of Iran between 1990 and 2010, urban areas will absorb over 39 million (86 percent) of this increase (Fig. 1.5). According to this projection, among urban areas, large cities will continue to grow at a relatively higher rate than others. Large cities already facing various urban problems will likely face more and new problems if their development is not managed properly.

The existing literature on Iranian cities does not address the urban structure particularly their land use patterns seriously. Because of this, the plans employed to direct urban growth suffer from an adequate understanding of the rules governing city systems in Iran. It is, perhaps, because of this lack of understanding that the prepared plans for cities are mainly superficial and based on only the present status, without taking into account the process leading up to the existing

Fig. 1.5 The Future Trend of Population Change in Iran, 1970-2020



Source: UN, 1993

situation. This leads to the provision of mostly ambitious and inappropriate plans for cities. Since these plans usually do not match with the real local needs and capabilities, in most cases they fail to meet their targets, thus leading to a further increase in urban problems (P.B.O., 1991; Habibi, 1990). Therefore, to manage the future growth there is need for better planning to guide the urban development and such a planning requires a better understanding of the city as a system.

By examining the process of recent growth and change in urban land use patterns in Tabriz during the 1966-1991 period, this study is going to contribute to a better understanding of the urban structure in Iran. The city of Tabriz has been selected as a case for this purpose, because it is a good example of a large Iranian city displaying a notable change in its spatial structure during the recent decades. It is an old city, multi-functional and one of the largest industrial centres in the country. As a typical large Iranian city, Tabriz has the following characteristics:

- i) It has inherited the structure of the traditional Islamic city, which is quite visible in the old districts of the city. From this perspective, not only is it similar to most old large and medium sized Iranian cities, but also it can represent other Islamic cities, especially those of in the Middle East.
- ii) As a large and regional centre, Tabriz has gone through a similar modernization process as other major urban centres in Iran during this century especially after the 1960s.
- iii) Because of its geographical location in the northwest of Iran, the city was not influenced directly by the Iran-Iraq war 1980-1988, and therefore, it has not undergone major reconstruction after the war.

iv) Finally, the familiarity of the author with Tabriz, having studied and lived there, allowed for the employment of personal links with various individuals and government agencies, without whose assistance data and information would have been difficult to obtain. In terms of study period, the selection of the 1966-1991 interval is due to rapid growth of Tabriz during this time as well as the availability of the data for this period.

### 1.5 Introduction to the Study Area

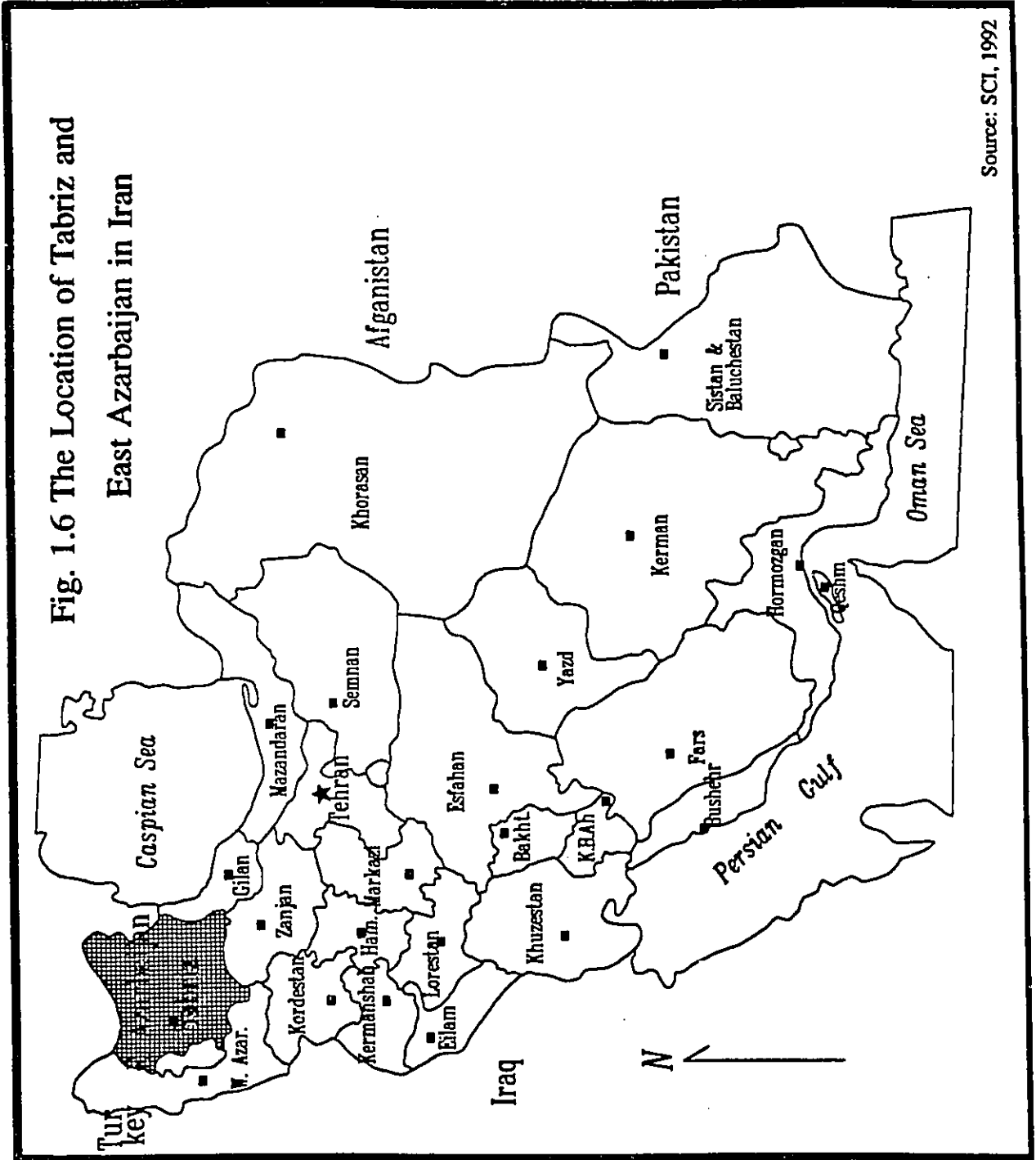
As the capital of the province of East Azarbaijan, Tabriz is located in the north west of Iran, and lies on latitude 38° 07' north and longitude 46° 15' east (Fig. 1.6). East Azarbaijan, which covers 63.3 thousand square kilometres, constitutes 4% of the country's land surface. In 1991, it included 8% of the population of Iran which made it one of the densely populated provinces in the country. This province, with 18 Shahrestan<sup>4</sup> (Fig. 1.7) and 41 cities had 4.5 million residents in 1991 ranked the third most populated province in Iran after Tehran and Khorasan.

Tabriz Shahrestan covers an area of 4.34 thousand square kilometres and has 17 towns and 175 villages, and a population of 1,394,249 in 1991. In this year, Tabriz alone included more than 78 percent of the Shahrestan's population while other towns together with 115,000 residents, and 175 villages collectively with 180,000 people included 22 percent of the population (S.C.I., 1992). Tabriz Shahrestan is the most populated Shahrestan in the province. While an average

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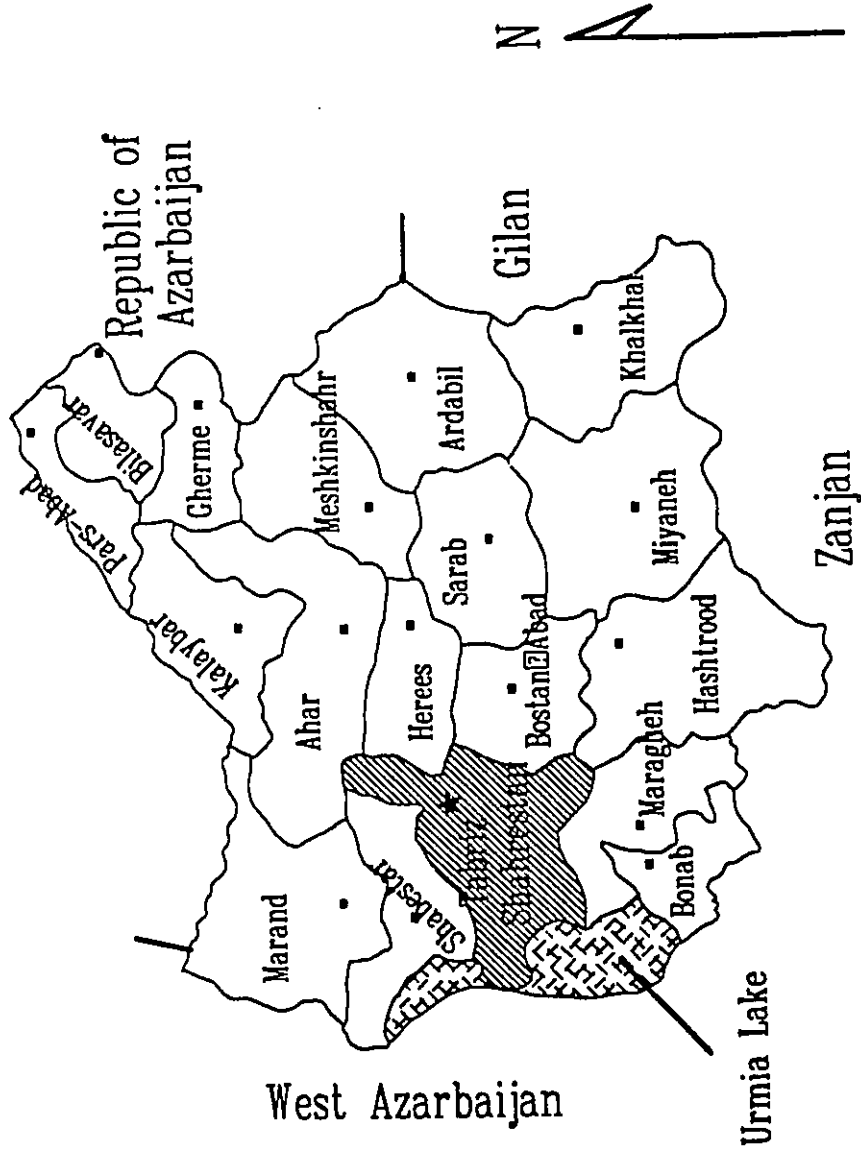
4 The term "Shahrestan" is an administrative urban area which refers to the second subdivision of territorial or administrative unit in Iran after province. This unit, which itself is divided into a number of "Bakhsh" or counties is composed of a city as the centre of the Shahrestan and a number of other cities or towns and usually a large number of villages. Until 1990, East Azarbaijan was divided into 11 Shahrestan, but according to new divisions in 1990, this province is divided into 18 Shahrestan, 65 Bakhsh and 4500 villages.

Fig. 1.6 The Location of Tabriz and East Azarbaijan in Iran



Source: SCTI, 1992

Fig. 1.7 The Location of Tabriz Shahrestan in the East Azarbaijan Province



Source: SCI, 1991

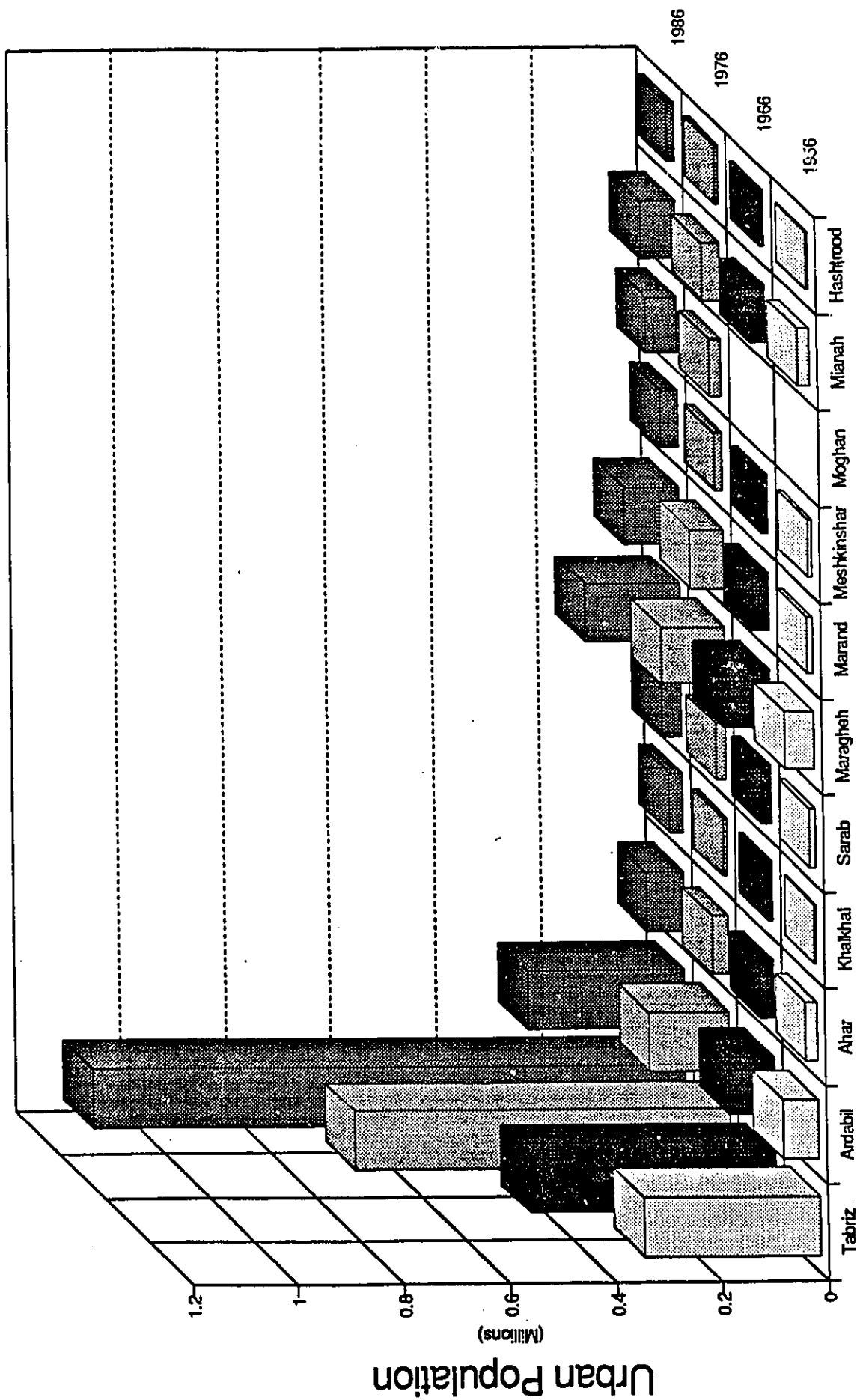
of 71 persons per square kilometre lived in East Azarbaijan in 1991, in Tabriz Shahrestan this number reached 321 persons (S.C.I., 1993). Thus, East Azarbaijan faces an unbalanced population distribution within its own boundaries (Fig. 1.8).

At 1350 meters above sea level, the city is situated on a huge triangular shaped basin called "Tabriz plain". This plain, which is located in the east coasts of Lake Urmia, covers a vast area of about 470,000 hectares (P.B.O., 1991, p.13). Except from the west side, which is open to the coasts of Lake Urmia, this plain is enclosed by Mount Mishow and Morrow from the northwest, Mount Eynal-Zaynal from the north and northeast, and the foothills of Mount Sahand from the east and south. The general slope of this basin is from east to west and the salty river of Talkheh Rood passes through it. The city of Tabriz is located in the eastern corner of this basin where the foothills of the Sahand meets Eynal-Zaynal's steep slopes. Tabriz is 620 kilometres from Tehran, 150 kilometres from Jolfa on the border of the republic of Azarbaijan and about 400 kilometres from Makkow on the border of Turkey.

## **1.6 Organization of Chapters**

This introductory chapter has briefly discussed the subject matter of the study and stated main research objectives and basic hypotheses. It has also justified the need to undertake this study in the context of Iranian cities and introduced the case study area of Tabriz. Chapter Two first explains the notion of urban land use as the key concept used in this study, it then reviews the main theoretical background in urban land use literature concerned with Western and Third World Cities. Since the study deals with an Iranian case, the third part of Chapter Two reviews

Fig. 1.8 Urban Growth in the Province of East Azarbaijan, Iran, 1956-1986



Urban Areas

Source: SCI, 1968, 1978, 1988, 1992

the main existing literature on urban development and spatial structure of Iranian cities in more detail. Chapter Three begins with a description of the data used in this study and its sources. It then explains the methods used to answer the main research questions and test basic hypotheses, and finally points out the problems encountered with handling the data and explains the methods used to solve them.

Chapter Four is concerned with the historical growth of Tabriz. It reviews the historical development and structural change in this city starting from its foundation until as recent as 1966 (the beginning of the study period) and points out the impact of this historical development on today's spatial structure of the city. Chapter Five analyzes the process of recent urban growth and its impact on physical expansion and population density patterns. Chapter Six examines the change in different categories of urban land uses during the 1966-1991 period. By putting these changes in spatial perspective, it finds the major variations in distributional patterns of different classes of urban lands in the city over the past three decades and explains the main causal factors. Chapter Seven discusses the main social and environmental impacts of recent growth and land use change in Tabriz and briefly explains how these impacts are represented in the spatial structure of the city. Chapter Eight summarizes the main findings of the study and suggests further research in the area under study.

## **Chapter Two**

### **Literature Review**

#### **2.1 Introduction**

Quantitatively, land given over to urban uses is of relatively minor importance, but given the concentration of people in cities, the significance of urban land is greater than its small share of the total area would suggest. Within urban areas, land is used and occupied in a remarkably intensive manner. Consequently, the nature of the land and its use has attracted the interest of many scholars, as economists, ecologists and human geographers try to find out what causes urban land uses to be located where they are, and whether there is a pattern of locational relationship between various land uses. This chapter after defining the term "urban land use" as the main concept used in this study, reviews the major theoretical background in urban land use in the west as well as in TWCs. Since the focus of the study is on Iran, it then reviews the main existing literature on the urban structure of Iranian cities.

#### **2.2 Urban Land Use Concept**

The "urban land use" concept covers a wide range of contexts, many of which are basically aspatial (Carter, 1977:171). On the other hand, the basic geographical interest in land use is in its distributional aspect or areal differentiation (ibid). It is from this perspective that urban land use analysis emphasizes the importance of distance and space relationships in arranging the distribution of land use types in the city (Ley, 1983:24). Geographical studies of urban land use have been based on a number of basic assumptions such as accessibility, land value, competition, dominance and density (ibid) upon which a number of classical urban land use models have been

developed. Greater awareness of the problems of rapid and unplanned urban growth and deterioration of urban environments of the post Second World War era accelerated urban geographers' interest in understanding the internal spatial structure of cities (Bourne, 1971:3). It was along this line of inquiry that some geographers began to study actual urban land use change in order to reduce uncertainty in predicting future urban change. Recently, the greater concern for minimizing and mitigating negative environmental factors has attracted the attention of some scholars in an attempt to promote urban land use compatibility (Hartshorn, 1992:240; Kivell, 1993). This study brings a spatial perspective to the attempt to obtain a better understanding of recent urban land use change and the problem of compatibility in the City of Tabriz, Iran. Given the significance of aspatial factors such as housing market, land ownership, municipal finance and legislation in shaping urban land use pattern, they are not addressed in this study, because it is difficult to cover every aspect.

### **2.3 Theoretical Background on Urban Land Use**

Two main lines of inquiry have been identified in the theoretical orientation of urban land use studies for the Western cities. The first is descriptive, which emphasizes the "what is", and the other is explanatory, which extends the "what is" to "why" (Chapin and Caisler, 1979:31). Among the earliest descriptive works, there are three classic land use models which are reviewed here:

#### **Burgess' Concentric Zone model**

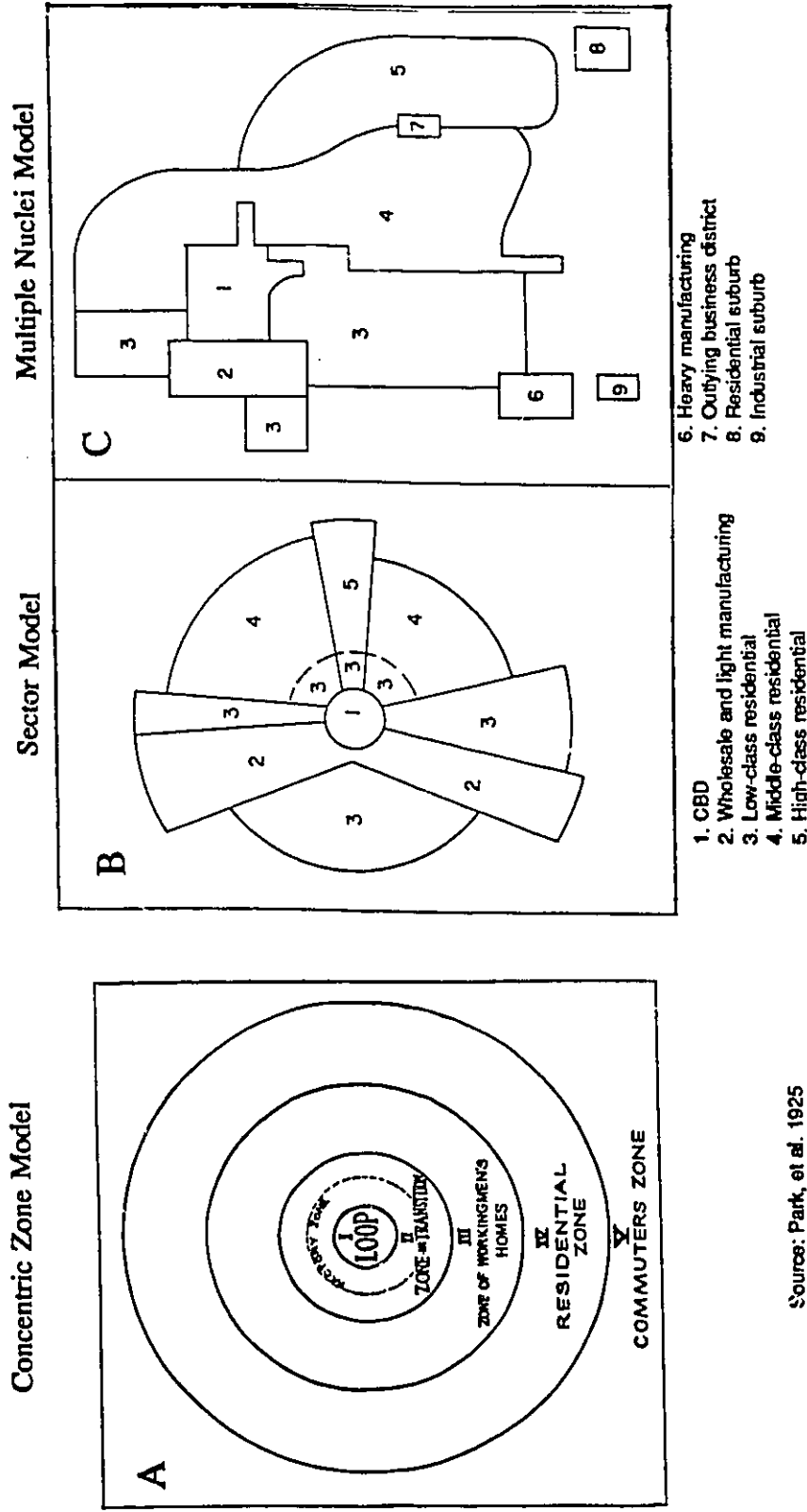
The concentric zone model of Burgess (1925) was proposed based on the context of the North

American city of Chicago. The main assumptions of this model are that: i) the growth of a city takes place from the centre outward, and it spreads more or less consistently in all directions. ii) ecological processes such as invasion and succession influence the zonation of the city structure. iii) the value of land, accessibility and the socio-economic status of the residents vary with respect to the distance from the city centre in a concentric form.

Making these assumptions, Burgess divided the city of Chicago into five zones based on function and the socio-economic status of the residents (Fig. 2.1 A). Thus, the first zone is the Central Business District (CBD), which occupies the most central area of the city and is the focal point of commercial, civic and social life in the city. Also, the CBD is the place where the main retail activities and offices are found, and where the major transportation routes converge making it the most accessible location in the urban area. The second zone in this model is called the zone of transition, an area known by blight conditions and the gradual penetration of commercial and industrial uses from the CBD into the residential areas. The quality of residential areas in this part is the lowest, and zone is mostly inhabited by immigrants and poor people. The remaining three zones in this model are purely residential. They are called the zone of workingmen's homes; the zone of better residences; and the commuters' zone. The quality of these residential areas increases with distance from the CBD, and is generally arranged based on the ability of groups of people to afford the cost of travel to work.

Though Burgess failed to give an explanation for the mentioned arrangement, Isard (1956) and Garrison and Berry (1959) tested some of his formulation and found a partial explanation of

**Fig. 2.1 Generalized Land Use Patterns of Cities**



residential differentiation in terms of rents instead of transportation costs. Alonso (1960) has accounted for the relevance of the concentric model with respect to the assumption that the poor live close to the centre on highly valued but small pieces of land, while the rich reside at the fringe on larger and cheaper lots. Blumenfeld (1949) and Smith (1962) have claimed the relevance of the concentric model in Philadelphia and Calgary respectively.

There have been a variety of criticism of Burgess's concentric model. Carter (1977:175) classifies these criticisms into three broad types: first, those which rejects the thesis; second, those which extend the theory; and third, those which follow from a deductive reformation of the model.

### **Hoyt's Sector Model**

Hoyt's (1939) sectoral conceptualization of urban land use was a direct response to Burgess' concentric zone model. Hoyt formulated his model based on a focus on housing and rent patterns in 142 American cities. This model is based on the assumption that accessibility to the main route differs widely, as some areas are closer to the radial routes and some are further away, and these differences in accessibility cause the sectoral variation in the land value surfaces (Fig. 2.1 B). Hoyt extracted a number of specific conclusions from his model, which can be summarized as follows: i) the highest rent areas are in many cases located in one or more sectors on one side of the city; ii) the high-rent areas often extend in wedge-like form in certain sectors along radial roads leading outward from the centre to the periphery of the city; iii) intermediate-rent areas tend to be located on either side of the highest rent areas; iv) some cities have large areas of

middle- rent units, which tend to be found on the peripheries of low and high-rent areas; v) and in every city, low-rent areas are frequently found extending from the centre to the edge of the city.

According to this model, as a city grows, the high-rent areas follow definite sectors of the city. In that Hoyt specified a directional as well as a distance from the city centre component to urban land use patterns, his model has been an improvement over that of Burgess (Haggett 1966). This model has been tested by some scholars. For example, Yeates (1965) found evidence of a sector of high class residences with high land value along the northern shore of Lake Michigan, and a sector of low class residences in the south of Chicago. Smith (1962) did a comparative study of Calgary, and found sectors more meaningful than concentric zones. At the same time, several criticisms levelled at the concentric model are applicable to Hoyt's sector model, such as lack of universality (Rhind and Hudson 1980).

### **Harris and Ullman's Multiple Nuclei Model**

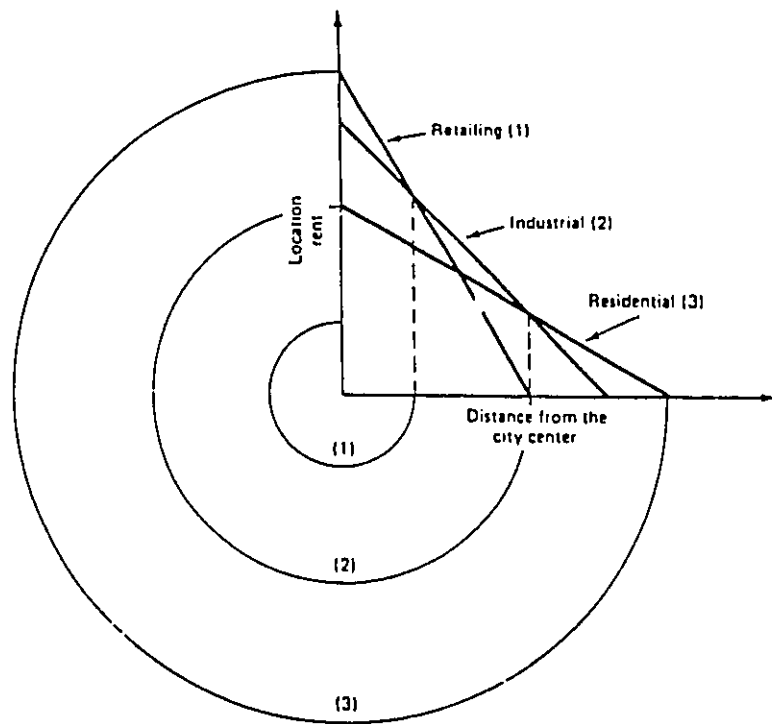
The third urban land use model is proposed by Harris and Ullman (1945). Their postulation is that the city is a complex organization, and therefore, the model removes the CBD as a major focal point, replacing it with a number of discrete nuclei around which the individual land uses are grouped. The number of nuclei largely depends on the size of the city, its structure and historical background. Harris and Ullman identified five districts in American cities: i) the CBD; ii) the wholesaling and small scale manufacturing areas; iii) heavy industry district; iv) various different residential districts; v) and the peripheral dormitory suburb (Fig. 2.1 C).

Some have argued that the models proposed by Burgess, Hoyt and Harris and Ullman are not independent of one another, and they have attempted to use a combination of them in their empirical studies (Smith 1962 and Robson 1969). Criticisms of the universality and underlying assumptions of the above mentioned models led to the development of explanatory theories. These theories are concerned not only with defining a certain process, behaviour or other phenomenon as it exists in reality, but also with why such a phenomenon comes into being and evolves in time and space (Chapin and Caiser (1979:38). Several models have been developed in this respect among which Alonso's land rent theory for its importance is briefly reviewed here.

### **Urban Land Rent Theory**

Alonso (1960, 1964) developed a model to account for intra-urban variations in land value, land use and land use density. He built his model based on Von Thunen's comparable work on rural land use. The key factors in this model are accessibility and its relationship to transportation costs. This model assumes that all work places are at the centre of the urban areas, so the further families live from the city centre, the more they should pay for transportation. As a result, the further from the centre families live, the less they will be able to afford dwellings. For any given income level, therefore, there is a bid-rent curve signifying the amount of money that people are able to pay for dwelling with increased distance from the centre (Fig. 2.2). According to Alonso's land value theory, an efficient land use pattern emerges within the city as various activities compete for locations by bidding at various rent levels. Their bids are calculated by considering their need for centrality against their ability to pay higher rents.

**Fig. 2.2 Concentric Land Use Zones Generated by the Bid-Rent Curves for Retailing, Industries and Residential Land Uses**



Source: Cadwallader, 1985

Alonso's model, as reviewed so far, corresponds to the simplest case, a single-centre city on a featureless plain, with transportation in all directions. However, he states that his reasoning can be extended to cities with several centres and structured road patterns and other realistic complications. If, for example, it is assumed that a city has more than a single centre, then we could imagine a series of sub-centres each generating its own set of concentric land use zones. Los Angeles has been identified as the classical example of a polycentric settlement (Cadwallader 1984:38).

Though Alonso's hypothesis concerning the spatial organization of land use and land value within cities seems to enjoy substantial empirical support, the overall approach to understanding urban spatial structure has been criticized. One criticism is that the process of land use allocation discussed by Alonso ignores government intervention (ibid:40). But, it may be assumed that such intervention is fairly common, and sometimes has quite profound effects on the distribution of land use and land value. Harvey (1973:179) argues that the assumption of a free-market economy does not hold for the urban land market. As a result, imperfections occur in the land use allocation process, for instance, the emergence of monopoly rent when the ownership of land becomes concentrated in the hands of a few individuals or corporations.

### **Urban Land Use Change Studies**

One common point in the two sets of theories is that they view and explain the pattern of urban land use in a given period of time. Such an approach, perhaps, is not able to fully inform the issues arising from actual urban change and the deterioration of the urban environment which

were accelerated by rapid urban growth. To investigate these issues some geographers through their empirical studies have taken a dynamic approach to study the actual change in urban land use patterns. For example Niedercorn and Hearle (1964), examined the trend of urban land use change in American cities. Through questionnaires, they gathered information about the patterns of urban land use from city planning departments of 48 cities for two periods (the most recent and 10 years before). The information described the proportion of various urban lands including: residential, industrial, commercial, road and highway, other public and vacant lands as well as residential and employment densities. By calculation of the percentage share of each category of land as well as residential and employment densities for the two periods, they found that in general:

First, vacant urban land in the larger cities is rapidly disappearing. Second, net manufacturing and population densities are decreasing, and commercial densities are barely holding their own. Third, unless large amounts of vacant land exist inside the city boundaries the average large city appears to have nearly reached its upper limits of population and employment in commerce and manufacturing Niedercorn and Hearle (1964).

Despite a fair description of overall urban land use change, however, the study does not explain the causes of the mentioned changes.

Another example of actual urban land use change is Bourne and Doucet's (1970) detailed study of the dimensions of land use change in Toronto. Bourne and Doucet derived their information from two sets of land use data which had been collected for census tracts in the Metropolitan Toronto area in 1963 and 1968. The analysis was performed to describe the spatial patterns of net aggregate land use change and to sort out the different components of land use change

through using factor analytic techniques. On this basis the authors attempted to generalize the processes that appear to be dominating the 1963-1968 changes in the structure of metropolitan land use and to suggest the implications of these trends for future urban growth and development.

Thus, the major findings of this study were:

- i) growth of the suburban fringe;
- ii) expansion of the central core; and
- ii) expansion of various networks of transportation and public utility facilities; and
- iv) the emergence of localized centres or nucleation, in which land use change is concentrated (Bourne and Doucet:28).

The supplementary studies conducted later by Bourne (1976) attempted to link these changes in urban land use to locational decision-making. Through using principal components analysis, Bourne tried to bring together two parallel studies, one of macroscale patterns of change in urban land use and the other of individual developer decisions in the urban development process. The study showed: i) the permeability of zoning controls and existing land ownership suggesting that land ownership patterns in urban areas have a substantial effect on the rate, direction and location of land use change; ii) the relationship between land availability (ease of land conversion) and the age and quality (or replacement costs) of the building stock in each subarea; and iii) developers following from the leads set by planners or other developers without explicit evaluation of their own locational choices (Bourne, 1976).

In conjunction with the above study, Doucet (1970) examines aggregate changes in the land use

structure of metropolitan Toronto between 1963 and 1968. Through calculating the land consumption and land absorption rates, on per capita basis for different types of land use categories, he illustrates both total utilization and the marginal rates at which land is being consumed for urban purposes. The main implications of this land use change on urban form are concluded to be: i) fairly rapid conversion of agricultural and vacant land to developed uses; ii) significant variation in land consumption rates of different types of activities; iii) the decline in the land utilization rate in general as densities and the pressures on land increase.

Recent studies of urban structure and land use are mainly concerned with the changes which occur in the structure of a particular activity such as change in residential areas, the transportation network, or commercial and manufacturing uses (e.g. Jones, 1991; Bunting, 1991; Filion and Mock, 1991; Bourne, 1991, 1989, 1982; Borden, 1992; Giuliano, 1986; Ley, 1991, 1986; Hartshorn, 1992; Muller, 1986; Filion, 1987). For instance, Borden (1992) studies how the growth and redistribution of urban population, the rise or fall of income and the change in retail marketing strategies in North America have affected the spatial structure of retail activities. And, Bunting (1991) shows how recent changes in residential areas within Canadian cities have led to further social differentiation or social segregation among previously homogeneous neighbourhoods.

Hall and Bourne (1992) summarize the major findings of recent changes of the spatial structure of Western cities in the following statements:

- the shifting of living arrangements in cities from larger houses to smaller ones because

of the decline of the nuclear family;

- the emergence of new locational patterns for economic activities because of the shift to an informal economy;

- more distinct segregation of different income groups because of the emergence of an urban underclass; and

- more urban expansion and low density land uses because of the deconcentration of people and jobs from cities to suburbs .

### **Studies on Third World Cities**

The above mentioned studies have been conducted in the context of Western cities; however, with the growing importance of urbanization in developing countries over the past three decades, a number of studies have dealt with the spatial structure of TWCs. These studies, like the land use theories on Western cities discussed above, have taken two approaches. The first one is a descriptive approach which includes models deduced from the study of a single city at a specific time (e.g. UN, 1973; Tanabe, 1983; Griffin and Ford, 1980). This approach mainly tries to generalize the distributional pattern of residential groups and manufacturing activities within the TWCs. The second is the explanatory approach (e.g. Yadov, 1979; McGee, 1967; Okapala, 1978) which focuses on the processes which explain the association of social groups with specific types of locations within the expanding city.

From the above mentioned studies on TWCs, three of them which offer general models for cities in three distinct regions of the world (one for Africa, one for Latin America and one for Asia)

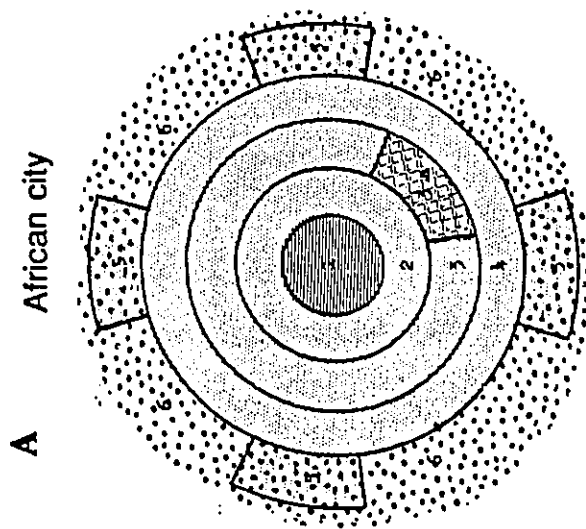
are briefly reviewed.

i. The African city (United Nations, 1973): this model, which does not consider Arab cities, appears to be most applicable to Western African cities of about 100,000 persons (Lowder, 1986:212). According to this model, in the core of the city is found the original pre-industrial city involving a combination of commercial and residential activities. Around the core is a ring including government uses and low density elite groups. An intermediate density of mixed groups constitutes the next ring around which there are shanties, villages and sectors allocated to industry and large scale institutions (Fig. 2.3 A).

ii. The Latin American city (Griffin and Ford 1982): to some extent similar with the Western city, this model displays a scale ranging from dense to sparse population for residential areas. Its central zone, with a full range of utilities, holds middle-class residents. The periphery is occupied mostly by squatters, as well as by industrial and uncongenial uses (Fig. 2.3 B).

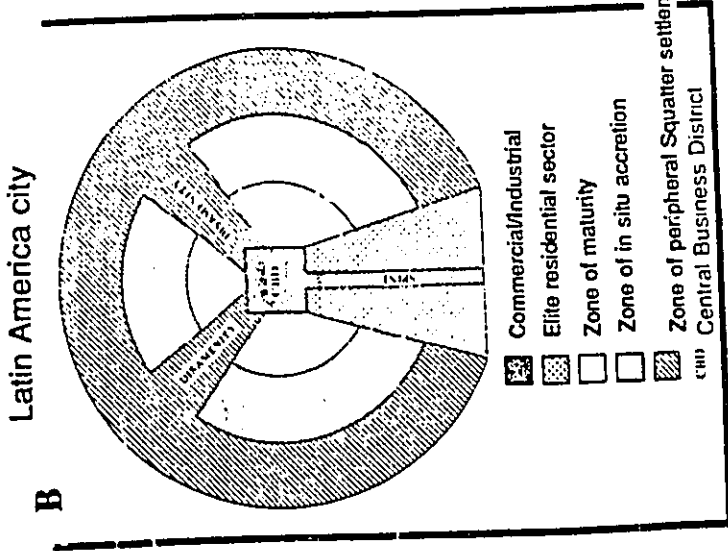
iii. Asian port cities (Tanabe 1983): this model presents a type of multiple nuclei pattern by bipolar classification. This model identifies two classes of different land use allocation for modern and non-modern (old and new) parts, which appears to be based on the formal and informal division of production (Lowder 1986:212). While the old part in the core of the city, with a mixture of residential, industrial and slum areas occupies only a small area, the new part has extended to a much larger residential area engulfing various nuclei of downtowns, industrial areas, and slums (Fig. 2.3 C).

Fig. 2.3 General Models of Land Use in Third World Cities

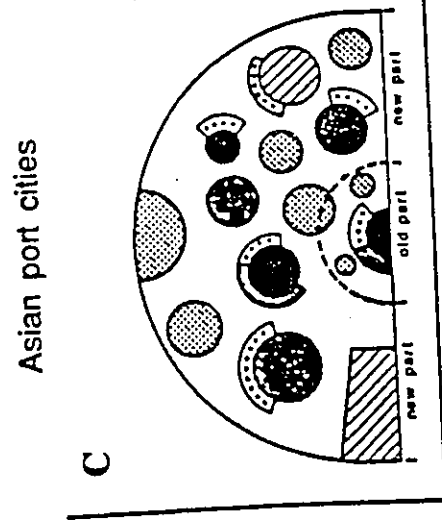


- 1. CITY CORE  
(Commercial / Industrial  
RESIDENTIAL / DENSITY)
- 2. Indigenous / high
- 3. High class / low
- 3a. Government area
- 4. Mixed/intermediate
- 5. Shanties/villages
- 6. Open space, industry & large scale institutions

Source: United Nations 1973



Source: Griffin and Ford 1982



Source: Lowder 1986

While these models again deal with the spatial structure of the city in a given period, they cannot explain the structure of all cities in the developing nations, mainly because of the diverse cultural and socio-economic characteristics of the TWCs. Moreover, the cities upon which these models have been developed are in countries which have experienced the colonial stage; the structure of these cities, therefore has greatly been affected by the direct impact of outside influences, not necessarily the case in all TWCs.

With respect to issues of urban land use change, a study by Royle (1994) in Niteroi, a Brazilian city close to Rio de Janeiro, reveals how the recent expansion of built-up areas in Niteroi has led to separate residential developments and environment deterioration. Royle, by using two sets of topographic maps from 1959 and 1987 and by doing a field survey is able to identify three distinct types of change in Niteroi: i) high residential suburbanization in a pleasant environment at one edge of the city (south), with planned streets, adequate infrastructure, elaborately designed houses, new shopping plaza, sufficient public services and protection; ii) development of a number of new towns at another edge (east) of the city, with shops, offices, industries and schools. These are busy working and residential places, with less pleasant environments and lower levels of services compared with the high-class suburbs to the south; iii) the expansion of favelas (shanty towns) which are found either on the edge of the city or on the flanks of the steep mountains which pepper the Niteroi area. The steep slopes, which are prone to landslides, are not attractive to those who can afford to reside in safer locations.

The major environmental impacts of land use change in Niteroi, according to Royle, have been

i) the considerable loss of forest mainly because of population growth and the development of low density settlements; and ii) the shrinking of the two lagoons as a result of increased deposition into the lagoons as a consequence of the disturbance of the surrounding vegetation accompanying urbanization.

With respect to the Muslim world, there has been a significant change in rapidly growing Islamic cities during this century. Amirahmadi and El-Shakhs' (1993) maintain that harmoniously structured Islamic cities of the past are experiencing pronounced disunion in urban life in general and in the urban built environment in particular during the modern era due to the new transportation system, shantytowns and squatter settlements, industrial complexes, informal markets and satellite towns. This has led to a rupture of continuity between the inherited morphology and more recent urban structure. According to Galantay (1987), because of rapid urban development and modernization, contrasting morphologies have emerged in many Islamic cities in Africa and Asia. The present Islamic cities are now characterized mainly by a small historic core with traditional urban tissue (e.g bazaar, distinct neighbourhoods and compact housing) in the centre, surrounded by a vast and amorphous agglomeration in which formally planned projects in the Western mode, devoted to the secular working class, are juxtaposed with illegal and informal development occupied by poor rural immigrants (Saqqaf, 1987; Galantay, 1987; Mechkat, 1987; Drakakis-Smith, 1980)).

Despite the advantages of modern amenities, the modern Islamic cities, like other TWCs, face a wide range of new urban problems such as rapid population growth, the rising cost of land,

inadequate public services, housing shortage, urban sprawl, a heterogeneous social fabric and segregated residential areas (Saqqaf, 1987; Amirahmadi and El-Shakhs, 1993;). The existing realities of the present-day Islamic cities and their urban problems have instigated scholars to assess the consequence of the forced pace of modernization which has sharpened the conflict between traditional values and imported ideas in some Islamic countries. To deal with these problems, urban researchers attempt to seek solutions, part of which are linked to the traditional Islamic cities and the way they were organized.

#### **2.4 The Historical Development and Urban Change in Iran**

Geographical studies of Iranian cities have appeared only recently (Rahnamaei, 1988); however, we can trace the general urban structural change in Iran among studies in other disciplines such as history, archaeology and architecture. In terms of the main changes, Iranian cities can be studied in three periods. First, the ancient period (referred to as the pre-Islamic time until the mid 7th century) during which the formation and development of cities was under powerful empires. Second, the Islamic or pre-modern era (from the mid 7th until the early 20th century) during which the development and organization of cities was greatly influenced by Islamic culture. And third, the modern or contemporary era<sup>1</sup> (since the early 20th century on) during which cities have substantially grown and changed under the influence of capitalism and modern technology.

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<sup>1</sup> In essence, the contemporary period is the continuation of the Islamic period; however, one reason to separate these two is because of the considerable change in the degree of urbanization and structure of cities during this century.

The approaches taken to study the structure of Iranian cities are mainly descriptive in nature and, as we will see in the following pages, due to the lack of detailed information, the arrived conclusions are rather general and hypothetical. With respect to the application of Western models in studying the structure of Iranian cities, they are not considered appropriate, at least for the cities in the ancient era and pre-modern period, mainly because of the different culture and socio-economic conditions in which Iranian cities have evolved in the past. However, with the gradual integration of the Iranian economy into the global economy and with the impact of Western technology on Iranian society during the contemporary period, which have led to considerable changes in the urban built environment, some of the western models of urban structure, may be utilized to explain the present urban structure in Iran. Because of more similarities in terms of socio-economic conditions and technological level between present-day Iranian cities and other TWCs, the theoretical models developed for TWCs, perhaps, could be more applicable than western models for the explanation of Iranian urban structure. In the remaining part of this chapter, the literature on the structure of Iranian cities will be reviewed with reference to the three periods mentioned above.

#### **2.4.1 Ancient Cities.**

Among the important studies of ancient cities is Taghavi-Nejad's (1984) work on the history of urban development in Iran, which looks at the formation of early Iranian cities during the third and second millennium B.C.. Taghavi-Nejad relates the emergence of early cities in Iran to the extension of Mesopotamian civilization in the region. He maintains that the appearance of cities like Shosh in south west Iran and Sialak in central Iran during the 3rd millennium B.C. were

examples of such influence. However, more organized cities in the plateau of Iran appear later after the formation of the first government in Iran by Medes<sup>2</sup> during the 8th century B.C.. The foundation of Heghmataneh (present Hamadan) is considered to be the symbol of more organized cities by Medes at that time (ibid:24).

Ashraf's (1974) investigation of the historical characteristics of urbanization in Iran gives more information for understanding the process of urban development in the ancient time. According to Ashraf, urbanization in ancient Iran has passed through three stages. The first was the emergence and slow growth of cities during the time of the Medes and Achaemenids<sup>3</sup>. The second was the creation of autonomous or Greek-like cities and their relatively rapid growth under Alexander's successors, the Seleucids and later under the Parthians<sup>4</sup> (330 b.C.-208 A.D.). The third was the fall of these autonomous cities under the control of the central government of the Sasanid dynasty (208-640 A.D.). According to Ashraf (1974), in the first stage, because of the involvement of Medes and Achaemenids in wars with neighbouring nations, urbanization grew slowly and cities were important mainly as administrative and tax gathering centres. However, during the second stage, in which the autonomous cities were established, urbanization grew faster because the hellinization policy of the Seleucids, which could be better achieved in

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2 Medes tribes whose main land was in the north west of Iran (present Azarbaijan, Kordestan, Hamadan) after unification managed to form the first government in Iran at the end of 8th century B.C.. They ruled for about 150 years until Akhamaenids took the power from them in 550 (B.C.) (Taghavi-Nejad, 1984).

3 Cyrus the Great, who seized power from Medes in 550 B.C., founded the Achaemenid Dynasty. Achaemenids made the first great persian empire which ruled a vast territory in the Middle East until they were defeated by Alexander in 330 B.C. (ibid).

4 Seleucids ruled for about a century until they were succeeded by Parthians. Parthians were nomadic people of Aryan stock who remained close to their nomadic origins, but their culture was an amalgamation of Persian, Hellenistic and Mediterranean culture (ibid).

cities, required more urban development. During this period, the economic role of cities improved and a number of new cities were built along the silk roads to facilitate the trade between the east and west. This policy, to some extent, was followed by the Parthians until the early 3rd century A.D.. In the third stage, the Sasanids accepted both functional patterns (administrative and economic roles), but cities lost their autonomy by falling under the control of the central government, and their economic role to some extent decreased. This experience in urbanization later was transferred to the Islamic era and influenced the Irano-Islamic cities.

Soltanzadeh's (1986) studies on the history of urbanization, and Colledge's (1977) work on the Parthians of Iran provide some valuable information for understanding the spatial structure of ancient cities in Iran. According to Colledge (1977:34), the typical Iranian city during the ancient period was built in a circular form. The circular form facilitated defence and required less walling for a surrounded space than if it was built in a rectangular shape. According to Soltanzadeh (1986:67), palaces, government buildings and garrisons were built in a complex called the Kohandej, literally meaning the residence of the king or ruler, which usually was located on a higher and better land in terms of defence somewhere at the centre of the city. The Kohandej was protected by strong walls and a ditch, and it was linked to the outside from one side. The area outside the Kohandej was called the Sharestan which contained the residence of wealthy people, government employees and members of the armed forces. Like the Kohandej, the Sharestan was protected by walls and sometimes reinforced with a ditch.

During the Seleucids and Parthians, the Sharestan became more important. It was administered

by a council elected by citizens rather than a king or the ruler (Ashraf, 1974). The Sharestan, in fact, was the main part of the city, and sometimes the city market, or bazaar, was located inside the walls of the Sharestan. During the Sasanids, cities were mostly built in a similar organizational pattern as those of the Parthians. The common idea in the Sasanid period was that the world was composed of four districts; therefore, they opened the cities to the outside world from four sides by putting one gate in each direction (ibid).

According to Ashraf (1974), the area outside the Sharestan's wall was called the Savad, literally meaning suburb. A number of villages were built in the Savad mainly to provide food for the residents of the city, and sometimes, the Savad was protected by walls too. Merchants, craftsmen, religious minorities, artisans and farmers usually resided in the Savad. People from each occupation normally lived in their own quarters, and sometimes even war prisoners were forced to live in a specific quarter. Based on the description that was given, the spatial structure of a typical ancient Iranian city can be illustrated as in Figure 2.4.

#### **2.4.2 Islamic (Pre-modern) Cities**

Cities of the Islamic era can be divided into two groups: first, those which basically originated from the ancient period and second, the newly built cities. Each of the two groups was distinguished from the ancient cities in terms of their functions and forms. A number of studies deal with the form and spatial structure of Iranian cities in the Islamic era, such as Kheirabadi (1991); Saeidi (1987); Tavassoli (1990); Soltanzadeh (1986); Ashraf (1974). The major changes in the structure of cities of the Islamic era can be summarized as follow:

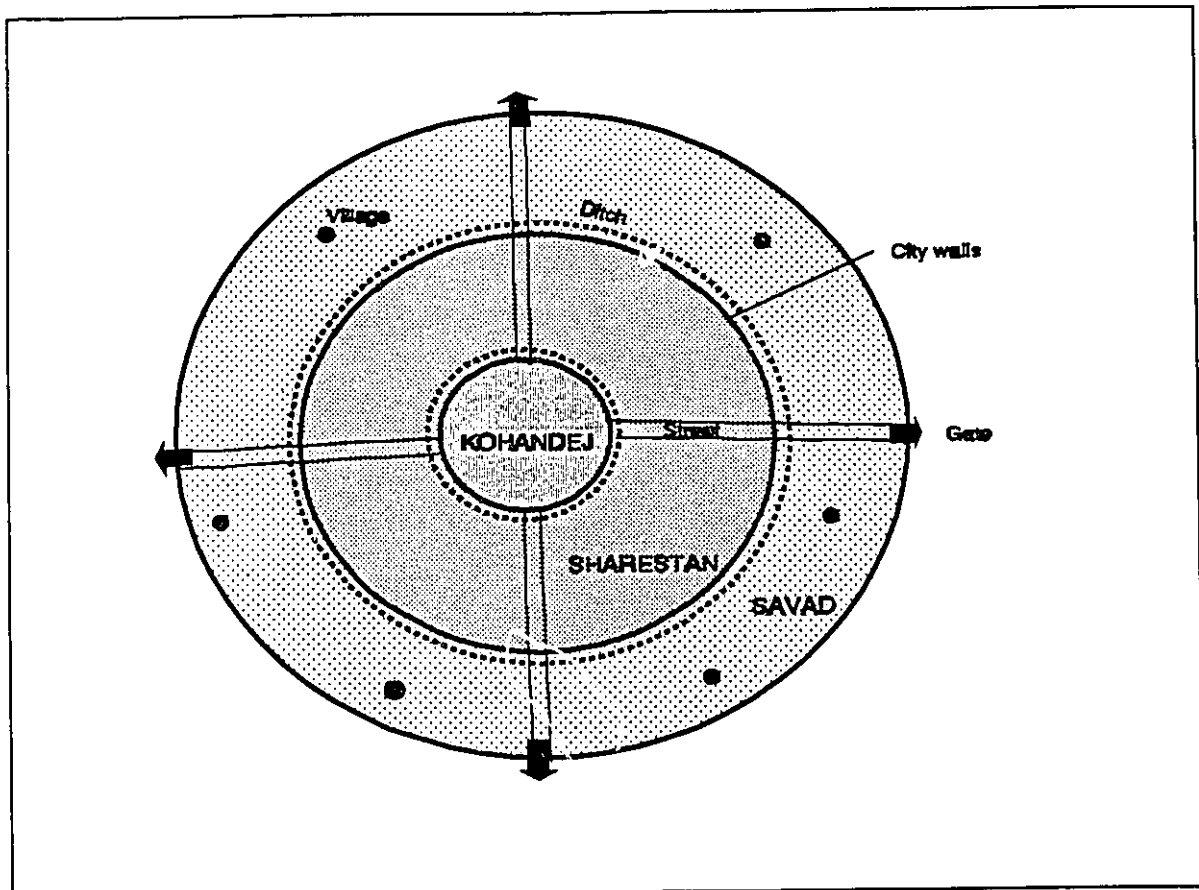


Fig. 2.4 The Spatial Structure of A Typical Ancient City in Iran

One important change during early Islamic time was the emergence of religious institutes characterized mainly by the Masjid Jamih (the Friday mosque) as the major religious and political centre. In new cities built by Muslims, the Masjid Jamih was founded beside or at the crossroads of major caravan roads. Usually, it was erected on a vast piece of land in a rectangular form. Beside the Masjid Jamih, were located the main government buildings and the residences of the governor and his assistance. With the further growth of the city, the Masjid Jamih usually remained in the centre of the city and today it can still be seen in the central part of many old Islamic cities. As the city expanded, other elements such as Madreseh (schools) and neighbourhood mosques were added to the city (Saeidi, 1987).

The second important change in Islamic cities was the substantial improvement in their economic role (Ashraf, 1974) which can be seen by the development of the Islamic bazaar as the main complex of economic activities. Security, especially between the 10th and 15th centuries, increased inter-regional trade, which led to the growth of cities. Usually located at the city centre and beside the Masjid Jamih, the bazaar played the most important role in urban life because it was there that the majority of people worked. In addition, with strong economic and political ties with rural areas, cities and villages had a high degree of interaction with each other (ibid).

One important spatial structural change in cities originating in ancient times was the gradual movement of the city's population from the Sharestan to the Savad (called the Rabaz in Islamic time). As mentioned before, ancient cities were composed of three parts: Kohandej, Sharestan and Savad. During the Islamic period, because of the elimination of the past socio-political structure on the one hand, and the flourishing of the bazaar as the major commercial and industrial activities and building the Masjid Jamih beside the bazaar on the other hand, the Rabaz (Savad) was expanded while the Kohandej and Sharestan parts were neglected. These two (Kohandej and Sharestan), in fact, became the old parts of the city and symbols of the past socio-political system, where people were reluctant to reside, and in some cases, such as in Bokhara, they were completely abandoned (ibid).

Aside from the political and economic aspects, the cities of the Islamic period were distinguished from those of ancient times in terms of spatial arrangement of social groups. In Islamic cities, social groups were organized into a more homogeneous pattern than before. As stated

previously, in ancient times, the physical distance between social groups was rigid as it was characterized by elements such as the Kohandej, Sharestan and Savad; however, in Islamic cities such rigid boundaries disappeared and on occasion, particularly during social tensions, voluntary residential segregation was employed for religious minorities such as Jews, Christians and Zoroastrians (Abu-Loghod, 1993).

Another characteristic of the spatial structure of Islamic cities was the segregation between residential and commercial areas. Such a separation is attributed to what Abu-Lughod (1993) calls "gender segregation", referring to the need to separate private (that is, female) from public (that is, male) space in Islamic culture. Such a segregation did have important effects which left the residential areas a large measure of autonomy, since many of the public functionaries (the supervisor of the marketplaces or the supervisors of public morals) operated largely in the commercial section (the bazaar) of the city. Neighbourhoods managed many of their internal functions on a more ad hoc basis, being unable to afford more commercialized services (ibid).

Studies of Iranian cities of the later stages of the Islamic period, until the end of the 19th century, do not suggest major change in their spatial structure from cities of the earlier period. Though, urban growth declined to a great extent by the time of the invasion of Mongols in the late 13th and 14th centuries, with the assimilation of these invaders in Irano-Islamic culture they themselves later contributed in the reconstruction and development of Iranian cities (see Chapter 4).

With the rise of the Safavids in the early 16th century, urbanization in Iran began to flourish. The Safavids were from the Shiite fraction of Islam, and for the first time they made Shiite the official religion in Iran. Since that time, Shiite related elements were also added to Iranian cities. According to Kheirabadi (1991) and Saeidi (1987) two important elements associated with the Shiite included Imamzadihs and Hossaynihs.

Imamzadihs, literally meaning a descendent of an Imam<sup>5</sup>, which refers to the shrine or the building in which a descendent of an Imam is buried. These shrines are scattered throughout the country, and most of them are thought to be the Imam Riza's (the 8th Shiite Imam) brothers, sisters, cousins, or other close relatives.

Imamzadihs, when located within cities, form the major focal point in the city. In Iran, the religious importance of these buildings often surpasses that of the Masjid Jamih when they become the major visiting and gathering places of citizens, as well as pilgrims. In some cases, they were the main reasons for the initial establishment and further development of cities. A prime example of this is the city of Mashahd in north eastern Iran, now the second largest city and one of the fastest growing metropolitan areas in Iran. Due to its extraordinary religious-cultural importance, the shrine of Imam Riza has been the main urban core of Mashahd. The Shrine has been a hub from which many streets radiated outward; as a result, it has influenced the structure of the city. By attracting 12 million pilgrims each year (Ghomami, 1992), in fact, the shrine has transformed the economy of the city.

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<sup>5</sup> Imam is a religious term which, in general, refers to a leader, but here has an specific meaning which refers to one of the twelve saints or the true successors of Muhammad in Shiite belief.

The second example of the Imamzadih's impact on city structure in Iran is the shrine of Hazratih Massoumeh (Imam Riza's sister) in the city of Qum, 140 kilometres south of Tehran. The location of this Imamzadih is the main reason for Qum being one of the biggest centres for religious studies in the Muslim world, with many religious schools. The shape and economy of this city, like Mashhad, has been significantly influenced by the holy shrine which attracts millions of pilgrims every year. Examples of the Imamzadihs' impact on urban structure can also be found in other countries, as in the Iraqi cities of Najaf, Karbala, Kazemain and Samerra.

Another Shiite related element which was added to the Iranian cities was the Hossaynihs<sup>6</sup>. These buildings are built in neighbourhoods usually in conjunction with the local mosque and used for various religious gathering, especially during the months of Muharram and Safar of the Islamic calender.

Some studies have focused on other influences of Islamic culture on the form of buildings and their orientation (Momeni, 1987; Pirnia, 1991). Examples of such influences can be seen in the walled courtyards and specific interior design of houses which increase the privacy of families, as well as building the houses facing south or south west in the direction of Mecca. Because Muslims must face Mecca during the daily prayers, most houses are built facing south, unless there are topographic reasons for doing otherwise.

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<sup>6</sup> Hossaynihs are religious buildings built in memory of Imam Hossayn the grandson of Prophet Muhammad who was martyred in 680 A.D. in a war against the army of Yazid, the Caliph of the time (Kheirabadi, 1991).

Aside from the socio-political factors which were discussed, the spatial structure of Iranian cities has been greatly influenced by environmental factors, such as climate, sun, water and the bowl-shaped physiography of the Iranian plateau as well (e.g. Pirnia, 1991; Tvassoli's 1989; Bonine 1979; and Rabubi and Rahimiyyih, 1974). These studies reveal Iran as a place to find a good relationship between physical and cultural environments. The main impact of the natural environment on the structure of Iranian cities can be characterised in the compact residential districts, specific architectural design of buildings resistant to harsh climate (especially in the central and northern parts of the country) and arrangements of streets in connection with Qanat<sup>7</sup> and water courses. For a typical Iranian city during Islamic (pre-modern) era see Fig. 2.5.

### 2.4.3 Modern Cities

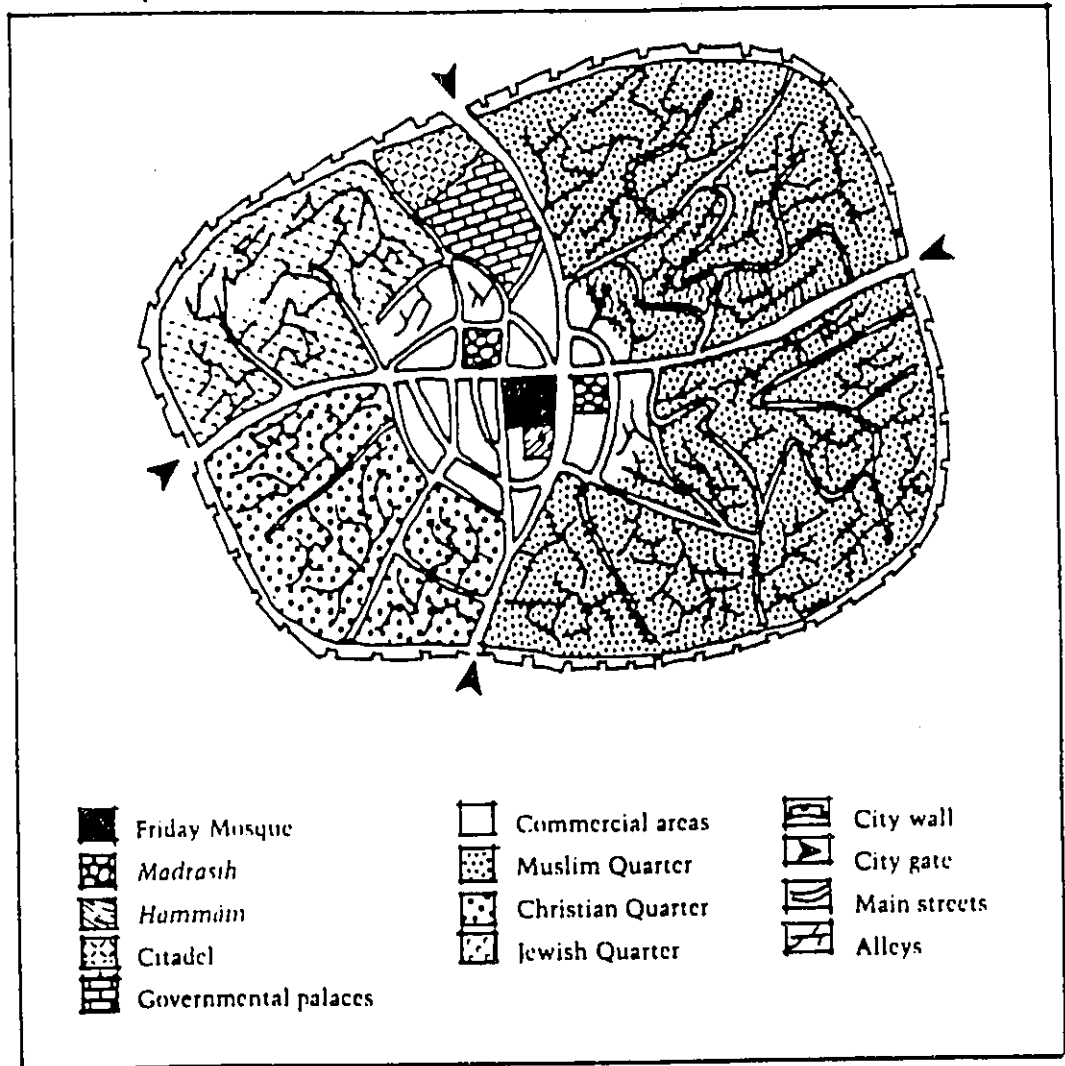
Two rather distinct phases of urban change can be distinguished during the modern time in Iran. The first phase is the 1925-1960 period during which urbanization grew slowly; however, the traditional structure of cities saw some major changes. In the second phase, that is after 1960, while urbanization has grown rapidly, the spatial structural change has been intensified as well.

The major structural changes during the first phase of modernization which distinguished modern cities from pre-modern cities were: the superimposition of a grid-iron pattern of new streets on

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<sup>7</sup> Qanats are underground canals which Iranians are believed to have invented more than a thousand years ago. These canals bring fresh water from the mountains to settlements by using gravitational forces without any need for machine tools. Qanats were widely used in Iran until the 1950s, but replacement of many of them with pumped wells significantly decreased their number. In the past, many cities in Iran, especially in the central parts, where running water is scarce or inaccessible, were supplied by water from Qanats. Today some small cities and many villages on the margins of Iranian deserts and other central parts of the country still use Qanats as their main water source.

Fig. 2.5 A Typical Islamic City



Source: Kheirabadi, 1991

conventional Kuches (paths) to adapt the city to newly imported transportation means; the extension of commercial activities from the bazaar along the new streets; the construction of imposing squares; and the erection of new buildings, most of which were governmental or administrative- police headquarters; the addition of banks or railway stations (Mozayeni, 1974). These structural change took place mainly in large cities.

After the Second World War and especially after the nationalization of oil in the early 1950s, the economy of the country became more dependent on the oil industry than on agriculture (Hosamian et al, 1983). This shift in the economy allowed most cities to grow independent of their rural areas, since most of the oil revenue was spent in urban areas (Rahnamaei, 1988; Poorahmad, 1991). City planning activities related to national development plans began in 1949. In the first two national plans (1949-1955 and 1956-1962), attention was given to the provision of urban facilities such as potable water supplies, electric power plants and street surfacing. In spite of these structural changes in the first phase, cities continued to grow relatively slowly and more in compact form similar to that of traditional cities because the use of the car was limited and natural population growth was relatively low. Urban studies related to this period, do not suggest major changes in the spatial arrangement of residential areas in Iranian cities.

During the second phase, which continues to today, while Iran has experienced rapid urban growth (an average annual growth rate of over 5 percent compared with less than 2 percent in the first phase) the spatial structure of cities has changed considerably too. The industrialization policy of the country, which began in the early 1960s, and the oil boom of the early 1970s

enhanced industrial activities and contributed to the recent rapid urban growth in Iran. The major spatial structural impact of the second phase of modernization (western technology) could be seen in less compact physical development of cities, shifting the industrial activities from city centre to the periphery and establishment of modern factories (e.g. refineries, steel mills, automobile assembly factories) along the major roads, expansion of transport networks, development of satellite towns around large cities and social segregation among residential groups. The recent process of urbanization in Iran, generally, has led to an uneven urban development both at the inter and intra-urban scales (Amirahmadi and Kiafar, 1993; Rahmani and Hafeznia, 1988).

The present literature on the recent urban change in Iran, does not provide more detailed information about how these changes have occurred, especially regarding the change in urban land use patterns. Therefore, there is a need for more investigations to determine the characteristics of recent changes in the spatial structure of Iranian cities and the processes leading to these changes. In this respect, understanding the patterns of urban land use change would provide us with a more substantial basis for better prediction of future change.

## **2.5 Conclusion**

This chapter first defined the concept of "urban land use" as the key term used in this study from geographical point of view and described land use studies as an approach to understand the areal distributional pattern of activities, analyze the problems of rapid urban growth and predict the future urban changes. Then it reviewed the main descriptive and explanatory theories about urban land use concerning Western cities particularly those of North America. Moreover,

theoretical approaches in studying the urban structure of TWCs were briefly reviewed. The last section examined the main studies on Iranian cities. We have seen that the spatial structure of cities in Iran has seen two major changes: one was when the country was taken over by Muslims, and cities were reshaped under the influence of Islamic culture; the second was during the contemporary era (since 1925) during which urbanization has greatly been influenced by Western technology. We also saw that the existing literature on Iranian cities does not deal with the patterns of urban land use change seriously, and it was argued that undertaking this study would provide a better understanding of the recent change in urban structure, and may help in better predicting future urban change in Iran.

## **Chapter Three**

### **Methodology**

#### **3.1 Introduction**

This chapter explains the methods and techniques utilized to collect data and test the thesis hypothesis. Section 3.2 describes the data sets, their various sources, collection process and validity. Section 3.3 discusses the methods and techniques employed to analyze the collected data, and finally section 3.4 comments on the limits of available data and explains methods used to overcome these shortcomings.

#### **3.2 Data and Information**

##### **3.2.1 Data Sets**

To accomplish the main objectives of the study, the following data and information were collected.

- 1) Historical information concerning the foundation, geographical location, major factors involved in the growth, important historical events and main elements of the spatial structure in the city was acquired to analyze the historical development of Tabriz in order to respond question 1, page 4.
- 2) Data on recent population change for the city and within the districts, the physical expansion of built-up areas over time and the factors of population and areal growth were obtained to analyze the process of urban development and its impact on density pattern during the study period to answer question 2, page 4.
- 3) To examine the urban land use change two sets of data were collected: a) the total

amount of land for each type of land in 1966 and 1991 for identifying the major land use changes at city scale; b) the amount of land for each class of land within the different districts for identifying the extent of change in the patterns of land use distribution during the same period to respond question 3, page 4.

4) To study the social and environmental impacts of the recent urban change, information was collected about the major urban problems associated with the rapid growth and physical expansion in Tabriz. This information was concerned with both the degradation of urban built environment as well as social structure and unequal distribution of public facilities. Even though the available data for this section are limited, they enable us to pinpoint major problems which have been occurred as a result of recent urban change in Tabriz.

### **3.2.2 Data Collection Methods**

The data utilized in this study were mainly collected through a field trip which took place between October and December 1993. Methods of data collection included:

- 1) Direct referral to the various government, non-governmental agencies and libraries in Tabriz and Tehran to obtain the existing statistics, reports, maps, air photos and other documents about the development of Tabriz;
- 2) Extracting data from government documents (e.g. summarizing or classifying figures and measuring maps) and interviewing various official and non official individuals in Tabriz.
- 3) Making personal observations in different parts of the city and obtaining photos and

slides from important phenomena under study.

Apart from the field trip, some additional information was obtained through correspondence with some government organizations in Tabriz.

### 3.2.3 Data Sources

The major sources consulted during the field trip to obtain data for this study include:

- 1) Department of Housing and Urban Development (DHUD) in Tabriz for reports of master plans of 1966 and 1991 to obtain data on different classes of urban land use, social structure and economic activities. Data on land use change in traditional bazaar for 1960 and 1993 was also acquired from this department. Urban development plans in Iran usually are prepared by planning consultant groups through government contracts. These plans are approved by both DHUD at the province level and the Ministry of Housing and Urban Development (MHUD) in Tehran. Thus data used for official plans, in general, is verified by the DHUD in the province and MHUD in Tehran.
- 2) Plan and Budget Organization (PBO) in Tehran and Tabriz: to acquire national and provincial urban development policies in Tabriz.
- 3) Municipality of Tabriz for the housing policies, maps of the 1966 master plan, reports on housing constructions.
- 4) Statistical Centre of Iran (SCI) in Tehran and its branch in Tabriz to obtain the results of national censuses on population and housing in 1956, 1966, 1976, 1986 and 1991 for the country, the province of East Azarbaijan and the city of Tabriz.
- 5) Department of Agriculture of East Azarbaijan for data on agricultural lands and the

amount of farmlands absorbed by new urban development.

6) Bureau of Urban Transportation in Tabriz for data on the number of motor vehicles and transportation network for 1966 and 1991.

7) Department of Urban Land in Tabriz for data on the amount of allocated land for public housing projects and existing land control policies.

8) Department of Geography and Urban Planning, Tabriz University for existing studies on the geography or urban structure of Tabriz.

9) Libraries of Tabriz and Tehran Universities for the literature on the history of Tabriz.

10) Other organizations in Tehran were contacted to obtain different maps including:

11) The Geographical Organization of Armed Forces (GOAF) for topographic map of Tabriz, 1984, 1:50,000 and 1:250,000); Sahub Geographic and Drafting Institute for Tabriz City, 1970, 1:17,500 and Darolsaltaneh Map of Tabriz, 1880, about 1:9,000 scale; Gita Shenasi Geographic and Cartographic Organization for Tabriz, 1978, 1:13,300 and Tabriz City, 1991, 1:15,000) and Ministry of Culture and Higher Education (MCHE) for Tabriz, 1991, 1:21,000).

As mentioned earlier, one of the research objectives is to discuss the social and environmental implications of the recent urban change in Tabriz. Since the data obtained through records did not supply adequate information, supplementary data were collected in the course of interviews with following groups: officials in Town Planning Unit (TPU) of the Municipality of Tabriz; members of the Planning Division of DHUD of Tabriz; members of the Department of Urban Land; experts involved in Iranian urban studies, especially those who have worked on Tabriz in

Tabriz university and working groups of private consultants. These groups were interviewed because they were either official employees dealing with urban development in Tabriz directly, Or they had research experience on urban development in Iran in general and on Tabriz in particular. Thus, both groups would be more likely to have a better understanding of Tabriz and its main urban problems.

Since the number of experts concerned with the topic was limited and the interviews were related only to a small part of the analysis (part of Chapter 7), in total 15 persons were interviewed. Because each person was interviewed for a specific reason (depending on the responsibility of the official or academic), the questions varied from one person to another. However, the main themes of the questions were related to the major problems of recent rapid urban growth, their causes and the main government policies concerning the urban problems.

#### **3.2.4 Validity of Data**

Most of the data (figures) used in this study have been checked to ensure accuracy. The population numbers obtained for historical periods were checked in several sources so that the most acceptable values were selected. The only source for the recent urbanization data and population characteristics is the national censuses; however, to avoid possible distortion the original official documents have been referred to obtain the data.

The accuracy of the land use data for 1966 and 1991 was tested by comparison with measurements of land use patterns taken from 1:2,500 scale maps, produced from air photos, in

the DHUD. This measurement was made with a planimeter and in case of disagreement between the reports and figures obtained from the original maps, maps were re-measured so that data accuracy was ensured.

### **3.3 Methods and Techniques**

The analysis part of this study has four sections. The following methods and techniques were used in this research:

i) The first part of the analysis begins with a discussion of the historical evolution of Tabriz (Chapter 4). Primarily a geographical historical approach is used to analyze this historical growth because it can reveal some economic, political and social process influence on development which a purely statistical cross-sectional approach cannot explain (Onyewuenyi, 1990). The focus here is mainly to determine the important factors influencing the growth and spatial structure of the city; emphasis is placed on a descriptive approach. In this section the trend of historical growth of Tabriz is illustrated using a map produced from several other maps to show the physical extent of the city in different periods. Based on the 1:50,000 topographic map of Tabriz and using ARC/INFO, GIS, the source maps are re-scaled and then they are overlaid and plotted in a single map to illustrate the areal extension of Tabriz throughout its history. After description of the historical development of Tabriz for ancient and pre-modern era, the influence of this historical evolution on the present spatial structure of Tabriz is discussed, and then main changes in the spatial structure of the city during the modern period (until 1960s) is examined.

ii) In the second part (Chapter 5), two sets of analysis are performed: first the process of recent (1966-1991) rapid population growth in Tabriz is discussed and the main causal factors are analyzed. Then the relationship between recent urban growth and density pattern is tested by using the urban population density model. This analysis is for testing the first hypothesis which is related to overall population density decline in Tabriz, however with variations within different parts of the city. The purpose is to see how the change in technological, economic and cultural characteristic during the recent decades has altered the urban density in Tabriz with respect to time and space. Even though data used for this test are not detailed to obtain a higher level of confidence, the result shows rather a strong relationship between population density and time and space in Tabriz over the past decades.

iii) The third part of the analysis (Chapter 6) tests the second hypothesis which assumes the recent urban land use change in Tabriz has been associated with relatively higher concentration of activities within certain locations. This section includes two parts. The first part examines the extent of overall land use change for each class of land between 1966 and 1991 through calculating several indices such as, absolute change, relative change, land consumption rate and land absorption rate (for definitions see chapter 6). In this way, we can see what types of lands have experienced more changes in the city as a whole.

To understand how and in what locations of the city these changes have occurred, the second part looks for the variations in the spatial distribution of each class of land in 1966 and 1991. For this purpose, the location quotient (LQ) method has been utilized. LQ, most frequently used in

locational analysis, is an index for comparing an area's share of a particular activity with the area's share of some basic or aggregate phenomenon (Barber, 1988). In other words, the *LQ* for a given area *i* is the ratio of the percentage of the total regional activity in area *i* to the percentage of the total base in area *i*. If *A<sub>i</sub>* is equal to the level of the activity in area *i* and *B<sub>i</sub>* is the level of the base then

$$LQ_i = \frac{A_i / \sum A_i}{B_i / \sum B_i}$$

In this study the *LQ* for different land use classes within the city of Tabriz has been obtained through the following steps: 1) calculating the percentage share of various land uses in each district for 1966 and 1991; 2) obtaining the percentage share of total developed land (as the base or standard) in each district, and 3) dividing the value in step 1 to that of in step 2 (see appendix 3 and 6). In fact, by transforming the percentage value to *LQ* index the data have been standardized for the size of spatial units.

Conventionally, if the rate of *LQ* for a particular activity in a given area is zero, it means the area does not have any share of that activity. And, if *LQ* is equal to 1, the area has a share of the activity in accordance with its share of the base, and finally if *LQ* is bigger than 1, the area has a relative concentration of the activity compared to the region as a whole (ibid).

For the purpose of this study, the above classification has slightly been modified for better interpretation, because according to the above classification, the *LQ* in most land uses either is

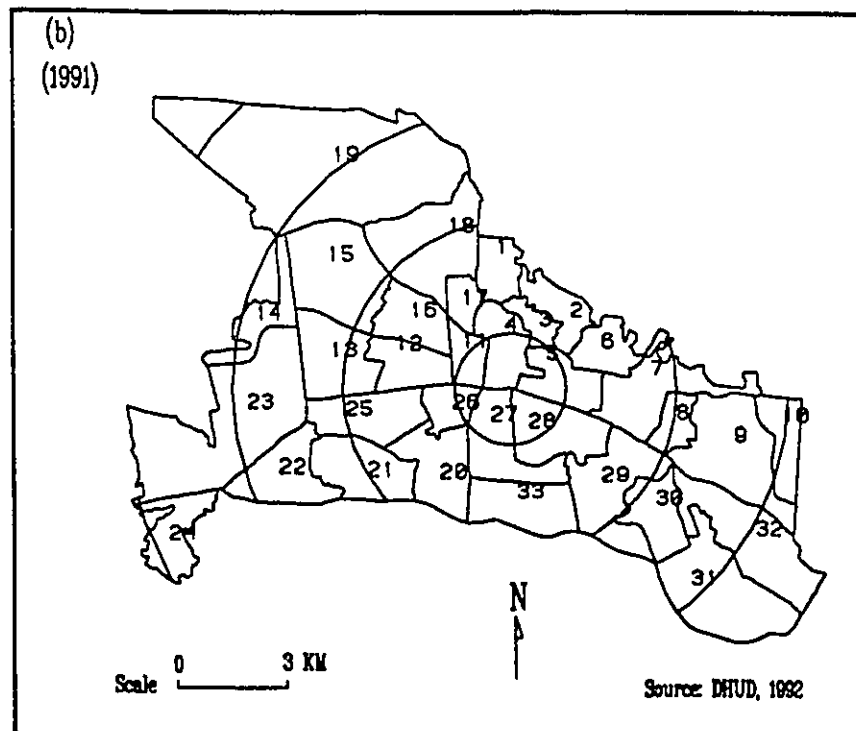
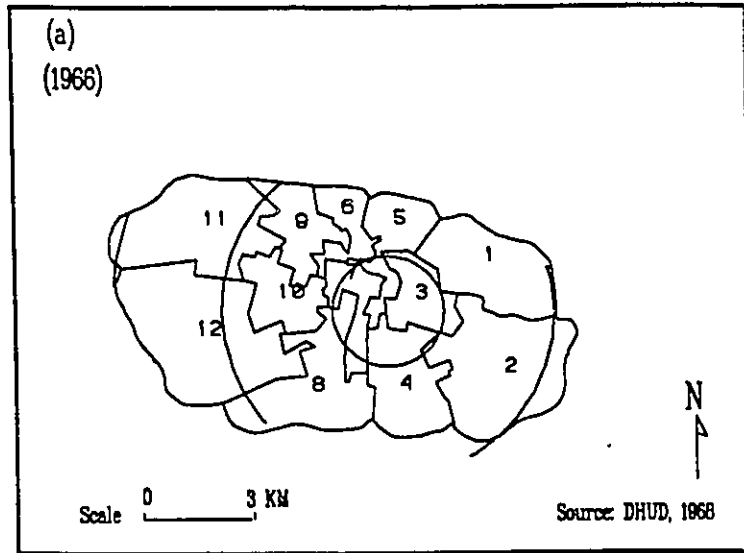
less or above 1. Thus, most of the areas fell in either one of the two classes, because in some land uses no and in some of them only few areas have the LQ rate of equal to 1. Moreover, all areas with the LQ of over 1.0 fall into the same class. Therefore, the following classification is defined to explain the spatial distribution of urban land uses in this study:

1. If a district in the city has the LQ of less than 0.99 for a given land use, the district has small share of that land use.
2. If a district has the LQ of between 1.0 and 1.99, the district has some concentration of that land.
3. If a district has the LQ rate of 2.0 or more the district has high concentration.

Since the city limits and zone boundaries between 1966 and 1991 vary, both city limits and district boundaries for 1966 and 1991 were redrawn in the same scale and to make the comparison clearer a concentric zone pattern was superimposed on top of the original zones, so that we can see the changes in the spatial distribution of various land uses in the city centre, inner districts and periphery. For each type of land, two maps have been produced which illustrate the change in each class of land in Tabriz, one for 1966 and the other for 1991 (Fig. 3 a and b).

iv) The fourth part of the analysis (Chapter 7) is related to the testing of the third hypothesis which assumes that the recent urban change in Tabriz has been associated with the emergence of new urban social and environmental problems. An impact analysis has been used to discuss these issues. Information obtained from interviews, observations and available statistics has been

Fig. 3 Zone Boundaries in Tabriz , 1966 and 1991



synthesized and in order to obtain a clearer picture of the process, this information has been supplemented with photos, maps, tables and graphs.

### **3.4 Comments on Data Limits**

The lack of detailed and systematic data in most developing nations is common problem, particularly in the case of land use data the acquisition of which is hard even in developed nations (Niedercorn, and Hearle 1971). For this reason, while the data utilized in this study are rather general, they were critically examined and then reorganized. One of the limits of the existing land use data for Tabriz is that they exist mostly in figures. This limits the reclassification of spatial units for boundary problems. For this limitations, displaying the spatial distribution of different land uses was possible only by illustrating them in areal patterns within the districts.

Another limitation of the existing data was the scale problem. The available maps of the city's growth are different in terms of scale and each lacks some information, requiring a composite to be made using all the maps. These maps were first converted to a single scale. Then, overlaying several maps with each other allowed the production of more detailed maps. The rescaling was done by using ARC/INFO through a process of digitizing, converting to real world coordinates, overlaying and plotting new maps. The output maps were carefully examined to search for possible major errors which might have occurred during the rescaling process and which could affect the interpretation of results. In case of error, map coordinates of overlaying maps were checked and the process of projection was repeated until an accurate overlay was

achieved.

The third limit was the boundary problem for the two sets of land use data used in this study. This limited the number of techniques which could be used to analyze the change in the spatial distribution of land uses. However, by using the location quotient index, the value of urban land uses was standardized based on the size of areal units in order to show the relative distributional change for two sets of land use patterns within the city. Imposing an additional concentric zone pattern helped to aggregate the shift in the concentration of land uses among main sections of the city: city centre, inner districts and peripheries.

## Chapter Four

### The Historical Development of Tabriz

#### 4.1 Introduction

This chapter responds to the first question of the research objectives which deals with the historical development of Tabriz from its foundation until 1966 (the beginning of the study period). The main goal here is to understand the processes by which the city has evolved during its long history. This historical review provides a background to better evaluate recent structural change in Tabriz and helps to provide a broader viewpoint for speculating about its future change.

Like many other cities in Iran (see Chapter Two), the historical development of Tabriz can be studied using three periods: 1) the ancient or pre-Islamic period; 2) the Islamic or pre-modern period; and 3) the contemporary or modern era<sup>1</sup>. Attempts have been made to identify the basic structure of the city in each period and analyze the main changes from one period to another.

Unfortunately, the history of Tabriz in the ancient period is not very clear and its origin in pre-Islamic time is based on a number of speculations among which three of them are discussed. The history of the city, however, is more clear and well described during the Islamic period, especially after the 11th century. Since then, Tabriz has been one of the most important cities

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<sup>1</sup> For definitions of these three periods see Chapter Two.

in the country as a regional and/or national capital<sup>2</sup>, an important economic centre, and militarily as a strategic point. The historical importance of Tabriz can be better understood from its selection in 1990 as one of five main historical and cultural centres in Iran<sup>3</sup> by the High Consul of Architecture and Urban Development. This selection has been made to preserve and revitalize the historical districts, monuments and traditional architecture in important old Iranian cities.

#### 4.2 Tabriz in the Ancient Period

Among the different ideas proposed for the origin of Tabriz in the pre-Islamic period, two of them appear to be more acceptable by most recent historians. One idea, which is based on Assyrian records, claims that Tabriz originated during the time of the Medes, the tribal group who lived in the north west of Iran between the 8th and 6th centuries B.C. (Hertsfeld, 1975). According to these records, when Sargon II, in his battle with Oratours around Lake Urmia of Iran captured the city of Oshkaya (the present Osku) in 714 B.C., he took another town or fortress with two walls and a ditch near Oshkaya called Tawarir (ibid). Because of the geographical location of Oshkaya, 40 kilometres south of present-day Tabriz, Tawarir was probably in the same place where present-day Tabriz is located (Taghavi-Nejad, 1984:34; Hosseinzadeh, 1982:5). The Medes lived in small, walled communities called Deh Dej (village-fortresses), and it is believed that Tabriz was one of them. One reason to support this idea is the existence of a neighbourhood called Mehud Mahin (Mehud's home) in the old district of present-

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2 While Tabriz after 11th century, almost always, has been the centre of Azarbaijan province, from late 13th century until mid 16th century, during Mongols, Jalaieries, Timurid, Qara Quionlus, Aq-Quionlus, and early Safavids, mostly was the national capital of Iran.

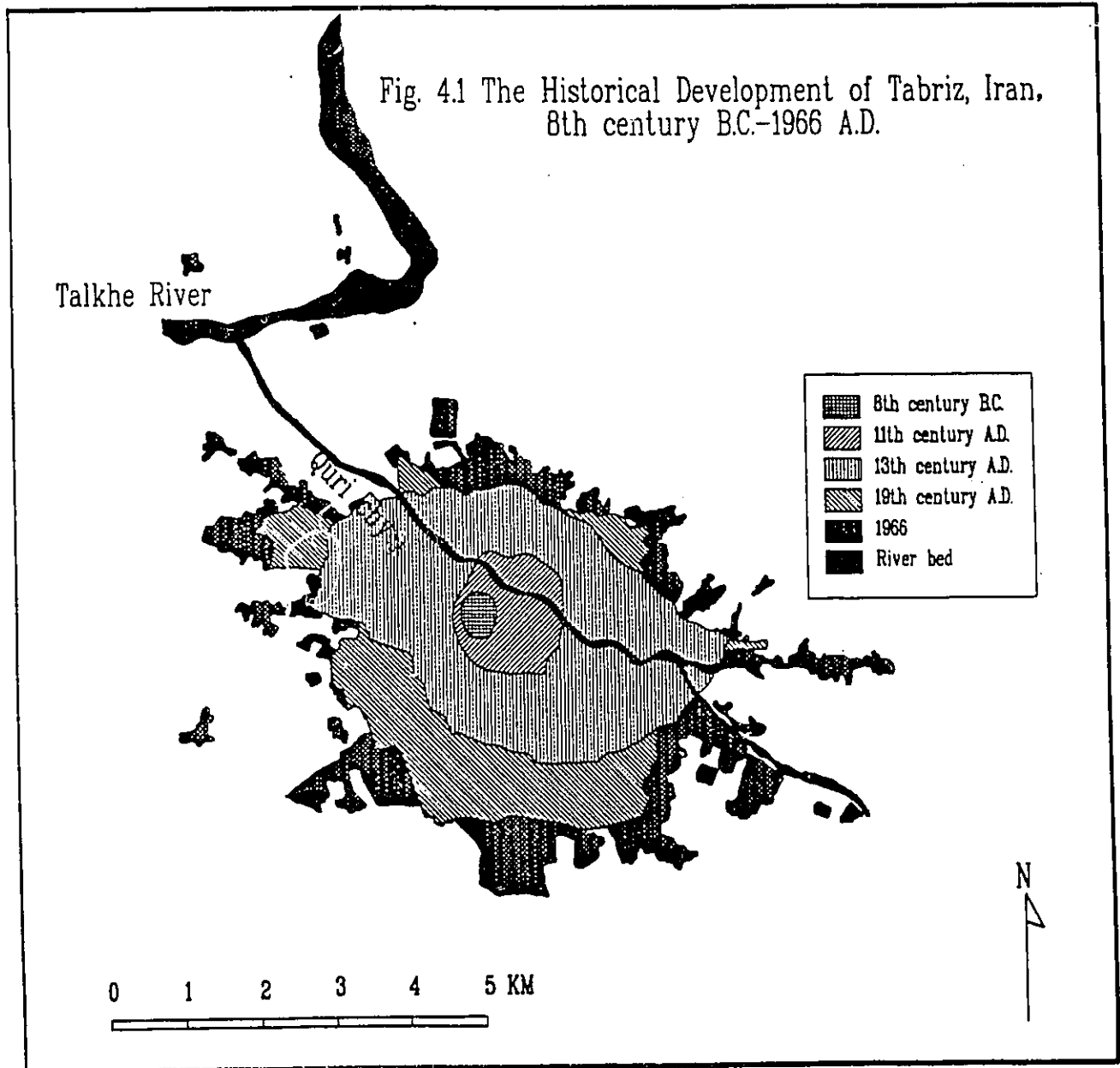
3 The other four cities are Esfahan, Kerman, Hamadan and Shiraz.

day Tabriz. Presumably, the word Mehud has been derived from Mede and Mehud Mahin probably refers to the place where the Medes lived. This neighbourhood, which is located on relatively elevated land compared to its adjacent areas, is likely the place where Tawarir was situated in 8th century B.C. (DHUD, 1992). The hypothetical geographical location of Tawarir (Tabriz in 8th century B.C.) is outlined in Fig. 4.1. Based on this outline, Tawarir was about 23 hectares in area and 1.7 kilometres in circumference.

There are other grounds that relate the foundation of Tabriz to the Armenian King "Khosrow" in the 3rd century A.D. Vahram (1970), from Armenian historians, Faust (3rd century), Asolik (11th century) and Vartan (14th century), cites that the name of Tabriz has been derived from Da-i-Verg which in the Armenian language means "revenge". The story is that the Armenian King, Khosrow, had a close relationship with Ardavan, the Parthian King of Iran. Ardavan's minister Ardashir, in a plot, kills the King in 243 A.D. and founds the Sassanid Dynasty of Iran. When Khosrow heard this incident, he decided to take revenge on Ardashir. After ten years of fighting, Khosrow finally defeated Ardashir in 253 A.D. and in the place where he won built a city and ordered it to be called Da-i-Verge. Over time, this word has changed to Tav-riz, and now Tabriz.

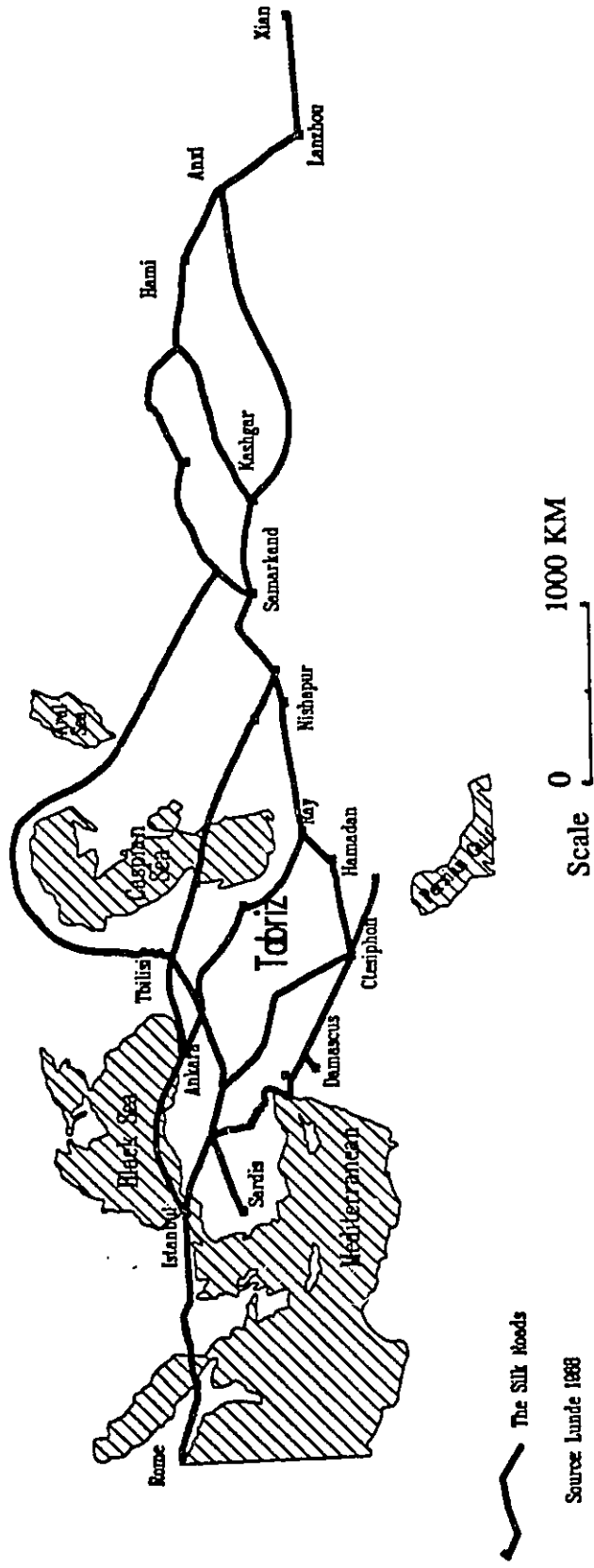
In addition to the above propositions on the foundation of Tabriz, I should add another theory about the origin of Tabriz in the ancient time which seems to have been forgotten in most records. The reason is the appearance of the name of Tabriz on one of the silk roads which passed through the north west Iran in the ancient time (Fig. 4.2). The geographical location of

Fig. 4.1 The Historical Development of Tabriz, Iran,  
8th century B.C.-1966 A.D.



Source: Adapted from DHUD, 1992; Sahub, 1970

Fig. 4.2 The Location of Tabriz on One of the Silk Roads



Tabriz on the major east-west commercial routes has always given it a good opportunity to be a main trade centre in north west Iran. Other cities like Merve, Nishapur, Semnan and Ray, have emerged on the silk roads or other caravan routes in ancient times.

Whether Tabriz originated in the Medes or the early Sassanid time, apparently it remained very small or disappeared during the late Sassanid period, because after the 3rd century until the 9th century, there is no name "Tabriz" in historical records. Two reasons can be proposed for the possible disappearance of Tabriz in the late ancient period. First, it may have been destroyed by natural disasters like earthquakes, a series of which have destroyed Tabriz several times during the past millennium. Second, it may have disappeared because of wars, as it has suffered many times from different invasions since the 11th century until as recent as the Second World War.

### **4.3 Tabriz During the Islamic Era**

#### **4.3.1 The Early Period**

When Arabs conquered Azarbaijan in 642 A.D., Tabriz was only a small military fortress (H.O., 1991:20). There are some allegations that relate the foundation of Tabriz to Arabs in the 8th century A.D.. According to Frye (1954:227), in 758 Calif al-Mansour appointed a settled Yamani tribal group of al-Rawwad to the Tabriz region. The Rawwad, after erecting a wall for Tabriz, settled in it. In another speculation based on 11th century Arab geographers, Yaqut Hamavy and Hamdolla Mostofi, Tabriz was founded by Zubaideh, the wife of Calif Harun al-Rashid. Apparently, when Zubaideh was cured from a severe fever in the Tabriz area in 791 she founded this city and named it Tab-ri-z meaning "fever dispelling". According to Agiri (1950) and

Lockhart (1960), Tabriz long existed before Zubaideh, and she built only a Qanat for the city which remained until a few decades ago. Another possible reason for rejecting the foundation of Tabriz by Arabs relates to its Persian name. Perhaps, it would have been called by an Arabic name rather than a Persian name if Tabriz had been founded by Arabs. What is clear is that Tabriz, in the early Islamic period, and for a long time after, was merely a small town and overshadowed by the cities of Ardabil and Maragheh (Lockhart, 1960:10).

With its proximity to Russia and Turkey and the fact that it is located in an earthquake zone, Tabriz has had an eventful history during the last millennium. In 858, it was totally destroyed by an earthquake; however, by the order of Calif Motavakkel it was soon rebuilt, and a century later Al-Muqaddasi, the Arab Geographer, described it as a walled town, prosperous, well watered by many streams and surrounded by fruitful gardens. In 998, Ibn-i-Hoghal, and in 1030, Ibn-i-Maskouieh, two other Arab geographers, described Tabriz as the largest city in Azarbaijan. By mid 11th century, Tabriz was already quite a big city. This can be understood from the huge loss of population by a severe earthquake in 1041 which took the lives of 40 to 50 thousand people and destroyed the walls, citadel, bazaar and most of the administrative buildings and houses (Lockhart, 1960: 11). But, when Nassir-Khosrow, the well known Iranian traveller of the 11th century, visited the city four years later, he described it as a rich and prosperous city and more important than its rivals Ardabil and Maragheh. According to the writings of Nassir-Khosrow, in 1046 Tabriz had 50 caravanserais, and the city wall was 6,000 paces (about 4.16 KM) and was estimated to cover an area of about 175 hectares (Chander, 1987:330). The existence of 50 caravanserais in such an area implies a high population density for Tabriz in that time. The

hypothetical outline of the city during the 11th century is shown in Fig. 4.1. The 11th century Tabriz encompasses today's main city centre including most historical monuments, the traditional bazaar, Masjid Jamih and many government buildings.

After being taken by the Seljuq conqueror Tughril Beg in 1054, Tabriz was again surpassed by Ardabil and Maragheh for more than a century. However, later in 1213-14 it was again described by Hamavie (1965:36) as the chief city of Azarbaijan. The Seljuqs ruled about two centuries in Azarbaijan from 1054 until 1220. Their contribution to Tabriz was the construction of the present bazaar and Masjid Jamih (Friday mosque) which after several times of reconstruction, today stand in the city centre. It is said that the present Turkish language in Azarbaijan remains from these central Asian Turks since their occupation of this region in the 11th century.

#### **4.3.2 The Mongols Era**

One of the highest points which Tabriz reached in the Islamic period was during the Mongols II Khan dynasty in the late 13th and early 14th centuries. When the Mongols invaded Iran in 1220-21, their armies appeared three times before the walls of Tabriz, but each time they were returned by the payment of a large ransom. However, not long after, the city fell into their hands (Agiri, 1950:110). Unlike many other cities in Iran, Tabriz not only was not destroyed by Mongols, but also later during Abagha Khan (1265-1282) it was selected as the Mongols capital. During the Ghazan Khan reign (1295-1304) it was, in fact, the chief administrative centre of a vast empire that stretched from the Oxus to the borders of Egypt and from the Caucasus to the Indian Ocean (Lockhart, 1960:11).

During the Mongols rule, the city expanded beyond the limits of the Saljuqs era. Realizing that the existing city wall was too small for his capital, Ghazan Khan ordered a new wall to be erected around the city. The expansion mainly took an east-west direction because of the topographic limits which the city faces from the north and south. The Quri Chy River was the axis of this expansion (Fig. 4.1) and at the two ends of the city the two new towns of Shanb Ghazan and Rashidieh were built. Chander's (1987) estimation of 3,200 hectares for the area and 25,000 paces (17.33 KM) for the city wall during the Mongols era seems to be exaggerated compared with the city limits defined by the DHUD (1992)<sup>4</sup>. According to DHUD., Tabriz, during the Mongols rule, is estimated to have covered an area of about 1,265 hectares with a city wall of about 15 kilometres.

According to Ulyari (1992) and Lavasani (1992), Ghazan Khan erected new caravanserais, markets, public baths and many striking buildings at each gate, and constructed a mausoleum for himself in his new suburb of Shanb. He also built an observatory in imitation of Hulaku's famous one in Maragheh, as well as colleges and libraries to attract scholars from all parts of his empire.

Ghazan Khan's Vazir (minister) Rashid-al-Din (a historian, philosopher and physician), built his own suburb in the east part of the city called Rashidieh. In this city he built a university for which he brought the best scientists from the vast empire. In a letter to his son, he describes his university having 400 teachers and 7,000 students. He also mentions a hospital for which he had

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<sup>4</sup> In some sources such as Lockhart (1960) and Ulyari (1992), the city wall in Tabriz during Mongols has been mentioned as being even longer, about 54,000 paces (37.44 KM), which seems to be exaggerated.

employed 50 physicians from other places such as India, China, Egypt and Syria. According to his letter, the town had 30,000 houses, 1,500 stores, a library with 60,000 books, 24 caravanserais, beautiful gardens, mint, dye-houses, paper-mill, pharmacy, public baths and qanats (Ulyari, 1992).

Rashid-al-Din's rival the Vazir Taj al-Din Alishah built a gigantic mosque called Alishah Mosque. Since this mosque was constructed too quickly, its gigantic dome collapsed after a few years. Today, only one of its walls has remained which demonstrates the wonderful conception of its architect and superb quality of its brickwork. In 1313, Oljaitu, the Ghazan Khan's successor, moved the capital to the city of Soltaniih, near Zanjan, but his new capital never rivalled Tabriz. Of all the buildings which were built during the Ghazan Khan's reign nothing remained because of a series of earthquakes and invasions. Chander's (1987) population figure of 125,000 for Tabriz during Ghazan Khan seems to be underestimated regarding the vast area that the city wall had enclosed as well as the two existence suburban towns of Shanb Ghazan and Rashidieh.

A drawing of Tabriz by a Turk traveller in the 14th century (Fig. 4.3) demonstrates his vision of the city during the Mongols period. The big houses, large house yards, mosques with tall minarets, roads, bridges, gardens and the city wall display the structure of the central part of Tabriz during the Mongols era. The existence of several mosques in a relatively small area imply the impact of the Islamic culture in the social life, and the bigger houses may represent the existence of wealthy and/or large size households. This is possible probably because of position

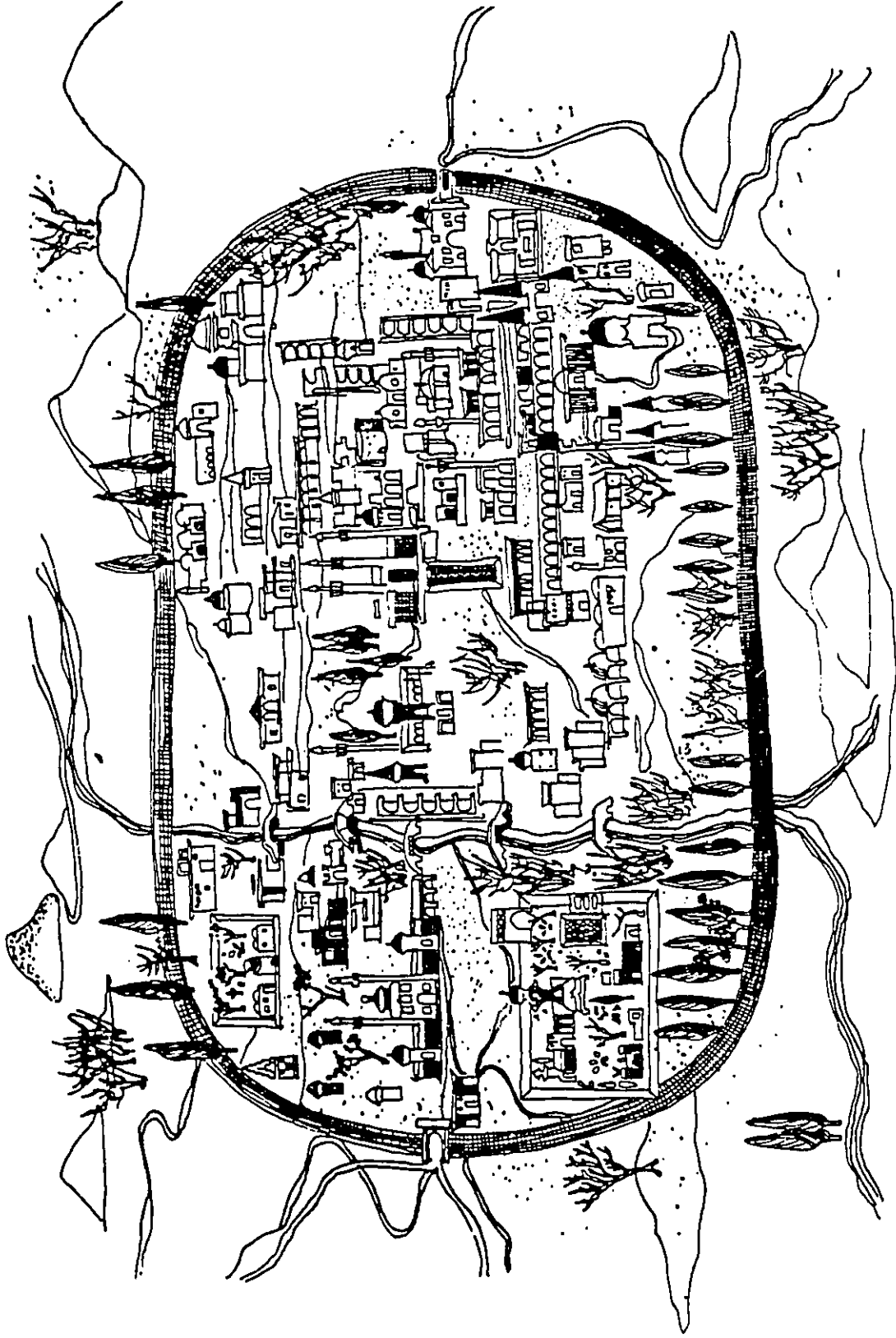


Fig. 4.3 A Drawing of Tabriz by a Turk Traveller, 14th Century A.D.  
Source: DHUD, 1992

of Tabriz as the capital of Mongols during early 14th century.

After 1336, with the fall of the Mongols II Khan's dynasty, for a half a century Tabriz was the scene of tribal conflicts between Jalaieris and Chupanids. When Sultan Muhammad Jalaierie gained power in 1336 he made Tabriz his capital city. During the Jalarieries and Chupanids era some important buildings were erected such as Dameshqiieh Mausoleum, large government buildings and Ostad-Shagherd mosque among which only the last one remains today. In 1386, Teimur (another central Asian invader) occupied Tabriz and sent all the city artisans to his capital city of Samarghand. He appointed his son Miranshah as the governor of north western Iran and Minor Asia, and he himself went on further conquests. Unfortunately for Tabriz, Miranshah went mad and destroyed many of the magnificent historic and public buildings. Following this event, Teimur returned to Tabriz and removed him from power and appointed Miranshah's son Mirza Umar for government (Lockhart, 1960).

After the death of Teimur in 1402, his successors could not control the large territory which he had conquered. In Azarbaijan, Sultan Ahmad Jalaierie, who had already been removed from power by Teimur in 1386, regained power and ended the uncertain situation (Vahram, 1970). After the death of Sultan Ahmad in 1418, an Iranian tribal group called Qara-Quionlu (Black sheep) came to power and ruled the country until 1467. In 1437, Jahanshah Qara-Quionlu chose Tabriz again as the capital city, and in 1445 the famous Blue Mosque of Tabriz was built. This mosque, which now is under repair, is the chief architectural feature of the city.

In 1467, Uzun Hassan, the chief of the rival Turkman tribe of Aq-Quionlu, gained mastery over the Qara-Quionlu, occupied Tabriz and ruled until 1500 (Lockhart, 1960:13). Tabriz was reselected as the capital city by Uzun Hassan and remained as a prosperous city. The Aq-Quionlus, for the first time, established a relationship with Europe such as Venice. Uzun Hassan's main architectural contribution to his capital city was the Qaisarryeh bazaar.

#### **4.3.3 Tabriz After the Safavids**

In 1501, Shah Ismaeil, the first ruler of the Safavid dynasty, defeated the Aq-Quionlus and occupied Tabriz. When Shah Ismaeil was crowned in this city, it had a population of about 250,000 (Chander, 1987). Shah Ismaeil, who was an extremist supporter of the Shiite, forced all of the majority Sunni residents of Tabriz to adapt the Shiite belief. Since then, and during the rest of the Safavid period, for about two centuries Tabriz was the scene of a series of wars between Iran and the Ottoman Empire. In the first war, Ottoman Sultan Salim, after defeating the Shah Ismaeil's forces to the west of Urmia Lake in 1514, occupied Tabriz. He behaved moderately with the city, and a few days later was forced to evacuate it.

The memory of this disaster and the possibility of further attacks by Turks led Shah Tahmasb I, Shah Ismaeil's successor, to choose Qazvin as his capital in 1548. In 1584, Turks occupied Tabriz again, but shortly after they evacuated it. As a result of Shah Abbas the Great's sensational victories in 1600 and 1602, Tabriz remained in the hands of Iranians. To improve the city's defence, Shah Abbas demolished parts of the suburb of Shanb, built some fortresses instead, and reconstructed the Rashidieh complex which had already been ruined (Lockhart,

1960:14). During Shah Abbas' reign, Tabriz became the biggest trade centre of Iran, through which most of the exports and imports to Turkey and Europe were taking place.

Olia Chalabi, who visited Tabriz in 1639, described this city as having 270 caravanserais, 320 mosques, 47 schools, 40 churches, and very clean passages (Soltanzadeh, 1986:140). In 1641, Tabriz was hit by a severe earthquake, but when Chardin visited it some thirty years later, it was in flourishing state. According to Chardin, in 1570 Tabriz was the second largest city in Iran, after Esfahan. It (Tabriz) had a population of about 150,000, 250 mosques and 300 caravanserais. The city's chief Maidan, or square, was greater than the great Maidan shah of Esfahan (Chardin, 1956).

Repeated wars and natural disasters during the 18th century led to the dramatic decline of Tabriz from a large city in the 16 and 17th centuries to a small city at the end of the 18th century. For instance, the earthquake of 1721, just before Tabriz was attacked by Turks and Russians, caused the loss of 80,000 people and the destruction of many buildings as well as the city wall (Lockhart, 1960:15).

The fall of the Safavids allowed the invasion of Russians and Turks into Iran. Turks occupied Tabriz in 1724, but later in 1730 they were expelled by Nader Quli Beg, who seized the throne in 1736 and reigned as Nadir Shah. According to Soltanzadeh (1986:145), during the six years of Turkish occupation and resistance of the people against them, about 200,000 were killed. This figure seems to be exaggerated considering the huge loss of people by the earthquake in 1721.

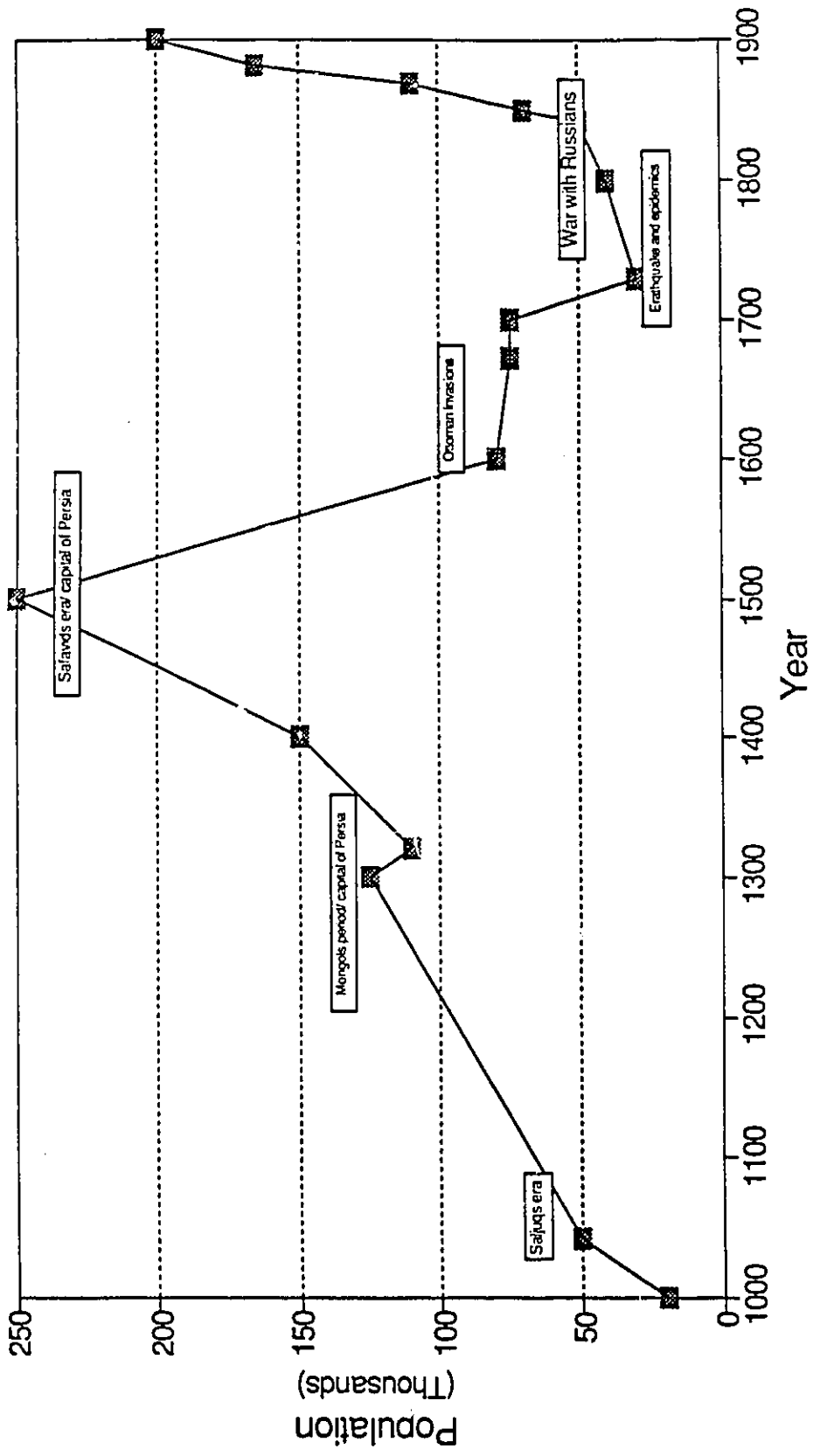
In the winter of 1737-38, a severe outbreak of the plague killed another 47,000 people in Tabriz (ibid). In 1780, another earthquake caused the loss of many lives and much damage to buildings. Rashidiyeh, which had been rebuilt by Shah Abbas in the early 17th century, and many other buildings were destroyed by this earthquake (Lockhart 1960:12).

The descriptions of the Europeans who visited Tabriz in the early 19th century show how the city had declined by that time. Lockhart mentions from Pierre-Amadee Jubert, the French diplomatic envoy who was in Tabriz in 1806, that most of the buildings which existed during Chardin's time had been destroyed and the population was only 50,000 (1960:15). According to James Morier, who has seen Tabriz after Jubert, the modern town was nearly in the centre of the former one, the ruins of which extended for some distance on all sides (ibid).

Russians occupied Tabriz in 1827, but it was returned to Iran by the 1828 Torkmanchay Treaty. During the Qajars rule, Tabriz was selected as the seat of the prince; thus it was considered the second most important city in Iran. Because of the expansion of trade with European countries and Russia in the 19th century, Tabriz benefited from its geographical location on the main Iran-Europe commercial road. As a result, during the rest of the 19th century, despite the ravage of cholera and plaque, it regained much of its population, and by the end of 19th century its population reached about 200,000 (Bharier, 1972). Fig. 4.4 and Table 4.1 summarize the population change of Tabriz between the 11th and 19th centuries.

In the early 20th century, the city had an important role in the nationalist and constitutionalist

Fig. 4.4 Estimated Population Growth of Tabriz, Iran, 1000-1900



Source: Table 4.1

movements. In 1914, in the course of the First World War, Turks occupied the city, but they were expelled by Russians in the following year. After the Russian revolution of 1917, the Turks re-entered the country and once more occupied Tabriz, but the following year it was returned to Iran by Iranians.

#### 4.3.4 The Spatial Structure of Tabriz in the 19th Century

19th century Tabriz was a good example displaying the physical structure of the traditional Iranian city. Its spatial structure was the outcome of the centuries of urban experience during the Islamic period, before it was influenced by the socio-economic conditions and technological

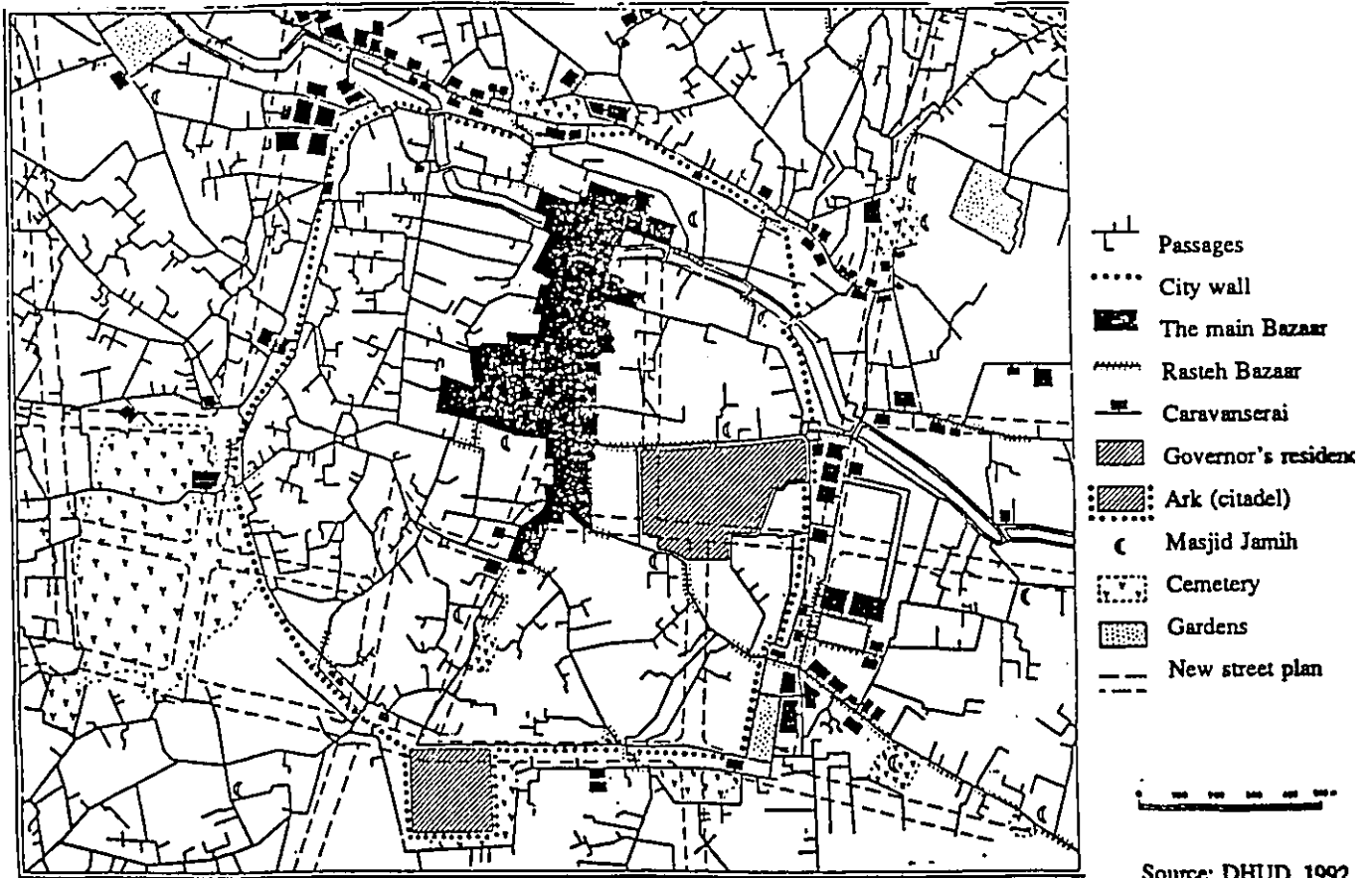
Table 4.1: The estimated population of Tabriz between 1000 and 1900

Year	Population	Source of estimation
1000	20,000	Lockhart, 1906
1300	125,000	Ency. of Brit., 1910
1320	110,000	Petrushevsky
1400	150,000	Lambton
1500	250,000 (capital of all Persia)	Bamont
1600	80,000 (under Turk occupation)	Ency. of Islam., 1913
1673	75,000	Chardin
1700	75,000	Lockhart
1730	30,000 (under Turk occupation)	Bemont
1800	40,000	-
1809	40,000	Ency. of Islam., 1913
1842	50,000	" "
1850	70,000	-
1869	110,000	Bemont
1881	165,000	"
1900	200,000	Bharier (1972)

Source: Chander (1987)

impacts of the 20th century. As Fig. 4.5 shows, the major urban elements including bazaar, Masjid Jamih, and Ark, in close proximity to each other in the city centre, represented the

Fig. 4.5 Tabriz in 1880 A.D., The Central Part of the City



Islamic identity of the city. Most of the economic and administrative activities were concentrated in or around the bazaar. Thus, places of trade and production, caravansaries and government offices were found in the city centre. Only a few structures such as brick and ore making factories, tanneries, etc., were located outside the city to minimize their environmental impacts on the city also distance to resources. Beyond the city centre, ordinary residents lived in distinct neighbourhoods called Mahalleh or Kuy. In 1880, Tabriz was composed of 20 Mahallehs and each Mahalleh was divided into sub-neighbourhoods called Barzan .

#### **4.4 Tabriz During the First Period of the Modern Era**

As discussed in Chapter One, the modern era in Iran began with the establishment of the Pahlavi regime in 1925. It was also mentioned that in the first period of the modern era (1925-1956), urbanization grew slowly (about two percent per year) while in the second period after 1956, it has had a very rapid growth (about five percent per year). In this section, the development of Tabriz is discussed in the first period of the modern era during which its population grew very slowly. The growth of Tabriz during the second period (1956-1991) is discussed in the next chapter.

As Table 4.2 depicts, at the beginning of this century Tabriz had a population of about 200,000 and like Tehran, it ranked first in the Iranian urban system. However, with the decline of commercial links with Russia after 1920 and the shifting of commercial interests to the southern oil fields, the expansion of Tabriz tended to decline. For example, while the average annual growth rate of the total and the urban population at the national level during the 1900-1956

Table 4.2 Population growth in Tabriz compared with other large cities in Iran (1900-1956) (1,000 persons)

City	1900 <sup>a</sup>	1940 <sup>b</sup>	1956 <sup>c</sup>	Average growth rate (%)	
				1900-40	1940-56
Tehran	200	541	1,512	2.52	6.6
<b>Tabriz</b>	<b>200</b>	<b>213</b>	<b>289</b>	<b>0.16</b>	<b>1.9</b>
Esfahan	100	204	254	1.80	1.4
Mashhad	75	176	242	2.15	2.0
Shiraz	60	129	170	1.93	1.7
Total urban areas	2,033	3,773	5,954	1.56	2.9
Total population	9,860	12,833	18,955	0.66	2.5

Source: <sup>a</sup> Bharier, 1972

<sup>b</sup> Agiri, 1950

<sup>c</sup> S.C.I. 1958

period was 0.66 and 1.56 percent respectively, Tabriz grew only at a rate of 0.16 per cent per year which was very low compared with the large cities and even compared with the natural growth rate of the country.

Three main reasons are attributed to the slow growth of Tabriz in the first period of the modern era. First, because of the foreign invasions by the Russians and Turks in the past, the city was not considered as a safe place for investments<sup>5</sup>; as a result, many capital owners moved to Tehran (Farid, 1990). Second, Tabriz as the centre of Persian Azarbaijan, with cultural and political ties to both Russia and Turkey, has for long been a highly politically minded city with radical groups not always in accord with the central government (Fisher, 1968). For instance,

<sup>5</sup> The most recent invasions were those of Turkey in 1914 and 1917 and Russia occupation during the Second World War.

in 1946 local extremists seized power and proclaimed the Republic of Azarbaijan for one year. For this political reason, Tabriz seems to have received relatively less government attention than other large cities (e.g Esfahan, Shiraz and Mashhad) as we can see from their different population growth rates during the first period of the modernization era. Because, higher population growth in cities imply their relatively good economic attractions.

The third factor was the development of sea transport which left out Tabriz as the major linking city of Iran to Europe in foreign trade. Because of its geographical location on the main commercial road to Europe, for a long time, Tabriz had benefited as a centre for storage, exchange and distribution of commercial goods. The development of southern port cities like Khoramshahr, Bandar Abbas and Boshehr shifted most of the profits from foreign trade to them.

For the mentioned reasons, Tabriz had a very slow growth rate in the first half of this century which implies the out-migration from this city to other areas. Since there was no general census in Iran before 1956, it is impossible to determine the real number of out-migrants from Tabriz. However, assuming the same natural population growth rate was applicable for all cities, based on Table 4.2, it is estimated that approximately 47,000 people between 1900 and 1940, and 24,000 between 1940 to 1956 have moved out of Tabriz. According to Farid (October 1993, personal communication), Tehran was the main attraction point for out-migration from Tabriz during the first half of this century.

As mentioned in Chapter Two, despite the relatively slow urban growth of all cities in the first

period of the modern era, the structure of traditional cities in Iran witnessed some important changes which laid ground for the vast changes of the second period. The main structural changes of the first period of the contemporary era in Tabriz can be summarized as follows:

A number of new streets were superimposed on the traditional structure of the city. One main street was built in the east-west direction which was a result of widening the Iran-Europe transit road through Tabriz. Other streets were radiated from this central street towards the north or south, mostly without reaching the city limits.

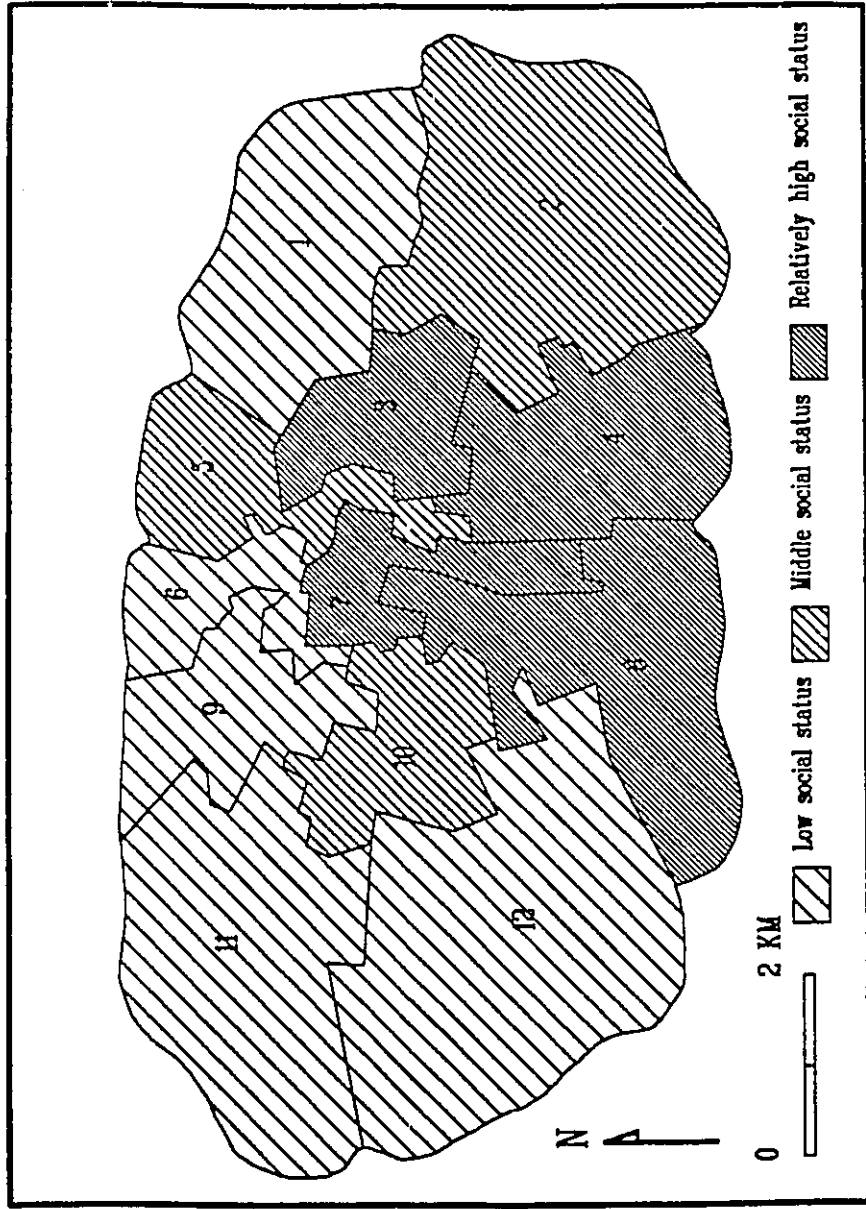
Another important element was the construction of the railway which linked Tabriz to Russia at the end of the Second World War and later to Tehran. Even though the railway passed some distance to the west, it was significant in terms of its future impact on the direction of the physical expansion of the city. As is discussed in the next chapter, the space created between the railway and the city went under rapid construction after the 1960s.

The other main new component added to Tabriz was the construction of an airport in the north west of the city. Like the railway, it influenced the future growth of the city in the north west direction, but the existence of Quri Chy between the city and the airport weakened this influence compared with the railway to the west. The passage of the railway and Tabriz-Maragheh and Tabriz-Marand transit roads to the west side and availability of flat lands provided the city with a suitable location for establishment of new industrial developments, particularly after the 1960s (see also Chapter 5).

Despite the newly added urban elements, by the 1960s the traditional spatial organization of Tabriz had not been changed much compared with the spatial structural changes which have occurred since the 1960s. This can be realized in city's land use pattern, density and residential structure which were similar to the spatial organization of pre-modern cities. The city's main land use pattern still revealed the concentration of most commercial activities, government buildings, and public services in the central parts of the city. For instance, more than two-thirds of commercial land use, 85 percent of recreational use, about 70 percent of government land use, 60 percent of health land use, and most of the educational use were concentrated in or around the city centre. Only one third of industrial activities were located in the periphery (DHUD, 1968). In terms of population density, the city centre had the highest density which decreased in the periphery (see Chapter 5).

With respect to the spatial structure of residential groups, while the high social status groups were located close to the city centre, the low-class social groups were at the periphery and medium-class groups between them (Fig. 4.6). Classification of general social status of residential areas of Tabriz in 1966 and their distribution has been made by using data provided by the master plan of 1966. Data included five sets of information on employment structure (distribution of government employees, distribution of business owners and self employed, distribution of low status workers), distribution of car owner families and distribution of families with access to piped water. The percentage distribution of each category was calculated and then divided into three classes to show the areal differentiation. The final map (Fig. 4.6), the general social status, was drawn based on the average value of five sets of information for each district. The result

Fig. 4.6 The General Social Status of Residents in Tabriz, 1966



Source: Data from DHUD, 1968

showed that relatively higher social status groups were living in the centre and southern part with families with higher business owners, government employees, relatively high percentage of private car and better access to piped water. The middle class residents were occupying the districts beyond the centre where had residents with average percentage of business owners, government employees, car owners and access to piped water. The low social status residents were located in the outer districts (especially in west and north) with lowest business owners, government employees, most low status workers, lowest car owners and lowest access to piped water.

#### **4.5 The Impact of Historical Development On the Present Spatial Structure of Tabriz**

Despite the destruction of most physical structures of the past in Tabriz mainly by earthquakes and wars, the impact of history can still be seen in the present spatial structure of the city. This historical impact mainly remains from the late 18th and 19th centuries, the time since which apparently no major earthquake has hit Tabriz.

The most important impact of history in today's structure in Tabriz is, in fact, the presence of the old part in the middle of the city, which is easily discernable from newly built districts in terms of the street pattern, and the age, density and quality of buildings. One can easily distinguish the old structure of the city from recently developed areas simply by looking at an air photo or a map sheet. The existence of irregular, narrow and many dead-end passages in the old section of the city implies the elementary transportation means of the time and the security strategy used to minimize losses in the case of an outside invasion. The narrow and twisted

passages could minimize the infiltration of an invading army inside the neighbourhoods regarding the several invasions which were described in the previous pages. Despite the erection of a number of new streets which have cut through the old section of the city, the present main transportation network had to be adapted to the old street pattern in order to use the existent public spaces and minimize the demolition of buildings.

By walking in the city one can easily distinguish the difference between the dense and aged structure of many buildings of the old section from the relatively less dense and recently built structure of the newly developed areas, especially in the periphery. Even though some of the buildings in the old section have recently been replaced by modern buildings particularly along main streets, the dominant structure of the old part of the city, especially inside the districts, remains old and poorly maintained. This contrasting physical structure, indeed, speaks about different stages of development which the city has gone through.

Another impact of historical development on the present spatial structure of Tabriz, is the existence of the bazaar in the old part both in terms of its physical structure and its economic role which, to a great extent, has influenced the present street patterns. Though rebuilt a number of times, the complex of the bazaar in the city centre, its existence dating back to 11th century, with relatively its large size, over 16 ha (DHUD 1993), exotic structure (domes, covered passages and traditional architecture) forms one of the major present physical elements of the city (see Fig. 4.7, 4.8 and 4.9).

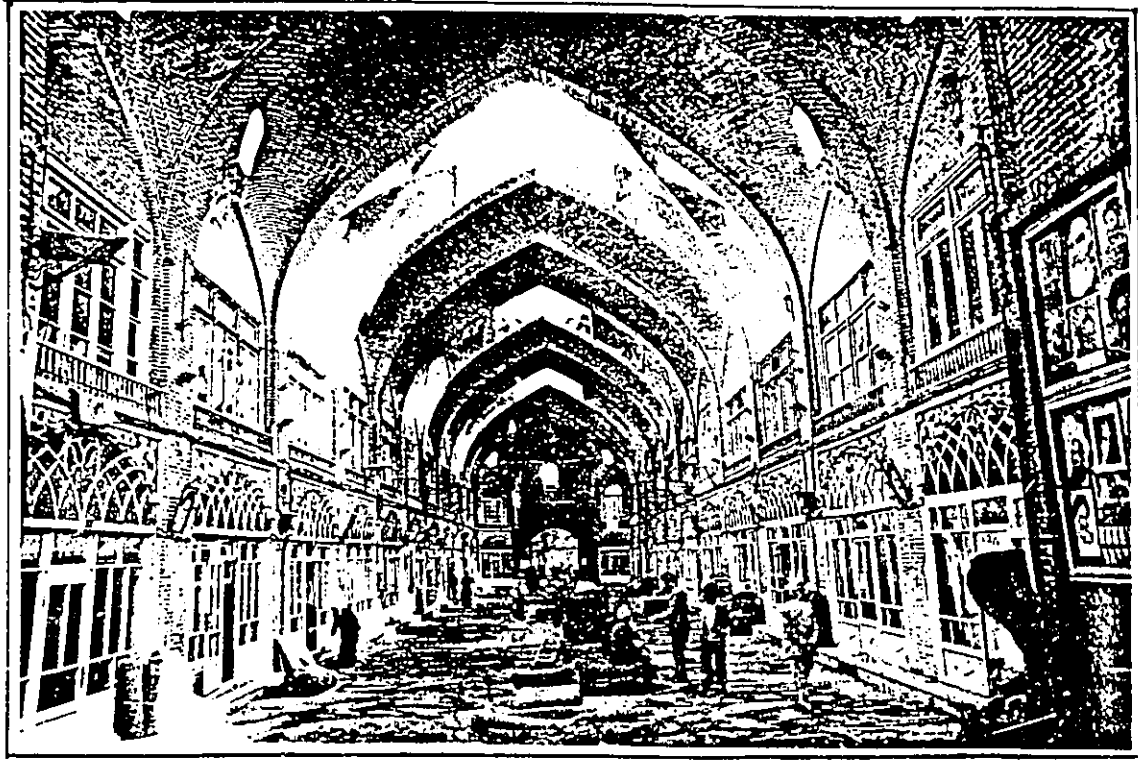


Fig. 4.7 An Inside View of Mozaifasfeh Arcade of Tabriz Bazaar, 11th Century, rebuilt in the 19th Century  
Source: MCHE, 1992

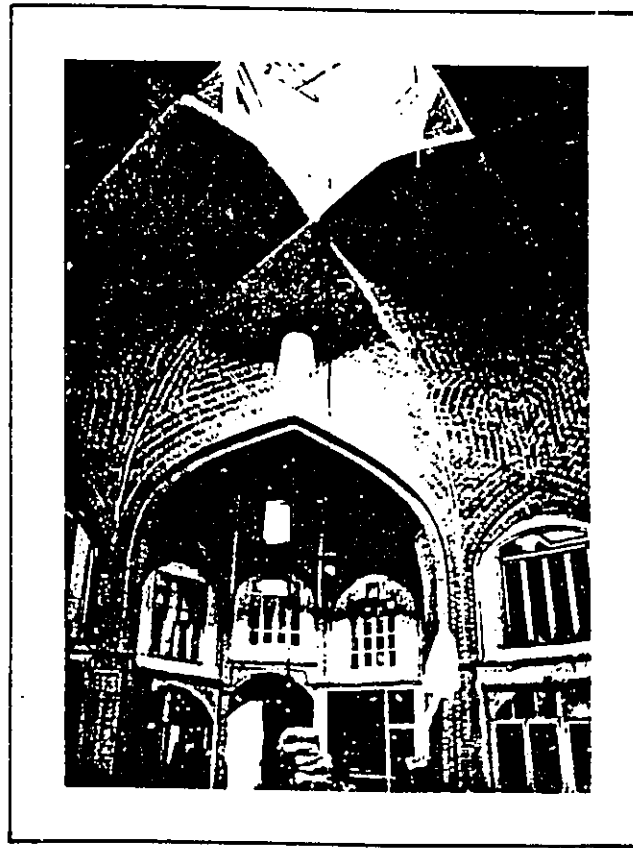


Fig. 4.8 An Inside View of the Dome of Sheikh Kazem Arcade  
(the Highest Dome in Bazaar)  
Source: H. O., 1991

The main impact of the bazaar, is perhaps its economic role which has greatly influenced the shape of the existing street network. The Bazaar, as the main economic centre in the past and as the most important commercial complex at present is the focus of the main present transportation network in order to facilitate the accessibility of residents and transportation of goods to the bazaar. For instance, 52 out of 63 existing public bus routes originate from the bazaar (Babapoor, November 1993, personal communication). The centrality of the bazaar has led to the orientation of many streets towards this major activity centre, making the city form similar to a radial plan. The centrality of the bazaar has also led to the concentration of other services such as banks, doctors clinics, and many government offices around the bazaar, making the city centre more crowded than any other part of the city.

The stronger role of religion in pre-modern Iran had led to the establishment of various religious institutions such as Masjid Jamih and other neighbourhood mosques, hossayniyehs and religious schools (see also Chapter 2). In the traditional Islamic society, religious centres (mosques) were very important for their multi functional purposes. Not only, were they places for performing daily religious duties, but also, they were used as centres for providing services for the residents of neighbourhoods and other social activities. For this reason, there were many of them within residential areas. Since, in present-day society most of the services previously offered in mosques are offered in various public or governmental organizations, the need to mosques is restricted mainly for prayer purposes, consequently today their number within the newly developed residential areas is much fewer than before. Since the built mosques in the past are usually preserved as sacred places, one can clearly detect the existence of more mosques in the

old part of the cities than in the modern districts. In Tabriz, like other historical cities (e.g. Esfahan, Mashhad and Kerman) the old section of the city has many more mosques than its planned districts. For example, whereas inside the old part of Tabriz in average there are 14 to 17 mosques in each square kilometre, there are only about 3 or 4 of them in each square kilometre within the newly built peripheries (Gitashenasi, 1992).

In terms of physical structure, old mosques such as Masjid Jamih, Alishah Mosque, Masjid Ostad Shagherd and Blue Mosque are identifiable in terms of their size, age and style in the old section of the city (Fig. 4.10, 4.11, 4.12, 4.13). This has made them important landmarks in the central part of the city. Their relatively large size and their architectural style easily lure the attention of each new-comer to the city as historical sites. These land marks also have influenced the existing street network by being selected as major transportation nodes. To preserve these historical sites and bring them to the attention of people, they have been used either as main squares (e.g. Sahebol Amre Square), or main streets have to cross from close-by to provide better accessibility to them. For example, one of the most important streets of the city (Khiaban Imam) provides easy accessibility to Alishah Mosque (the present Friday prayer location) and Blue Mosque in the old part of the city and Khiaban Jomhori (another important street) provides accessibility for Masjid Jamih near the traditional bazaar.

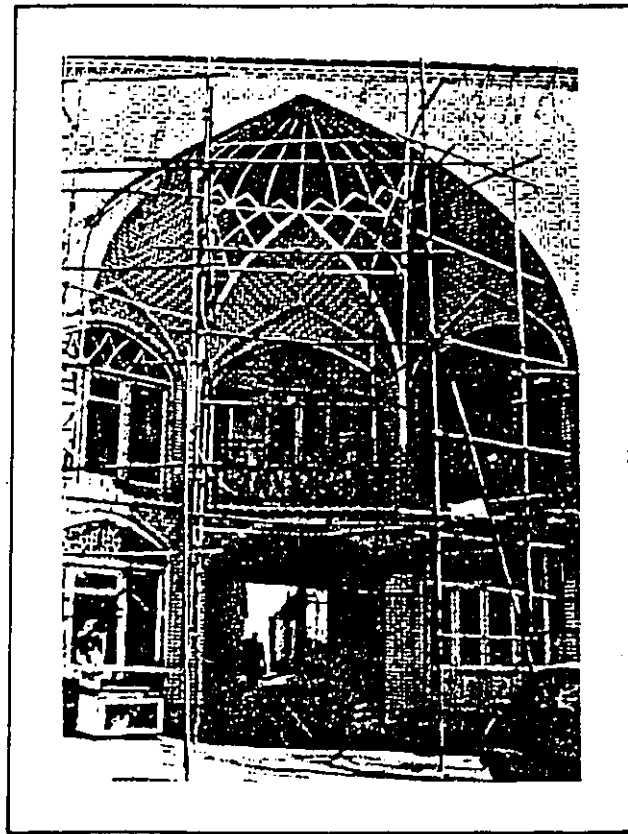


Fig. 4.9 The Amir Arcade Front Door (under repair)  
Source: H. O., 1991

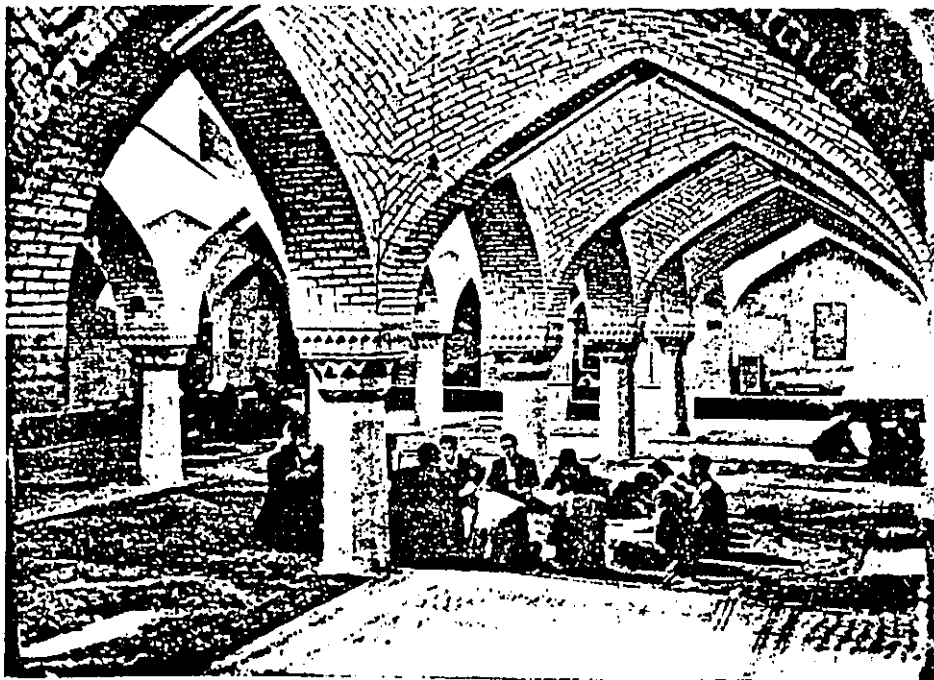


Fig. 4.10 An Interior View of the Masjid Jameh (Friday Mosque), 11th Century  
Source: H. O., 1991

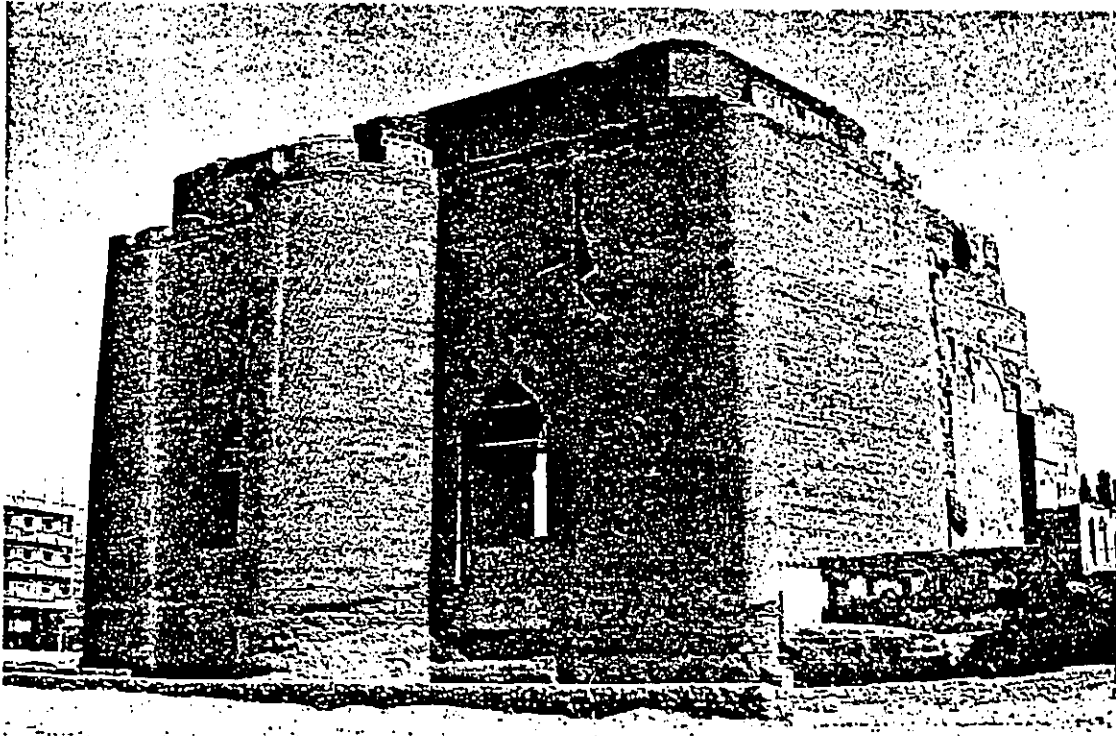


Fig. 4.11 Alishah Mosque (Ark-e-Tabriz), Early 14th Century  
Source: MCHE, 1992

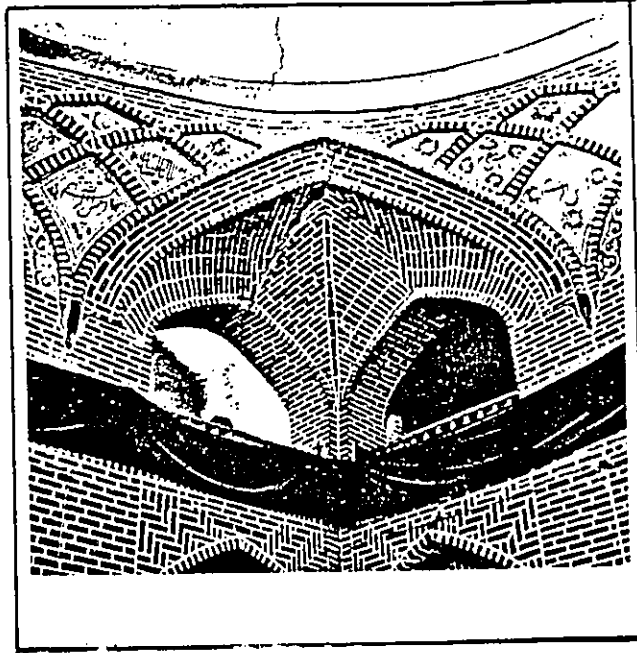


Fig. 4.12 An Interior View of the Ostad and Shahgherd Mosque, 14th Century  
Source: H. O., 1991

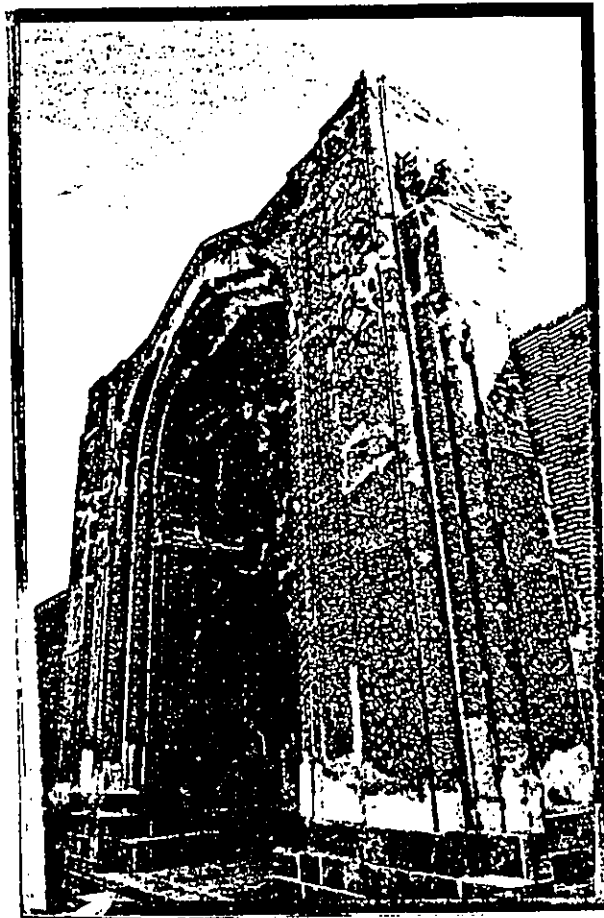


Fig. 4.13 The Blue Mosque Front Door, 15th Century  
Source: Gita Shenasi, 1993

#### 4.6 Conclusion

This chapter examines the process of historical growth and basic structural change in Tabriz in the ancient, Islamic and modern periods. It is revealed that the geographical location of Tabriz in the centre of Azarbaijan and on the major road that links Iran to Europe has provided it with a great opportunity as a trade centre during its long history and, perhaps, this has been one of the main reasons for its foundation and its survival after many devastating events.

Because of the location of the city in close proximity to Turkey and Russia's borders, the history of Tabriz has heavily been involved with political issues as well. In fact, the growth or the decline of the city has had a direct relationship to political decisions. For instance, the selection of Tabriz by the II Khan of the Mongol dynasty in the 13th century as the capital city made it the prominent city of that era, but in many cases it has suffered from political tensions. For instance, from the 16th to 19th century the city was the scene of Iran-Ottoman and Iran-Russia's conflicts. Another very important factor which has caused considerable decline in the city's growth is natural disasters such as earthquakes. Since Tabriz is located on an earthquake zone, it has been destroyed several times by severe earthquakes.

While there is not much information about Tabriz in the ancient period, the basic urban structure of Tabriz was formed during the Islamic period, especially after the 11th century. Since that time, the traditional bazaar and Masjid Jamih, in the centre of the city, have been identified as two major Islamic urban elements. While most of the physical elements from the past have been destroyed by repeated earthquakes and wars, the impact of the remaining historical development

on the present-day spatial structure of Tabriz still can be seen in the city. The major difference is basically the contrasting morphology which we can see between the old part in the centre and the newly developed areas, especially those in the periphery. The difference in the morphology mainly includes an irregular street pattern, abundance of religious buildings and other landmarks, dense, aged and lower maintained structures in the old part verses the relatively planned streets, lower density, and better maintained structures in the recently developed districts.

The recent structural change in large Iranian cities such as Tabriz, Tehran, Esfahan and Shiraz basically began during the modernization period through which the process of the integration of the Iranian economy into the global economy started. The impacts of modernization on the old spatial structure in Tabriz, like many other major Iranian cities, led to the establishment of new physical elements such as planned streets, rail station, airport new factories and modern buildings. With the intensification of the modernization process and with increasing the integration of economy of large cities at national and eventually international economy brought major socio-economic and technological changes within the urban life. These socio-economic and technological changes which were intensified particularly after the 1960s modified the spatial organization of activities, especially in large cities. These recent changes in the spatial structure of Iranian cities are exemplified with the case of Tabriz in the following chapters.

## Chapter Five

### Recent Urban Growth and Population Density Change in Tabriz (1966-1991)

#### 5.1 Introduction:

The preceding chapter (4) provides a background for the historical development and the main structural changes in Tabriz until the 1960s. This chapter examines the process of recent urban growth and its impact on population density (land use intensity) in Tabriz during the 1966-1991 period. Section 5.2 discusses the process of recent rapid population growth and its main causal factors. Section 5.3 documents the impact of this growth on urban density with respect to time and space: first it analyzes the overall population density change by studying the relationship between recent population growth and physical expansion of the city over the 1966-1991 period (Section 5.3.1). Then, it discusses patterns of population density and their changes within the different sections of the city, i.e. it examines the relationship between density and distance during the mentioned period. With respect to the available data, the population density discussion in this chapter is mainly quantitative rather than qualitative.

#### 5.2 Recent Population Growth and its Main Factors

As already mentioned in Chapter One, like other large Iranian cities Tabriz has experienced rapid population growth during recent decades. According to Table 5.1, Tabriz has grown from 290,000 in 1956 to 403,000 in 1966, 597,000 in 1976, 979,000 in 1986 and 1,087,000 in 1991, increasing at a rate of 3.3 percent per annum between 1956-66, 4 percent between 1966-76, 5 percent between 1976-86 and 2.1 percent between 1986-1991.

Table 5.1 Population growth of Tabriz between 1956-1991

Year	Population	Abs. inc. <sup>(a)</sup>	P.ch. <sup>(b)</sup>	Growth rate	NPGR <sup>(c)</sup>
1956	290,000				
		113,000	38	3.3	3.1
1966	403,000				
		194,000	48	4.0	2.7
1976	597,000				
		382,000	64	5.0	3.6
1986	979,000				
		108,000	11	2.1	2.4
1991	1,087,000				

<sup>(a)</sup> Absolute increase

<sup>(b)</sup> Percentage change

<sup>(c)</sup> National population growth rate

Source: SCI, 1992

Two main factors associated with the rapid population growth in Tabriz are a **high natural population growth rate** and **massive rural-urban migration**. These two factors have been caused by changes in socio-economic conditions and technological improvements are considered to be the most important factors of recent rapid urban growth at the national level as well. The third factor related to recent urban growth in Iran is changing and/or annexation of rural areas into cities<sup>1</sup>. Table 5.2 shows the share of each of these factors in the population growth of Tabriz between 1966 and 1986 and compares them to those of urban growth at the national level.

### i) High Natural Population Growth Rate

Natural growth of the existing population accounts for an increasingly larger share of the total

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<sup>1</sup> Though the third factor may not be considered as a real cause, in practice it has contributed over 15 percent of total urban population growth in the country between 1966 and 1986. This has been due to either converting villages to cities when they reach to urban population threshold or are granted a municipality. Some villages are annexed to cities when urban centres simply embrace them during their course of expansions.

urban population in the developing world (Devas and Rakodi, 1992:22). This has been the case in Iran and Tabriz since the 1960s as well. As Table 5.2 depicts, over 56 percent of the population increase in Tabriz between 1966 and 1986 has been due to natural growth. Improvements in medical technology and government efforts to enhance public health after the 1950s led to a sharp decline in the death rate while the high birth rate remained unchanged. This

Table 5.2 Factors of rapid urban growth in Tabriz and Iran

Major factors	Tabriz				Country (urban areas)			
	1966-1976 (1000)	%	1976-1986 (1000)	%	1966-1976 (1000)	%	1976-1986 (1000)	%
Total increase in urban population	194	100.0	374	100.0	6,188	100.0	12,491	100.0
Natural population growth	111	57.2	210	56.1	3,458	56.5	5,694	45.6
Net rural-urban migration	74	38.1	154	41.1	1,742	28.5	4,556	36.5
Changing villages to cities	9	4.6	10	2.8	918	15.0	2,441	17.9

Sources: Tofiq, 1993; S.C.I. 1968, 1978, 1988, 1992

led to the excess of births over deaths in the whole country, rising from 19 per 1000 in 1956 to 31 in 1958 (Mohammadi, 1990). In 1966, the government adopted a population control policy which led to a slight decrease in the national population growth rate from 3.1 to 2.7 over the 1966-1976 period. However, after the Islamic revolution of 1979, the population control policy

was halted for nearly a decade resulting in a dramatic increase in the population growth rate from 2.7 percent in 1976 to 3.9 percent in 1976. As Table 5.2 shows, the high natural population growth has contributed over 56.5 and 45.6 percent to the urban population increase at the national level between 1966-76 and 1976-86 and 57.2 and 56.1 percent in Tabriz for the same periods. This confirms Preston's (1988) claim that natural increase of the urban population is the prime reason for urban growth in most of the developing world; for instance, the percentage was 67.7 in India (1961-71), 64.3 in Indonesia (1961-71), and 55.1 in Brazil (1960-70).

The preliminary results of the 1991 census revealed a decline in the population growth rate of large cities such as Tehran, Tabriz and Esfahan. In essence, this decline is not a real decrease. Rather, it is due to the selection of nearby towns and villages around large cities by new rural immigrants for low housing prices compared with the high housing prices inside the big cities (Rahnamaei, October 1993, personal communication). These surrounding towns and villages, which are not considered part of large cities in statistics, are usually under the direct influence of the economy of large cities.

## **ii) Rural-Urban Migration**

In the past, rapid urban growth was attributed mainly to migration. Migration still accounts for a substantial proportion of urban population increase in Third World countries (Devas and Rakodi, 1992:22). In Tabriz, rural-urban migration has been the second major factor for its rapid growth over the past three decades. As Table 5.2 depicts, rural migration has contributed to 38.1 and 41.1 percent of the urban population increase in Tabriz during the 1966-76 and 1976-86

periods respectively. Compared with the national rate (with 28.5 and 36.5 percent for the mentioned periods), we can say that larger cities, perhaps, proportionally attract more rural immigrants than other cities in Iran. The detailed explanation for the causes of rural migrations is beyond the scope of this research; however, its main causal factors at the national level and in Tabriz are briefly discussed.

The implementation of a land reform policy, which began in 1962, has been one of the major factors of rural-urban migration in Iran (Danesh, 1985; Hosamian, et al., 1983; Kazemi, 1980;). Like other developing countries, land reform in Iran pursued two main objectives: transfer of capital from the agricultural sector to the industrial sector and the release of the surplus of workforce from rural areas for use in manufacturing in cities. Such a policy was carried out through compulsory selling of farmlands by landlords to farmers and the nationalization of forests and pastures. Farmers were eligible to purchase land which had already been rented from landlords through a traditional lease called Nasagh. This meant that those who lived in villages as agricultural workers could not gain land. As a result, hundreds of thousands of rural households were released from rural areas (Hosamian et al, 1983:102). The release of the workforce from rural areas coincided with the launching of the industrialization process of the early 1960s. Therefore, the released workforce from rural areas, on the one hand, and the demand for workforce in cities for manufacturing, on the other hand, led to the massive rural-urban migrations.

Another main factor associated with the rural-urban migration in Iran is the mechanization of

agriculture which has led to the release of more workers from rural areas (Danesh, 1985). The major mechanization process which mainly began by government investments in a number of large agricultural projects such as Khuzestan, Moghan, Gazvin, Jeeroft and Kermanshah in the early 1960s, was later extended across the country. The use of modern technology and its gradual replacement of traditional tools has contributed to the reduction of the number of workforce in the agricultural sector, causing more migration from rural areas to cities (Farid, 1973).

Inequality between urban and rural areas has been mentioned as another important factor in rural-urban migration in Iran (Kazemi, 1980; Hosseinzadeh, 1982). With the increasing role of oil income in the national economy after the 1960s, the importance of the agricultural sector declined because food could easily be imported from other countries. Thus, rural areas did not receive adequate government investments to provide public services such as roads, electricity, health care and potable water, whereas cities received the bulk of the government investments for services. The result increased the inequality between cities and rural areas which, in the belief of many, is considered another important factor in the rural-urban migration of the past three decades (Amirahmadi, 1987; Danesh, 1985; Banifateme, 1982).

The eight-year war between Iran and Iraq is regarded as another main reason in intensifying migration during the 1976-86 period. Because of the war, many cities and thousands of villages in the war torn regions of the south and west were evacuated, which led to the dislocation of about three million people, most of whom were re-settled in urban areas (Ehsani, 1994).

Moreover, since 1980 about 3.5 million international refugees entered Iran mainly from Afghanistan and Iraq, a considerable number of whom were settled in cities (ibid).

The discussed factors at the national level apply to the case of Tabriz as well, except for the limited number of foreign refugees due to geographical distance. Some studies on rural migration to Tabriz have reasserted the influence of the above discussed factors; for instance, Hosseinzadeh (1982) identifies the following factors as important to the decision of rural migrants to move to Tabriz: lack of sufficient income and job opportunities in rural areas (50%); lack of agricultural land and tools (25%); lack of hygienic facilities and transport network in rural areas (17%); and the presence of cheap land on the outskirts of the city (8%).

In East Azarbaijan province, overpopulation has been an important push factor for the rural population. As cited before, the dramatic decline in the mortality rate due to breakthroughs in the medical sciences and an unchanged high birth rate after the 1950s led to a high natural population growth rate. The higher population growth, mechanization of agriculture and the limited amount of agricultural lands resulted in overpopulation and higher unemployment, which consequently pushed jobless people from rural areas to cities. (Danesh, 1985). The overpopulation in East Azarbaijan province coincided with the selection of Tabriz as an industrial pole in the north west region of Iran in 1962. As a regional pole, Tabriz received considerable industrial investment which made it the main attraction centre for the released workforce from rural areas after the land reform in East Azarbaijan province. The degree of the concentration of industrial activities in Tabriz can be seen in Table 5.3. With 25% of the population of the

province during the 1980s, Tabriz accounted for more than 90% of the total value of manufacturing products.

As the main economic centre in the province, public services have been un-proportionally concentrated in Tabriz as well. For instance, Tabriz, with one fourth of the population of the province in 1991, accounted for 64 percent of doctors and hospital beds, 77 percent of dentists and 90 percent of higher educational facilities in the province.

Table 5.3 The value of manufacturing products in the province of East Azarbaijan 1982-1986 (million Rials)

Year	Tabriz	%	other 10 Shahrestans	Percentage
1982	39193	90.4	4174	9.6
1983	55069	92.4	5441	7.6
1984	70029	92.4	4920	6.6
1985	60128	92.1	5145	7.9
1986	48868	85.9	8008	14.1

Source: S.C.I. 1990

### 5.3 Impact of Rapid Growth on Population Density Patterns

The previous section reviewed the process of recent rapid growth in Tabriz and discussed the main factors. This section aims to find the impact of this rapid growth on population density patterns during the 1966-1991 period. The effect of population growth on urban density generally is studied in terms of time and space (Berry and Horton, 1970:276). To explain urban

density Clark (1951) developed his population density model which received considerable attention from geographers in describing the intra-urban distribution of population (Johnston, et al, 1994:125). According to this model, urban population densities beyond the limits of the central business district decline exponentially with distance from the centre. Further studies by Schnore (1957), Berry (1964) and Newling (1969) on North American cities suggested that as the cities grow, their population densities are subject to decline.

While the number of population density studies in TWCs is small, the results vary with respect to their size and development process. For example, Brush (1977) by studying Indian cities came to the conclusion that a regular continuum of decreasing gradients of population did not exist. According to Brush's calculations, Poona and Varanasi, dated from the pre-colonial period, had retained or intensified residence in their cores; Bombay and Calcutta with colonial foundation had lower central residential densities, and recently planned industrial centres like Jamshidpour had a very low gradient compared to other settlements of its size.

This section first tests the relationship between time (1966-1991) and population density in Tabriz and explains the major underlying factors (section 5.3.1). Then, the distance and population density relationship is examined in section 5.3.2 to find main density patterns at the intra-urban level and explain their major changes over the 1966-1991 period.

### **5.3.1 Population Density Decline over Time (1966-1991)**

Urban population densities, in general, tend to decline over time as income increases, transport

develops and the total population of the area expands outward (Lowder, 1986:216). Higher income allows increased expenditure in housing, developed transport networks allow greater distances to be inhibited and larger urban territories encourages the growth of subsidiary service centres, which relax the need to travel to the centre (ibid).

The comparison between areal and population changes in Tabriz suggests that the overall population density has declined over time. As Table 5.4 indicates, population density in Tabriz has declined from 189 persons per hectare in 1966 to 136 in 1991. The size of the urban built area in this comparison has been the base which varies for the different periods. This may lead to questioning of the validity of the test, but the higher rate of change in areal expansion than in population increase proves the declining trend in density. If we assume that the density remains constant over time, we would expect a similar rate of increase for both population and area; therefore, if one of the elements (area or population) grows more than the other, this could lead to overall population density change. This has been the case in Tabriz, where its built-up area has proportionally had a higher increase than its population, leading to overall population density decline.

As Table 5.4 indicates, the total built-up area in Tabriz was 2127 ha in 1966 which increased to 2520 ha in 1970. Thus, during this period, built-up areas in the city increased by 18.4 percent, whereas the population grew by about 16.9 percent which resulted in a slight density decline from 189 persons per ha to 186. Between 1970 and 1978, the built-up area expanded by 59.4 percent reaching over 4000 ha, while the city's population increased by about 46.9 percent,

Table 5.4 Change in the built-up area and population density in Tabriz 1966-1991

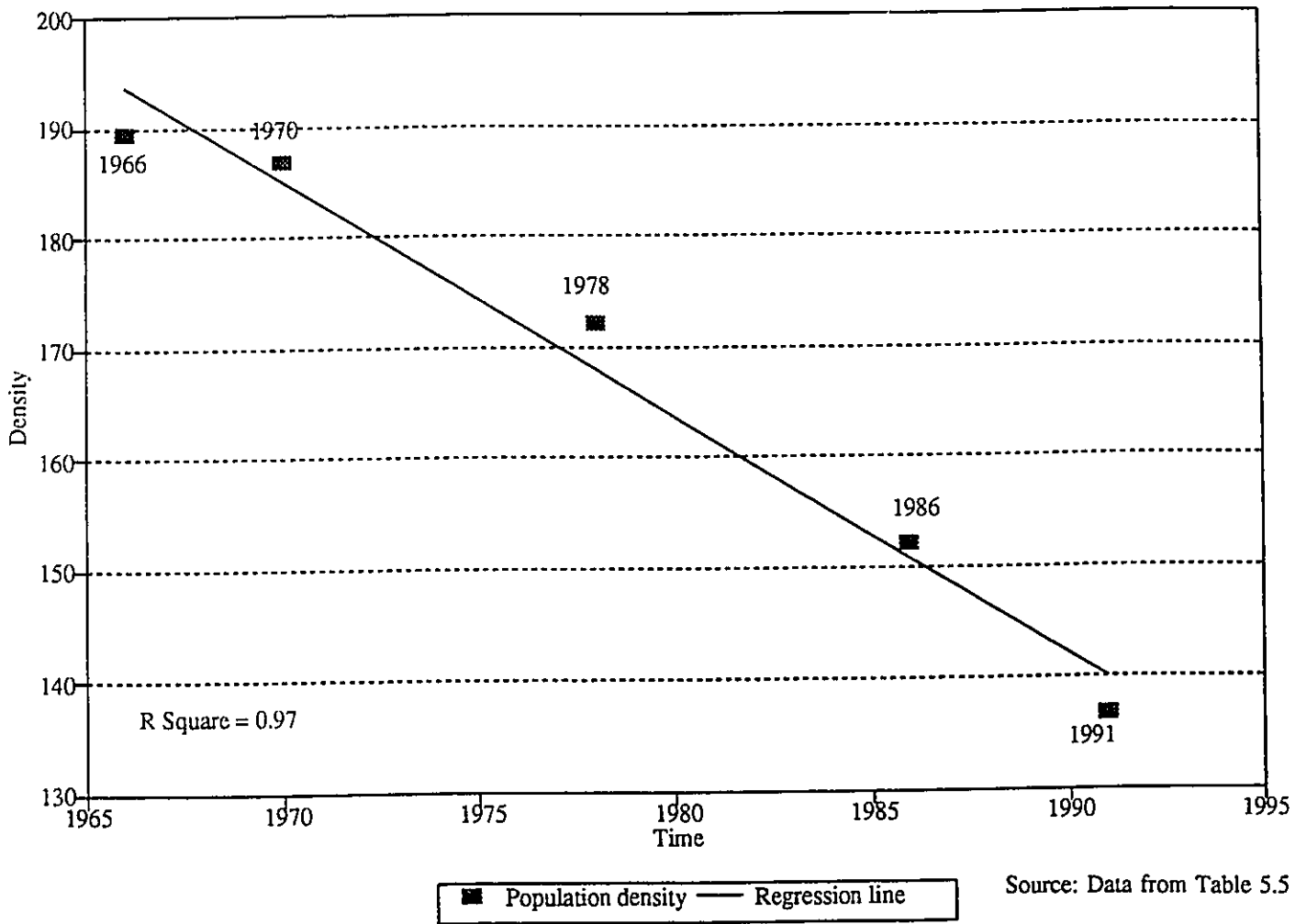
Year	Area	population	Area inc. %	Pop. inc. %	Pop. density
1966*	2127	403000			189
1970*	2520	471000	18.4	16.9	186
1978*	4019	692000	59.4	46.9	172
1986*	6440	979000	60.2	41.5	152
1991*	7965	1089000	23.7	11.2	136

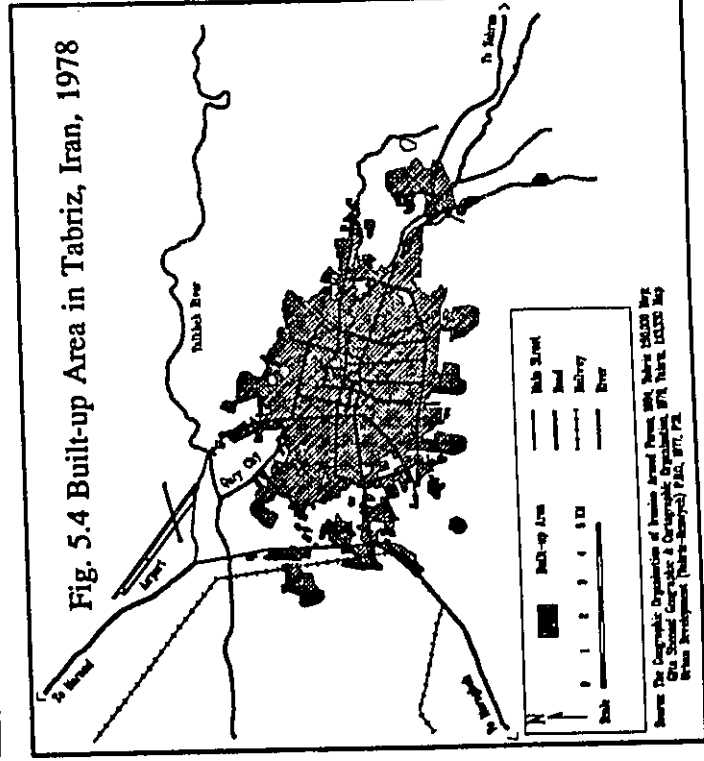
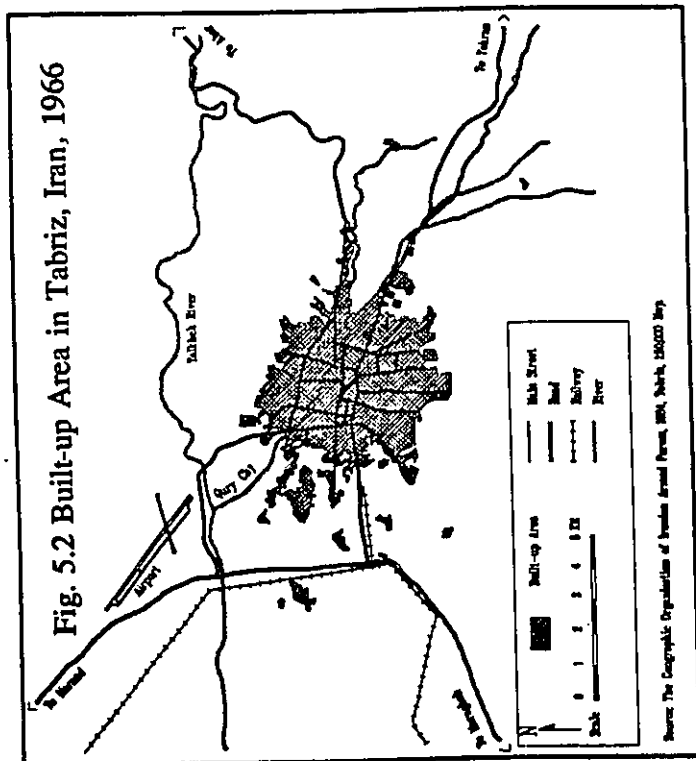
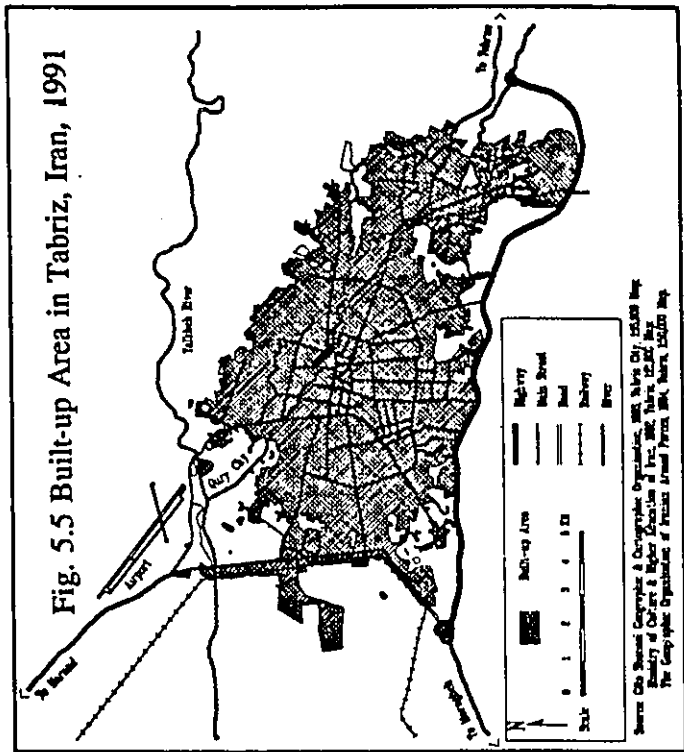
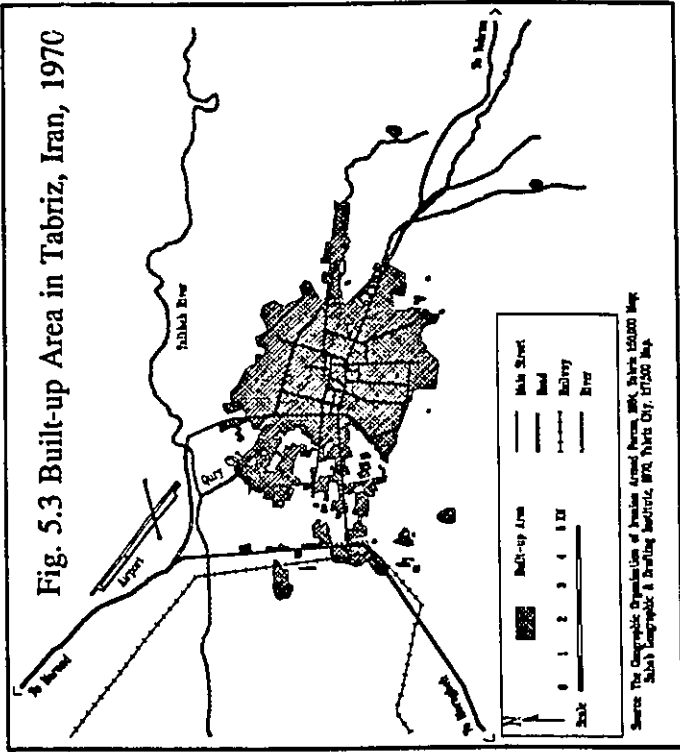
Sources: \*DHUD, 1968 and 1992; SCI, 1968, 1986, 1992

\*The area was calculated from available maps of Tabriz using ARC/INFO

resulting in a decline in overall density from 186 persons per ha to 172. This trend intensified after the revolution of 1979. Between 1978 and 1986, the total built-up area expanded by over 60 percent whereas the population increased only by 41 percent which led to a further density decline from 172 persons per hectare to 152. The density continued to decline as the figure dropped from 152 persons per ha in 1986 to 136 in 1991. As Fig. 5.1 shows, this declining trend reveals a strong relationship ( $R^2 = 0.97$ ) between the overall population density and time in Tabriz over the past decades. Such a relationship, in fact, confirms the similarity of the trend of population density change in Tabriz with what has been witnessed in some other TWCs. For example, studies on Bombay (1881-1961); Seoul (1965-1973) and Bogota (1964-78) display steady population density decline between consecutive periods (Lowder, 1986:216). The physical extension (built-up area) of Tabriz has been illustrated for four out of five mentioned periods (1966, 1970, 1978 and 1991) in Fig. 5.2 to 5.5. These maps show the trend of areal expansion in Tabriz and its physical dimensions over the 1966-1991 period.

Fig. 5.1 Population Density Decline  
In Tabriz Over the Time, 1966-1991





Three main factors are associated with the overall population density decline and rapid physical expansion in Tabriz during the 1966-91 period. These three factors are: a) **modern technology**, b) **changes in the socio-economic conditions**, and c) **government policies**.

#### **i) Modern Technology**

Modern technology has played a significant role in low density expansion of many cities across the world during the 20th century. This role has been linked to several factors such as the dramatic increase in the use of private automobiles, development of manufacturing, expansion of transportation networks, all of which have led to the considerable physical expansion of cities. In Tabriz, the impact of modern technology on population density decline can be discussed from at least two aspects. The most influential aspect, perhaps, has been the recent dramatic increase in the number of motor vehicles and expansion of transportation networks. As Table 5.5 indicates, in 1966 there were only 6,500 motor vehicles in Tabriz in total, which increased to over 94,000 in 1991. The effect of this dramatic increase (14 fold) in the number of motor vehicles on the spatial structure has been through either imposing new streets on the previously built-up areas or the expansion of the city in a lower density pattern.

Until the 1960s, the city continued to grow in compact form as this can be understood from the population density increase between 1956 and 1966 from 170 persons per ha to 189 (DHUD, 1966). The limited number of motor vehicles, perhaps, has been one of the reasons for this density increases. However, with the rapid growth in the number of motor vehicles between 1966-1991 and consequently the erection of many new streets, the city has tended

Table 5.5 Change in the number of motor vehicles in Tabriz in 1966-1991 period

Vehicle	1966*	%	1991*	%	increase between 1966-91
Private car	3,473	52.7	54,189	57	15.6 fold
Small public truck and taxi	960	14.6	11,801	12.4	12.3 "
Bus	838	12.7	1,650	1.7	1.97 "
Big truck	1,217	18.5	4,514	4.7	3.7 "
Gov. vehicles	NA <sup>2</sup>		8,140	8.6	-
Motor cycle	NA		14,572	15.4	-
Total	6,588	100.0	94,866	100.0	14.4 "

Sources: \* DHUD, 1968; † Babapoor, November 1993, personal communication

to expand in a low density pattern, since physical mobility has become more convenient and more families have been able to move to suburbs for environmental advantages.

Another important aspect of the technological influence on population density decline in Tabriz over the 1966-1991 period is the establishment of modern manufacturing units. After the selection of Tabriz in 1962 as the major industrial pole in northwest Iran, a considerable number of modern factories, both governmental and private, have been built which have significantly contributed to the rapid physical expansion and density decline in the city. Establishment of 52 large industrial units<sup>3</sup> such as refineries, Tractorsazi (tractor manufacturing Co.) Mashinsazi-e-

2 NA = Not Available

3 Based on SCI (1992), a factory which has over 50 employees is called a large industrial unit.

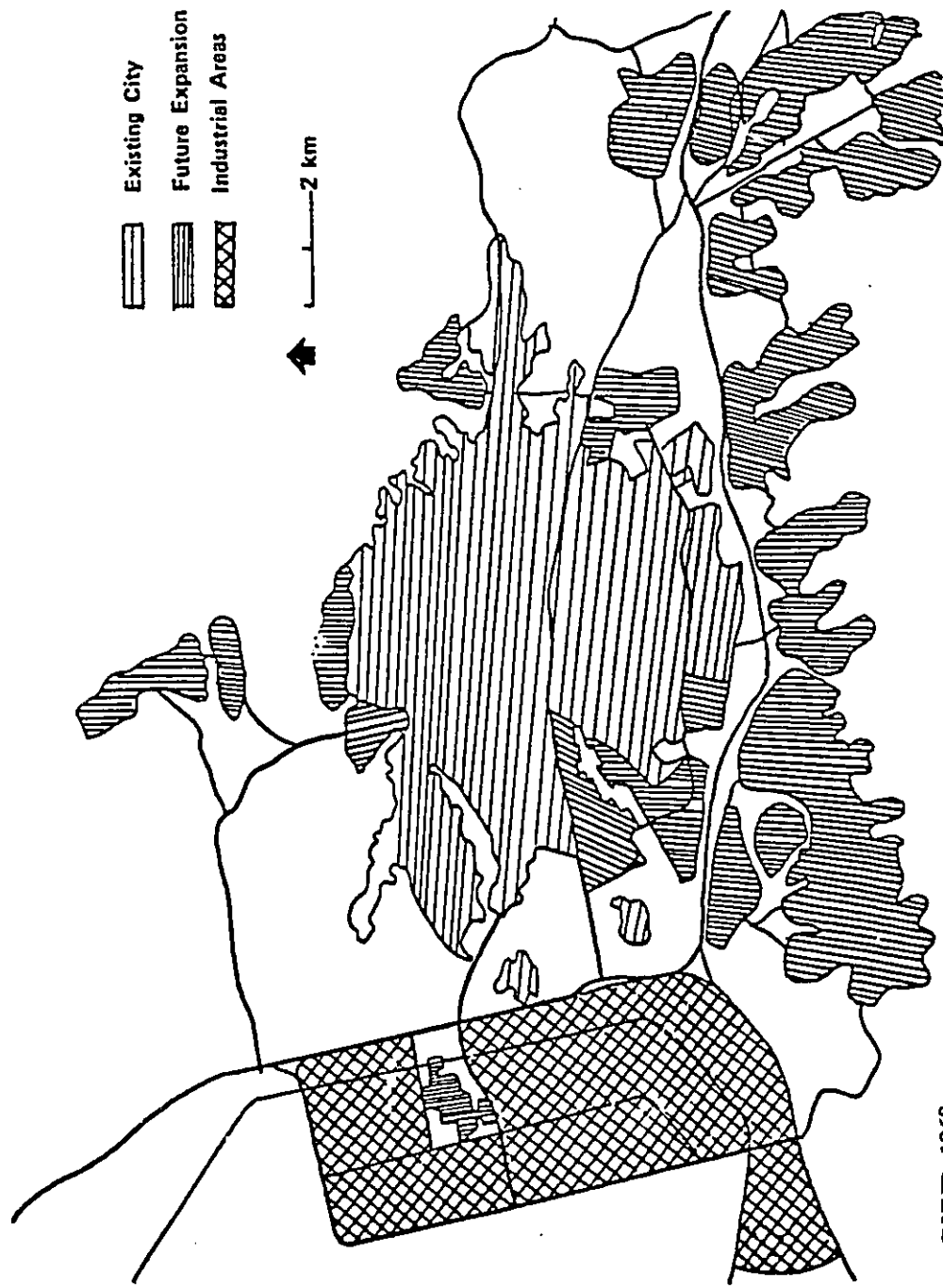
Tabriz, Motojen, Dorman Dizel, Liftracksazi, Khanehsazi and the creation of hundreds of medium and small sized industrial units has required a large amount of urban land. In order to avoid more congestion within the city and to control air pollution, the 1966 master plan allocated a large amount of land (about 1500 ha) on the west side of the city as the industrial zone. The annexation of this large zone has been one of the main reasons in declining the population density in Tabriz (see Fig. 5.6).

## ii) Changes in the Socio-Economic Conditions

The modernization process and diversification of the economy of Iran during this century and their intensification after the 1960s have improved the quality of life, in general, and in urban areas in particular. This improvement can be realized through a substantial increase in per capita income after the oil boom of the 1970s which enabled more people to improve their life quality. Gross National Product (GNP) per capita in Iran increased from \$309 in 1960 to \$456 in 1965, \$798 in 1970 and \$3020 in 1974 (Jacqz, 1976). This, perhaps, has been the main reason for the increase in the rate of car ownership from 4.4 percent in 1966 to 24 percent in 1991 in Tabriz (see also Table 5.5).

Another aspect of the change in socio-economic conditions is the reduction of the average household size in the country. Though this process in Iran has not gone as far as in Western societies, its effect on the overall population density decline and physical expansion of cities appears to be significant. The influence of the decrease in average household size on physical expansion can be interpreted by the increase in the demand for housing. In Western cities, the

Fig. 5.6 The Comprehensive Plan's Proposal for the Expansion of Tabriz, 1966-1991



Source: DHUD, 1968

increase in the number of single family homes has been associated to urban population density decline (Hartshorn, 1992:230). In the case of Tabriz, the average household size has constantly been decreasing over the 1966-1991 period (Table 5.6).

Table 5.6 Change in the household size in Tabriz 1966-1991

Year	total population	total household	average household size	change in household size
1966	403,000	77,047	5.24	
1976	597,000	117,534	5.09	-0.15
1986	971,000	201,378	4.82	-0.27
1991	1,088,000	227,328	4.79	-0.03

Source: S.C.I. 1992

According to Table 5.6, in 1966, while the average household size in Tabriz was 5.24 persons, it decreased to 4.79 in 1991. Even though it seems that the decrease in the average household size in Tabriz is not significant, its overall impact on the physical expansion and density decline appears to be important. This impact can be understood by calculating the additional households that have been formed due to the decrease in the average household size during the 1966 and 1991 period using the following formula:

$$AH=(P/HS)-PH$$

where AH is the added household in a given period, P is the population number in the destination year, HS is the average household size in the origin year and PH is the number of households in the destination year. In the case of Tabriz, the change in the number of households between 1966 and 1991 is as follow:

$$AH = 1,088,000/5.24) - 227,328$$

$$AH = (-19,506) \text{ households}$$

If we assume that no reduction in the average household size would occur from 1966 to 1991, the total number of households in Tabriz would be 19,506 less than the actual number of families in 1991. In other words, we can say that as a result of the decrease in average household size, 19,506 new families have been added to the city which have required more housing development, and more housing development means the need for more urban land. In the case of Tabriz, assuming the same amount of land consumed for each family, 19,506 households require some 400 ha of land, which approximately make 7 persons per hectare difference in population density.

The gradual decrease in household size can also be seen through the change in the distribution of urban households. In the case of Tabriz, this change is shown in Table 5.7.

Table 5.7 Change in the distribution of household size in Tabriz 1966-1986

Year	1 P*	2 P	3 P	4 P	5 P	6 P	7 P	8 P	9 P	10 P & more	Total (%)
1966	4.2	10.4	12.3	14.4	15.9	14.9	11.7	7.6	4.4	4.2	100
1976	4.2	10.3	12.9	16.5	16.7	14.6	10.9	6.9	3.7	3.3	100
1986	4.0	10.7	14.4	18.9	17.4	13.5	9.5	6.3	2.8	2.5	100

\* P = Person(s)

Source: S.C.I. 1988

According to the above Table, during 1966-86, except for the proportion of persons living alone, which reduced slightly, the share of families between 2 and 5 persons increased from 42 to 50 percent, but large families with 6 persons and more declined from 42 percent to 34 percent. This

change in household structure has contributed to the declining trend in the average family size, and smaller household size, as mentioned, contributes to the higher demand in the housing market, leading to gradual decline in population density .

### **iii) Government Policies**

The demarcation of local government jurisdictions and the implementation of planning or housing policy can affect the population density in cities through the allocation of land to specific uses or users (Lowder, 1986:217). Such a factor (government policy) appears to be one of the main reasons associated with the general population density decline in Tabriz. At the national level, as a provincial capital, Tabriz has attracted the most attention from the central government in terms of economic investments in the northwest of Iran. In the previous pages, the impact of the selection of Tabriz as an industrial pole and the associated government investments which boosted the economy of the city was mentioned. It was also after a central government decision in the 1963-67 National Economic Development Plan (NEDP) that the first master plan of Tabriz (along with several other larger cities such as Tehran, Esfahan, Mashhad and Shiraz) was prepared (PBO, 1963). The present spatial structure of the city has been considerably influenced by the land use policy of this plan. The detailed impact of this plan on different types of urban lands is discussed in the next chapter, but its general influence on the present urban physical shape and density patterns in Tabriz is discussed here.

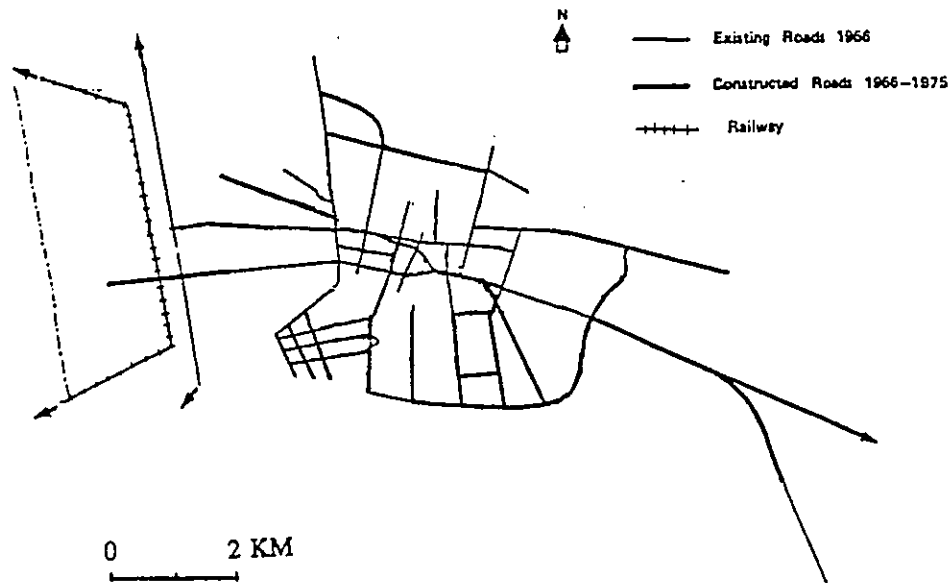
The master plan of 1966 has been a main factor in the expansion of the city towards the west and southwest (Fig. 5.6). Following the plan's proposal, the open space between the city and

railway station to the west, for its flat surface, began to be developed, and by 1978 most of the available land in this part was built, and several villages in the area were absorbed by the city expansion (see Fig. 5.2 to 5.3). By infilling the vacant lands to the west during the 1970s, according to the plan's proposal, the city expanded towards the southwest and east (Fig. 5.4). The expansion of the city towards the west, southwest and east was also facilitated by the construction of new transportation networks built by the municipality based on the 1966 proposal (see Fig. 5.7 and 5.8). The comparison between Fig. 5.5, Fig. 5.7 and Fig. 5.8 shows how the newly constructed main streets have influenced the direction of the actual physical expansion in Tabriz during recent decades.

Another effect of the 1966 master plan on the physical structure of Tabriz can be identified by its decision to lower the urban density. While in 1966, the per capita developed lands in Tabriz was 52.7 square meters, the plan proposed 65.9 and 67.7 square meters for 1976 and 1991 respectively (DHUD, 1968). To achieve this goal, the plan proposed several, relatively low density new residential areas in the eastern and southwestern suburbs and allocated a considerable amount of land for a transit system, industrial park and green space. If we compare the existing 1991 per capita built-up land (73 square meters) with that proposed by the master plan (67.7 square meters) we can see how the plan's policy and its related decisions have contributed in lowering the overall population density in Tabriz during the 1966-1991 period.

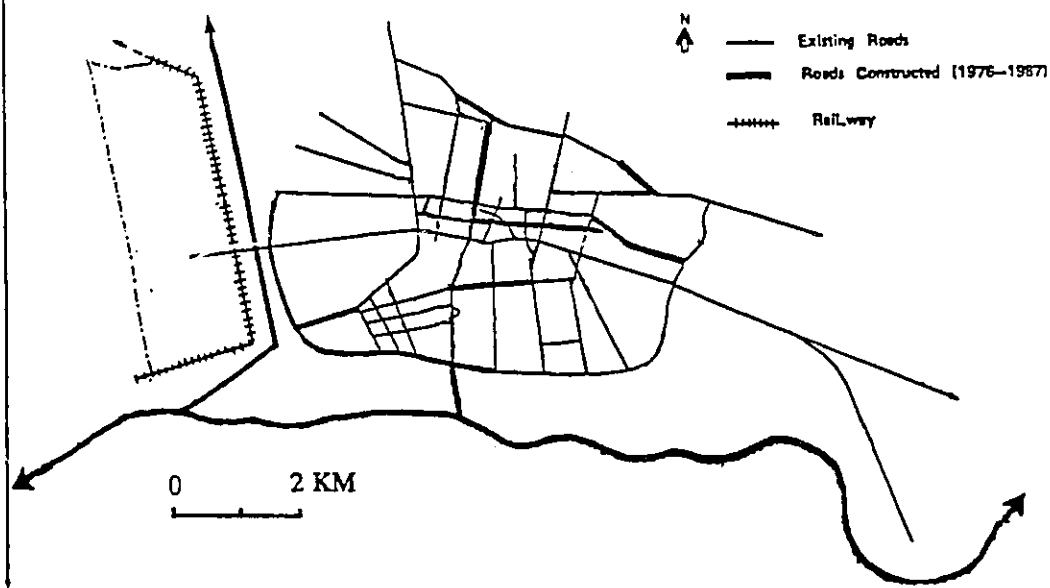
The revolution of 1979 has also been considered to be another factor in the rapid physical expansion of the city, especially in the early 1980s. The revolution itself produced the hope for

Fig. 5.7 Existing Road Network in Tabriz in 1966 and Constructed Roads by 1975



Source: Adapted from Mohammadi, 1990

Fig. 5.8 Existing Road Network in Tabriz in 1987



Source: Adapted from Mohammadi, 1990

thousands of urban poor of access to cheaper land for housing. Because of the lack of land use control in early 1979 revolution, in a short period thousands of hectares around large cities in Iran were illegally occupied by poor rural immigrants. For instance, one of the biggest illegal settlements in Tehran called Khak-sefid in the east of the city was occupied during the early months of the revolution in 1979. A similar phenomenon, however in smaller scale, occurred in Tabriz on the slopes of Eynal Zaynal Mounts to the north.

### **5.3.2 Population Density Change Within the City**

This section attempts to determine and explain the underlying processes of change in the population density in Tabriz at the intra-urban scale over the 1966-1991 period. Population density data within the city in literature refers to two types: a) day time population density which accounts for the distribution of population during the day or where people work over the day; and b) the night time population density which refers to the distribution of population during the night or where people live over night. Census tract data on population, usually refer to the night time population distribution. In this study, population density in the city (Tabriz) accounts for the night time population distribution, because it is the only available data.

To examine density change in Tabriz, first the patterns of population distribution at the intra-urban scale for both 1966 and 1991 are described. Second, to generalize this change, the distance-density model is used to see whether the patterns of population density in Tabriz comply with the general rule. According to the general model, the intra-urban population density declines exponentially with distance beyond the limits of the central business district (Newling,

1969).

Although the overall population density decline over time in Tabriz (as discussed in the previous section) conforms with the general rule, patterns of intra-urban population density in 1966 and especially in 1991 reveal differences to the distance-density model. An overall look at the pattern of population distribution of Tabriz in 1966 shows that the central and northern part of the city had the highest density and areas beyond the centre, especially in the east and west, had relatively medium or low density (Fig. 5.9, A).

The **1966 population density pattern** in Tabriz can be explained by **accessibility** (to activity centre and amenities) and **historical development**. As mentioned previously, in 1966, in Tabriz the city centre contained the main economic centre (bazaar) as well as public services (such as hospitals, schools, offices and public institutions). In 1966, because of the weak transportation network and the dependency of most intra-urban movements to the elementary transport system, proximity to workplace and public facilities played an important role in the distribution of population within the city. For the weak transport system, people tended to live as close as possible to the city centre where most activities and amenities were located resulting in relatively higher population density in the centre than in periphery.

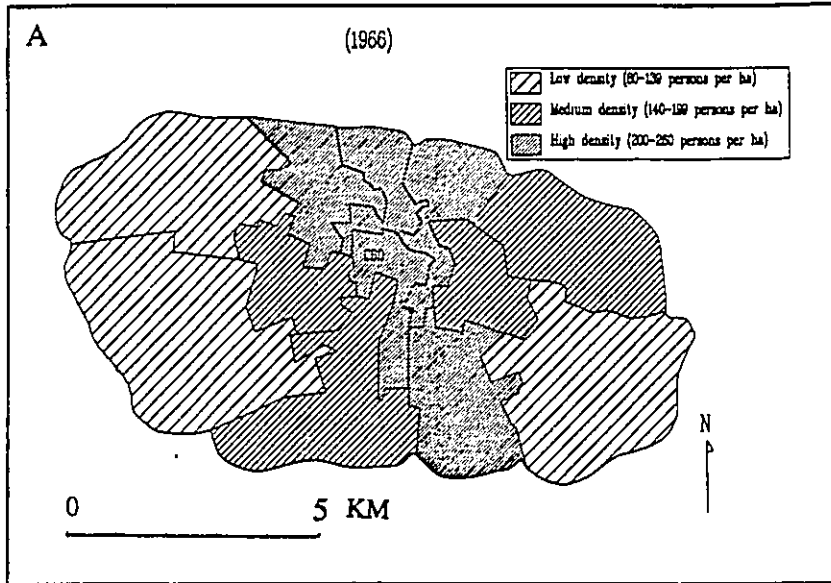
The higher population density in the city centre in 1966 is also related to historical development. As mentioned previously (Chapter 4), the residential areas in the historical part of the city centre were characterized by a dense housing pattern. Since in 1966, people tended to live as close as

possible to the city centre, the dense housing allowed higher population density. The city centre with the bazaar, government offices and major religious institutions was for long time the residence of wealthy families, religious leaders, local authorities and high ranking government employees. For this reason, **security** in the city centre was better than other places in the city (Mohammadi, 1990). Consequently, in the past, for security reasons people tended to live as close as possible to the city centre. These tendencies, namely, accessibility to the activity centre, amenities and security, and historical development have been major factors in the development of a higher population density in the city centre.

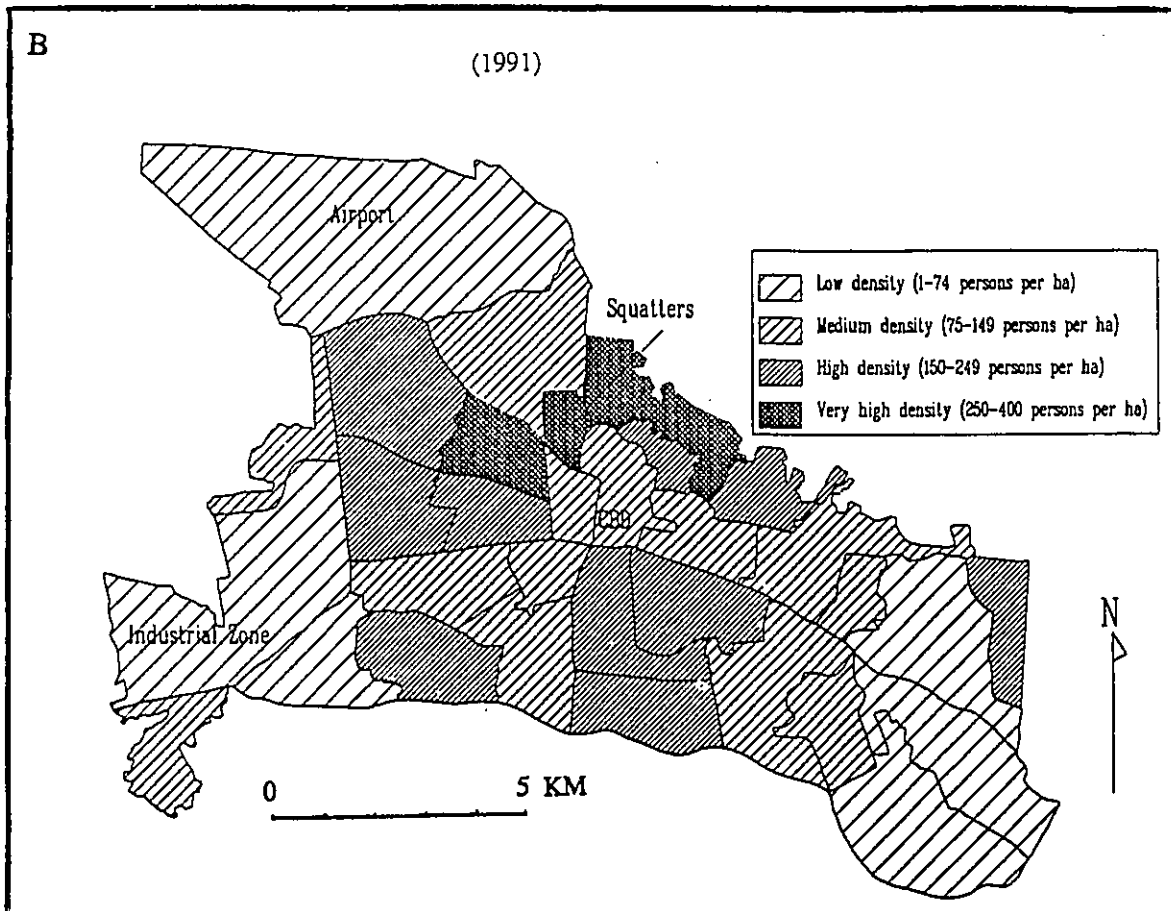
The intra-urban population density in 1991, however, reveals a different pattern than that of 1966. In 1991 while central districts had relatively medium density, northern and southern parts of the city had highest population density (Fig. 5.9, B). Districts surrounding the centre also had a relatively higher density. On the other hand, the eastern and western peripheries had the lowest density, and districts between the centre and periphery had for the most part medium density.

To summarize the patterns of population distribution, the density gradients for Tabriz have been calculated and plotted separately in four directions (east, west, north and south) for both 1966 and 1991. In 1966, whereas the population gradients declined slightly from the centre to the east and west directions, they were almost flat from the centre to the north and south directions (Fig. 5.10). However, the 1991 pattern portrays relatively steeper gradients in all directions (Fig. 5.11). The comparison between 1966 and 1991 population gradients reveals the following main changes:

Fig. 5.9 Population Density Patterns in Tabriz, Iran in 1966 and 1991



Source: Data from DHUD, 1968

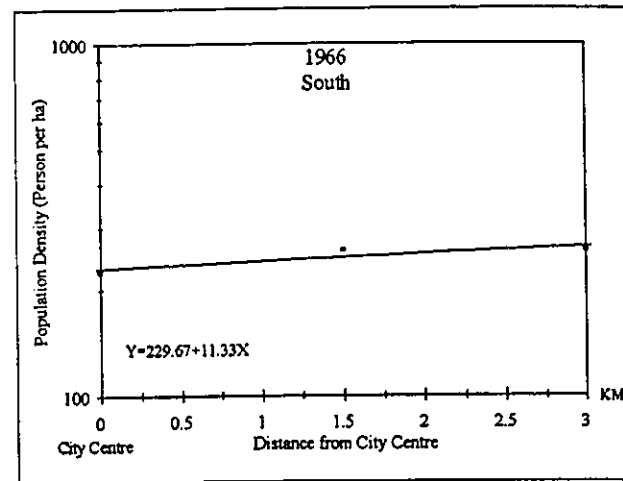
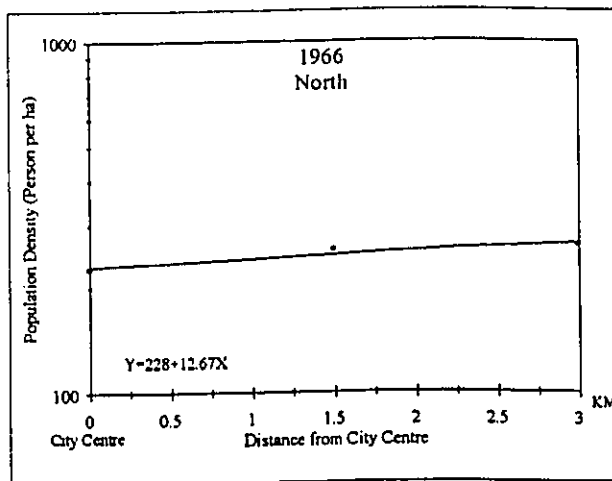
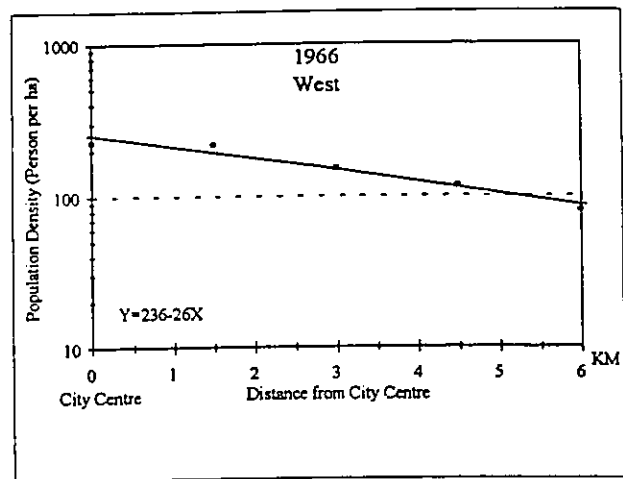
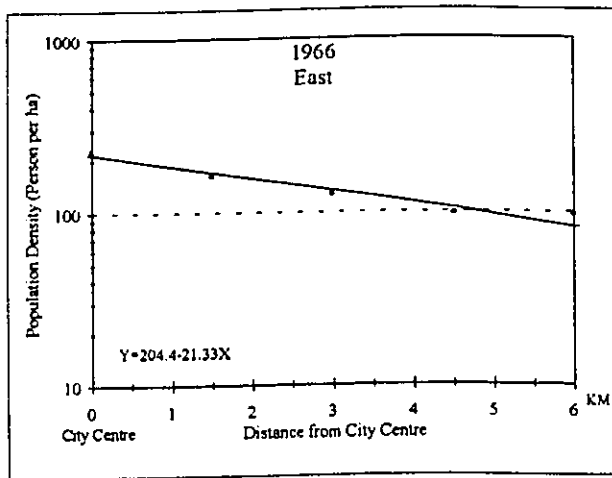


- i) **A significant density decline in the city centre (from 224 persons per ha in 1966 to 158 in 1991).**
- ii) **Further decline in population density from city centre towards the east and west directions. This is evident in the steeper east-west density gradients in 1991 compared with those of 1966.**
- iii) **Conversely, further increase in population density from the centre towards the north and south directions is reflected in steeper north-south density gradients in 1991 compared to that of 1966.**

As Fig. 5.10 and 5.11 show, while the decline of density gradients in east and west directions fit the general model, their increase in the north and south directions contrasts the model. This produces a mixed pattern of population density in Tabriz which needs to be explained.

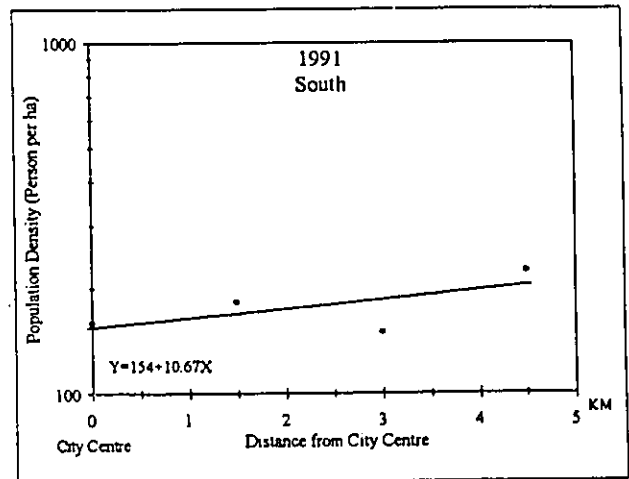
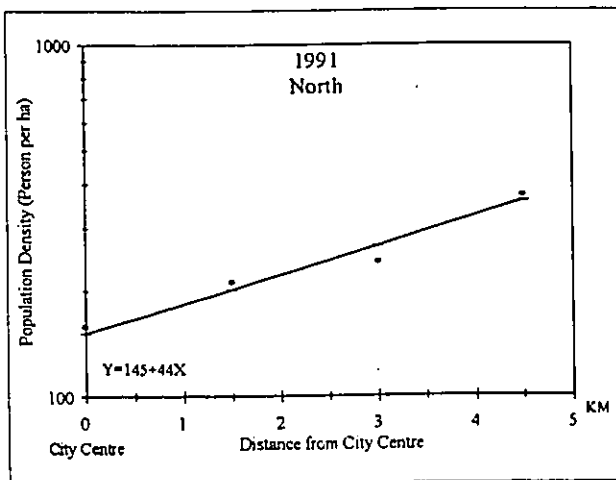
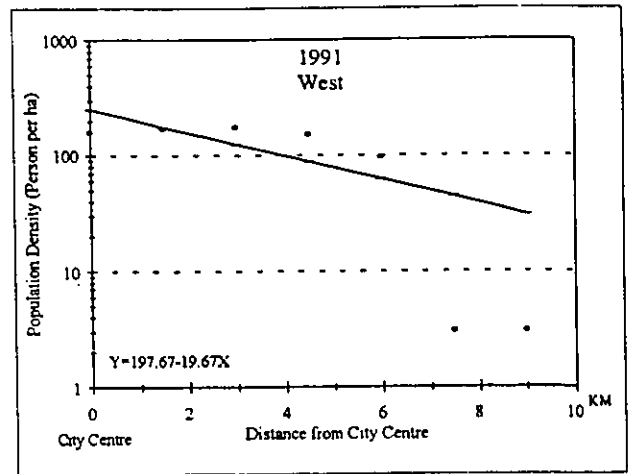
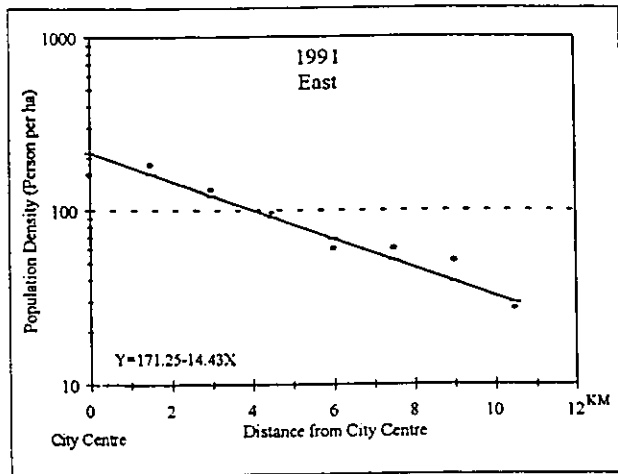
- i) One of the characteristics of the recent population density change in Tabriz is the **decline in the city centre** which, to some extent, is similar to what has been happening in many North American cities during the 20th century and, perhaps, has been influenced by similar forces (e.g. expansion of commercial activities in the centre and out-migration). The difference is that such a process in Tabriz is occurring later than in North American cities. In Tabriz, the declining trend of population density in the centre, could be explained by the **expansion of commercial activities, land value and out-migration**. The city centre, as the most accessible place, is usually occupied by commercial activities because of their ability to bid higher rent. As cities grow, the centre (CBD) expands compelling residential land uses farther from the centre which

**Fig. 5.10 Distance and Population Density Relationship in Tabriz, Iran, 1966**



Source: Data from DHUD, 1968

**Fig. 5.11 Distance and Population Density Relationship in Tabriz, Iran, 1991**



Source: Data from DHUD, 1992

leads to the decline of population density in the city centre over time. With respect to the rapid urban growth in Tabriz over the past three decades (see section 5.2) similar process seems to be working in the city centre. The decline in the population density from 224 persons per ha in 1966 to 158 persons per ha in 1991 has probably been because of out-migration to the periphery. Similar process has been observed in other Iranian cities such as Kerman and Tehran (Poorahmad, 1991 and Rahmani and Hafeznia, 1988). The out-migration was primarily taken place by high and middle class groups who have moved to the periphery because of their ability to afford higher transportation costs. Another facilitating factor for the out-migration is the old structure of residential areas in the historical part of the city. Because of old structure and narrow passages, the reconstruction of houses is usually difficult and even more expensive compared with building new houses in the periphery. Therefore, people prefer to sell their houses in the city centre and move to the new houses in the suburbs.

ii) The second characteristic of the population density change in Tabriz over the 1966-1991 period is the further decline in density gradient from city centre to periphery (east and west). Such a trend in population gradients towards the east-west periphery shows some similarities with North American cities in which population density declines from the city centre towards periphery.

Several factors could be discussed for the declining trend of population density from the city centre towards periphery. The easy access to periphery, brought by modern transportation, has allowed people (who can afford to higher transportation costs) to move to the periphery as a

trade-off because of cheaper and bigger lots. In Tabriz, the improvement of the transportation system (development of street network, public transit system and a considerable increase in the rate of car ownership) over the 1966-1991 period (see section 5.3.1) has allowed people to move to the periphery where the price of land is cheaper. One difference between Tabriz and the North American cities is that in the latter the low density periphery is usually occupied by high or middle class residents, while in Tabriz, the periphery is occupied by all groups (high class, middle class, low class and even squatters), however each in their own sector depending on the natural environment and ability to pay for amenities. The main reasons for the occupation of the periphery by low income groups is the lower price of land as well as cheaper public transportation system.

The density decline in the east and west axes is mainly related to the **orientation of major transit roads** which has attracted industrial, new residential and commercial developments. The designation of the industrial zone along the Tabriz-Maragheh and Tabriz-Marand roads, which contributes to density decline in the western section, is also linked to **better accessibility to major roads**. Also the Tehran-Tabriz transit road in the east has attracted the newly developed residential areas and recent commercial developments (see also chapter 6).

The declining density gradient in the east and west directions have been influenced by the **topographic condition** of the city as well. The availability of land, especially in the west has allowed vast industrial and relatively low density residential development. The east section of the city, for its pleasant environment (e.g. relatively higher altitude, good scenery and gardens),

has attracted most of the high-class and middle-class residents in a relatively low density pattern. One of the main reasons for low density residential developments in eastern and western peripheries is the implementation of subsidized housing projects initiated by **government policies** primarily to accommodate factory workers (see also Chapter 6). In sum, the orientation of major transit roads and better accessibility, suitable topographic conditions and government policies have been main factors for density decline from centre towards periphery in east-west directions of the city.

iii) The density increase from the city centre towards north and south peripheries in Tabriz is opposed to the general density gradient rule. The population density pattern in the north and south directions in Tabriz, in fact, reflects more its Third World City nature, where rural migrants and low income groups have occupied most of the low price land at the northern and southern edges of the city. In this respect, it has some similarities with Latin American and African urban morphologies (see Chapter 2) in which squatter settlements occupy most of the periphery in a high density pattern (Lowder, 1986:217). The occupation of peripheries by incoming rural migrants is a common phenomenon in most TWCs.

Geographically, northern and southern peripheries in Tabriz are closer to the city centre than eastern and western peripheries because of physical restrictions imposed by northern and southern mountains. The northern and southern peripheries in Tabriz offer two advantages: i) **relatively closer accessibility** (distance) to the centre, and ii) **cheaper price of land** especially because of its less attractive environment. These advantages apt to most rural migrants because basically

they want closer accessibility to activity centres and amenities. Because of relative accessibility to the centre and cheaper price of land, rural migrants have mainly tended to reside in the northern and southern peripheries in Tabriz. For example, two main squatter settlements, which account for about 25 percent of the population of the city, are located to the north and south relatively close to the city centre (DHUD, 1992).

Despite the lower price of land, rural migrants can only afford small lots which leads to the occupation of land in high density manner. The smaller size of housing units combined with the usual larger household size of rural migrants produces much higher density for the neighbourhoods occupied by rural migrants and poor families than other areas. The higher density in northern and southern peripheries has also been intensified by **geographical restrictions**. Since the city cannot expand much to outside (especially to the north side), this physical constraint, in fact, puts pressure on population density. Also, because of a lack of economic activities, the lack of green space and the weak transportation network, the northern and southern parts of the city have almost exclusively been used for residential purposes, resulting in higher density than other areas of the city (see also Chapter 6). In sum, relative accessibility to the city centre, lower price of land, larger family size, less non-residential land uses and physical constraints have led to the occupation of northern and southern peripheries mainly by rural migrants in a high density pattern.

This chapter dealt mainly with the quantitative aspect of population density change in Tabriz; however, population density should be examined from a qualitative perspective as well. While

quantitatively we analyzed the overall density change (the relationship between population and all urban land uses (e.g. residential, industrial, transportation), qualitatively we can look at the way, for example, residential units are organized within neighbourhoods.

To briefly outline the qualitative aspect of population density change in Tabriz it should be pointed out that while pre-modern residential units were clustered in distinct neighbourhoods relatively similar to each other, as a result of recent urban development different spatial arrangement of residential areas have emerged in Tabriz. This can be interpreted with respect to the stage of development and social status of residents in different neighbourhoods. The old, clustered and irregular residential structure of the historical/traditional district, dominated by big houses (in connection with extended families in the past), one or two story buildings and limited accessibility represent the residential units developed in the pre-modern era. It should be mentioned that the superimposition of modern streets during this century has chopped this district into pieces which has resulted in the destruction of neighbourhood homogeneity. The semi-modern residential districts surrounding the historical section is an indication of the residential areas developed early this century. These residential areas, to some extent, are similar to traditional pattern in terms of dense structure, but with a more regular housing pattern. The city during its rapid physical expansion has encompassed a number of villages whose clustered, predominately single story and low quality buildings make them like islands within recently developed suburbs. More low density residential expansion is evident among modern and planned districts developed in the east and south eastern fringes, dominated by relatively larger row or single detached houses with a geometric street pattern occupied mainly by high income

groups. On the other hand, very dense and clustered structure are found among the squatter settlements of the northern and southern peripheries dominated by single story, but small buildings occupied mostly by poor rural immigrants. The recently developed residential complexes, located mainly in the eastern and western peripheries, which have predominantly been built up with high rises and multi story buildings are other densely occupied areas in Tabriz.

#### **5.4 Conclusion**

This chapter examines the process of recent population growth in Tabriz and discusses its impact on urban density patterns. It is revealed that the city has had a rapid population growth over the 1966-1991 period. A high natural population growth rate and rural-urban migration caused by the excess of births over deaths, land reform, mechanization of agriculture and government policies are found to be the major factors of recent rapid growth in Tabriz. The first impact of this rapid growth has been the enormous physical expansion which has led to a considerable decline in overall population density from 189 persons per ha in 1966 to 136 in 1991. Rapid increases in the car ownership rate, decreases in the average household size and the planning policies of 1966 are revealed to be the main causes of population density decline over time.

The second impact of recent growth has been a considerable change in the patterns of population density within the city. It was mentioned that the population density in the city centre (because of out migration), eastern districts (because of relatively high income residential development) and in western districts (because of the concentration of industrial activities) has decreased during the 1966-1991 period. However, in the northern and southern districts population density has

considerably increased because of the rise in the number of low income groups and expansion of squatter settlements, geographical limits, a less pleasant environment, lack of non-residential land uses and a weak transportation network. Although this single study may not be able to generalize population density pattern and its recent change in all Iranian cities, it suggests that the recent rapid urban growth in larger cities has led to considerable change in intra-urban population density pattern and uneven urban development.

## Chapter Six

### Patterns of Urban Land Use Change in Tabriz (1966-1991)

#### 6.1. Introduction:

As stated in the introductory chapter, the process of modern urbanization in Iran has significantly altered the form and function of cities particularly the large urban centres. The previous chapter (5) discussed the process of the recent rapid growth and its impact on population density patterns in Tabriz during the 1966 and 1991 period. This chapter examines the effects of this rapid growth on the activity (land use) pattern in Tabriz. The analyses in this chapter include three parts. Section 6.2 looks at the overall change in urban land uses in order to identify the main changes in activity patterns at the city scale. Section 6.3 studies the spatial distribution of land uses and their variations within different parts of the city. Finally, section 6.4 synthesizes the main changes in urban land use based on the analyses offered in sections 6.2 and 6.3.

#### 6.2. The Overall Land Use Change

In Chapter Five we saw that Tabriz faced a rapid physical growth during the 1966-1991 period; however, all types of urban lands did not experience the same expansion. Table 6.1 summarizes the overall change among the various land uses between 1966 and 1991. In this Table, five indices have been used to show the extent of change among land uses in the city as a whole:

**Absolute change:** the absolute amount of land changed in each class over a given time.

**Percentage change:** the percentage change in each class of land during a given period.

**Relative change:** the change in the percentage share of each class from total developed (built-up)

area at a given time.

**Land consumption rate:** the amount of land consumed for each person in a given period (Yeates and Garner, 1980).

**Land absorption rate:** the amount of land added for each new urban person over a given period (ibid).

While the first three of the above indicators show the extent of change in each class of urban land at a given time, the last two depict the intensity of land uses and their changes over a given period. According to Table 6.1, total developed land in Tabriz expanded from 2126 ha in 1966 to 7964 ha in 1991, meaning an increase of 274 percent over a 25-year period. The change among different land uses varied considerably; for instance, in absolute terms residential land use with 3,232 ha had the biggest expansion followed by transportation land with 1,081 ha and industrial land with 368 ha increase. On the other hand, the smallest change belonged to health care land use with 34 ha and commercial activities with 38 ha increase. The vast expansion in built-up areas has led to the absorption of some 5837 ha of agricultural and vacant land in Tabriz. However, because of changing the city limits over the period 1966-1991, more agriculture and vacant land has been added to the city from surrounding rural areas.

In terms of percentage change, while three activities including recreation with 631 %, transportation with 412 % and industrial use with 364 % respectively had the fastest expansion, governmental and commercial uses with 47 % and 68 % had the lowest growth. The different change among various land uses has led to significant change in their relative share from total developed area. For example, while the share of residential use decreased from 65 % to 57.9 %,

government use from 7.1 % to 2.8 %, and public organization from 3.2 % to 1.2 % between 1966 and 1991, the proportion of transportation land use increased from 12 % to about 17 %, industrial use from 4.8 % to 5.9 % and recreation from 0.5 % to 1.0 %. These figures suggest that while in Tabriz, in general, the residential land use and technology related activities such as transportation and industrial lands have undergone tremendous physical expansion, activities

Table 6.1 General land use change in Tabriz between 1966 and 1991 (hectare)

Land category	1966 (ha) <sup>1</sup>	1991 (ha) <sup>1</sup>	Absolute change 66-91	Percen- tag change 66-91	Relative change		LCRate		LARate m <sup>2</sup> 66-91
					1966 (%)	1991 (%)	1966 M <sup>2</sup>	1991 M <sup>2</sup>	
Residential	1381.8	4613.9	3232.1	233.9	65.0	57.9	34.3	42.4	47.1
Commercial	55.7	93.9	38.2	68.6	2.6	1.2	1.9	1.7	0.6
Education	76.5	184.2	107.7	140.8	3.6	2.3	1.9	1.7	1.6
Health care	17.0	51.1	34.1	200.6	0.8	0.6	0.4	0.5	0.5
Government	151.2	222.5	71.3	47.2	7.1	2.8	3.8	2.9	1.04
Public Organization	69.1	142.1	73	105.6	3.2	1.8	1.7	1.3	1.06
Recreation	10.42	76.2	65.8	631.5	0.5	1.0	0.3	0.7	0.96
Industrial	101.2	469.7	368.5	364.1	4.8	5.9	2.5	4.3	5.34
Transportation	262.5	1344.2	1081.7	412.1	12.3	16.9	6.5	12.3	15.8
Open space	N.A.	208.3	-	-		2.6		1.9	1.9
Under const.	N.A.	197.7	-	-		2.5		1.8	1.8
Others	N.A.	361.0	-	-		4.5		3.3	3.3
Total developed	2126.8	7964.7	5837.9	274.5	55.0 <sup>b</sup>	60.1 <sup>c</sup>	52.8	73.1	85.1
Agriculture/vacant	1739.4	5276.9	3537.5	203.4	45.0	39.9	43.2	48.5	
Total land	3866.3	13241.6	9375.3	242.5	100.0	100.0	95.9	121.6	136.7

<sup>1</sup> Source: DHUD, 1968, 1992.

related to public services such as public organization, government, education as well as commercial have had little expansion.

The comparison between the land consumption rate (LCR) of 1966 and 1991 again show a division among various land uses. According to Table 6.1, while the LCR (per capita land) for residential use in 1966 was 34.3 square meters, in 1991 it increased to 42.4. Other categories of land with increased LCR include transportation from 6.5 square meters to 12.3; industrial land from 2.5 to 4.3; recreation from 0.3 to 0.7 and health from 0.4 to 0.5. On the other hand, the LCR in four other classes decreased: government land use from 3.8 square meters to 2.9; public organization from 1.7 to 1.3; commercial from 1.9 to 1.7; and education from 1.9 to 1.7.

Land absorption rate (LAR) is another indicator by which we can see the trend of the intensity of land use in the past and its implication for the future. For example, in Tabriz while the LCR for residential land in 1991 was 42.4 square meters, the LAR was 47.1. It means that every new person added to the city between 1966 and 1991 has absorbed 47.1 square meters of residential land compared with the average of 34.3 square meters in 1966 and 42.4 in 1991. This implies that more per capita land will be needed for future residential use than the average consumed land in 1966 or 1991. The higher LAR for 1966-91 included transportation, industrial and recreation, whereas commercial, government, public organization and educational land uses lowered their LARs (Table 6.1). This again suggests a rapid expansion for residential, transportation, industrial and recreation activities and a low expansion among land uses related to most public institutions and commercial activities. Since higher LARs belong to the land uses

with biggest proportion in the city, therefore the LAR for total developed lands over the period 1966-1991 was higher than the LCRs of both 1966 and 1991 implying lower density physical expansion in the future in Tabriz.

To obtain a broader idea of the magnitude of general land use change in Tabriz, it is here put in the North American context to see to what extent the recent urban land use change in Iranian cities varies with that of western cities. For this purpose, a comparison is made between land use change in Tabriz and the Regional Municipality of Ottawa-Carleton because of relative similarity in their population size and their rapid physical growth<sup>1</sup>. Table 6.2 compares major land use change in Tabriz and Ottawa-Carleton area during the recent decades. Data for land use change in Tabriz refers to 1966-1991 period, whereas for Ottawa-Carleton it refers to 1961-1986 period.

Table 6.2 shows that developed urban land in Tabriz expanded by 242 percent between 1966 and 1991, whereas it increased by only 99 percent in the Ottawa-Carleton area over 1961-86 implying a faster physical expansion for Tabriz than for Ottawa. However, a significant difference in total developed area and the percentage of residential, open space and roads between the two cities indicate a higher urban density in Tabriz than Ottawa. Moreover a significant difference is found in the trend of major land use change between the two urban centres. As Table 6.2 suggests,

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<sup>1</sup> Population of Ottawa-Carleton in 1961 was 357,000 which increased to 606,000 in 1986. In comparison, the population of Tabriz increased from about 340,000 in 1961 to 979,000 in 1986 (RMOC, 1988).

while the trend toward residential density<sup>2</sup> in Tabriz has declined, it has increased in Ottawa. The proportion of residential land use from total developed lands in Tabriz decreased from 65 % percent to 57 %, but in Ottawa it increased from 39 % to 42 %. The main reasons for the increase in residential intensity in Ottawa are associated with the decline in the average

Table 6.2 Comparison between recent urban land use change in Tabriz and Ottawa-Carleton

Major land uses	Tabriz			Ottawa-Carleton		
	1966 (ha)	1991 (ha)	1966-91 increase	1961 (ha)	1986 (ha)	1961-86 increase
Residential (ha) (% from total developed areas)	1381.8 (65.0)	4613.9 (57.9)	234	3876 (39.7)	8269 (42.5)	113.3
Commercial (ha) (%)	55.7 (2.6)	93.9 (1.2)	68.6	387 (4.0)	1330 (6.8)	343
Institutes (ha) (%)	313.8 (14.8)	599.9 (7.5)	91.1	507 (5.2)	1459 (7.5)	187.8
Industrial (ha) (%)	101.2 (4.8)	469.7 (5.9)	368.5	820 (8.4)	1519 (7.8)	85.2
Recreation/open space (ha) (%)	N.A.	274.1 (3.6)	-	2387 (24.5)	3662 (18.8)	53.4
Roads (ha) (%)	262.5 (12.3)	1344.2 (16.9)	412.1	1776 (18.2)	3191 (16.4)	79.7
Under construction/others (ha) (%)	N.A.	558.7 (7.0)	-	N.A.		
Tot. developed area (ha) (%)	2126.8 (100.0)	7954.7 (100.0)	274.5	9753 (100.0)	19429 (100.0)	99.2

Source: Table 6.1; The Regional Municipality of Ottawa-Carleton (1988), (RMOC)

<sup>2</sup> Residential density differs from population density. While the first refers to the number of housing units per gross hectare, the second indicates the number of persons per hectare. In Ottawa, over the 1961-86 period the population density per hectare had decreased from 36.6 to 31.2, whereas household density has increased from 8 to 10 (RMOC, 1988:8). In this respect, the household density in Tabriz has declined from 36.2 household per ha to 28.5.

household size, lower average housing density and high proportion of single detached houses construction (RMOC, 1988:9). In Tabriz the decline in the residential intensity is attributed to the recent industrialization process which has led to considerable transportation and industrial developments. In contrast, the share of roads and open space from total developed land in Tabriz has increased while it has shown a declining trend in Ottawa. The contrasting tendency in commercial and institutional land use changes suggests commercial and service activities in Tabriz are performed in much denser patterns than in Ottawa. As the modernization process continues, Tabriz may expand in a relatively lower density pattern, but Ottawa has already developed in a quite low density form and seems to be going in the direction of increased residential intensity.

### **6.3. Change in the Spatial Distribution of Urban Land Uses**

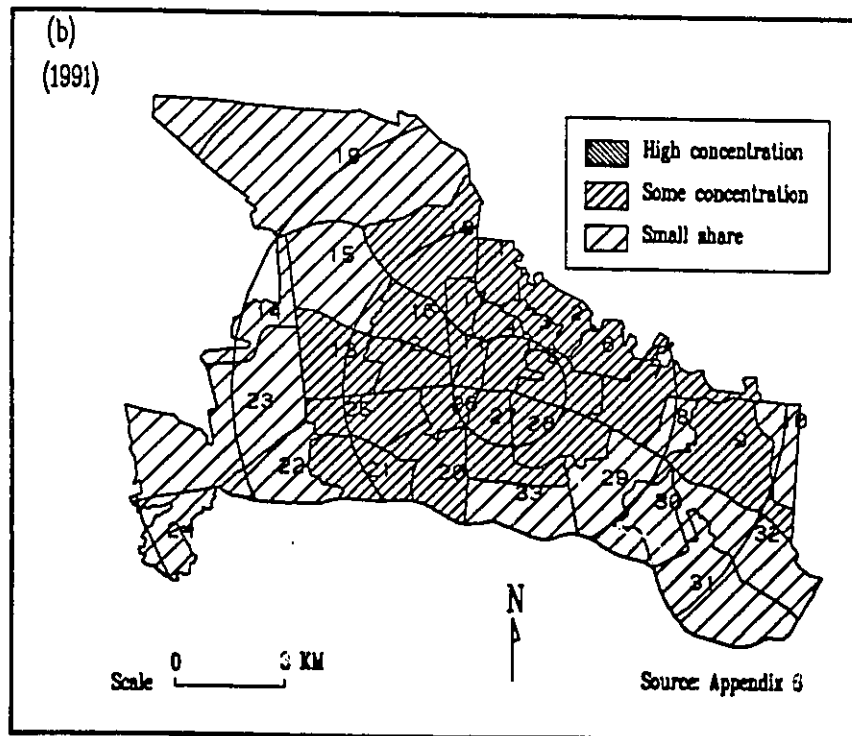
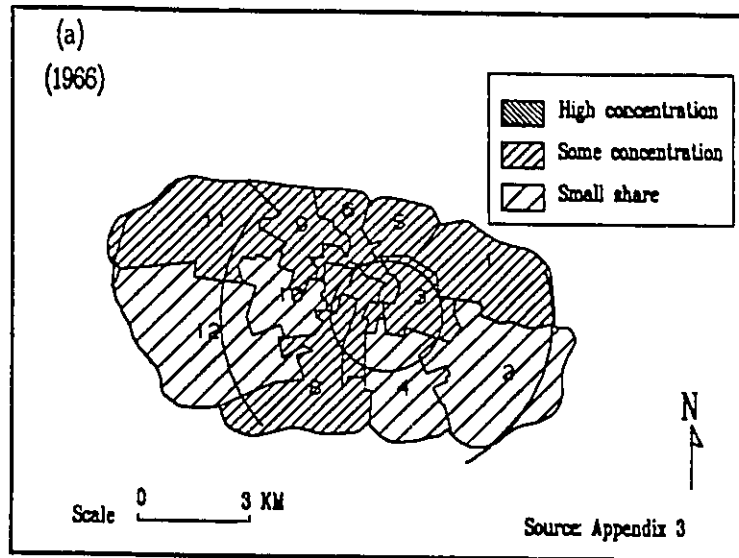
The previous section looked at the overall change among urban land uses in Tabriz over the past decades. This section examines the change in the spatial distribution of land uses over the 1966-1991 period and discusses the main causal factors. As mentioned in Chapter 3, the location quotient (LQ) method has been used to examine this change. Using this method, the area's share of each land use has been compared with the area's share of total developed land in Tabriz over the study period and the results have been mapped for each class of land for both 1966 and 1991. The comparison between the two maps shows how the distribution of each class of land has changed in Tabriz.

### 6.3.1 Change in Residential Land Use Pattern

As previously noted, the largest change among urban lands in Tabriz during 1966-1991 occurred in residential use. The process of recent urban growth has led to relatively higher concentration of residential land in 1991 compared with that of 1966. According to Appendix 3, the range of LQ rate for residential land use in Tabriz in 1966 varied between 0.77 to 1.26 meaning a relatively even distribution within the different areas. In 1966, while the northern and central districts including 9, 11, 3, 6, 1, 5, 7, 8 had some concentration of residential land use with the LQ of 1.02 to 1.26, districts 12, 2, 4, and 10 (in the west, east and south) had relatively smaller share with the LQ of 0.77 to 0.89 (Fig. 6.1, a).

As mentioned before, residential land use expanded by over 3200 ha during the 1966-1991 period. This vast expansion has mostly taken place in an east-west direction mainly because of the physical constraints created by the northern and southern mountains. The wider range of LQ for residential land use in 1991 (between 0.0 to 1.50) shows relatively higher concentration in some districts and the smaller share in others. As Fig. 6.1, b shows, in 1991 while eastern and western peripheries had a small share of residential lands, most of the northern and central parts (previously built-up areas) had relatively higher concentration. According to Appendix 6, most of the north and northwestern districts including 1, 2, 3, 16, 17, had the highest concentration with the LQ of between 1.38 and 1.49. Zone 19 had no residential land and zone 23 had a very small share of residential land with the LQ of 0.03. Although the northern and central districts had a relative concentration of residential land use, most of the recent residential developments have occurred in the east, southeast and southwest parts, but relatively in a low density pattern.

Fig. 6.1 Residential Land use Change in Tabriz



Several factors are associated with the change in residential land use pattern over the 1966-1991 period in Tabriz among which the following ones seem to be significant.

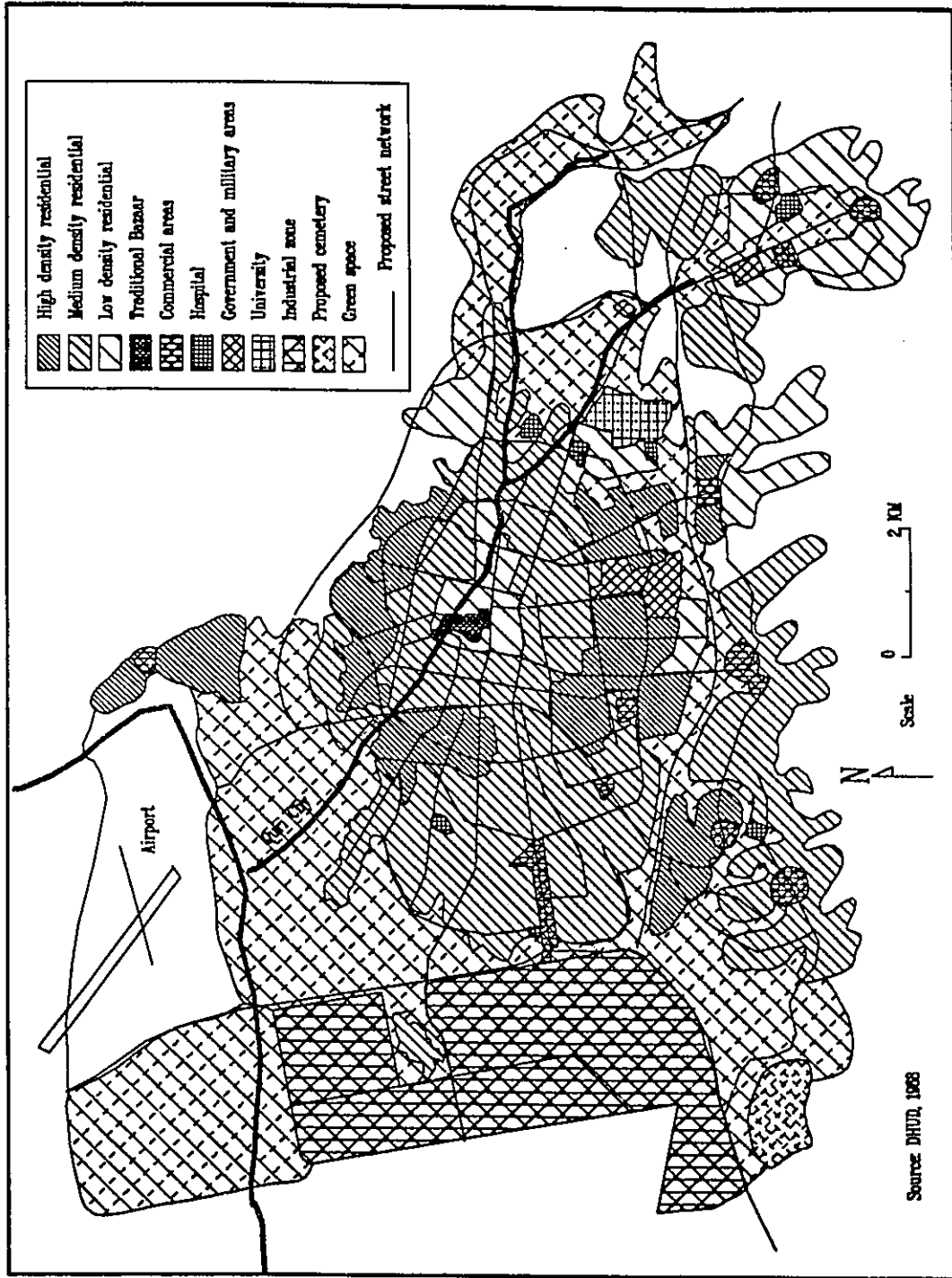
i. One of the important reasons is related to the zoning policy of the 1966 comprehensive plan. Though this policy had underestimated the extent of residential expansion<sup>3</sup>, it has had a significant impact in geographical distribution of residential areas during the recent decades. To reduce the congestion created by concentration of economic activities in the city centre, the plan had proposed a low residential density for the city centre, a medium density for districts surrounding the centre and a high density for inner city districts. The plan's proposal for the peripheral areas was medium density in the south and west and a low density in the east and southeast (Fig. 6.2). The comparison between Fig. 6.2 and 1991 residential land use distribution (Fig. 6.1, b) shows us the existing land use pattern has significantly been affected by the zoning policy of the comprehensive plan of 1966.

ii. Another significant factor of the change in the residential land use pattern is the change in the location of economic activities. Before 1966, most of the activities (commercial, industrial and services) were located within or around the city centre. For this reason and because of the limited use of motor vehicles in intra-urban movements, most people tended to live as close as possible to their work place which resulted in higher concentration of residential land use in the central districts. However, during the recent decades, most of the industrial activities in the city centre have moved to the periphery and all modern manufacturing units have been established

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<sup>3</sup> The plan's estimation for the expansion of residential land use by 1991 was 3,245 ha, but in reality it reached to 4,614 ha.

Fig. 6.2 Proposed Density and Land Use Patterns by the Master Plan of 1966 in Tabriz



Source: DHUD, 1968

in newly designated industrial zone. Moreover, most of the services related to industrial activities have moved to the vicinity of industrial zone. This new pattern of activity location coincided with modernization of the transportation system which enabled many people to live in suburbs. Consequently the central districts faced a reduction in residential density, while the suburbs expanded in low density form.

iii. Implementation of several public housing projects by government or public sectors during the 1970s and 1980s has been another major reason for the changing of the residential land use patterns in Tabriz. These projects mostly were carried out after the oil boom of the early 1970s and continued during the 1980s. Public housing projects, in fact, were part of the objectives of the comprehensive plan of 1966. Table 6.3 depicts the major implemented public housing projects and their geographical location in Tabriz during the 1970s and 1980s. These projects

Table 6.3 Main public housing projects carried out in Tabriz during the 1970s and 1980s

<u>No.</u>	<u>Name of project</u>	<u>Number of units</u>	<u>Location</u>	<u>Completed Year</u>
1	Manzariieh	500	south	1975
2	Shahrak-e-Imam	5456	west	1979
3	Koy-e-Shahid Beheshti	708	west	1975
4	Koy-e-Shahid Chamran	811	west	1984
5	Koy-e-Laleh	641	southwest	1975
6	Koy Shahid Madani	354	southeast	1972
7	Koy-e-Sherkat Naft	250	southeast	1979
8	Mojtameh Irdak	252	east	1977
9	Koy-e-Farhanghian	500	east	1985
10	Koy-e-Negin Park	368	east	1986
11	Koy-e-Khazar	154	inner city	1981
12	Koy-e-Ub-barhg	80	east	1973
13	Koy-e-Saeb	60	inner city	1977
Total		10134		

Source: Azimi, 1986

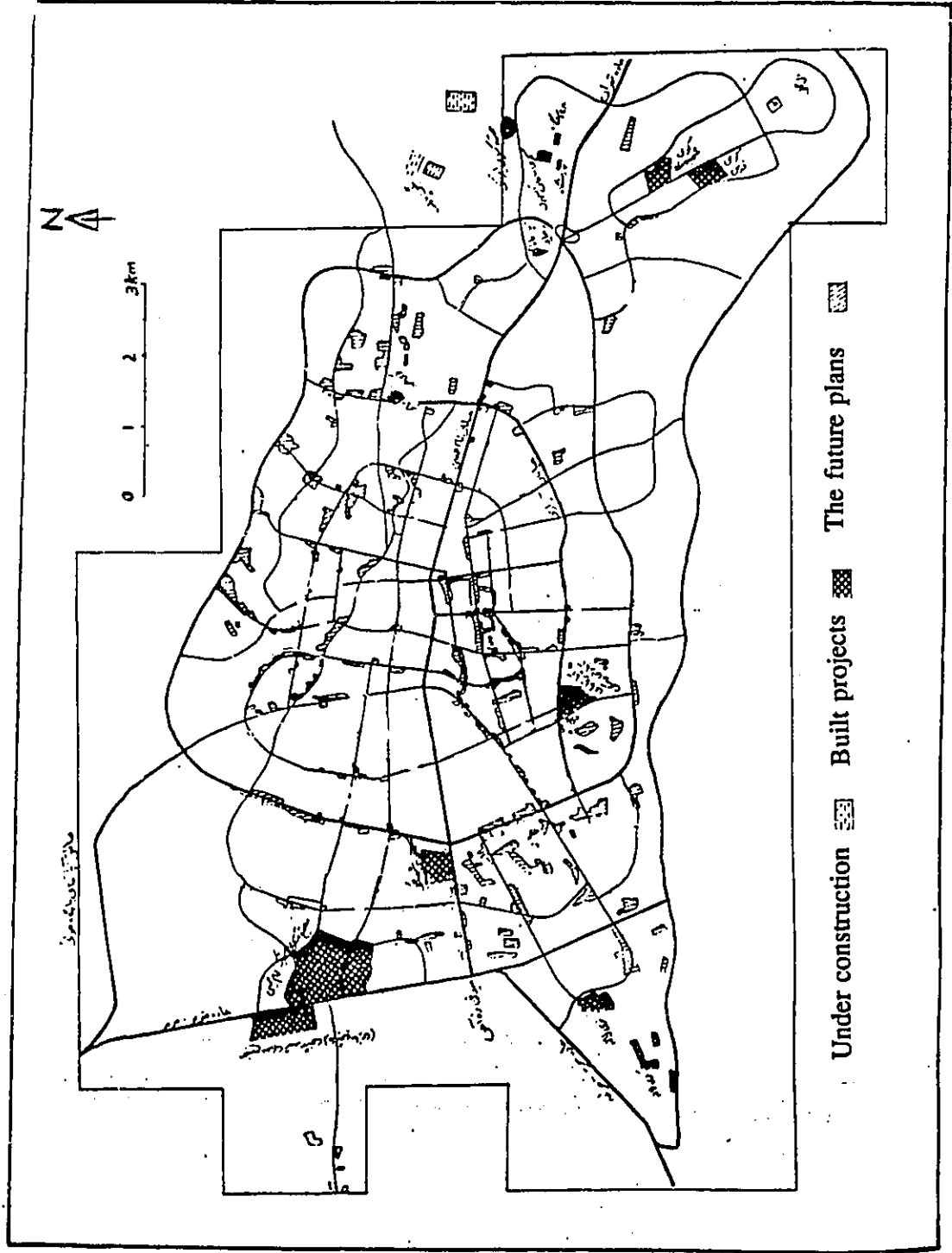
were mainly carried out in the fringe where adequate and low price lands were available. The

biggest projects were implemented in the west part- close to the industrial zone- in order to accommodate factory workers and reduce transportation costs and traffic (e.g. Shahrak-e-Imam, with over 5400 units; koy-e-Shahid Beheshti with 708 units; Coy-e-Shahid Chamran with 811 units; Koy-e-Laleh with 641 units). Some of them were constructed in the east end and south east (like Koy-e-Shahid Madani with 354 units; Koy-e-Sherkat-e-Naft, koy-e-Negin Park with 352 units; Koy-e-Farhangian with 500 units; Mojtabeh Irdak with 252 units) and one in the south (Koy-e-Abadani Maskan with 500 units). Only few and relatively small projects such as Koy-e-Khazar with 154 units and Koy-e-Saeb with 60 units were built in inner city.

These projects had two important impacts on residential areas in Tabriz: one was a morphological impact since almost all the construction were multi story residential buildings especially those in the east; and second, they attracted the private sector for further residential developments in the periphery (see Fig. 6.3 for the location of public housing projects).

Government involvement in residential land use development during the 1980s has mainly consisted of supplying site and services. Through a policy called "Amadehsazi", the government supplies land, basic infrastructure and services (e.g. street, water, sewer system, electricity, school, local shopping centre) for each site and provides loans for housing construction. The plan is implemented by two organizations: the Urban Land Organization (ULO) which is responsible for registering people, verifying their requests, obtaining land from other sources and allocating it to people; and DHUD responsible for providing development plans and preparing basic infrastructures and services.

Fig. 6.3 The Location of Public Housing Projects in Tabriz, 1972-1985



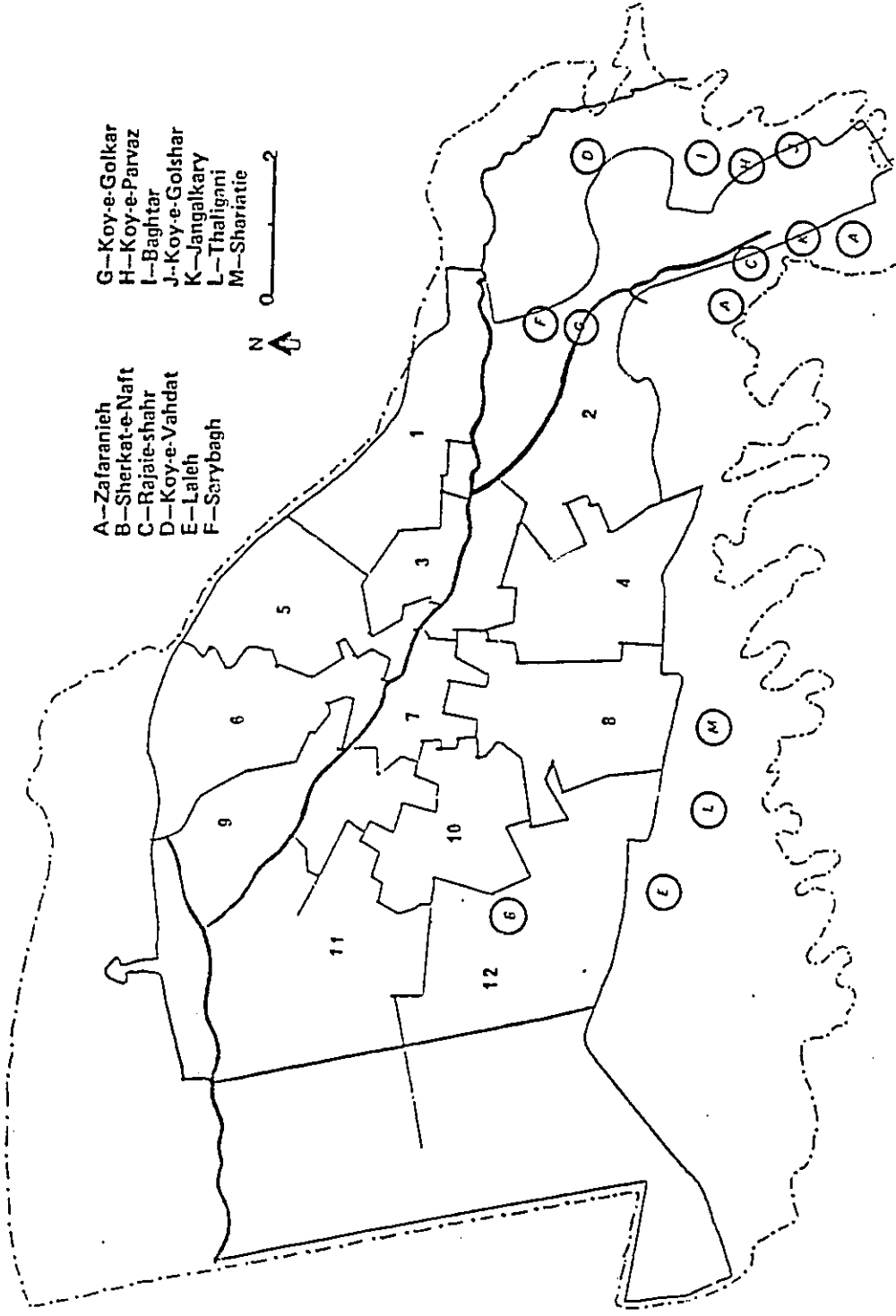
Two phases of the Amadehsazi projects have been implemented in Tabriz since 1982. In phase one (1982-1987), 13 projects were carried out on 504 ha of land of which 4 (116 ha) were located in the southwest and the rest in the east and southeast. Out of 504 ha allocated to these projects 236 ha (47 percent) was for residential and the remaining for other uses (transportation, recreation, education, commercial, etc.). Fig. 6.4 shows the location of Amadehsazi projects implemented during 1982-1987. Since these projects all were for single unit houses, they had a significant impact on low population density, especially in the east and southeastern peripheries.

In phase two (since 1987), 26 Amadehsazi projects are being implemented. These projects include 1659 ha of lands and the number of lots estimated to be allocated totals 50,866 units, of which 14,497 units were prepared and allocated to people by 1992. Among the 26 projects, most of them (18 projects) with about 950 ha are located in the east and south east. The projects of the second phase contrast with the first one in that they are planned to be in multistorey housing form which likely will increase the population density of peripheries.

### **6.3.2 Change in Transportation Land Use Pattern**

As mentioned before, with the 1081 ha increase, transportation land use had the second largest expansion among other classes in Tabriz over the 1966-1991 period. Main reasons for this increase are associated with the change in transportation mode, economic development and establishment of large scale manufacturing units which required better access within the city. For instance, the recent 14 times increase in the number of motor vehicles (see Chapter 5) obviously demanded larger transportation network which was provided through widening of the

**Fig. 6.4 The Location of Site and Services (Amadesazi) Projects in Tabriz, 1982-1987**



Source: Mohammadi, 1990

narrow passages in the previously built areas and the erection of new streets in the newly developed districts.

In 1966 transportation land use had a relatively even distribution with the LQ of between 0.77 and 1.26, but widening this range between 0.21 to 2.58 in 1991 shows more concentration of this land use over the past decades (Appendix 3). While central and northern zones had a relative concentration of transportation land use, eastern and western zones had smaller share of transportation land use (Fig. 6.5, a). The 1991 transportation pattern revealed some changes compared with that of 1966. In 1991, while the northern and central districts had small share, eastern and western zones (except zone 10) had a relative concentration. According to Fig. (6.5, b), in 1991 district 10 in the east and districts 13 and 16 in the inner city had the smallest share of transportation land use with the LQ of 0.21, 0.33 and 0.33 respectively, whereas districts 23 and 22 had the highest concentration of transportation land use with LQ of 2.58 and 2.12. The latter two, in the west and southwest, are the main industrial areas and where the major roads are converged. Districts 8, 9, 30, 31, 32 in the east had a relative concentration of transportation land use with the LQ of between 1.28 and 1.84. The reason for this relative concentration is because most of them are planned districts with adequate access roads. Districts 21, 29, and 33 in the southern part had almost their own shares with the LQ of 0.98 to 1.12. On the other hand, northern and most of the central and inner city districts had the small share of transportation land use. This is mainly because of their old structure or squatter settlements which lack adequate access roads and face high cost of building new streets, see also Fig. 6.6.

Fig. 6.5 Transportation Land use Change in Tabriz

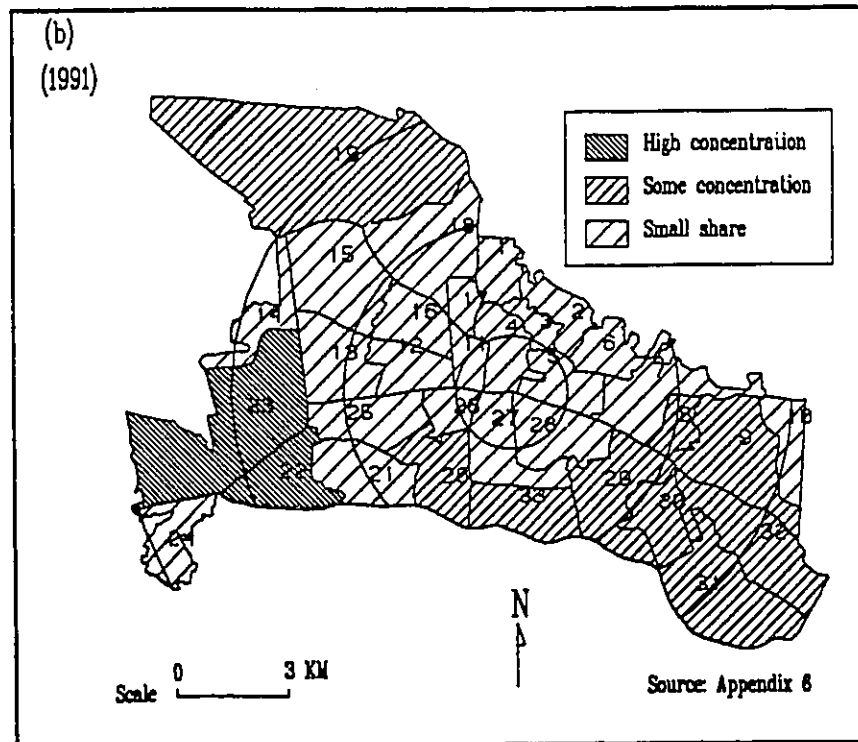
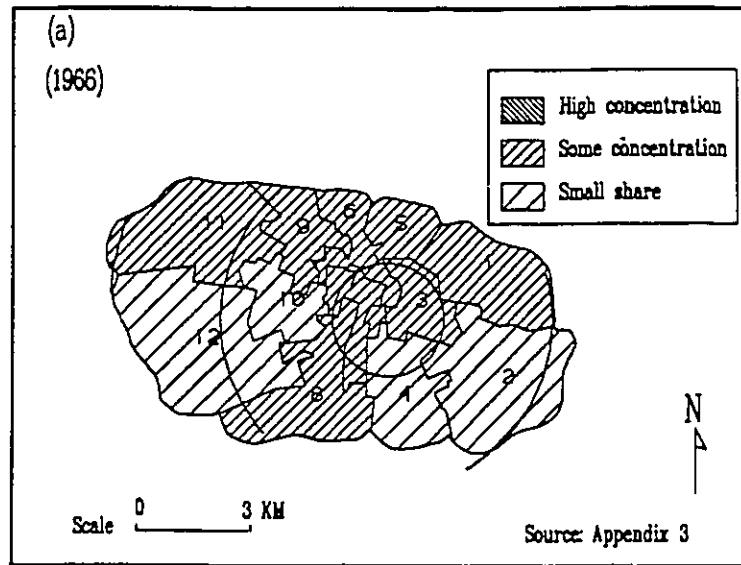
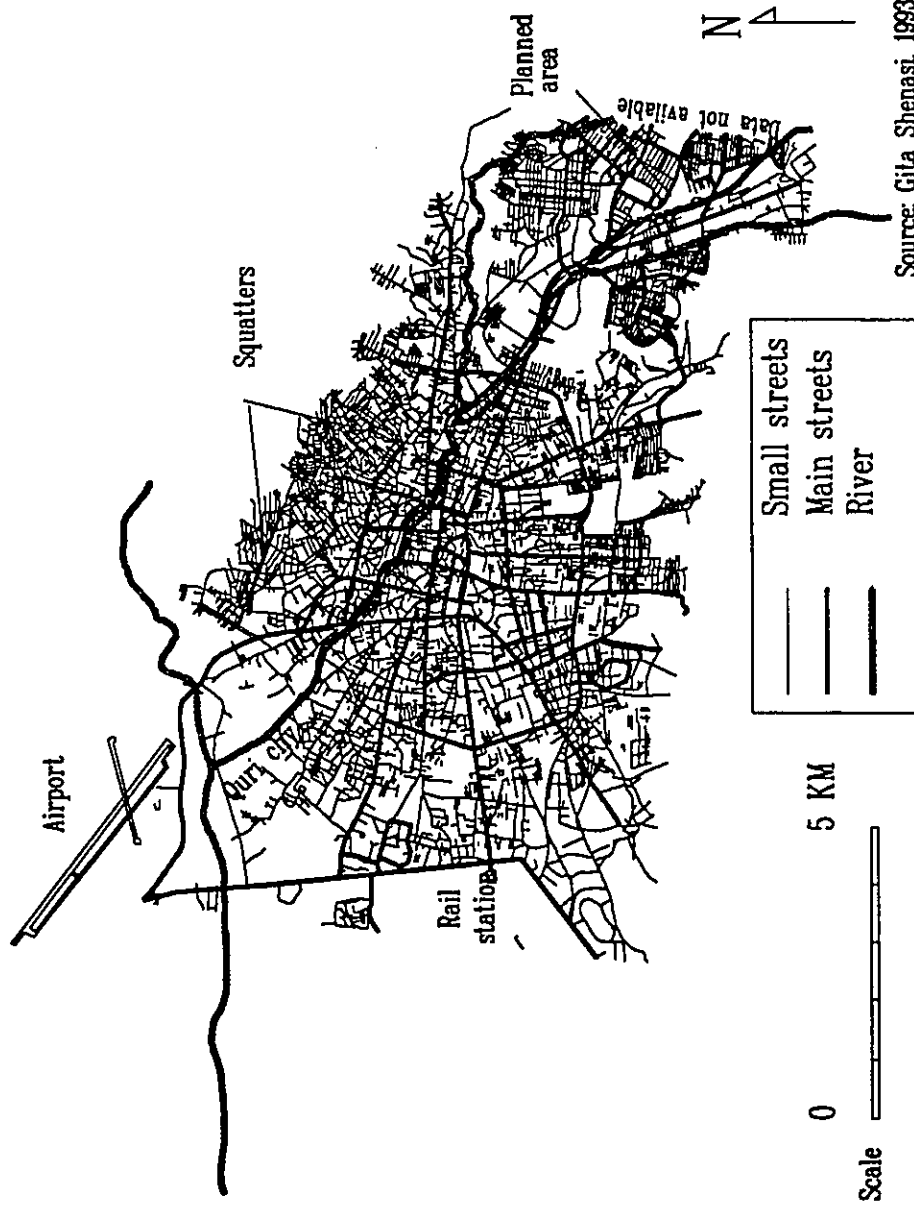


Fig. 6.6 Street Patterns in Tabriz, 1991



Source: Gita Shenasi, 1993

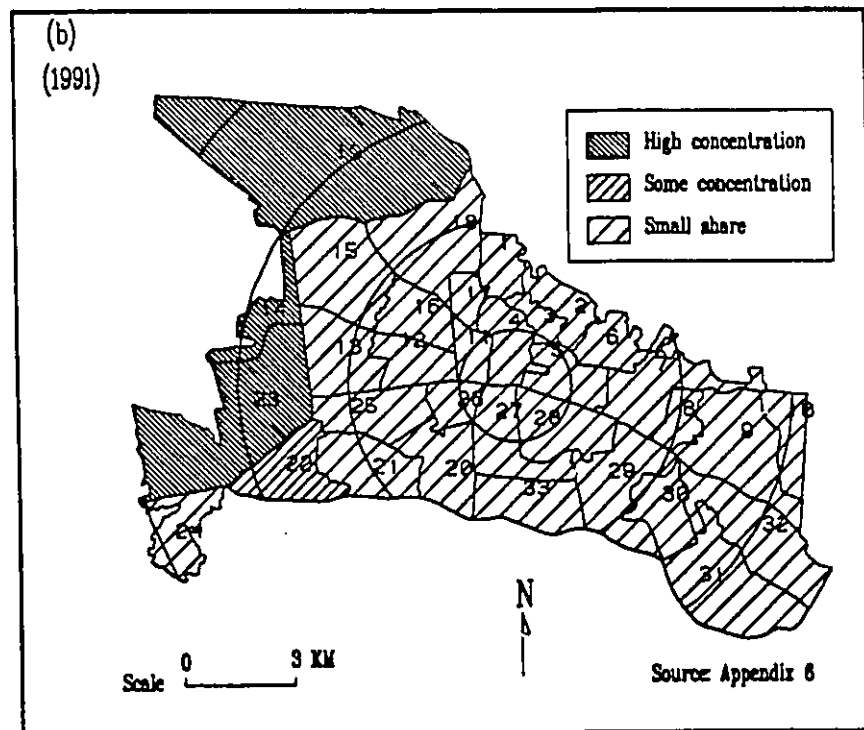
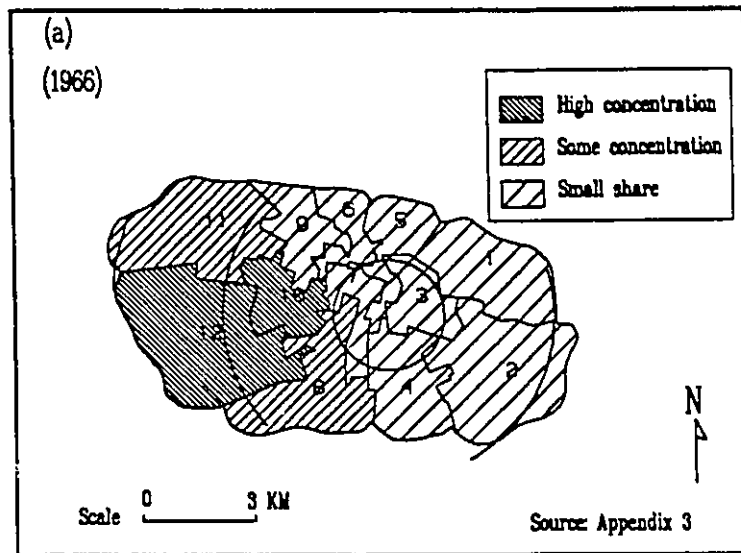
### 6.3.3 Change in Industrial Land Use Pattern

The industrialization process which began after the 1960s, has resulted in an important change in the spatial distribution of industrial activities in Tabriz. This change includes both the relocation of activities inside the previously built-up areas and converting a considerable amount of land to industrial use in the newly developed districts. Based on Appendix 3 and Fig. 6.7, a, zones 10 and 12 in the western section of the city had the highest concentration of industrial land use with the LQ of 3.98 and 3.70. Zones 8 and 11 had some concentration of industrial land use with the LQ of 1.21 and 1.26 and the remaining districts had small share of industrial activity with the LQ of below 1.0 .

The process of recent urban development in Tabriz has resulted in more concentration of industrial activities as the range of LQ for this land use has changed from 0.03 to 3.98 in 1966 to 0.0 to 7.51 in 1991. In 1991, zones 23, 14 and 19 had the highest concentration with the LQ of 7.51, 4.41 and 2.91. These three zones accounted for 82.5 percent of total industrial land use in the city in 1991. These four zones are all located in the west and southwest and have been designated as the industrial zone. Zone 22 had almost its own share with the LQ of 1.13. Other 29 zones had the small share of industrial activity with the LQ of less than 1 (Fig. 6.7, b).

As discussed before, the selection of Tabriz as an industrial pole in 1962 (Amirahmadi, 1987) and subsequent government and private investments have been the main reasons for industrialization of Tabriz during the recent decades. With the designation of a vast industrial zone in the west part, related activities gradually moved from city centre to this zone and the new

Fig. 6.7 Industrial Land use Change in Tabriz



manufacturing units had to be established in this section. The major relocation occurred in the inner districts of 1966 map (zones 8, 10) which included 51 ha industrial land use, but in 1991 the comparable districts (12, 16, 20, 21 and 26) had only 13 ha. Two main reasons associated with this relocation are: first, the 1966 comprehensive plan's decision to remove nuisance industries from residential districts and relocate them in industrial zone, and second, the decline of household industry, e.g. many families who had carpet weaving workshops left their jobs in competition with modern factories (DHUD, 1992).

#### **6.3.4 Change in Educational Land-Use Pattern<sup>4</sup>**

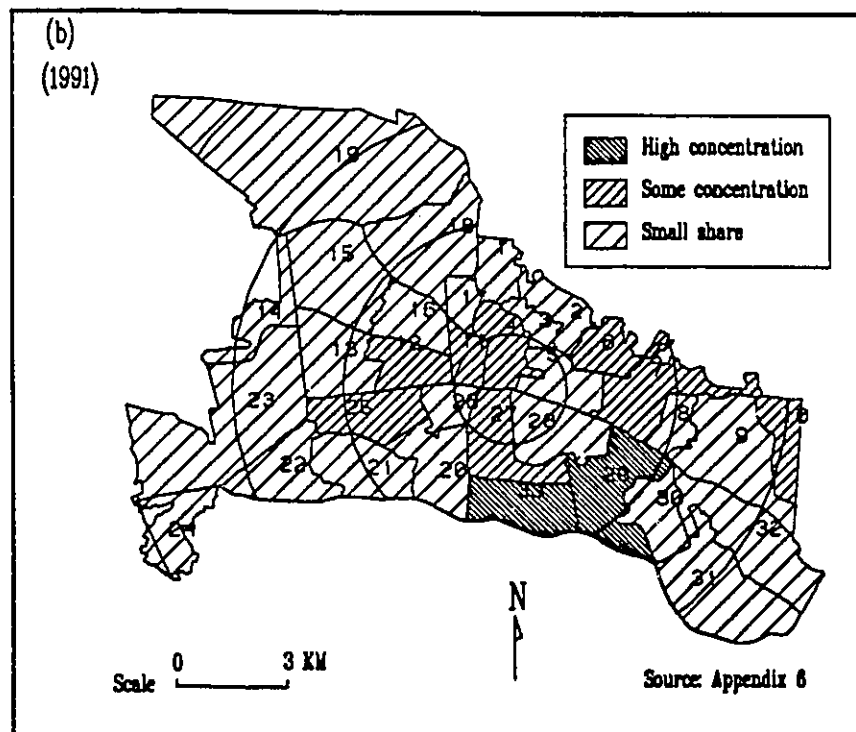
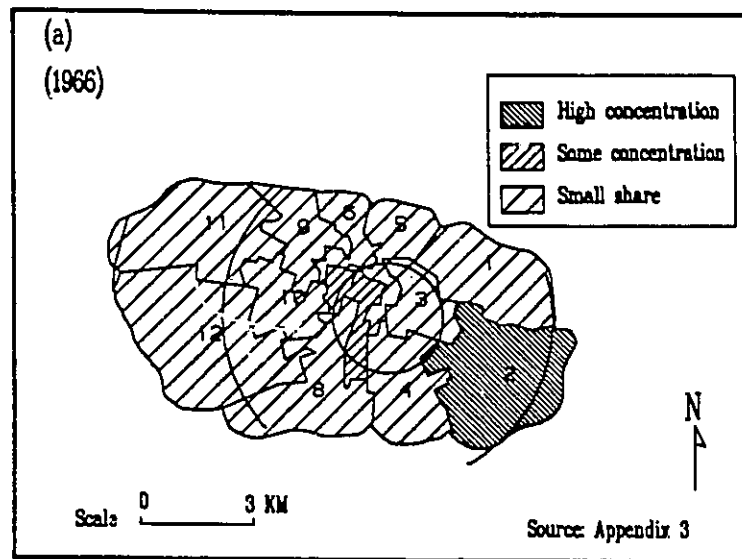
Except for residential, transportation and industrial land uses which had the biggest expansion in absolute terms, other classes of land use had small changes. For example, educational land use increased from 76.5 ha in 1966 to 184.2 ha in 1991, but its share of total developed area decreased from 3.6 percent to 2.3 over the same period (Table 6.1).

In 1966, zone 2 had the high concentration of educational land use with the LQ of 5.76 mainly because of the location of the University of Tabriz in this part of the city. Zone 7 in the city centre had some concentration with the LQ of 1.75. This was because of the location of several colleges such as the Teachers Training Centre, Institute of Technology of Tabriz and most of high schools in the city centre. The remaining zones had small share of the education activity with the LQ of below 1.0, especially zones 9, 10 and 12 had very small share with the LQ of less than 0.15 to 0.28 (Fig. 6.8, a).

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<sup>4</sup> Here, educational land use includes all educational related uses such as, kindergarten, elementary schools, guidance schools, high schools, colleges and universities.

Fig. 6.8 Educational Land use Change in Tabriz



Over the 1966-91 period the distribution of educational activity became more concentrated. In 1991, zone 29 was the most specialized district for education activity with the LQ of 11.09. This was again because of the location of the university and its recent development in this part of the city. Zone 33 beside the zone 29 was another area with the high concentration of educational activity with the LQ of 3.41 because of the establishment of a number of new collages built in this section. Zones 4, 7, 11, 12, 26 and 27 in the centre and inner city and zones 7 and 10 in the east had some concentration with the LQ of between 1.02 and 1.76 whereas most of the zones in the north, east and western parts had the small share of educational land use (Fig. 6.8, b). If we exclude the higher educational uses, which includes over 48 percent of total educational lands, the patterns of educational land use becomes less concentrated.

### **6.3.5 Change in Commercial Land Use Pattern**

Commercial land use comprises retailing and wholesale uses, business services, hotels and guest houses. Over the 1966-1991 period, commercial land use in Tabriz did not have much increase in absolute terms, however, its distribution pattern revealed important changes. The area covered by commercial activity was 55.7 ha in 1966 which increased to 93.9 ha in 1991. Compared with the average increase in total built-up area, commercial land use with 68 percent increase had one of the lowest expansion among the other land uses (Table 6.1).

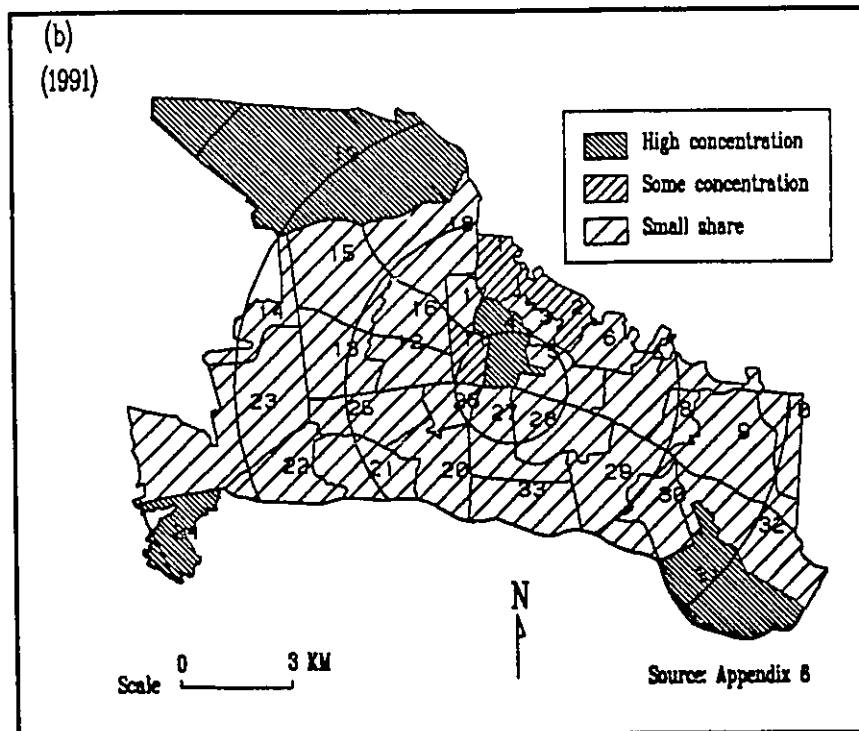
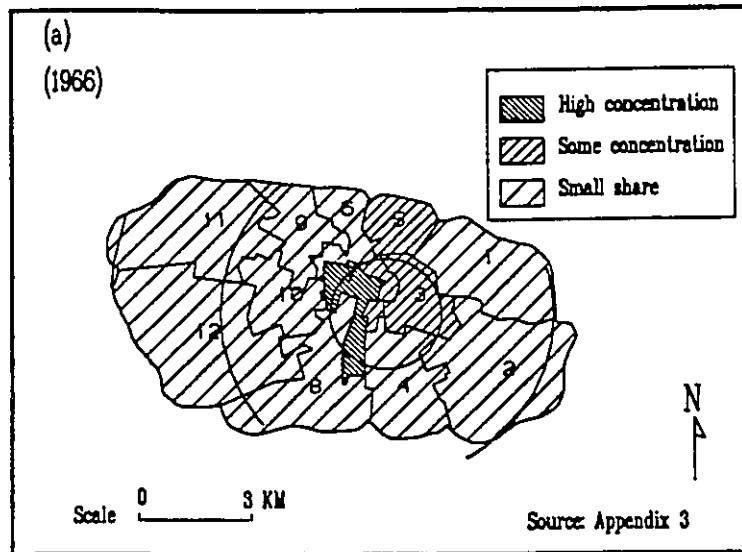
In 1966, commercial activities were concentrated in the city centre where the traditional bazaar is located (Fig. 6.9, a). Zone 7 had the highest concentration with the LQ of 3.85 and zone 5 with the LQ of 1.61 had some concentration of commercial land use. Zone 3 and 6 had almost

their own shares with the LQ of 1.03 and 0.96. The remaining areas had a small share of commercial land use. In 1991, in addition to central part, other areas especially one in the east and another in the west became more specialized in commercial activity. According to Fig. 6.9,b, zone 4 in the city centre (where the bazaar is located), had the highest concentration with the LQ of 5.47. Zones 24 in southwest and zone 31 in the east and 19 in northwest were others areas which had a high concentration of commercial land use with the LQ of 5.04, 3.40 and 2.79 respectively. Knowing that the city centre had the major commercial concentration in the past we can say that most of the new commercial developments have occurred in the peripheries. A number of other zones e.g. 1, 2, and 11 in or close to the centre had some concentration of commercial land use with the LQ of 1.57, 1.41 and 1.70 respectively. The remaining 26 zones had less share of commercial activity.

The newly developed commercial areas in the peripheries have mostly occurred along the major entering roads to the city. For instance, in district 31 the main entering road from the east has attracted most of the linearly extended retail shops and services such as hotels, guest houses and bus terminals. In zone 19, the Tabriz-Marand road has attracted many auto repair shops and some wholesaling units and in zone 24 (in southwest) the areas along the Tabriz-Maragheh road has attracted many garages, repair shops and other industrial related services.

During the recent decades, the traditional bazaar has continued to serve as the most important commercial centre, providing a variety of high and low order goods in the city. Since the 1960s, some interesting changes have occurred in the activity pattern within the bazaar. Since activities

Fig. 6.9 Commercial Land use Change in Tabriz



in the bazaar, in essence, are to respond to the needs of society, the change in its activity pattern to some extent shows the change in the society. For this reason, and because of the economic importance of the bazaar, the change in the bazaar's land use pattern over the last three decades is briefly discussed.

In pre-modern Iran, the bazaar was the major centre for economic activities such as trade, production and storage in most cities. Since the beginning of the modernization era and especially after the 1960s, while the production and storage activities have gradually moved out, the trade has maintained its significance. In this respect, Table 6.4 shows the extent of change in land use pattern within the traditional bazaar of Tabriz between 1960 and 1993.

Based on Table 6.4, over the past three decades, while the bazaar has remained unchanged in terms of area, the number of its commercial units has increased from 4,538 in 1960 to 4,744 in 1993. During this period, in general, the number of stores in 9 types of activities has increased, in 10 of them it has decreased and in 1 it has remained unchanged. The number of abandoned units has risen from 33 to 143. The 206 added shops during 1960-1993 have been due to dividing the large stores into smaller ones.

Based on Table 6.4, the major change among the different types of activities within the bazaar were: a high increase in the number of activities involved in high order goods, for instance, carpet and jewels with 254 and 143 units increase. This increase has probably been because of the overall improvement in the quality of urban life during the past three decades. Activities

Table 6.4 Land use change in traditional bazaar of Tabriz, 1960-1993 <sup>5</sup>

Land use	1960 <sup>a</sup>	1993 <sup>b</sup>	(b-a)	(b-a)100	PFT60 <sup>c</sup>	PFT93 <sup>d</sup>	(d-c)
Carpet	1102	1356	254	23.0	24.3	28.6	4.3
Jewellery	85	228	143	168.2	1.9	4.8	2.9
Fabric	304	386	82	27.0	6.7	8.1	1.4
Clothing	456	527	71	15.5	10.0	11.0	1.0
Hardware	284	347	63	22.2	6.2	7.3	1.1
Banks	12	25	13	108.3	0.3	0.5	0.2
Offices	23	35	12	52.2	0.5	0.7	0.2
Stationery	53	55	2	3.8	1.2	1.2	0.0
Meet	33	34	1	3.0	0.7	0.7	0.0
Fruit & Veg.	66	58	-8	-12.1	1.5	1.2	-0.2
Health product	31	23	-8	-25.8	0.7	0.5	-0.2
Coppersmithing	32	22	-10	-31.3	0.7	0.5	-0.2
Confectionery	38	24	-14	-36.8	0.8	0.5	-0.3
Repair shop	92	62	-30	-32.6	2.0	1.3	-0.7
Restaurant	121	90	-31	-25.6	2.7	1.9	-0.8
Shoe & leather	585	510	-75	-12.8	12.9	10.8	-2.1
Houseware	174	92	-82	-47.1	3.8	1.9	-1.9
Grocery	611	509	-102	-16.7	13.5	10.7	-2.7
Industry	371	186	-185	-49.8	8.0	3.9	-4.0
Mosques	32	32	0	0.0	0.7	0.7	0.0
Empty	33	143	110	333	0.7	3.0	2.3
Total	4538	4744	206	4.4	100.0	100.0	

<sup>a</sup> Number of shops in 1960 <sup>b</sup> Number of shops in 1993

<sup>c</sup> Percentage from total of 1960 <sup>d</sup> Percentage from total of 1993.

Source: DHUD, 1993

involved in fabric, clothing and hardware with 82, 71 and 63 units respectively had also a high increase which has likely been in response to the increasing market demand. In contrast, activities related to industry (usually small workshops) have significantly declined (from 371 units to 186). This decrease has been due to either their being identified as nuisance and

<sup>5</sup> Data for land use change in the traditional bazaar of Tabriz has been obtained through an enumeration by DHUD in 1993. Lands allocated to different activities have been classified only based on the type of activity in which is taking place. According to this enumeration, activities in the bazaar have been divided into 20 types and the number of units (shops) in each type of activity both for 1960 and 1993 have been accounted. Activities have been sorted in terms of change in the number of units in each type, their absolute and percentage change and the share of each activity in both years.

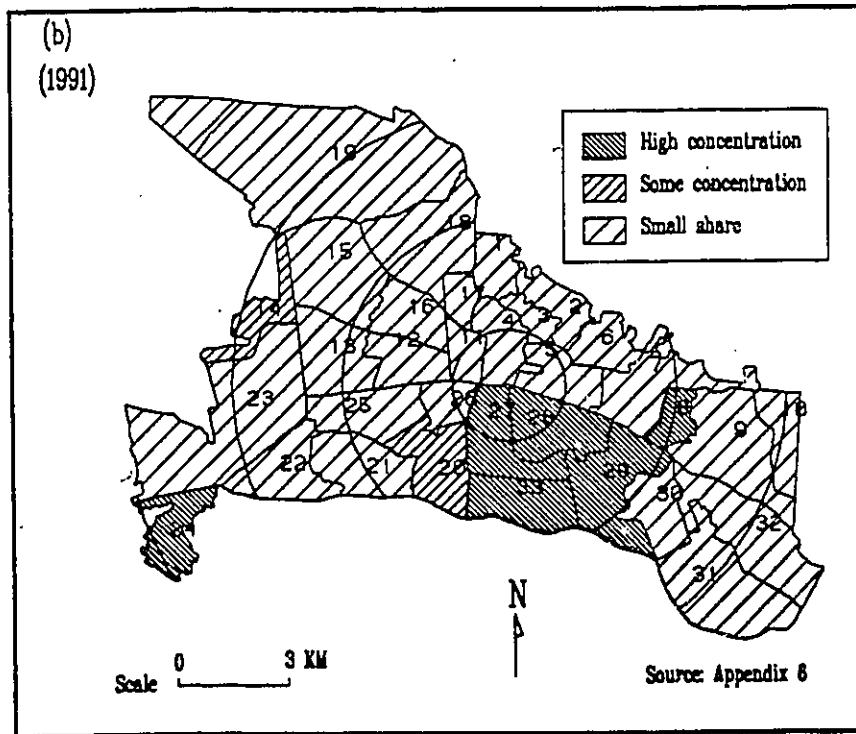
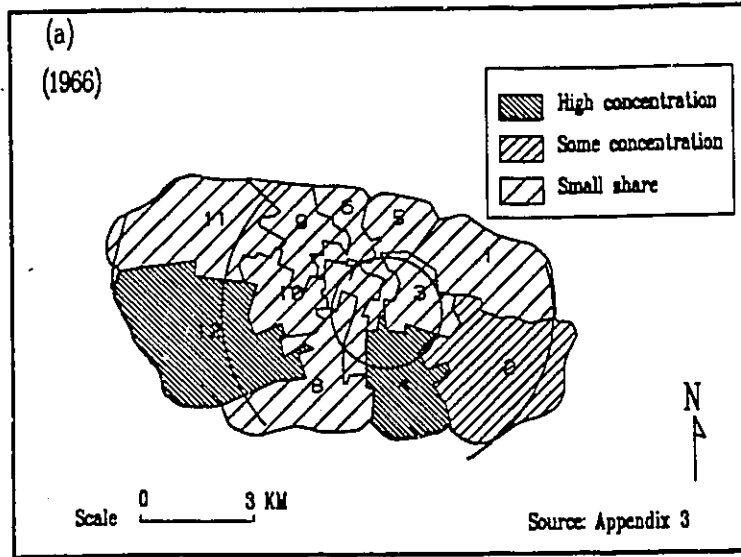
removed from the bazaar or their elimination in competition with modern factories. Another main decrease has been in activities relating to grocery, houseware and shoe and leather units. While the decrease in the number of houseware units has been due to their being moved to the peripheries mainly for better accessibility, the decline in the number of grocery and shoe and leather units has presumably been due to the decline in the population of the city centre and transfer of these units to the newly constructed streets beyond the city centre. These factors have likely caused the decrease in the number of other activities such as confectionary and health products as well.

#### **6.3.6 Change in Government Land Use Pattern**

Government land use includes all departments and offices run by government agencies and armed forces. In terms of area, most of the government land use both in 1966 and 1991 belonged to the armed forces. As Fig. (6.10, a) shows, in 1966, zone 4 had the highest concentration of government land use with the LQ of 3.73. This was mainly because of the location of the city's largest garrison and police headquarters in this zone. Zone 4 alone had 56% of the total government land uses (Appendix 1). Zone 12 was another area with high concentration with the LQ of 2.06 because of the location of some government offices such as Custom Office, Department of Road and Transportation and National Oil Company in proximity of the rail station. Zone 2 also had some concentration because of the locations of a number of offices like TV and Radio stations, Department of Agriculture and Department of Energy.

During the 1966-1991 period, despite the absolute increase in government land use from 151 ha

(Fig. 6.10 Government Land use Change in Tabriz



to 222 ha, its relative share from total built-up area decreased from 7 percent to 2.8. Most of the 71 ha added to this activity was a result of the construction of new government buildings and the establishment of another military base in north west.

Like other land uses, the distribution of government activity over the 1966-1991 period has become more concentrated as the range of LQ increased from (0.0-3.73) to (0.00-5.92). In 1991, zone 33 where the city's main garrison is located, had the highest concentration with the LQ of 5.92. Other zones including 28, 27, 29, 24 and 8 also had a high concentration of government land use with the LQ of 4.52, 3.45, 2.76, 2.03 and 2.03 respectively (Fig. 6.10, b). Such concentration has been due to the construction of the most newly built government offices and removal of some old offices from the city centre and their relocation along the two main streets; one located in district 27 and 28; and the other in the east in zones 8 and 29. Zones 14 and 20 had some concentration with the LQ of 1.2 and 1.1 and the rest had the small share of government land use.

### **6.3.7 Change in Public Organizations Land Use Pattern**

Public organizations land use includes uses in urban infrastructures, religious and cultural activities. Among public organizations land uses, religious centres which include mainly mosques and Hossyniiyh are distributed almost evenly across the city. These centres follow mainly the population distribution pattern, because they are built by the residents of each neighbourhood and planning decisions usually do not affect their locations. However, the location of infrastructures built usually by government agencies are related to the planning

decisions, geographical location and availability of land. Maps illustrating these two groups combines them under one class of public organizations. In 1966, there was 69 ha of this type of land use which constituted 3.2 percent of total built-up area. According to Fig. 6.11, a, in 1966 zone 8 had a high concentration with the LQ of 2.16, more likely, because of its relative height and available land had been allocated for infrastructures such as water reservoirs. Zones 1, 2, 10 and 12 in the eastern and western sections, where adequate land was available, had some concentration of public organizations. Zone 7 also in the centre because of concentration of old mosques and other religious building was another zone with some concentration.

During the 1966-1991 period, most of the newly public organizations were added to peripheral zones. Zones 1, 6, 7, 18, 24, 31, 32, and 33, all in the fringe, had high concentration with the LQ of over 2.0. Zone 2 had some concentration and the remaining 24 zones had small share of public organization lands (fig. 6.11, b). This type of distribution is mainly related to the geographical location of these areas in terms of altitude and available land.

### **6.3.8 Change in Health Care Land Use Pattern**

Health care land use includes hospitals, clinics and public baths. In 1966 there was a total of 18 ha of land categorised under health care activity which increased to 51 ha in 1991. In 1966, zone 4 with the LQ of 2.3 had the highest concentration and zones 1, 12, 8, 3 had some concentration with the LQ of 1.79, 1.36, 1.16, 1.1 respectively and the remaining zones had less than of their own shares (Fig. 6.12, a).

Fig. 6.11 Public Organizations Land use Change in Tabriz

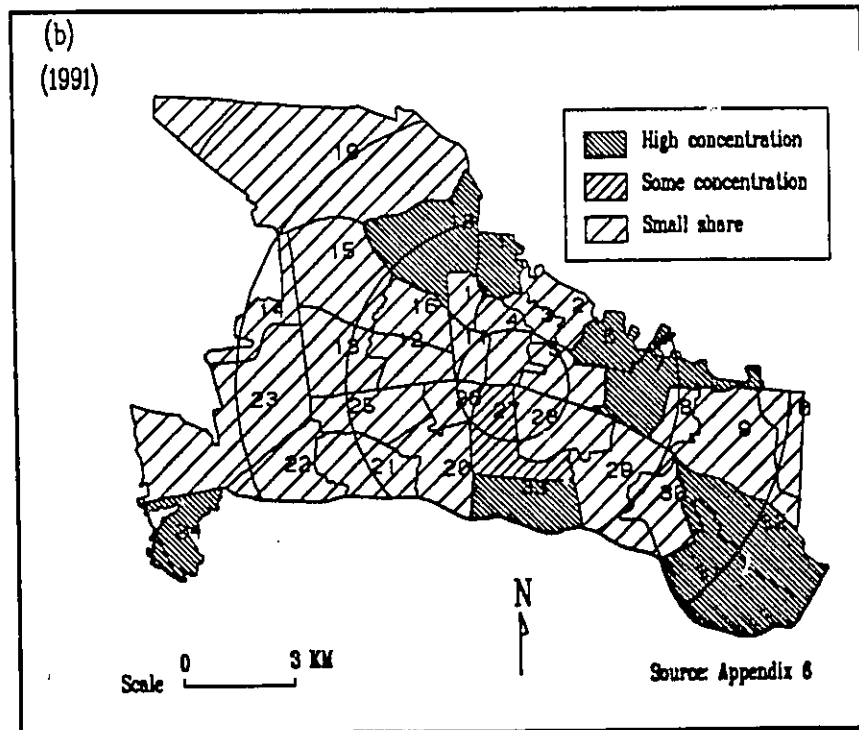
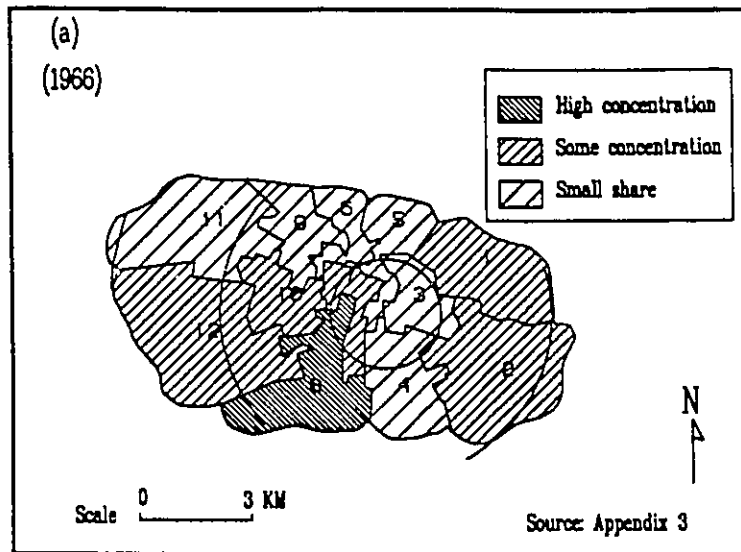
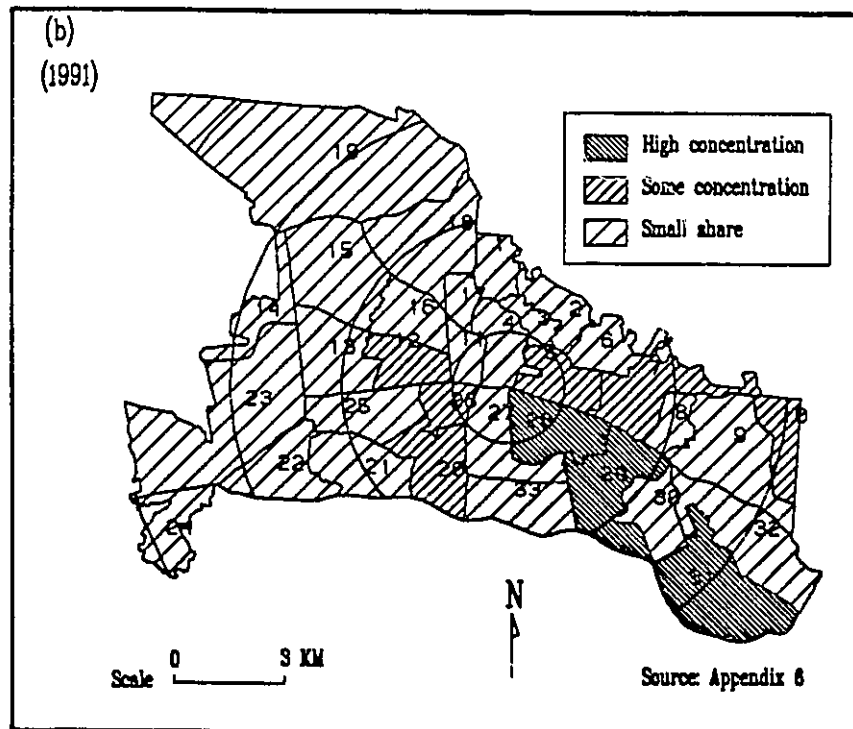
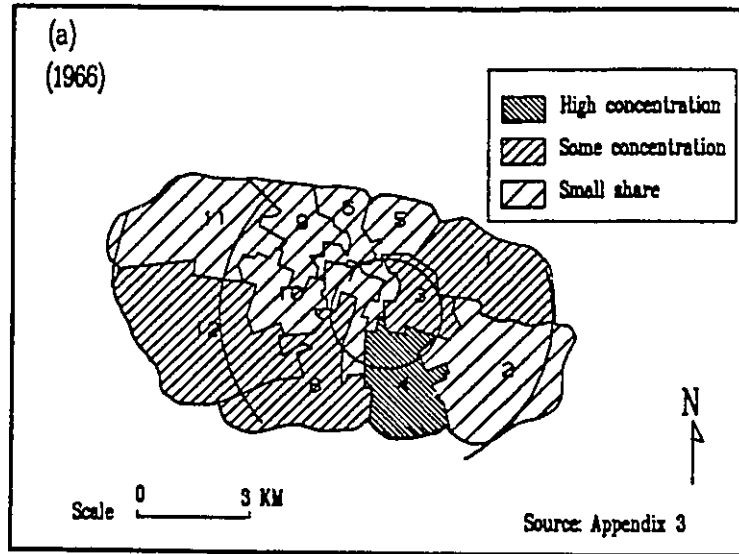


Fig. 6.12 Health Land use Change in Tabriz



In 1991, the wider range of LQ shows more specialization of health care activity in some areas. Zone 31 in the east had the highest concentration with the LQ of 7.04. This was mainly because of the establishment of newly built hospitals in this part of the city. Zone 29 and 28 besides each other were other areas with high concentration of health care activity with the LQ of 5.42 and 2.91. The reason for this concentration is because of the location of most previously built hospitals in these zones. Zones 5, 7, 26 12 and 20 had some concentration with the LQ of between 1.02 and 1.72 because of their proximity to the city centre where most of the private clinics and doctors offices are located. The remaining zones had small share (Fig. 6.12, b).

### **6.3.9 Change in Recreational Land Use Pattern<sup>6</sup>**

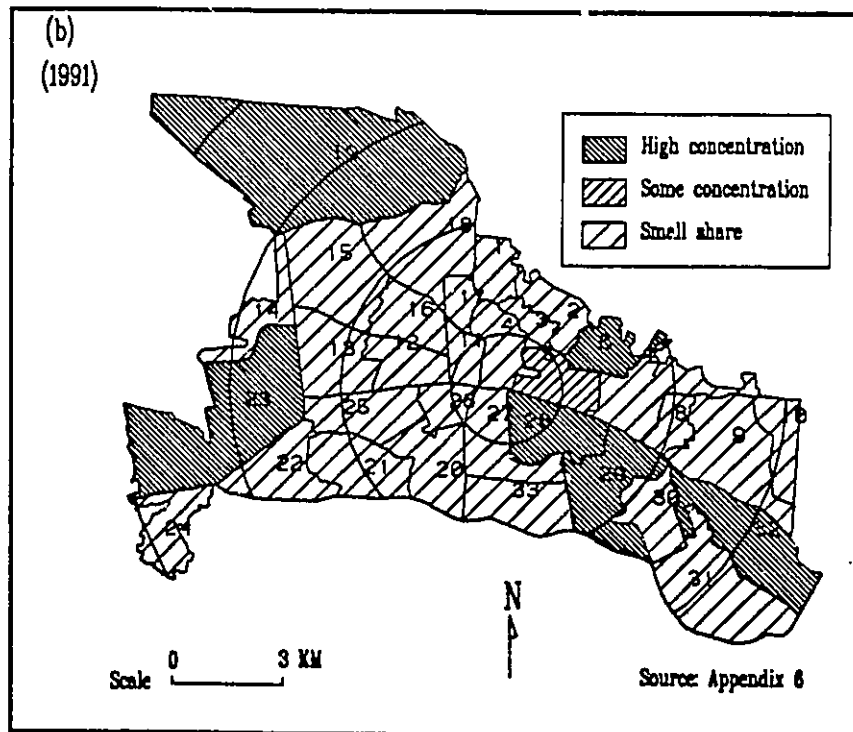
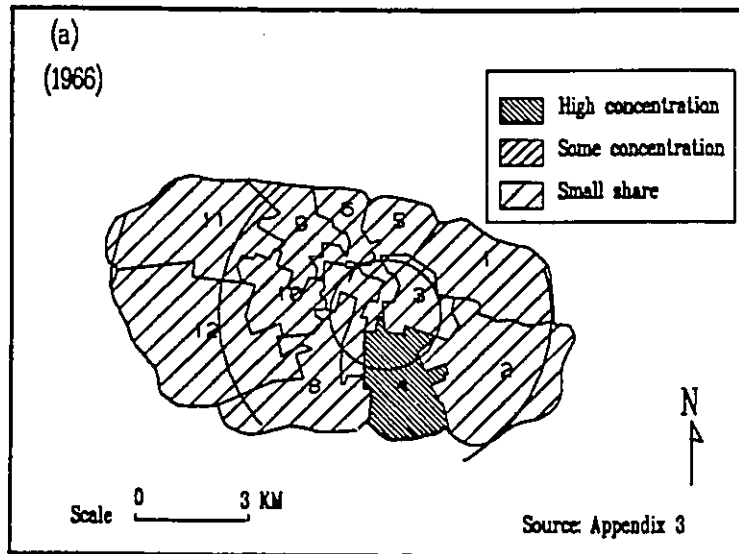
In 1966, the smallest portion of land had been allocated to recreational use. In fact, with 10 ha Tabriz had very limited recreational land for its over 400,000 population. As a result, one of the objectives of 1966 comprehensive plan was to encourage recreational development. With an increase from 10 ha to 76 ha during 1966-91 period, recreational land use proportionally was the fastest expanding land use among others. For this relatively rapid expansion, its share increased from 0.5 percent in 1966 to 1.0 percent in 1991.

In 1966, zone 4 had the highest concentration with the LQ of 4.88. This was mainly because of the location of the main stadium of the city. All the remaining zones had small share of recreational land with the LQ of less than 1.0 (Fig. 6.13, a). During the 1966-1991 period, with

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<sup>6</sup> In 1966, land use data for recreational category included parks and sports fields and tourist centres, but in 1991 data, parks with about 65 ha were excluded from this category along with planted forest and cemeteries which were classified under open space. Therefore, recreation category in 1991 data, refers to sports fields and tourist uses.

Fig. 6.13 Recreational Land use Change in Tabriz



the construction of a number of sport centres in different section, other areas also acquired more share of recreational land use. For example, out of 76 ha of recreational land use about 66 ha were stadiums and other sports fields. Zone 19 and zones 29, 6, 28, 32 and 23 with the LQ of 5.32, 3.04, 2.61, 2.55, 2.17 and 2.09 respectively were areas with high concentration. In zone 19, a sport complex was built during the 1966-91 period mainly for availability of adequate land and low price of land. The high concentration in zone 28 is because of the location of previously built stadium and in zone 29 for the location of university's sports field and in zones 32 and 6 because of the erection of newly built stadiums. Zones 5 and 2 had almost their own shares of recreational land with the LQ of 1.08 and 0.98 and the rest had small share (Fig. 6.13, b).

#### **6.3.10 Open Space Land Use Pattern**

Open space land use includes public parks, planted forest and cemeteries. As mentioned before, the open space land use was not classified separately in the 1966 data, but in 1991, measured separately, it included some 208 ha from total developed areas. From 208 ha, 64.7 ha was public parks, 62 ha planted forest, and 81.7 ha cemeteries. The overall distribution of open space land use is illustrated in Fig. 6.14. Accordingly, in 1991 open space land use was mostly concentrated in the peripheral districts especially in the east, south and south west. Districts 8 and 31 had the highest concentration with the LQ of 9.24 and 8.76 because of the location of the largest public park (El-Gholoi) and forest plantation. Other zones including 10, 20 for having proportionally more public parks and zone 24 for the location of main cemetery of the city had high concentration of open space. Zone 17, 33, 11 and 3 had some concentration with the LQ of 1.67, 1.54, 1.34 and 1.1. Other zones especially most of the central and inner city zones had small

share of open space land. In general, about 75 percent of parks and planted forest are concentrated in low density residential areas of the east, whereas most land occupied by cemeteries is located on the foothills of south, southwest and northern parts of the city (Appendix 5).

### **6.3.11 Under Construction Land Use**

In 1991, some 197 ha of land was classified under construction land use. As Fig. 6.15 and Appendix 4 show, the fringe areas, especially in the east and southeast, had the most land under construction. Zones 29, 32, 30, and 21 had the highest concentration with the LQ of 6.78, 4.6, 3.63 and 2.08 respectively. These zones are located in the east, southeast and south where a number of residential development mainly for Amadehsazi projects are undertaking. Other districts including 9, 23, and 30 in the east or south west had some concentration with the LQ of 1.02 to 1.31 mainly because of developing the residential or industrial projects.

### **6.3.12 Agricultural and Vacant Land Use Change**

In 1966, from total 3,866 ha of urban lands 1,739 ha (about 48 %) was agricultural and vacant lands from which about 512 ha (29.5 %) was in district 12 and 294 ha (16.9 %) in district 2 (Appendices 1 and 2). Other districts, especially those in the city centre like 7 and 3 had the smallest share of agricultural and vacant lands (Fig. 6.16, a).

Over the recent decades, with the rapid physical growth, more agricultural and vacant lands have gone under construction. For this reason, the city limits had to be redefined to cover a larger

Fig. 6.14 The Spatial Distribution of Open Space Land use in Tabriz, 1991

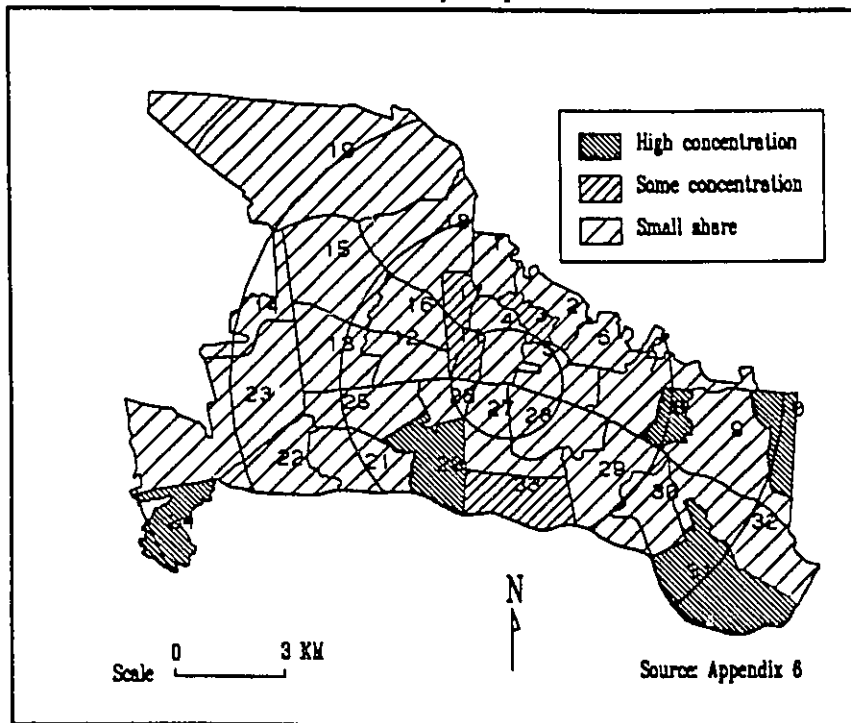


Fig. 6.15 Distribution of Under Construction Land use in Tabriz, 1991

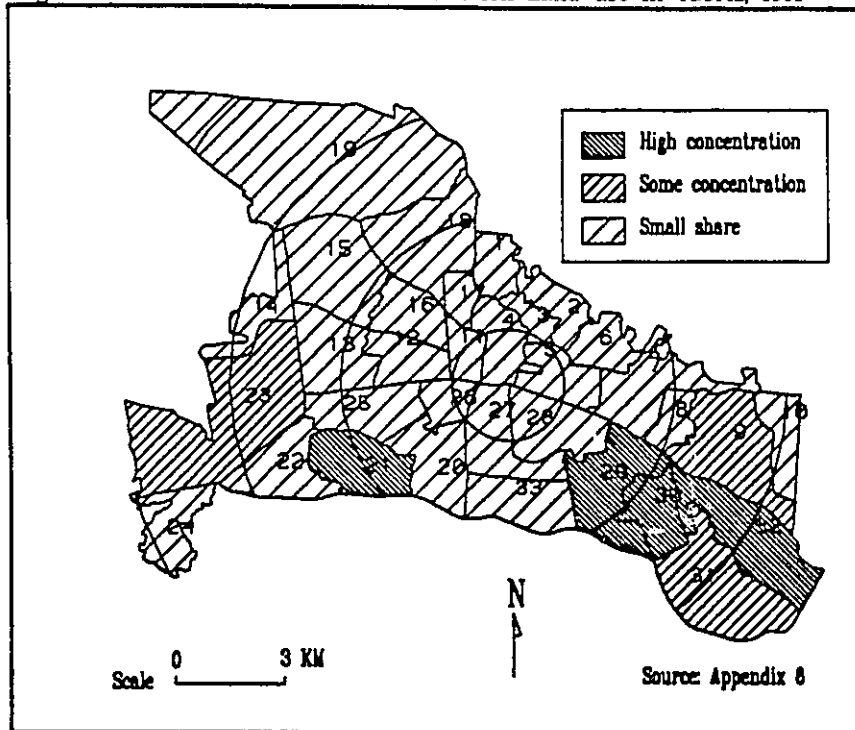
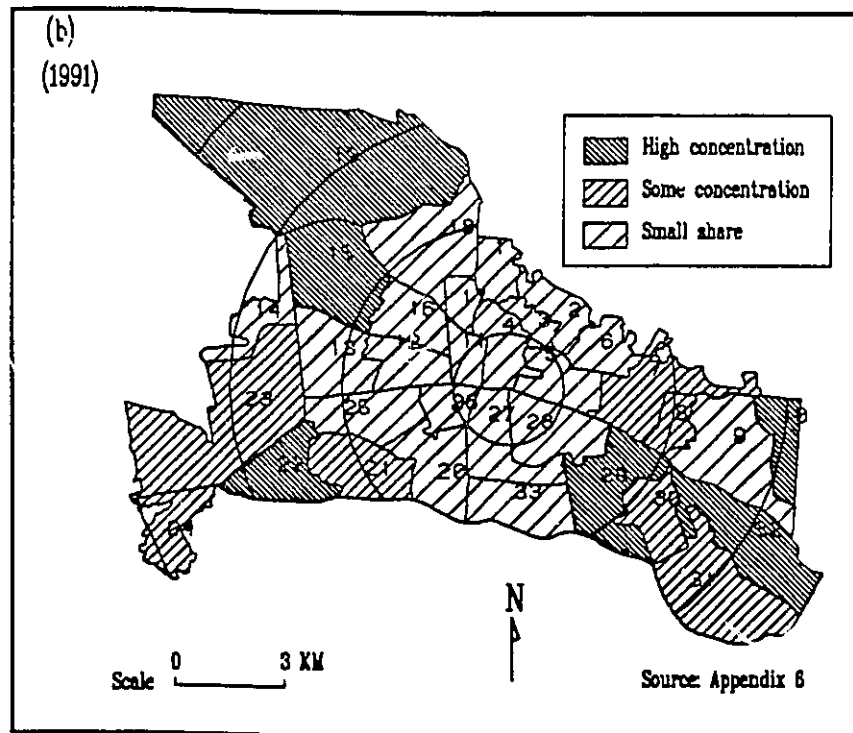
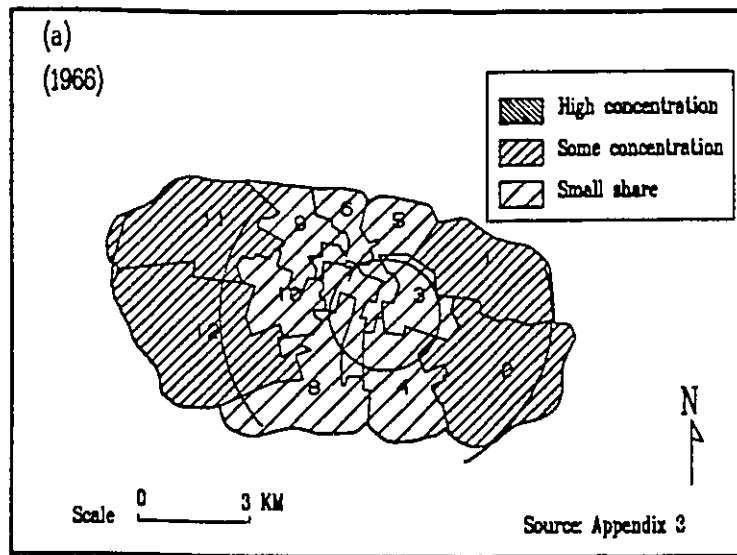


Fig. 6.16 Agricultural & Vacant Land use Change in Tabriz



area. In 1991, from the total 13,242 ha of urban lands, 5,277 ha (about 40 %) was classified as Agriculture and vacant land from which 866 ha was orchards, 1353 farmlands and 3057 vacant lands.

According to Appendix 6, zones 10 and 19 in the east and northwest had the highest concentration of vacant land with the LQ of 6.81 and 5.91. Other districts including 15 and 23 in the west and southwest and districts 29 and 32 in the east were other areas with a high concentration of vacant lands. Zones 31, 30, 23, 24, 21, 7 and 8 in the fringe had some concentration. On the other hand, central zones had the smallest share (Fig. 6.16, b). Because of the concentration of most of the existing agricultural and vacant lands in districts 19, 23, 15, and 32, the expansion of the city in the near future will likely focus in the northwest, west and eastern peripheries.

#### 6.4 Conclusion

This chapter has analyzed the recent urban land use change in Tabriz at two levels. First, it looked at the **overall change** in various urban land uses at the city level, and then it examined the distribution of activity patterns and their **changes within the different areas of the city**. It reveals that, in general, while residential, transportation and industrial land uses had the biggest physical expansion, activities related to public services (e.g. education, public organization, government) and commercial land uses had the smallest growth in recent decades. The change in the patterns of urban land use distribution in Tabriz over the past decades has **two main characteristics**: first, a **higher degree of specialization** of urban land uses, in other words, a

shift from relatively mixed land uses toward more discrete land uses; second, a tendency towards **decentralization** of urban activities.

The **comparison of the range of LQs** in 1966 with that of 1991 in Table 6.5. shows that all activities have had a **higher degree of specialization** over the recent decades. According to this table, education and industrial land uses in 1991 have been the two most specializing land uses with the LQ range of (0.0 to 11.09) and (0.0 to 7.51), whereas residential and transportation land

Table 6.5 The change in the LQ rate among urban land uses in Tabriz, 1966-1991

Land use	LQ range in 1966	LQ range in 1991
Education	0.03 to 5.76	0.00 to 11.09
Industrial	0.03 to 3.98	0.00 to 7.51
Health	0.00 to 2.30	0.00 to 7.04
Government	0.00 to 3.73	0.00 to 5.92
Commercial	0.34 to 3.85	0.11 to 5.47
Public organizations	0.08 to 2.16	0.00 to 5.83
Recreation	0.06 to 4.88	0.04 to 5.32
Transportation	0.77 to 1.26	0.21 to 2.58
Residential	0.77 to 1.26	0.03 to 1.50

Source: Appendices 3 and 6

uses have been the two least specializing ones with the LQ range of (0.03 to 1.50) and (0.21 to

2.58). The comparison of the range of LQ between 1966 and 1991 among other activities including commercial, government, public organizations, health and recreation land uses show their higher degree of specialization in 1991 than in 1966.

Fig. 6.17 and Fig. 6.18 depict the change in the geographical location of the main urban activities in Tabriz. According to these figures, the main changes can be summarized as follow:

- 1) Over the recent decades, while the residential land use has mainly expanded in the eastern and western peripheries, a relatively higher concentration of this land use has occurred in the northern and inner city districts.
- 2) Whereas the city centre maintained its significance in commercial activities, the recent commercial development has occurred in the eastern and western peripheries.
- 3) The concentration of industrial activities has shifted from the inner city districts in 1966 to the zone designated for industrial land use in the western fringe in 1991.
- 4) Recent government land uses have mainly been developed along the main streets linking the city centre to the low density residential areas in the periphery (east).
- 5) The main concentration of public organizations shifted from the vicinity of the city centre in 1966 to the fringe areas in the southwest and east.
- 6) The relative concentration of health care in the southeast part in 1966 has expanded towards the east and southern peripheries.
- 7) Even though the relative location of the main education land use did not change much between 1966 and 1991, it became more concentrated over the recent decades.
- 8) Like residential land, transportation land use in 1966 had a relatively even distribution;

Fig. 6.17 The General Land use Pattern in Tabriz, 1966

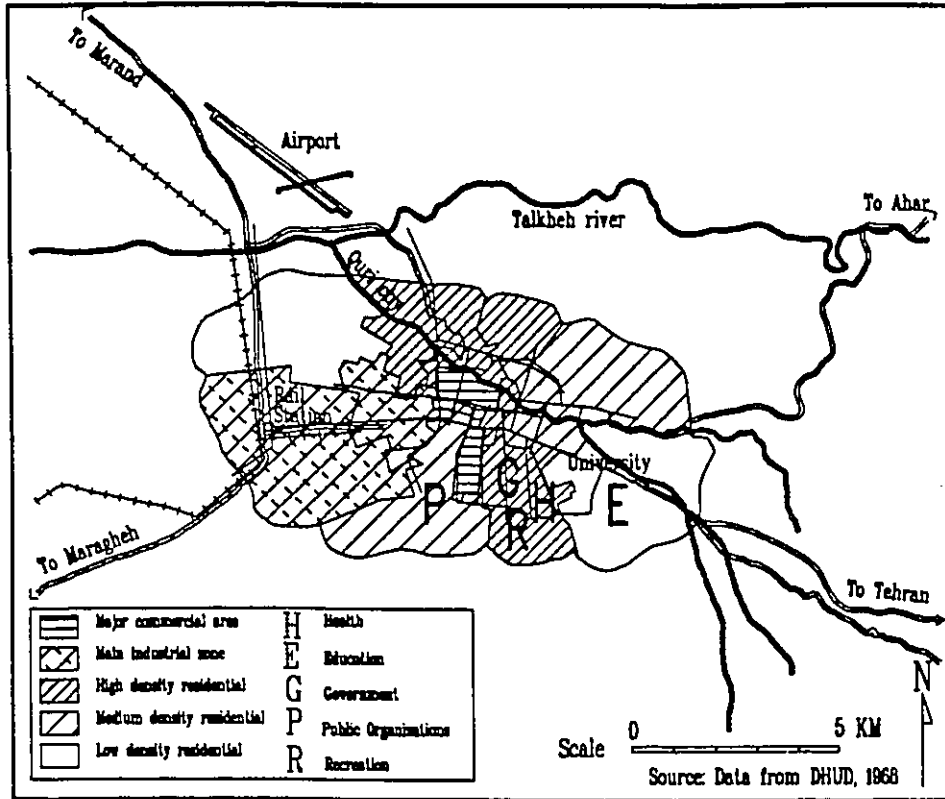
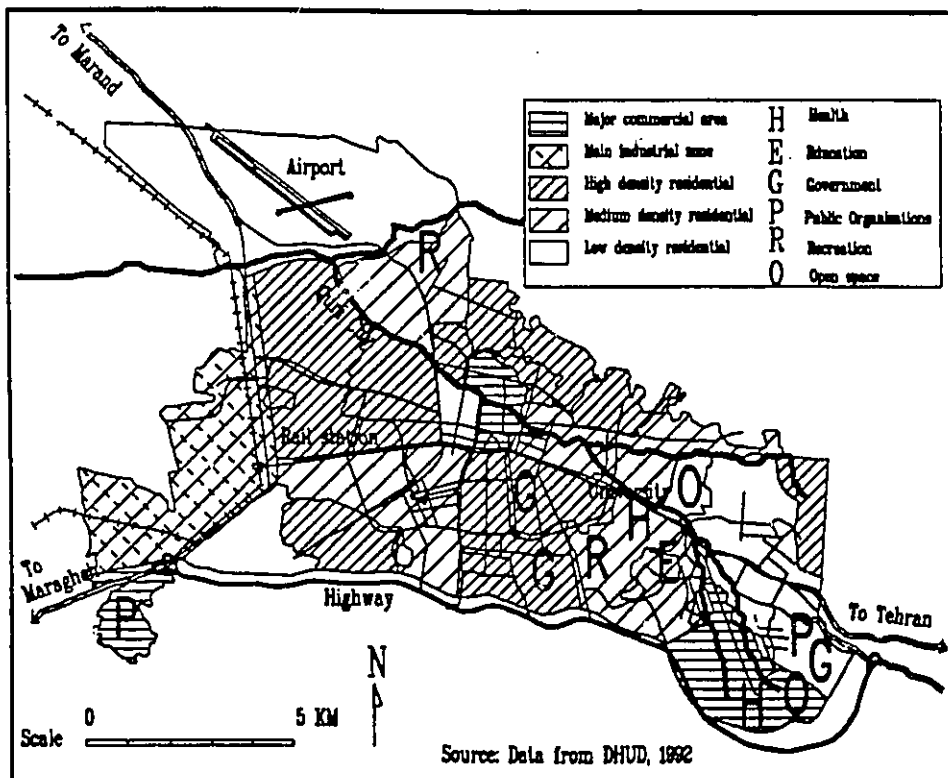


Fig. 6.18 The General Land use Pattern in Tabriz, 1991



however, over the past decades, the southwestern and eastern peripheries became more concentrated in transportation land use.

The higher degree of specialization and the change in the geographical location of the main urban land uses over the recent decades in Tabriz may lead to the further polarization of activities in the future. Such a land use pattern will likely increase intra-urban movements and demand substantial improvement in the transportation network. The more discrete land use pattern may also lead to lower population density and more segregation of residential groups. The consequence of such changes may increase the living expenses.

Having summarized the patterns of recent urban land use change in Tabriz, we now examine how these changes are portrayed in the overall spatial organization of the city and how their underlying factors for both 1966 and 1991 can be generalized compared with the major structural change in North American cities.

As mentioned previously in Chapter 4, despite the addition of a number of modern urban elements (e.g. new streets, rail station, airport, etc.) the spatial structure of Tabriz in 1966, mainly portrayed its pre-modern style of organization. **Urban land use in Tabriz in 1966**, in fact, was mainly the result of its historical development which could be generalized by the **concentration of economic activities in the city centre, higher population density in the centre and arrangement of residential groups based on social status from centre towards periphery.** Because of a **easier accessibility**, upper class residents tended to occupy mainly the central

district around the city's commercial (bazaar) and public institution including the religious, educational and political structures<sup>7</sup>. The major concentration of middle class residents was located in a zone outside the core and the lower class relegated to the outer zone and periphery (see also Chapters 5). The 1966 morphology of Tabriz revealed some similarities to the preindustrial cities of North America in which the city centre was the focal point of economic, political and social activities and because of the friction of distance people tended to reside close to the centre (Ley, 1983:18). In Tabriz, until the 1960s a weak transport system combined with the historical role of the city centre (economic function, public institutions and better security), resulted in the higher concentration of activities and population in the city core.

**Urban land use pattern in 1991**, as discussed in this chapter, shows some major changes when compared with that of 1966. The recent urban development in Tabriz has been associated with a **tendency towards decentralization of activities**. This can be observed in **moving industrial activities** from the city centre and inner districts to the **periphery** (in the west); recent **commercial developments** along the major roads in the **periphery** (east and west); a tendency for **moving governmental offices and public organization** land uses from the city centre towards **periphery** (in the east and southeast); moving most **upper class residents** from the centre to the **periphery**; and the emergence of **squatter settlements at the edge** of the city (north and south). As a result of these recent land use changes, the existing morphology of the city, in general, shows some similarities with Hoyt's sector model in which activities and residential groups, based on their accessibility to main roads, tend to segregate in a sectoral

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<sup>7</sup> Reflecting ability of wealthier citizens to overcome weaker transportation infrastructure by purchasing centrally located places.

pattern. A better understanding of the recent change in urban land use pattern in Tabriz and its physical development needs to be examined with respect to the recent changes in socio-economic conditions, historical development and special geographic situation of the city.

As stated, one of the major characteristics of recent land use change in Tabriz has been moving industrial activities from the centre towards the periphery. It was mentioned in Chapter 5 that after selection of Tabriz as one of the industrial poles in Iran during the early 1960s, the city has been the focus of government and private investments for industrial activities in the region. For three principal reasons the new industrial activities had to be established in the periphery. First, there was a shortage of appropriate space in the city centre. While the city centre had already been structured in a dense pattern, the periphery could provide adequate space for new industrial establishments. Second, the periphery offered better facilities for industrial establishments than city centre because of improved transport infrastructure (railway, regional and ring roads), and tax incentives. Third, government policy has restricted the establishment of new industrial activities within the city to reduce their environmental effects (pollution, congestion), forcing the nuisance activities to move to the designated industrial zone in the west part of the city.

Moving the industrial activities towards periphery was followed by government subsidized housing projects to accommodate factory workers during the 1970s and 1980s (see section 6.3.1). This led to the attraction of low class residents to the (western) periphery. As discussed in Chapter 5, because of improvement in accessibility brought by modern transportation systems most of upper class residents tended to move to the eastern periphery. Because of these

population movements to the periphery, the recent commercial activities have been developed in the periphery, where they meet the demands of increasing population at the edge of the city (see section 6.3.5).

The discussed structural change in Tabriz (moving the industrial activities, upper class residents and commercial activities from the city centre towards periphery) appears to replicate what has happened in North American cities earlier this century. However, the recent urban change in Tabriz reveals a number of differences with the changing structure of North American cities. While in North American cities, recently the city centre has been redeveloped for office activity, in Tabriz the city centre is still dominated by retailing<sup>8</sup>. The central bazaar continues its historical role in attracting most of the consumers, not only from the city, but from surrounding towns and villages. Also, the city centre and surrounding areas have relatively large population (see Chapter 5). Such a population is enough to support the existence of retailing activities in the bazaar. In contrast with North American cities, office development in Tabriz has mainly occurred beyond the city centre and along the major roads linking the centre to the periphery, this is a result of, perhaps, the shortage of space, and of congestion in the city centre.

The North American city centres recently have been undergoing a gentrification or revitalization process which has involved extensive urban renewal and development of monolithic blocks of high-rise public housing on the down-town margins of the inner city to upgrade the living conditions of low-income inner city residents (Ley, 1983:45). More recently the revitalization

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<sup>8</sup> Such as the bazaar and thousands of small shops.

process has led to the return of middle class to the central city encouraged by the downtown office boom and in-town institutional expansion (ibid). In Tabriz, like other Iranian cities, the deteriorating structure of the city centre or historical part (see also Chapter 7) has been the concern of local authorities and despite the recent attempts to preserve the historical buildings, no major sign of residential redevelopment projects is observed in the city centre.

The existing structure of the city can be further explained by its geographical location. As mentioned in Chapter One, Tabriz is located on a **triangular shaped basin** called the Tabriz plain with its base to the west and its peak to the east. During the course of its expansion, the city has basically filled the basin of the plain and reached to its physical limits from three sides: south, east and especially north. The city is now open to free expansion only from the west side while part of the recent developments have taken place on the slopes of the northern and southern mountains. As discussed earlier in this chapter, the main part of the flat land in the west has been allocated to industrial activities where the railway, main transit roads and airport are located. The industrial zone and railway now confine the further expansion of residential development to the west, but only in two corridors along the two major transit roads linking Tabriz to Maragheh in the southwest and Marand in the northwest. With a very limited amount of land left along the eastern highway linking Tabriz-Tehran, the further physical expansion of Tabriz will most probably take place in linear fashion at the three corners along the three major transit roads approaching the city.

## Chapter Seven

### **The Social and Environmental Implications of the Recent Urban Growth and Land Use Change in Tabriz**

#### **7.1 Introduction**

In the previous chapters (5 and 6), the process of recent urban growth in Tabriz and its effects on urban population density and activity pattern (land use structure) were discussed. The main objective of this chapter is briefly to outline the main social and environmental implications of this recent urban growth and change in urban land use structure in Tabriz over the past decades.

As mentioned earlier in chapter 5, one of the main characteristics of the recent urban change in Tabriz has been its rapid physical expansion. This has created a number of serious problems related to the environment. The first three sections of this chapter briefly discuss the process by which the rapid urban growth and land use change have led to the creation of some of the existing problems: section 7.2 identifies the extent of the loss of agricultural lands in general; section 7.3 discusses the consequences of the residential expansion into unsafe geographical locations and section 7.4 talks about the decay of the historical sector of the city. The last two sections try to indicate how the change in physical structure has influenced social structure in Tabriz. Section 7.5 briefly discusses social segregation and its link with the changes in the main activity patterns such as industrial, commercial and institutional land uses. Finally, section 7.6 highlights the unequal distribution of the main public services such as public schools, health centres, access roads and recreational places within the different residential areas.

## 7.2 Loss of Agricultural Lands

Over the past decades, there has been a concern over the quality and protection of the urban environment (Kivell, 1993:9). One of the negative impacts of urban development during this century has been the loss of agricultural lands around cities (Hashemi, 1993; Husswurm, 1974). The increasing trend of urban expansion has occurred without any serious consideration for the preservation of agricultural land. This has more recently led to the voicing by environmentalists for the protection of arable lands, because they consider agricultural lands, either within or outside the cities, as national resources and are against their conversion to industrial or residential uses (Hashemi, 1993). Because of the shortage of arable lands, the recent urban growth in Iran has also raised the concern among urban researchers for the preservation of agricultural lands (Tofiq, 1993; Hashemi, 1993; Ghomami, 1993).

In Tabriz, which has experienced rapid physical expansion over the past three decades, a considerable amount of agricultural land around the city has been converted to urban uses. As mentioned in chapter 6, between 1966 and 1991 the built-up area in Tabriz increased from 2,126 ha to 7,964 ha, meaning some 5,838 ha of new urban development over 25 years. Most of this new development has occurred on surrounding rural areas, much of which is considered as good arable land. According to Department of Agriculture of East Azarbaijan's 1966-1991 records, during the 25 years period about 4200 out of 5838 hectares of new development in Tabriz occurred on agricultural land. According to Esmaeili (October 1993, personal communication), agricultural land in Iran is usually divided into three classes: 1) orchards 2) irrigated farmland, and 3) dry farmland. Orchards and irrigated farmland are considered to be good (prime) land

and dry farmland is secondary (fair). As Table 7.1 shows, out of the total recently developed urban lands in Tabriz, 27 percent has been on orchards and 20 percent on irrigated farmland; in other words, about 47 percent of development has been on good agricultural land and another 24 percent on secondary farmland. Fig. 7.1 shows how urban development has invaded the existing orchards around Tabriz.

According to Poormehdi (November 1993, personal communication), the underestimation of the residential development and the lack of clear objectives for the orientation of physical growth by the 1966 plan<sup>1</sup> combined with the land speculation of the 1970s and inefficient urban land policies, have been the main factors contributing to the loss of farmlands around Tabriz. Javadi (November 1993, personal communication), claims that despite the recent regulations protecting orchards as green space around the city, these lands, in various ways, are converted to urban uses. One common way this conversion occurs, according to Javadi, is deliberate negligence in

Table 7.1 The loss of agricultural lands in Tabriz between the 1966 and 1991

Class	hectare	percentage
Orchards	1600	27.4
Irrigated farms	1180	20.2
Dry farms	1420	24.3
Total agricultural land	4200	72.5
Vacant land	1638	28.1
Total	5838	100.0

Source: Department of Agriculture of East Azarbaijan (1993)

<sup>1</sup> Based on the 1966 plan for Tabriz, the residential area had been estimated to expand from 1353 ha in 1966 to 3317 ha in 1991, but in practice it reached over 4600 ha, i.e., about 1300 ha more than what the plan had predicted.

Fig. 7.1 Conversion of Orchards to Urban Uses in Tabriz, 1993



A



B

Photos from the author (Fall, 1993)

maintaining the orchards and irrigated lands by their owners. Then, when the lands become vacant it is easy to apply for land use change, and after getting approval, these lands can be sold at a much higher price.

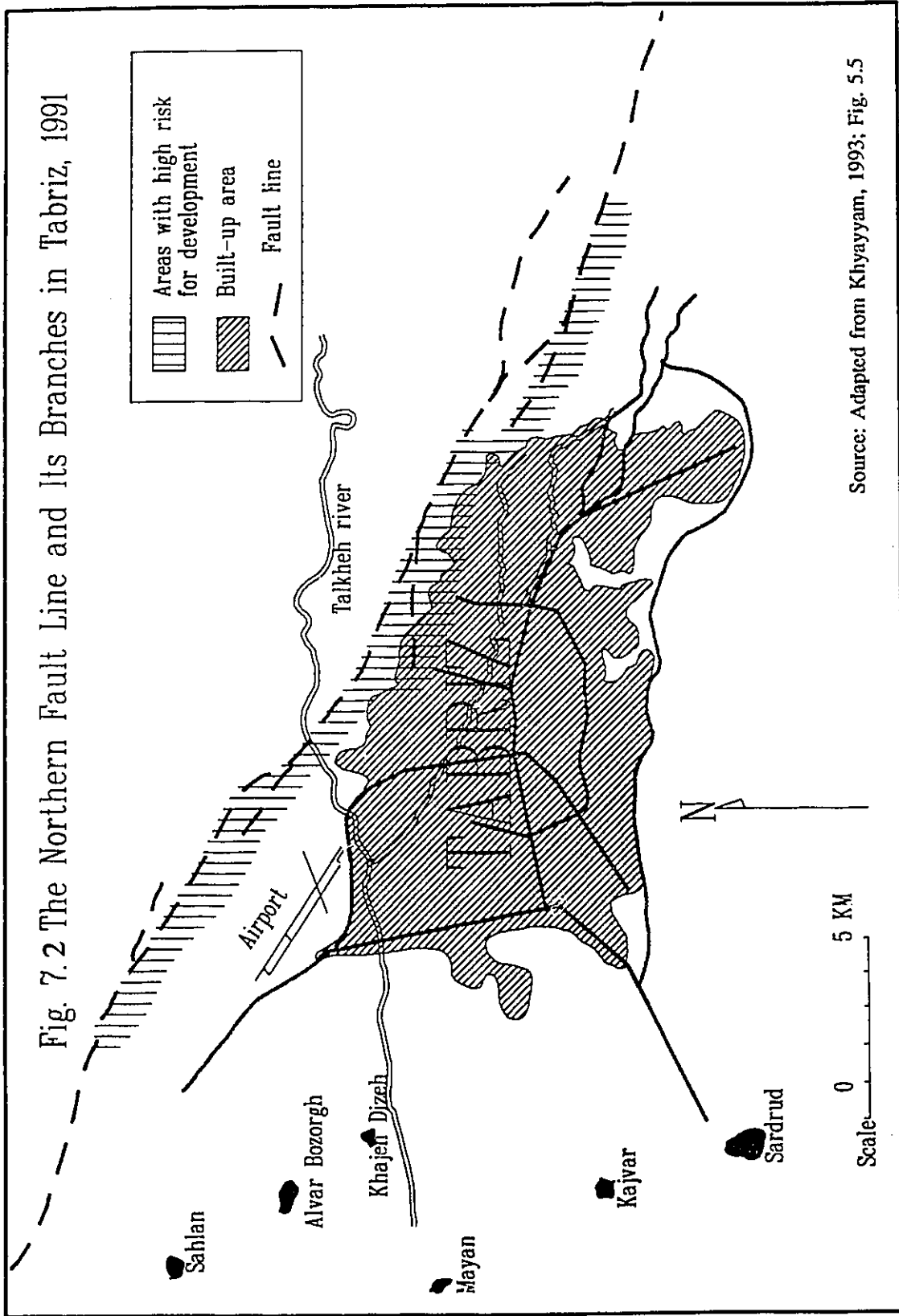
### **7.3 Expansion of Residential Areas into Unsafe Geographical Locations**

The process of rapid urban growth in many TWCs has been associated with improper housing developments. The development of shanties with poorly built material and in many cases on hazardous locations (steep slope, bad soil, floodway, etc.) is a common phenomenon in many TWCs (Royle, 1993; Devas and Rakodi, 1993). This has been the case in Tabriz where part of its recent residential developments has occurred in unsafe locations.

The expansion of some residential areas along the earthquake line, which has potentially a higher risk of a major earthquake, is one of the major problems of physical development in Tabriz. The fault line passes through the northern edge of Tabriz and is believed to be the main cause of several devastating earthquakes in the past (Khayyam, 1993). An overlay of this fault line with the existing developed area shows that, unfortunately, part of the recent urban development in Tabriz has occurred close to or along this line (Fig. 7.2).

According to Kananpoor (November 1993, personal communication), most of the developments in the earthquake zone have been due to illegal housing construction by northern squatters; however, some housing projects have also been implemented in the vicinity of the fault line by government agencies. For example, a large housing project called Shahrak-e-Baghmishih, about

Fig. 7.2 The Northern Fault Line and Its Branches in Tabriz, 1991



Source: Adapted from Khyayyam, 1993; Fig. 5.5

5,000 units of which 1,200 are multi story buildings, has been under construction in the recent years (see Fig. 7.3). Saei (November 1993, personal communication), believes that the main reasons for implementing such projects in this high risk area are the shortage of land, in general, and the low price of land in this part of the city.

Close to the northern fault is the hilly area called Valiasr where the soil has been found unstable for heavy loads and where there is a possibility of land sliding (Najjari, November 1993, personal communication). For this reason, the 1966 master plan of Tabriz had proposed a low density residential development in this area. However, the pressure of rapid growth and the higher demand for housing have led to the construction of a considerable number of multi-story residential buildings on levelled lands in this part of the city (Fig. 7.4). Although relatively higher standards of construction are applied for most buildings, because of the inappropriate soil structure, defects appear in many buildings soon after their completion, or even before they are finished (see Fig. 7.5). Despite such problems, the construction of multi-story buildings continues in this inappropriate location.

#### **7.4 The Decay of the Historical Sector<sup>2</sup>**

As cities expand, their core areas face changes. The decline of the city core has been a relatively common characteristic in many western cities as well as in TWCs. For example, physical deterioration of buildings, roads and social services (e.g. schools, police, fire stations), the overall loss of population and environmental pollution are the common problems of most inner cities in

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<sup>2</sup> The historical sector is referred to the very oldest residential area around the bazaar.

Fig. 7.3 Residential Developments on Hazardous Geographical Locations in Tabriz, 1993



A



B

Photos from the author (Fall, 1993)

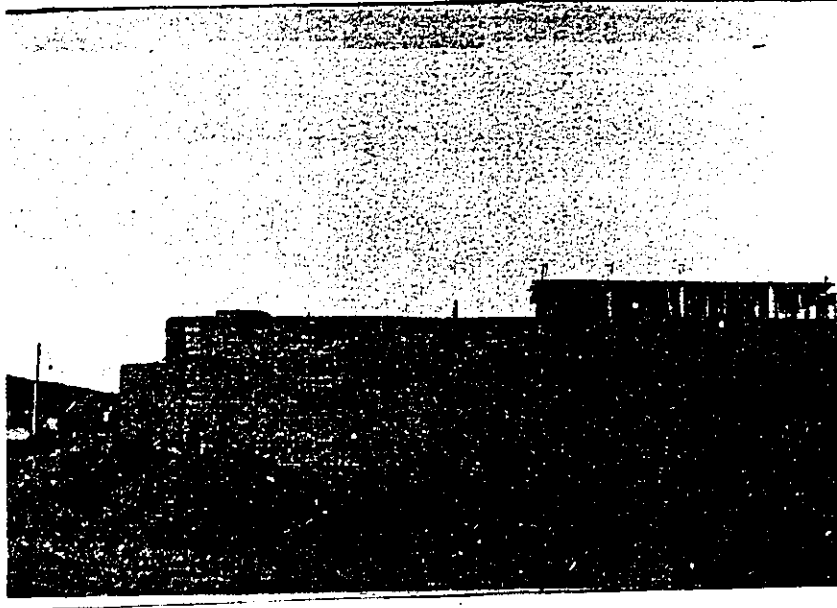
Fig. 7.4 Residential Development on Unstable Soil in the East of Tabriz, 1991



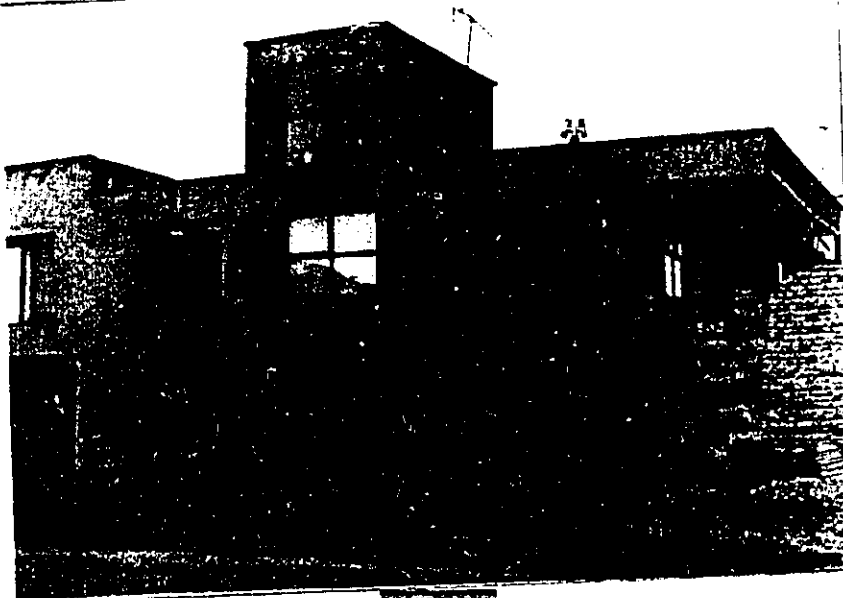
Source: Air Photo from DHUD, 1992

Fig. 7.5 Examples from Early Building Defection Built on Unstable Soil in Tabriz

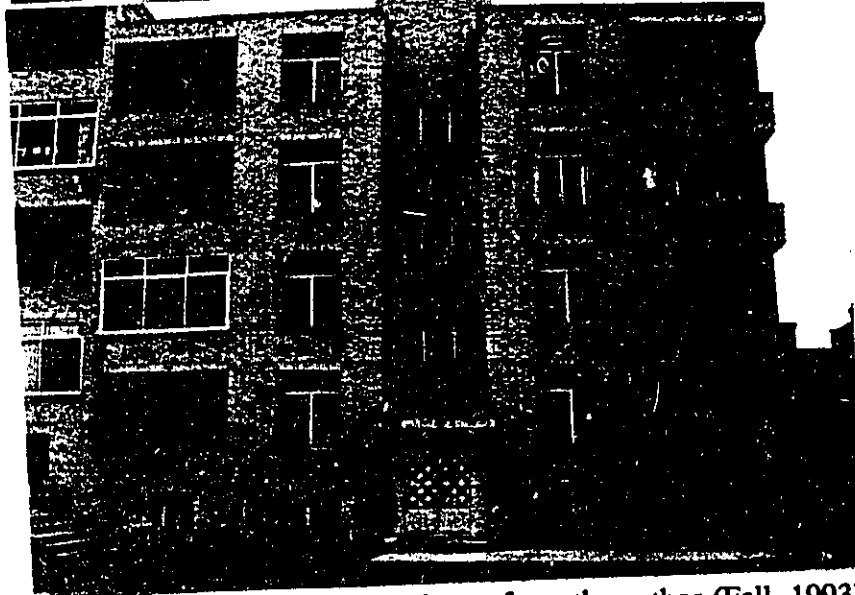
A



B



C



Photos from the author (Fall, 1993)

the West (Bourne, 1982). The inner city of some TWCs like Tehran is extremely polluted and deteriorated compared with other areas of the city.

As stated in chapter 5, the city centre in Tabriz has faced a population density decline during the recent decades. This density decline, exacerbated by the out-migration of wealthy families from the historical section and the poor accessibility of the old districts, has led to decreased investments for renovation, resulting in the decay of buildings in this part of the city (Parsi, November 1993, personal communication). This can be seen in the lower quality of the housing units in the historical sector where the lack of interest in reconstruction has led to a blight in the urban fabric (see Fig. 7.6). A survey of over 6,000 housing units by the DHUD of Tabriz in 1992 shows a significant difference between the quality of housing units<sup>3</sup> in the historical sector and in the city as a whole (Fig. 7.7).

According to Fig. 7.7, while 52 percent of the housing units in the city were classified as stable, this figure for the historical sector was 34.6 percent. The semi-stable units also varied from 42.9 percent in the city to 17.5 in the historical sector. The biggest difference, however, was between the percentage of unstable houses. While fewer than 4.9 percent of buildings in the city were classified as unstable, this figure for the historical sector was as high as 43 percent. Another difference was in the percentage of abandoned houses. Whereas 0.2 percent of the units in the city were abandoned, this figure in the historical sector was about 5 percent.

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3 Based on a report published by the Statistical Centre of Iran, the quality of housing units is classified into three main types: 1) stable which refers to a house made of a metal/concrete skeleton or brick and iron or stone and iron; 2) semi-stable which includes a house made of brick and wood or stone and wood and 3) unstable which refers to a house made of adobe and wood, cement blocks or wood only.

Fig. 7.6 Deterioration of Buildings in the Historical Part of Tabriz, 1993



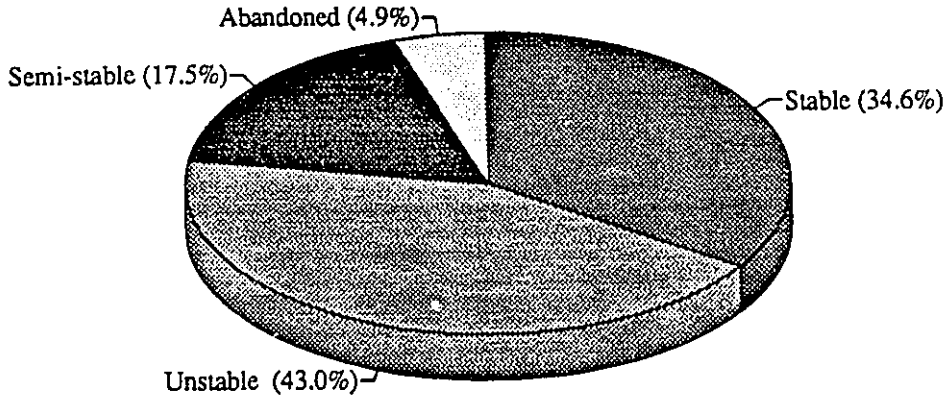
A



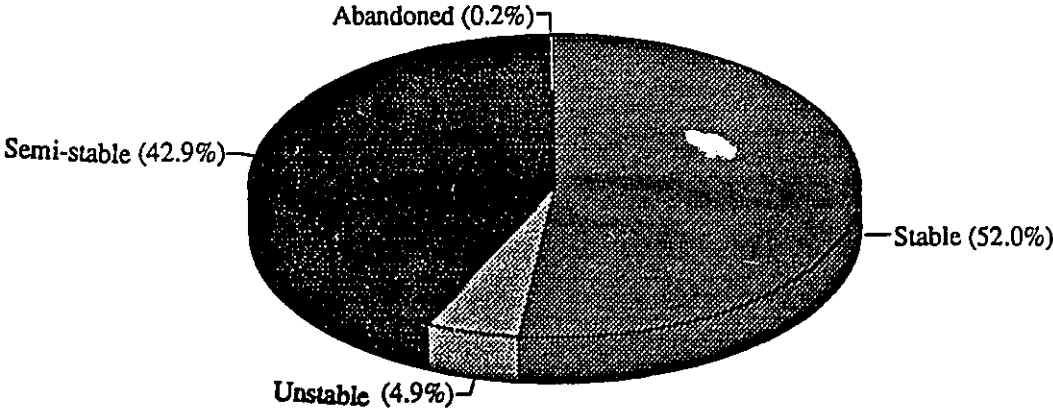
B

Photos from the author (Fall, 1993)

Fig. 7.7 Quality of Housing Units in the Historical Part  
Of Tabriz Compared with That of the City (1993)



(A) The Historical Part



(B) The Whole City

Source: Data from DHUD, 1993

The decay in the buildings in the traditional bazaar is becoming a serious problem as well. According to Abdollahi (November 1993, personal communication), despite the functioning of the bazaar as the most important retail centre in the city, because of the lack of access inside the covered bazaar (there is no access by motor vehicles into the bazaar) and restrictions made by the government against changing building styles in order to preserve the traditional architecture of the bazaar, little interest is shown by the owners for the renovation of the existing structures. For these reasons, the buildings inside the bazaar are deteriorating. For example, among the 4715 units surveyed by the DHUD in 1992, over 4,000 buildings (85 percent) had defects among which 1,343 (28.5 percent) required basic repair for severe structural cracks and breaks.

### **7.5 Social Segregation**

One may be concerned to examine where different types of people live within the boundaries of any particular city and how households locate themselves in residential neighbourhoods. Many complex and interrelated factors dictate who lives where in an urban area and why; among them are: societal values for various types of physical and social environments; income and its relative distribution throughout the society; land value and the technology of buildings; changing land use patterns, especially the suburbanization of employment centres; household composition; the changing role of developers and planners; and the relative mobility of different households (Bunting, 1991:295). Among the various factors, the role of changing patterns of urban land use on social segregation in the City of Tabriz over the past three decades is discussed here.

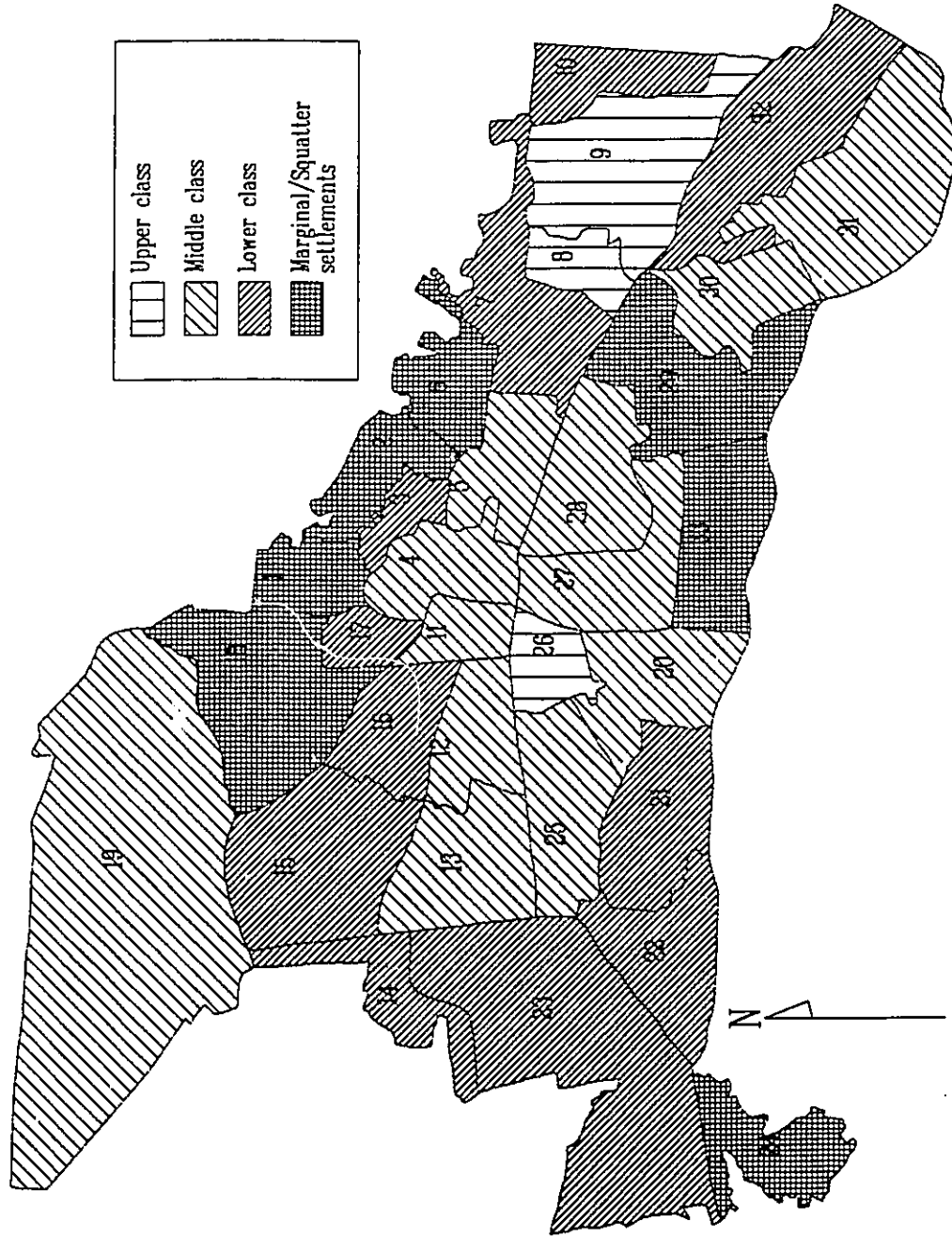
Recent urban growth and change in land use patterns in Tabriz have been associated with the

spatial segregation of residential groups within the city. As stated in the previous chapter, in the past, because of the concentration of most economic activities in the city centre and because of the rudimentary transportation system, people tended to live close to the centre. Further, because of the existence of strong social ties and neighbourhood attitudes, different income groups were not physically segregated. However, during the modernization process, and especially after the 1960s, as a result of the gradual separation of economic activities and the demands for a specialized workforce, as well as the improvement in the transportation system, income groups tended to stratify into different geographical locations.

DHUD, through using a number of housing, employment and social variables from the 1986 census, has identified four main distinct residential areas in Tabriz (Fig. 7.8). Based on this classification, 3 districts out of 33 (including districts 8 and 9 in the eastern periphery and 26 in the centre) were classified as upper class. Eleven districts (including 4, 5, 11, 12, 13, 20, 27, 28 in the centre and inner city, 30 and 31 in the southeast and 19 in the northwest) were identified as middle class. Nine districts (3 and 7 in the northeast and 10, 14, 15, 16, 21, 22, 23 in the west) were grouped as lower class, and 7 districts (1, 2, 6, and 18 in the northern fringe and 29 and 33 in the southern part) were classified as having marginal (squatter) residents.

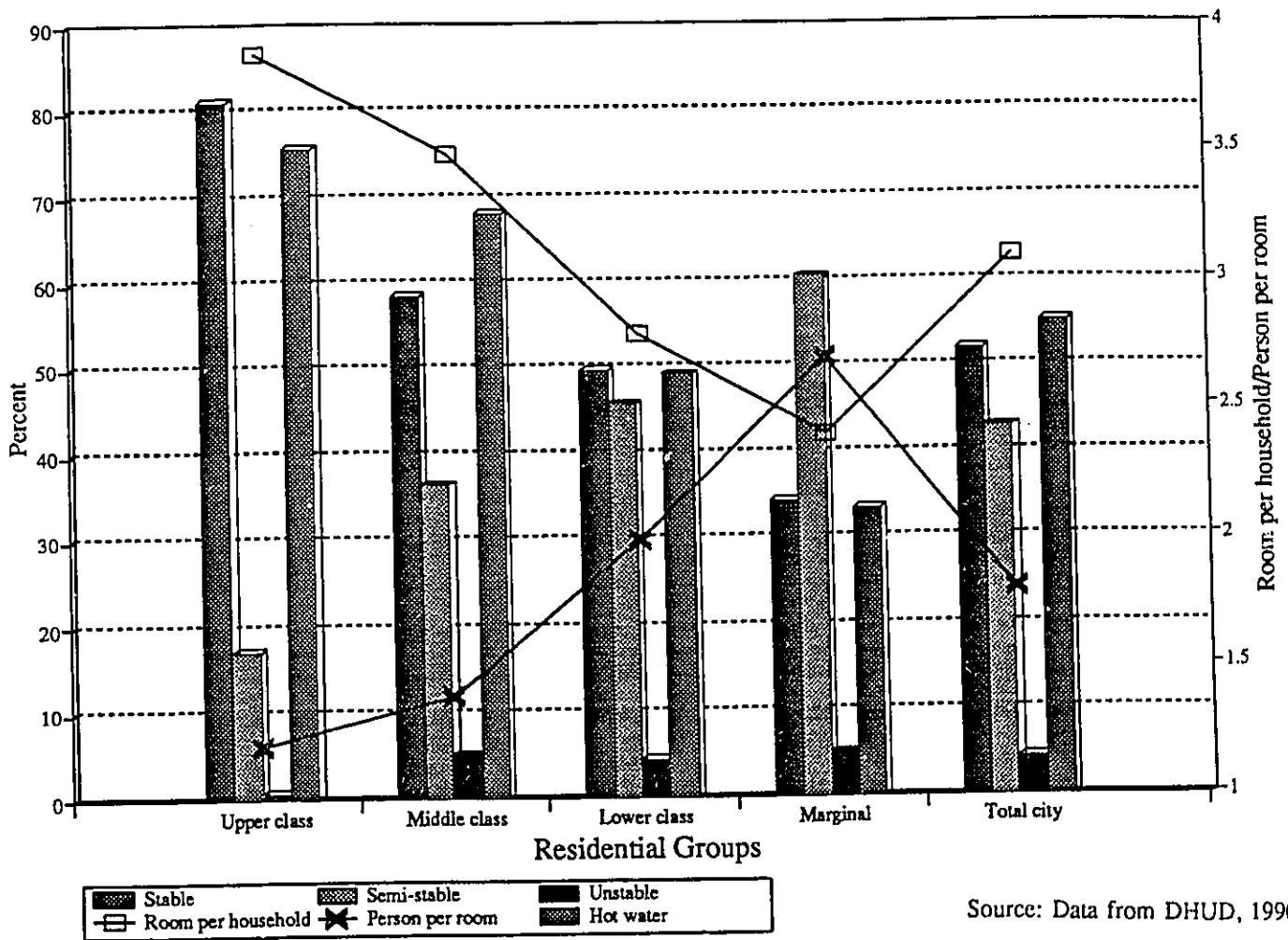
Due to a lack of data on people's income, housing conditions have been used as the criteria for classifying residential groups since, in general, the quality of housing is a function of people's financial situation. Fig. 7.9 shows a significant difference in the quality of housing conditions among various residential groups in Tabriz. Based on Fig. 7.9, in terms of the physical structure

Fig. 7.8 The Distribution of Typical Residential Areas in Tabriz in 1991



Source: Data from DHUD, 1992

Fig. 7.9 Housing Quality Among Residential Groups in Tabriz, 1986



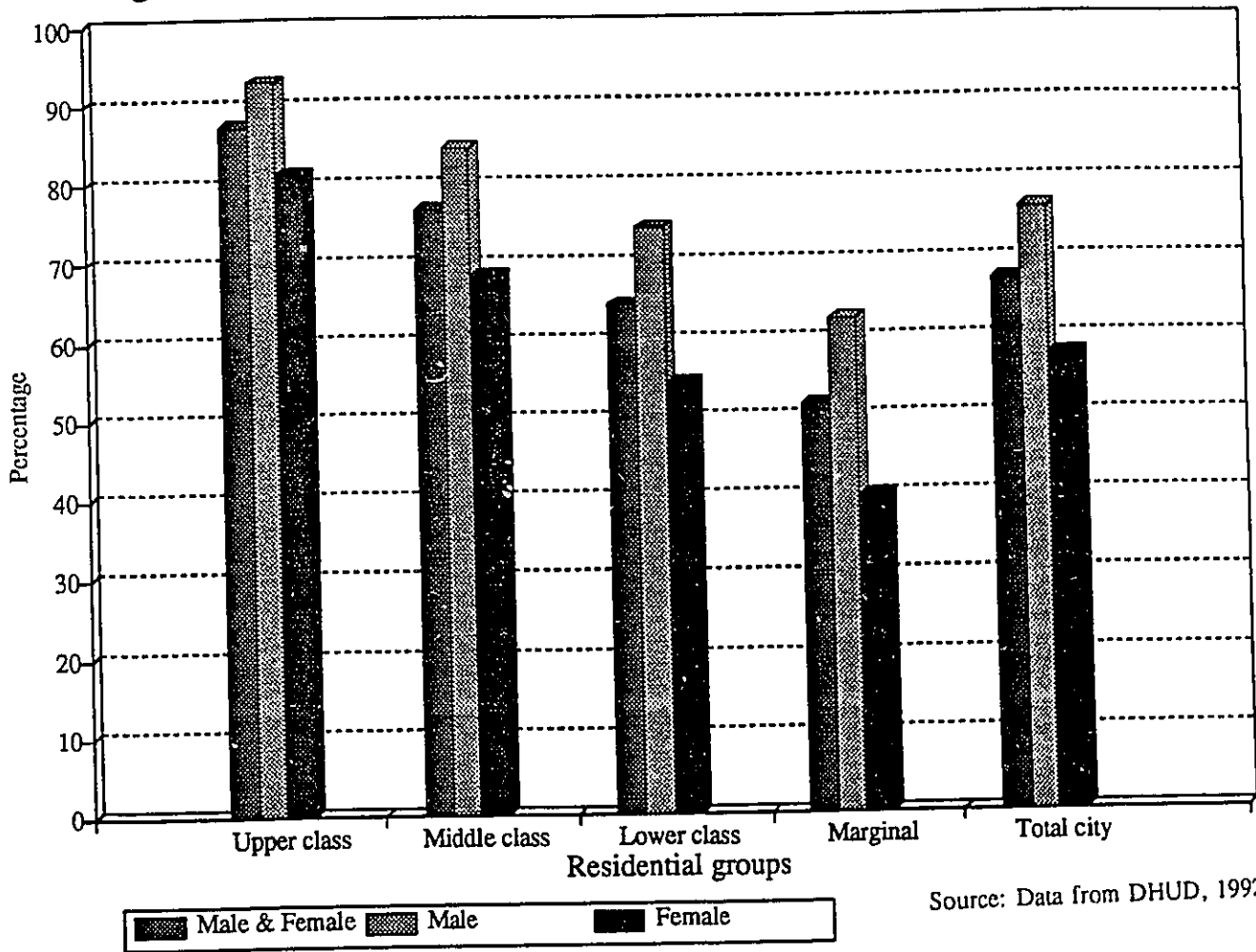
Source: Data from DHUD, 1990

of housing units, overall 52 percent of houses were classified as stable. This figure was 81, 58, 49 and 34 percent among upper, middle, lower and marginal classes respectively. Conversely, the percentage of semi-stable units increased from upper to marginal groups. As the figure shows, while the percentage for semi stable houses at the city level was 43, it was 17, 36, 45 and 60 percent for upper, middle, lower and marginal classes respectively. In terms of available living space for each household, there was an important difference among residential groups. For example, whereas on average each household among the upper class had 3.9 rooms, the middle class had 3.5, the lower class 2.8 and the marginal class 2.4 rooms. And, in terms of average of persons per room, it varied from 1.17 to 1.43, 1.95 and 2.67 among the four main residential groups respectively. Another item relating to housing condition, as Fig. 7.9 shows, is the percentage of households with access to hot water and a private bath which varied from 76 to 68, 49 and 33 percent among the four classes.

The four residential classes also display important differences in their social characteristics. For instance, while the overall average literacy rate (population over six years old) for the city was 67 percent, it varied from 87 to 76, 64 and 51 percent among upper, middle, lower and marginal groups (Fig. 7.10). If we break it down according to gender, the contrast becomes sharper. For example, while the average literacy for upper class males was 92.8 percent, it was 84, 74 and 62 among middle, lower and marginal residents. For females the gap was wider, varying from 81 percent to 68, 54 and 40 percent among the four residential groups respectively.

The variation among the school population was significant too. As Table 7.2 depicts, 1986

Fig. 7.10 Literacy Rate Among Residential Groups in Tabriz, 1986



marginal and lower class residents had the majority of their school population at elementary level (69 and 61 percent respectively) and only a small percentage of them (6 and 10 percent) could continue at high school level. At post secondary (university) level the percentage was very low (0.3 and 0.9 percent. But this ratio for upper and middle class groups was more evenly distributed. For example, 40 and 49 percent at elementary level, 18 and 15 percent at high school level and 10 and 6 percent at university level. The four main residential groups also showed a considerable variation among their employment structure (Table. 7.3). In general, while upper and middle class residential groups had a significant proportion of high level and professional employees, the lower class and marginal groups had a higher percentage of production workers. For example, 25.2 and 16.4 percent of the employed people among upper

Table 7.2 Distribution of school population among main residential groups in Tabriz in 1986 (out of 100%, Total)

Residential groups	School pop.(%)	Elementary (%)	Guidance (%)	High school (%)	University (%)	N.I.* (%)
Upper class	26.3	39.7	21.5	17.8	11.2	9.8
Middle class	26.4	48.5	23.8	15.0	6.4	6.3
Lower class	25.6	61.0	22.4	9.9	0.9	5.9
Marginal class	24.3	69.1	18.6	6.2	0.3	5.8
Total	25.6	56.9	21.9	11.4	3.5	6.3

Source: DHUD, 1992

and middle classes were professional and technical workers; this percentage was 7 and 2.7 percent among lower and marginal groups. On the other hand, while 50.8 and 64.8 percent of employed workers in lower

Table 7.3 The employed population of main residential groups in Tabriz by major occupational groups in 1986

Residential group	Professional & technical workers	Administrative & managerial workers	Clerical & related workers	Sales workers	service workers	production workers	Agricultural workers	Unclassified
Upper class	25.2	1.4	5.2	11.3	2.9	22.4	0.9	30.5
Middle class	16.4	0.8	5.7	17.1	4.7	34.6	1.2	19.5
lower class	7	0.2	3.4	10.3	5.7	50.8	4.1	18.5
Marginal residents	2.7	0.2	1.9	7.9	6	64.8	2.2	14.3
Total	11.4	0.5	4.2	12.6	5.1	45.1	2.1	19

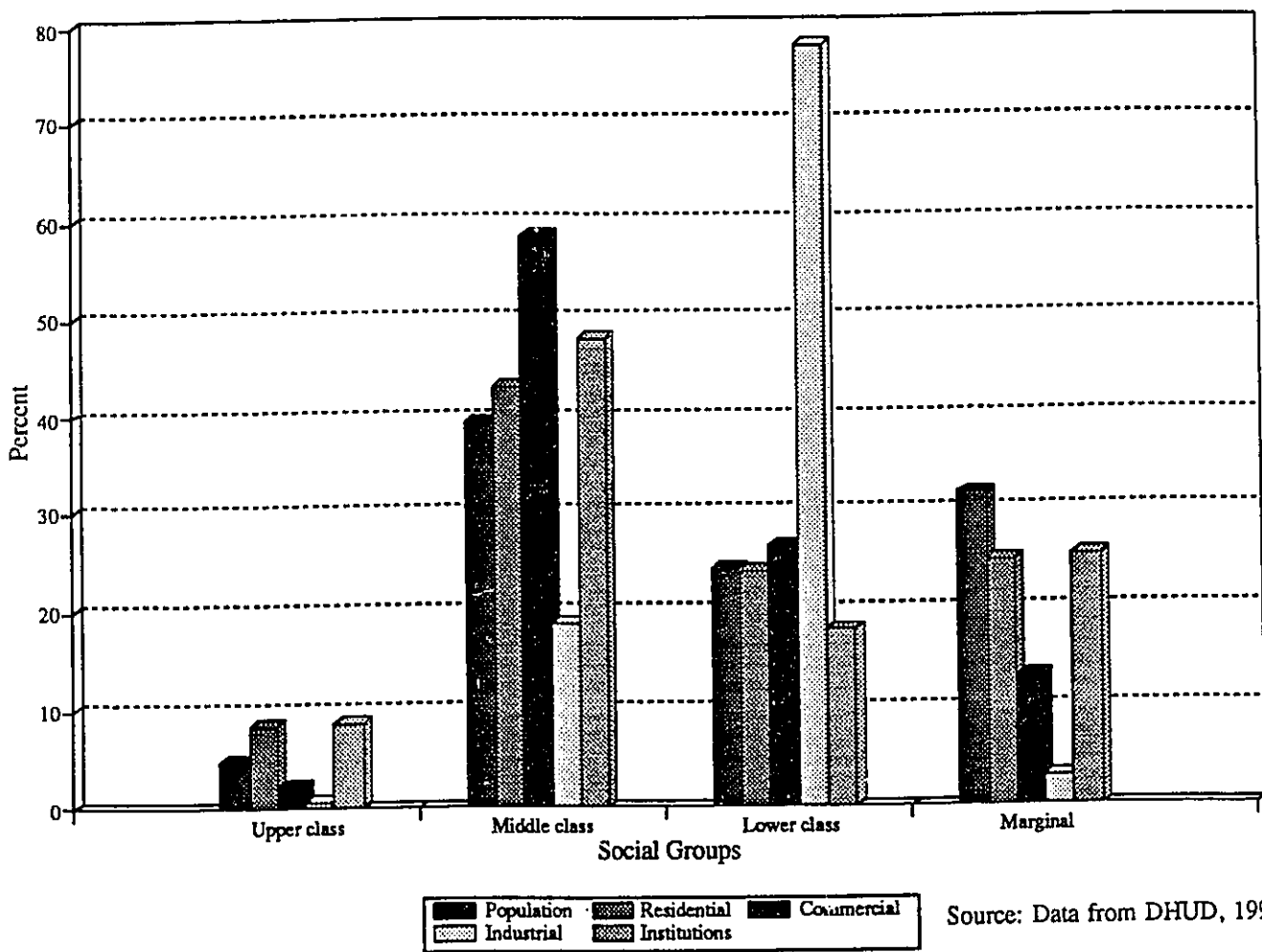
Source: DHUD, 1992

and marginal groups were production workers, this percentage was 22.4 and 34.6 among upper and middle classes.

To find the relationship between these social groups and the land use pattern, the amount of 1991 urban lands involved in industrial, commercial and institutions uses<sup>4</sup> within the four residential areas were calculated and compared (Fig. 7.11). Accordingly, the segregation of residential groups reveals a fairly strong link with the existing urban land use patterns in Tabriz. For example, the upper class residential areas, which have a higher proportion of professional and managerial workers, have a proportionally higher percentage of institutional land use and a lower percentage of industrial lands. On the other hand, the middle class residential areas, which have a relatively higher percentage of sales workers, have a higher level of commercial land uses. The

4 Institutions' land use here is combined of government, public organization, education and health land uses.

Fig. 7.11 Distribution of Major Land Uses Within Residential Groups in Tabriz, 1991



occupation of the central part of the city by middle class residents is another probable reason for its higher proportion of sales workers. A relationship also exists between the main land use pattern and the employment structure activity for lower class residents as well. The lower class residential area, which has a high proportion (50.8 %) of production workers and is located in the western fringe, has the highest proportion of industrial land use within its boundaries (about 78 %). This, perhaps, means factory workers tend to live close to their workplace. The marginal group is the only class which lacks the mentioned relationship between its dominant land use pattern and employment structure. Occupying the northern and southern fringes, marginal residents have the least diversified land use pattern. With over 30 percent of the city's population and 24 percent of the residential lands, the marginal zone has 13 percent of commercial and 3 percent of industrial land uses. However, 65 percent of its residents are involved in production. This implies that the residents of this zone rely heavily on the industrial activities of the lower class area in the west. The relatively high proportion of institutions in the marginal area is because of the location of government land use (military installation) in the southern district of 33 and the university of Tabriz in district 29 in the east. Most of the residents of these two districts are classified as squatters.

### **7.6 Unequal Distribution of Public Facilities**

The uneven urban development marks one of the major characteristics of many TWCC cities (e.g. Devas and Rakodi, 1993:314; Amirahmadi and Kiafar, 1993; Costello, 1993; Stren and White, 1989). This uneven development could partially be observed in the unequal distribution of public services between a minority of wealthy people and majority of poor people. This inequality, in

general, is often correlated with the socio-economic conditions of the TWCs and their development process.

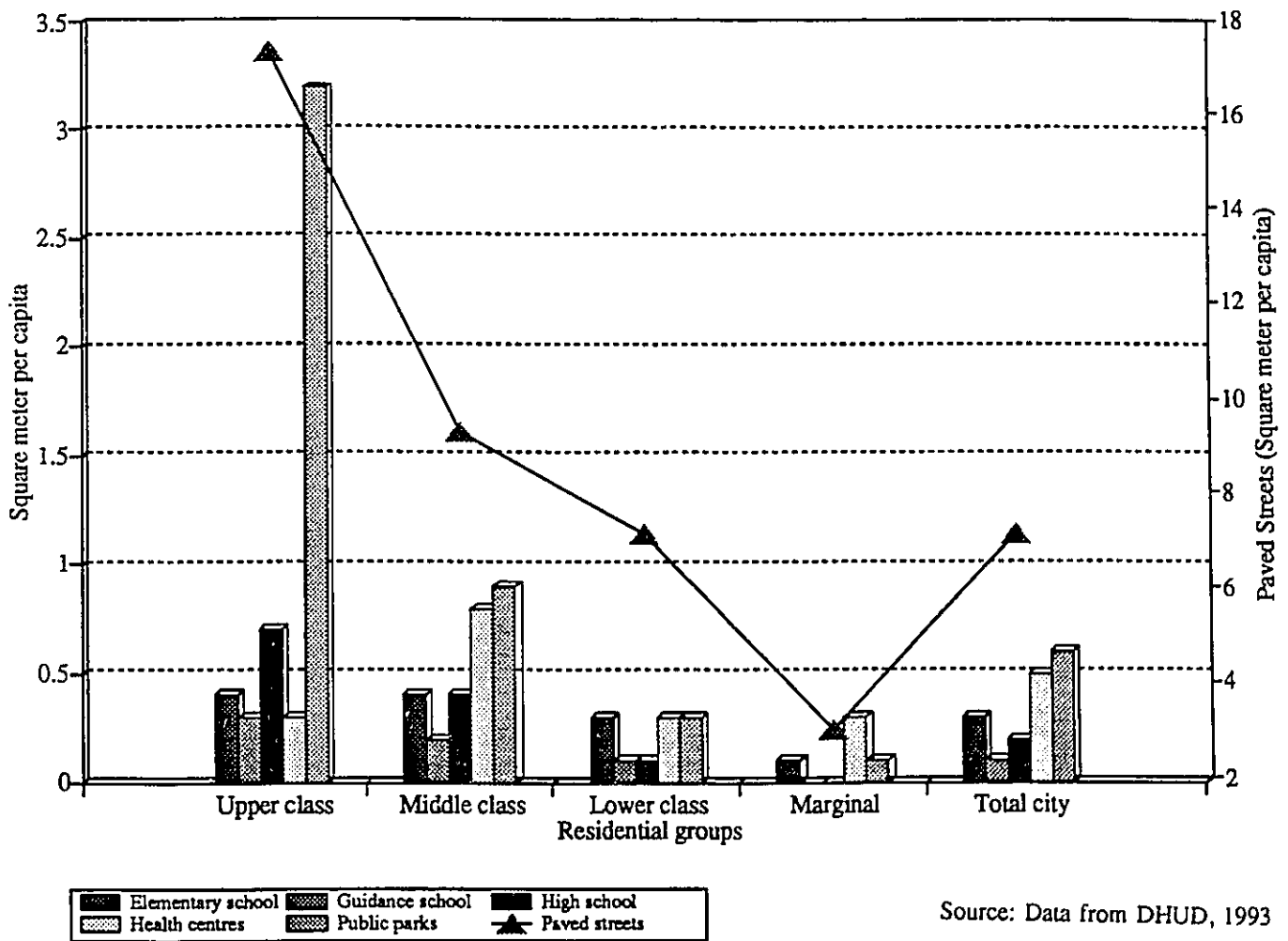
Having discussed the relationship between recent land use patterns and residential groups in the previous section, it is interesting to examine how the recent urban land use patterns are related to the distribution of public amenities among social groups. For this purpose, the amount of 1991 land uses related to commonly used services such as public schools (elementary, guidance and high schools<sup>5</sup>), health centres, public parks and paved streets was calculated on a per capita basis for each residential group. The results are compared in Fig. 7.12. According to this figure, we can say that the recent urban land use pattern in Tabriz reveals a serious inequality in the distribution of public services within the different residential groups. The result has been that the upper class and to some extent the middle class have received the most, while the lower and marginal classes the least.

Based on Fig. 7.12, in terms of public education facilities, the upper and middle classes have proportionally received a higher concentration, especially for guidance and high school land uses. The upper and middle class residential areas, with 0.4 square meters per capita and the lower class with 0.3 square meters per capita have a relatively equal share of elementary school, while the marginal group, with 0.1 square meters has the lowest amount. The difference for guidance and high school is greater. The share of land use for guidance schools is 0.3, 0.2, 0.1, 0 square meters per capita for upper, middle, lower and marginal classes respectively. For the high school

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<sup>5</sup> Public education in Iran includes three levels: 1) elementary school from grade 1 to 5; 2) guidance school from grade 6 to 8; and 3) high school from grade 9 to 12.

Fig. 7.12 Distribution of Public Facilities Among Residential Groups in Tabriz, 1991



Source: Data from DHUD, 1993

land use, while the average per capita for the city is 0.2 square meters, the share of the upper class is 0.7, the middle class 0.4 and the lower class 0.1. The marginal residents do not have high schools within their own areas. Such disproportional distribution, especially for guidance and high school land uses, means that the school population of the lower and marginal residents are dependent on the facilities of the other residential areas. This in turn increases the volume of traffic and the demand for more public transportation facilities which are already inadequate for lower and marginal residential areas.

For health care facilities, the middle class residential areas have the highest per capita (0.8 square meters). Because, most private health clinics and previously built hospitals are located in the central part, which is mainly inhabited by middle class residents, and most of the newly constructed hospitals are located in the eastern middle class peripheries. Although the upper class residents have a relatively lower share (0.2 square meters) in their areas, the most recently built hospitals are located in their vicinity in the eastern middle class area. The lower class and marginal residents each with 0.3 square meters per capita have less than the average amount (0.5 square meters) of health land use.

The difference in the proportion of public parks and paved streets seems to vary greatly among the residential groups. For instance, while on average there is 0.6 square meters per capita of public park at the city level, the upper class residents with 3.2 square meters per capita have the highest share, and the middle class with 0.9 has more than the city average. But, the lower class with 0.3 and marginal residents with 0.1 square meters have the lowest per capita land for public

parks. Using paved streets as a criterion for better access, the average per capita for the city is 9.2 square meters, the upper class has 17.4, the middle class 9.4, the lower class 7.2 and finally the marginal residents 3.1. This means that the upper class residential areas have almost six times more available access roads than marginal residents.

### **7.7 Conclusion**

This chapter discusses the major urban problems which have emerged as a result of recent rapid growth and land use change in Tabriz. It reveals that the physical expansion of the past three decades has led to the loss of good agricultural lands, especially orchards and irrigated farmlands around the city. It also appears that this rapid physical expansion has taken place without serious consideration of environmental limitations. The development of the residential areas on high risk lands in the northeast where a fault line passes to the north of Tabriz and the development of multi-storey residential units on unstable soil in the east are examples of residential development in unsuitable locations. The decay in the historical part, where the out-migration of especially wealthy families has led to the blight in the structure of buildings, is another main problem associated with the recent urban development in Tabriz.

The analysis of the social implications of the recent growth and land use pattern in Tabriz shows the spatial segregation of residential groups. It is found that this residential segregation is linked to the change in activity pattern, where the location of different residential groups shows a relationship with their places of occupation. The last section of the chapter examines the effect of the recent urban land use change on the distribution of public services. It is recognized that

the change in land uses involved in public services has led to a severe inequality among the different residential groups in terms of their access to basic public amenities such as public schools, health centres, parks and good roads.

## Chapter Eight

### Summary and Conclusions

#### 8.1 Introduction

This chapter provides the conclusions obtained as a result of this research into the recent urban land use change in Tabriz and recommends scopes for further research. The chapter consists of three sections. Section 8.2 generalizes the objectives of the study and summarizes the findings of the thesis. Section 8.3 discusses the general lessons which this study offers about the future changes in Iranian cities, and Section 8.4 states the thesis contribution and identifies areas for further investigations.

#### 8.2 Summary

The purpose of this thesis was to obtain a better understanding of the process of recent urban growth and change in the spatial structure of the City of Tabriz. Specific objectives were set to review the historical growth; find the main changes in population density and land use patterns; determine major underlying factors of these changes and discuss their main social and environmental implications over the 1966-1991 period.

In order to provide a theoretical background, Chapter 2 reviewed the main theoretical and empirical studies dealing with urban land use. In theoretical part, both descriptive and explanatory urban land use models concerning Western and Third World Cities were reviewed. It was argued that most of the descriptive and explanatory models try to describe or explain urban land use structure at a given time. Other urban land use studies which have taken a

dynamic approach and their methodological approaches were reviewed as well. It was stated that the thesis by taking a dynamic approach, examined the urban land use change from a geographical perspective. This approach helps to a better appreciation of the processes that have resulted in the existing spatial structure of cities and a broader view to the understanding of the problems related to urban change.

Since this study is related to Iran and since Tabriz, the case study, has evolved within the context of Iranian society, Chapter 2 also reviewed the literature on the Iranian cities and outlined their main structural changes during ancient, Islamic and contemporary periods. It was mentioned that ancient cities had a circular structure composed of three concentric zones of Kohandej, residence of king or ruler, in the centre; Sharestan, residence of government employees, armed forces and aristocrat, in the middle; and Rabaz, the main place of craftsmen, farmers, merchants and other social groups in the outer zone. During the Islamic period, cities gained stronger economic role and the new urban form with the centrality of Masjid Jamih and bazaar was shaped. Despite the various events and changes in the socio-economic condition, the spatial organization of cities during the Islamic period more or less remained similar. With the beginning of modernization, and its intensification after the 1960s, urbanization in Iran changed dramatically both in terms of population size and internal organization. Having reviewed the main studies related to Iranian cities it was concluded that the impact of recent rapid urban growth on the spatial structure of Iranian cities had not been dealt with seriously. This was the essential task intended for this study, to be conducted by focusing on the City of Tabriz.

To establish the context in which the recent urban change must be examined, Chapter 4 reviewed the history of urban development in Tabriz from its earliest time until 1966. It was revealed that the geographical location of Tabriz, that is in the centre of Azarbaijan and on the Iran-Europe transit route, has provided it with a great opportunity as a main commercial centre in the past and as a major economic centre at national level during its recent history. This favourable geographical location, as Lockhart (1960:10) states, has played an important role for the survival of this city in the face of many historical events. It was also realized that the historical development of Tabriz has significantly been influenced by political factors. The city has long benefited from being as a political centre of the region and as a national capital for some periods, however, it has also suffered from this centrality by being as a prime target during several invasions by Turks and Russians particularly between 16th and 19th centuries. Another significant factor which has always been detrimental to the city's growth has been natural disasters especially, earthquakes which have destroyed the city several times during the last millennium.

It was revealed that despite the destruction of the main part of the physical structures of the past in Tabriz, the impact of historical development can still be seen in the today's spatial structure of the city. It was discussed that the influence of historical development mainly is represented by the presence of old (historical) section in the city centre (with mostly its irregular and narrow streets, old, dense and low quality buildings); the traditional bazaar in the city centre (with its exotic structure and its major economic role) and historical land marks, especially concentration of mosques, in the old part.

The process of recent urban growth and its impact on population density in Tabriz during the 1966-1991 period was discussed in Chapter 5. It was clear that the recent rapid growth in Tabriz has mainly been as a result of natural population growth and rural-urban migrations caused by land reform, mechanization of agriculture and government policies. The impact of this recent growth on urban density was then examined. It was evident that a dramatic increase in the number of motor vehicles, a decline in average household size and government interventions have been the major factors in shaping the present physical form and causing the overall population density decline in Tabriz during the recent decades. However, due to the topographic constraints, orientation of the major transportation network and zoning policy, the change in density pattern within the different sections of the city varied substantially. While the city in the centre and east-west directions, occupied mainly by middle class residents, has experienced a density decline, the density in north-south directions (occupied mainly by low income groups and squatter settlements) has increased considerably. It was concluded that, the overall density decline over time in Tabriz conforms with the general rule in population density decline over time. However, the recent population distribution within the city in Tabriz present a mixed pattern. Whereas the declining population gradients with distance from centre in some direction (east and west) present some similarities with the general distance-density model, the increasing population gradients with distance from centre in other directions oppose the model.

The study of the patterns of urban land use change in Chapter Six showed that from the total of 5,838 ha of newly developed areas in Tabriz between 1966 and 1991, the major expanding land uses belonged to residential (55%), transportation (19.4%) and industrial activities (6.8%).

Commercial and health care land uses (with 0.6% and 0.5% respectively) had the smallest physical growth.

The examination of the spatial distribution of land uses revealed the higher degree of concentration and significant change in the geographical location of all urban activities within the city. The comparison of the location quotients of land uses between 1966 and 1991 showed that educational, industrial and health land uses had the biggest concentration, whereas transportation and residential land uses had relatively lower concentration. The higher concentration indicates a tendency from mixed land uses towards more discrete land use patterns. In terms of geographical location, the main changes during the 1966 and 1991 period include:

- an uneven residential development (lower density residential development in the eastern and western peripheries, but higher density residential developments in northern and southern fringes);
- specialization of economic activities in the space (the removal of some activities, e.g. industrial, wholesaling, storage, some services) from the centre and their concentration in the fringe;
- moving the concentration of public organizations from the inner districts to the fringe areas in the southwest and east;
- shifting the concentration of health care institutes from the inner city district to the periphery (in the east) and close to the high and middle class residential areas.

The examination of the overall morphology of the city showed that the 1966 land use model in

Tabriz mainly revealed its pre-modern style of spatial organization. It was generalized by the concentration of economic activities and public institutions in the core (bazaar and surrounding areas), higher population density in the centre and the residence of higher social status families in the centre and poorer families in the periphery. The 1991 morphology revealed some major changes with 1966 model. The differences were generalized in the decentralization of activities. This can be seen in the deconcentration of activities included mainly industrial activities, some public organization and government institutions and their shift mostly to the periphery as well as the establishment of new commercial developments in the periphery. The 1991 morphology of Tabriz displayed relatively lower population density in the centre, and the movement of most of the high-class social groups from centre to the periphery, and the increase in the density in northern and southern peripheries because of the location of low income groups and squatter settlements. The geographical situation of the city (e.g. **triangular shaped basin** in which Tabriz is located and its physical restrictions from three sides, south, east and north); the city's historical background (the old part in the centre with traditional bazaar as a major commercial centre and its irregular street pattern); modern technology; recent government policies and change in the socio-economic conditions were identified as the major underlying factors of the formation of the recent morphological change in Tabriz.

The social and environmental impacts of the recent urban growth and land use change in Tabriz were outlined in Chapter 7. Rapid consumption of prime agricultural lands around the city was a major environmental impact. Another problem was the development of residential areas in hazardous geographical locations, namely along the fault line that passes through the northern

part as well as the residential development on unsuitable soil in the east. The third problem was the decay of buildings in the historical sector due to the out-migration of wealthy families from the city centre and a lack of interest in the renovation and restoration of buildings in old districts.

The major social implication of recent urban change in Tabriz has been the physical segregation among different residential groups. It was revealed that while most of the upper class residents have congregated in the eastern section of the city, the city centre is dominated by the middle class. The lower class residents dominated mainly the western part of the city and squatters have occupied most of the northern and part of the southern margins. The comparison of the housing conditions, education and economic structure within the districts shows the physical segregation of four distinct residential groups in space. Related to this segregation was the unequal distribution of land uses involved in public services among the residential groups. Whereas the upper and middle class residential areas have a higher concentration of public services such as public schools, health centres, public parks, and access to good roads, the lower class and marginal residents have a limited access to the most public amenities.

### **8.3 Discussion**

Having summarized the results of the study, let's examine what the recent urban development in Tabriz may tell us about the future change in Iranian cities. The analysis in this study showed that the modernization era (since the 1920s) and its intensification after the 1960s, have been associated with a considerable change in the spatial structure of Tabriz. In a broader perspective, these changes were characterized with **rapid and less compact physical expansion, uneven**

development and social segregation, unequal distribution of public services, loss of agricultural lands, the decay of core and residential developments in unsafe geographical locations. Our expectation for future change depends on the change in the nature of the driving forces of recent urban development.

As discussed previously, recent urban change in Tabriz has mainly been due to by rapid population growth (caused by higher natural growth and massive rural-urban migrations), change in the socio-economic conditions and modern technology (e.g. smaller household size, dramatic increase in the number of private automobiles, development of transport systems), government policies through implementation of master plan(s) and orientation of government investments to this city in the region of Azarbaijan.

The examination of recent change in Tabriz suggests to us further future changes in Iranian cities. Despite the recent successes of government policies in controlling population growth by bringing the annual growth rate from 3.9 percent in 1986 to 2.7 percent in 1991, still Iran is a rapid growing country by the United Nations standards. Given the continuation of rural-urban migrations which are mainly oriented towards large cities (because of their relatively better opportunities for jobs and better public facilities), larger cities in Iran are expected to grow with relatively higher population growth rate than other areas in the coming decades. The change in the social structure will probably be continued with respect to the declining trend of household size as people prefer to live in smaller families and as today's economy allows young couples leave their parents homes and make their own independent families.

As world trade and communication expand, the modern technology spreads across the globe faster than before. Given the government industrialization policy in Iran and its industrial investments, the modernization process will proceed. Cities as the main recipients of these investments will, likely, be subject to further changes. With the modernization of economy, economic activities become more specialized leading to the further classification of human forces in response to the market demand. And with distancing social groups from each other because of different income levels, education and occupation, further social segregation is expected among the residential groups within Iranian cities .

A reflection on the driving forces of recent urban changes in Tabriz suggests to us that further exposure of TWCs to modern (western) technology leads to urban problems such as sprawl and low density expansion, social segregation, uneven development and environmental deterioration. Similar problems have already been experienced in Western cities and still are present in many of them. This may suggest that despite the advantages of Western technology in bringing easy life, when transferred to non-western societies it brings its own problems too. Thus, TWCs face aggravated urban problems during the course of modernization process.

The recent planning policies and westernization process in Tabriz and other large Iranian cities reveal that not much attention has been paid to the heritage of Irano-Islamic urbanization and its values which shaped these traditional cities for a long time. Planners and urban managers in Iran, as in other countries in the region, are mainly pursuing more western style solutions for the existing urban problems. However, post-modern experience in the west suggests approaches such

as densification, mixed urban land uses and the creation of more homogeneous neighbourhoods in cities to deal with existing urban problems such as low density expansion and heterogeneous social fabric (Hall and Bourne, 1992; RMOC, 1988). Such characteristics, ironically, are found in traditional Islamic cities where a high density, a mixed urban land use pattern, homogeneous neighbourhoods system and strong social ties bind urban environment (see chapters 2 and 4). The existing urban problems in Tabriz and other large cities in Iran will not necessarily be solved by adapting more western style solutions. Therefore, at the intra-urban level, there should be a serious consideration of employing the positive values of the traditional Irano-Islamic cities to better organizing present Iranian cities. At the meanwhile, at the inter-urban level adopting appropriate policies such as the rational allocation of national resources and investments among different regions should promote a balanced population distribution, even regional development and fair distribution of public facilities among urban centres.

#### **8.4 Areas for Further Research**

Most TWCs have experienced the colonialism period, therefore they have developed in response to exogenous forces more often than to endogenous ones (Lowder, 1986:216). Since Iran has never been a colony of any foreign country, this thesis contributes to the existing literature in the field in terms of **understanding the spatial organization of a non-colonized Third World City**. The spatial structure of Tabriz has mainly been influenced by its historical development, Islamic culture and imported modern technology.

In the existing literature on urban land use, not much attention has been given to the role of

historical development and its impact in the present structure. The second contribution of this thesis is its detailed analysis of the **historical development** and its impacts on the existing spatial structure of the city. This provides a better appreciation of the existing spatial structure of the city and gives a broader perspective for viewing future change.

The third contribution of this thesis is the attempts made to **link the urban land use change to the related major social and environmental problems**, as such link is not emphasized much in many studies on urban land use change by geographers. Such a link provides a better understanding of the existing urban problems and perhaps helps to seek for better solutions.

The fourth contribution of this thesis is related to the attempts that have been made to use **GIS** as a **main tool** to illustrate the change in urban land use patterns and part of the analysis. The use of GIS enhances our ability in better understanding the urban use change, through integrating various types of maps and information. This helps us in further spatial analysis, which is difficult to do by using only conventional methods of mapping.

This study has satisfied its objectives by finding the major characteristics of the recent urban growth and change in the spatial structure of the city of Tabriz over the 1966-1991 period. However, some important questions have risen from this study which require further investigations. There is a great need for additional studies in the following areas:

- i) The examination of the population density pattern in Chapter 5 showed that while Tabriz has

experienced an overall density decline over the time (1966-1991), a contradictory density change has occurred in different parts of the city. Therefore, further research is necessary to be done for the detailed analysis of the population density patterns especially for the explanation of their changing trend within the city and their qualitative aspect. Such analysis would provide an insight for city planners in better allocation of public amenities in the city.

ii) The analysis of the patterns of urban land use change in Chapter 6 revealed a significant difference in the changing patterns of technology related activities such as transportation and industrial lands on the one hand and land uses related to commercial activities and most of the public services like public organizations, educational and government lands on the other hand. But, further studies are needed for the explanation of these variations and the role of factors such as land market and ownership in these changes. This would provide a better knowledge base from which future urban change could be better anticipated.

iii) The study pointed out the main problems rising from recent urban change in Tabriz and outlined their main reasons. However, further research is needed to clarify the process leading to these problems, for example, the role of unofficial forces such as land speculators, behind the loss of good arable lands and the expansion of residential areas in unsuitable locations. A better understanding of the these processes would help in defining more efficient land use control policies.

iv) Since this study has focused on one of the largest Iranian cities, it is necessary further

research to be conducted to evaluate the applicability of the findings of this study to the other Iranian and Islamic cities.

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## **APPENDICES**

**Appendix 1: The Areal Distribution of Urban Land Use in Tabriz in 1966 (in hectare)**

Zone	Resid <sup>1</sup>	Comm <sup>2</sup>	Educ <sup>3</sup>	Hlth <sup>4</sup>	Govm <sup>5</sup>	PubOg <sup>6</sup>	Rec <sup>7</sup>	Indust <sup>8</sup>	Trans <sup>9</sup>	AgVc <sup>10</sup>	T.Dev <sup>11</sup>	Total
1	119.04	2.04	1.82	2.40	0.00	7.75	0.10	2.88	22.61	146.38	158.64	305.02
2	88.72	1.48	34.16	0.37	12.54	7.49	0.05	3.09	16.85	294.43	164.75	459.18
3	170.39	6.13	6.30	2.12	3.53	2.52	0.13	3.18	32.37	19.87	226.67	246.54
4	174.30	4.84	7.96	6.24	85.08	0.88	7.66	0.44	33.11	113.65	320.51	434.16
5	135.91	7.76	2.92	0.68	4.76	5.12	0.60	1.21	25.82	101.03	184.78	285.81
6	123.58	4.17	5.64	0.38	0.00	4.05	0.24	4.11	23.48	65.65	165.65	231.30
7	113.23	17.69	11.08	1.25	0.00	9.20	0.48	1.36	21.51	22.70	175.80	198.50
8	166.84	3.70	3.47	2.47	9.71	17.57	0.70	14.50	31.69	147.81	250.65	398.46
9	28.84	0.40	0.04	0.00	0.00	0.10	0.04	0.25	5.48	88.09	35.15	123.24
10	113.52	2.98	1.35	0.07	12.74	7.14	0.24	37.44	21.56	146.47	197.04	343.51
11	69.13	1.26	0.93	0.24	0.00	1.04	0.08	5.47	13.13	81.05	91.28	172.33
12	78.34	3.16	0.84	1.79	22.84	6.25	0.09	27.50	14.88	512.29	155.69	667.98
Total	1381.8	55.6	76.5	18.0	151.2	69.1	10.4	101.4	262.5	1739.4	2126.6	3866.0

<sup>1</sup> Residential <sup>2</sup> Commercial <sup>3</sup> Education <sup>4</sup> Health <sup>5</sup> Government <sup>6</sup> Public Organizations

<sup>7</sup> Recreation <sup>8</sup> Industrial <sup>9</sup> Transportation <sup>10</sup> Agriculture and Vacant <sup>11</sup> Total developed area

Source: DHUD, 1968

**Appendix 2: The Percentage Distribution of Urban Land Use in Tabriz in 1966**

Zone	Resid	Comm	Educ	Hlth	Govm	PubOg	Rec	Indust	Trans	AgVc	T.Dev (Base)	Total
1	8.61	3.67	2.38	13.33	0.00	11.21	0.96	2.84	8.61	8.42	7.46	7.89
2	6.42	2.66	44.65	2.05	8.29	10.84	0.48	3.05	6.42	16.93	7.75	11.88
3	12.33	11.02	8.23	11.77	2.33	3.65	1.25	3.14	12.33	1.14	10.66	6.38
4	12.61	8.70	10.40	34.65	56.27	1.27	73.58	0.43	12.61	6.53	15.07	11.23
5	9.84	13.95	3.82	3.78	3.15	7.41	5.76	1.19	9.84	5.81	8.69	7.39
6	8.94	7.50	7.37	2.11	0.00	5.86	2.31	4.05	8.95	3.77	7.79	5.98
7	8.19	31.81	14.48	6.94	0.00	13.31	4.61	1.34	8.19	1.31	8.27	5.13
8	12.07	6.65	4.54	13.71	6.42	25.42	6.72	14.30	12.07	8.50	11.79	10.31
9	2.09	0.72	0.05	0.00	0.00	0.14	0.38	0.25	2.09	5.06	1.65	3.19
10	8.22	5.36	1.76	0.39	8.43	10.33	2.31	36.91	8.21	8.42	9.27	8.89
11	5.00	2.27	1.22	1.33	0.00	1.50	0.77	5.39	5.00	4.66	4.29	4.46
12	5.67	5.68	1.10	9.94	15.11	9.04	0.86	27.11	5.67	29.45	7.32	17.28
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Appendix 1

**Appendix 3: Urban Land Use Location Quotients among Different Zones in Tabriz in 1966**

Zone	Resid	Comm	Edu	Hlth	Govn	PubOg	Rec	Indust	Trans	AgVc	T.Dev (Base)	Total
1	1.15	0.49	0.32	1.79	0.00	1.50	0.13	0.38	1.15	1.13	1.00	1.06
2	0.83	0.34	5.76	0.27	1.07	1.40	0.06	0.39	0.83	2.18	1.00	1.53
3	1.16	1.03	0.77	1.10	0.22	0.34	0.12	0.29	1.16	0.11	1.00	0.60
4	0.84	0.58	0.69	2.30	3.73	0.08	4.88	0.03	0.84	0.43	1.00	0.75
5	1.13	1.61	0.44	0.43	0.36	0.85	0.66	0.14	1.13	0.67	1.00	0.85
6	1.15	0.96	0.95	0.27	0.00	0.75	0.30	0.52	1.15	0.48	1.00	0.77
7	0.99	3.85	1.75	0.84	0.60	1.61	0.56	0.16	0.99	0.16	1.00	0.62
8	1.02	0.56	0.38	1.16	0.54	2.16	0.57	1.21	1.02	0.72	1.00	0.87
9	1.26	0.44	0.03	0.00	0.00	0.09	0.23	0.15	1.26	3.06	1.00	1.93
10	0.89	0.58	0.19	0.04	0.91	1.12	0.25	3.98	0.89	0.91	1.00	0.96
11	1.17	0.53	0.28	0.31	0.00	0.35	0.18	1.26	1.17	1.09	1.00	1.04
12	0.77	0.78	0.15	1.36	2.06	1.24	0.12	3.70	0.77	4.02	1.00	2.36
Base	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Source: Appendix 2

**Appendix 4: The Areal Distribution of Urban Land Use in Tabriz in 1991 (in hectare)**

Zone	Resid <sup>1</sup>	Comm <sup>2</sup>	Educ <sup>3</sup>	Hlth <sup>4</sup>	Govm <sup>5</sup>	PubOg <sup>6</sup>	Rec <sup>7</sup>	Indust <sup>8</sup>	Trans <sup>9</sup>	Opssc <sup>10</sup>	Undcon <sup>11</sup>	Oth <sup>12</sup>	T.Dev <sup>13</sup>	AgVc <sup>14</sup>	Total
1	133.27	3.10	1.24	0.14	0.00	10.83	0.90	0.00	13.81	0.00	2.60	1.29	167.18	22.18	189.36
2	197.15	3.90	1.38	0.14	0.00	2.72	2.20	0.09	16.25	6.08	2.00	2.08	233.99	6.65	240.64
3	106.47	1.39	2.60	0.28	0.09	0.44	0.23	0.10	7.98	3.60	1.03	0.00	124.21	0.51	124.72
4	169.94	16.40	8.42	1.12	4.86	3.92	2.23	2.07	32.40	0.28	3.75	9.06	254.45	1.86	256.31
5	193.02	1.75	5.09	2.25	1.54	2.55	2.69	2.61	32.15	0.00	3.37	12.18	259.20	23.25	282.45
6	139.94	1.74	4.60	0.00	0.61	8.73	4.75	0.98	24.49	1.86	2.58	0.00	190.28	43.25	233.53
7	166.59	1.90	6.98	2.77	5.63	12.94	0.83	0.16	29.34	3.39	4.27	16.44	251.24	286.15	537.39
8	19.62	0.02	0.92	0.00	3.40	0.00	0.00	0.20	16.02	14.50	1.45	3.89	60.02	71.11	131.13
9	241.22	1.04	2.79	0.08	7.44	0.26	1.43	4.56	99.63	2.24	12.82	21.08	394.59	217.33	611.92
10	5.55	0.16	0.87	0.14	0.00	0.15	0.03	0.29	0.77	3.85	0.27	9.19	21.27	95.91	117.18
11	98.40	2.77	4.93	0.51	2.52	1.59	1.16	0.30	17.89	4.83	0.93	2.00	137.83	1.30	139.13
12	191.80	1.93	7.27	1.88	1.16	0.86	0.35	1.75	29.37	4.53	3.58	0.11	244.59	18.27	262.86
13	274.15	2.19	2.00	1.68	3.73	1.65	0.66	3.56	17.67	1.09	7.70	0.12	316.20	91.73	407.93
14	111.31	0.53	0.36	0.23	6.65	0.31	0.06	51.04	16.61	0.23	3.82	4.95	196.10	52.40	248.50
15	90.43	0.72	0.71	0.31	0.00	0.58	0.24	0.17	12.07	1.29	1.80	49.55	157.87	454.45	612.32
16	183.90	1.78	4.18	0.77	0.13	0.76	0.34	1.08	11.82	2.17	1.29	5.50	213.72	55.00	268.72
17	92.68	1.04	0.89	0.50	0.20	0.42	0.31	2.47	8.79	5.01	0.52	1.81	114.64	1.37	116.01
18	406.68	2.69	0.03	0.34	0.08	18.16	2.57	3.44	31.29	1.16	6.31	34.86	507.61	82.61	590.22
19	0.00	10.13	0.00	0.00	0.00	0.03	15.68	52.93	71.44	1.79	3.36	152.63	307.99	1205.65	1513.64
20	202.04	2.39	5.35	3.65	10.53	1.94	1.43	2.82	75.42	31.31	2.57	0.08	339.53	51.11	390.64
21	143.59	1.65	0.99	0.19	0.00	0.33	0.09	4.99	32.50	1.16	10.12	0.00	195.61	199.05	394.66
22	83.58	1.17	1.98	0.20	0.00	0.04	0.52	10.48	56.16	1.13	0.32	1.64	157.22	216.68	373.90
23	12.44	0.90	13.11	2.21	15.28	3.29	12.93	285.45	280.88	1.94	16.30	0.00	644.73	556.72	1201.45
24	93.50	9.72	0.45	0.14	9.28	16.99	0.06	1.42	7.30	12.35	2.75	9.43	163.39	125.77	289.16
25	182.27	0.73	5.56	0.32	1.83	0.37	0.41	7.17	35.36	3.03	4.48	0.00	241.53	126.54	368.07
26	131.06	1.06	4.98	1.04	0.87	0.77	0.30	2.88	14.88	0.00	1.02	0.06	158.92	1.86	160.78
27	242.39	2.24	8.26	1.43	33.75	7.90	1.34	5.96	36.58	5.87	4.16	0.00	349.88	7.38	357.26
28	236.25	1.47	6.86	6.58	44.62	1.11	8.63	2.36	36.50	3.84	4.69	0.13	353.04	14.42	367.46
29	44.78	0.89	55.05	7.43	16.50	1.53	6.22	2.40	38.97	1.08	36.00	2.98	213.83	286.36	500.19
30	69.66	0.17	0.38	0.00	0.04	0.02	0.01	0.91	39.19	1.70	11.40	2.94	126.42	151.84	278.26
31	119.63	12.69	1.72	14.29	0.20	11.48	0.36	0.14	68.38	72.55	8.94	6.25	316.63	327.93	644.56
32	101.28	0.97	1.55	0.00	2.83	16.17	5.34	9.68	76.55	2.59	29.36	10.65	256.97	382.24	639.21
33	129.30	2.71	23.35	0.45	48.73	13.31	1.99	5.21	55.59	11.88	2.14	0.13	294.79	98.07	392.87
Total	4613.89	93.94	184.85	51.07	222.50	142.15	76.29	469.67	1344.05	208.33	197.70	361.03	7965.47	5276.95	13242.43

<sup>1</sup> Residential <sup>2</sup> Commercial <sup>3</sup> Education <sup>4</sup> Health <sup>5</sup> Government <sup>6</sup> Public Organizations <sup>7</sup> Recreation <sup>8</sup> Industrial <sup>9</sup> Transportation <sup>10</sup> Open Space <sup>11</sup> Under construction  
<sup>12</sup> Others <sup>13</sup> Total developed area <sup>14</sup> Agriculture and Vacant  
 Source: DHUD, 1992

**Appendix 5: The Percentage Distribution of Urban Land Use in Tabriz in 1991**

Zone	Resid	Comm	Educ	Hlth	Govm	PubOg	Rec	Indust	Trans	Opesp	Undcon	Oths	T.Dev (Base)	AgVc	Total
1	2.10	2.89	3.30	0.67	0.27	0.00	7.62	1.18	0.00	1.03	0.00	1.32	1.94	5.76	0.42
2	2.94	4.27	4.15	0.75	0.27	0.00	1.91	2.88	0.02	1.21	2.92	1.01	0.95	8.73	0.13
3	1.56	2.31	1.48	1.41	0.55	0.04	0.31	0.30	0.02	0.59	1.73	0.52	0.54	2.79	0.01
4	3.19	3.68	17.46	4.56	2.19	2.18	2.76	2.92	0.44	2.41	0.13	1.90	3.04	3.35	0.04
5	3.25	4.18	1.86	2.75	4.41	0.69	1.79	3.53	0.56	2.39	0.00	1.70	2.09	2.37	0.44
6	2.39	3.03	1.85	2.49	0.00	0.27	6.14	6.23	0.21	1.82	0.89	1.31	2.76	3.99	0.82
7	3.15	3.61	2.02	3.78	5.42	2.53	9.10	1.09	0.03	2.18	1.63	2.16	4.31	3.07	5.42
8	0.75	0.43	0.02	0.50	0.00	1.53	0.00	0.00	0.04	1.19	6.96	0.73	0.64	0.63	1.35
9	4.95	5.23	1.11	1.51	0.16	3.34	0.18	1.87	0.97	7.41	1.08	6.48	1.77	2.21	4.12
10	0.27	0.12	0.17	0.47	0.27	0.00	0.11	0.04	0.06	0.06	1.85	0.14	0.18	0.32	1.82
11	1.73	2.13	2.95	2.67	1.00	1.13	1.12	1.52	0.06	1.33	2.32	0.47	1.58	1.78	0.02
12	3.07	4.16	2.05	3.93	3.68	0.52	0.60	0.46	0.37	2.19	2.17	1.81	1.70	5.32	0.35
13	3.97	5.94	2.33	1.08	3.29	1.68	1.16	0.87	0.76	1.31	0.52	3.89	1.44	5.56	1.74
14	2.46	2.41	0.56	0.19	0.45	2.99	0.22	0.08	10.87	1.24	0.11	1.93	1.12	1.82	0.99
15	1.98	1.96	0.77	0.38	0.61	0.00	0.41	0.31	0.04	0.90	0.62	0.91	0.27	2.91	8.61
16	2.68	3.99	1.89	2.26	1.51	0.06	0.53	0.45	0.23	0.88	1.04	0.65	0.91	5.25	1.04
17	1.44	2.01	1.11	0.48	0.98	0.09	0.30	0.41	0.53	0.65	2.40	0.26	0.34	2.92	0.03
18	6.37	8.81	2.86	0.02	0.67	0.04	12.78	3.37	0.73	2.33	0.56	3.19	3.13	4.34	1.57
19	3.87	0.00	10.78	0.00	0.00	0.00	0.02	20.55	11.27	5.32	0.86	1.70	2.32	0.85	22.85
20	4.26	4.38	2.54	2.89	7.15	4.73	1.36	1.87	0.60	5.61	15.03	1.30	4.60	0.97	3.77
21	2.46	3.11	1.76	0.54	0.37	0.00	0.23	0.12	1.06	2.42	0.56	5.12	0.24	3.09	3.77
22	1.97	1.81	1.25	1.07	0.39	0.00	0.03	0.68	2.23	4.18	0.54	0.16	0.40	0.66	4.11
23	8.09	0.27	0.96	7.09	4.33	6.87	2.31	16.95	60.78	20.90	0.93	8.24	6.92	0.16	10.55
24	2.05	2.03	10.35	0.24	0.27	4.17	11.95	0.08	0.30	0.54	5.93	1.39	3.98	1.23	2.38
25	3.03	3.95	0.78	3.01	0.63	0.82	0.26	0.54	1.53	2.63	1.45	2.27	1.25	2.62	2.40
26	2.00	2.84	1.13	2.69	2.04	0.39	0.54	0.39	0.61	1.11	0.00	0.52	1.18	2.01	0.04
27	4.39	5.25	2.38	4.47	2.80	15.17	5.56	1.76	1.27	2.72	2.82	2.10	7.78	4.93	0.14
28	4.43	5.12	1.56	3.71	12.88	20.05	0.78	11.31	0.50	2.72	1.84	2.37	10.02	6.01	3.27
29	2.68	0.97	0.95	29.78	14.55	7.42	1.08	8.15	0.51	2.90	0.52	18.21	12.81	1.59	5.43
30	1.59	1.51	0.18	0.21	0.00	0.02	0.01	0.01	0.19	2.92	0.82	5.77	0.07	1.00	2.88
31	3.98	2.59	13.51	0.93	27.98	0.09	8.08	0.47	0.03	5.09	34.82	4.52	4.14	0.79	6.21
32	3.23	2.20	1.03	0.84	0.00	1.27	11.38	7.00	2.06	5.70	1.24	14.85	3.83	1.23	7.24
33	3.70	2.80	2.88	12.63	0.88	21.90	9.36	2.61	1.11	4.14	5.70	1.08	12.98	6.13	1.86
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Appendix 4

**Appendix 6: Urban Land Use Location Quotients among Different Zones in Tabriz in 1991**

Zone	Resid	Comm	Educ	Hlth	Govm	PubOg	Rec	Indust	Trans	Oppac	Undcom	Oths	T.Dev (Base)	AgVac
1	1.38	1.57	0.32	0.13	0.00	3.63	0.56	0.00	0.49	0.00	0.63	0.17	2.74	0.20
2	1.45	1.41	0.25	0.09	0.00	0.65	0.98	0.01	0.41	0.99	0.34	0.20	2.97	0.04
3	1.48	0.95	0.90	0.35	0.03	0.20	0.19	0.01	0.38	1.11	0.33	0.00	1.79	0.01
4	1.15	5.47	1.43	0.69	0.68	0.86	0.92	0.14	0.75	0.04	0.59	0.79	1.05	0.01
5	1.29	0.57	0.85	1.35	0.21	0.55	1.08	0.17	0.74	0.00	0.52	1.04	0.73	0.14
6	1.27	0.78	1.04	0.00	0.11	2.57	2.61	0.09	0.76	0.37	0.55	0.00	1.67	0.34
7	1.14	0.64	1.20	1.72	0.80	2.89	0.34	0.01	0.69	0.52	0.68	1.44	0.97	1.72
8	0.56	0.03	0.66	0.00	2.03	0.00	0.00	0.06	1.58	9.24	0.97	1.43	0.84	1.79
9	1.06	0.22	0.30	0.03	0.68	0.04	0.38	0.20	1.50	0.22	1.31	1.18	0.45	0.83
10	0.45	0.64	1.76	1.03	0.00	0.40	0.15	0.23	0.21	6.92	0.51	9.53	1.19	6.81
11	1.23	1.70	1.54	0.58	0.65	0.65	0.88	0.04	0.77	1.34	0.27	0.32	1.03	0.01
12	1.35	0.67	1.28	1.20	0.17	0.20	0.15	0.12	0.71	0.71	0.59	0.01	1.73	0.11
13	1.50	0.59	0.27	0.83	0.42	0.29	0.22	0.19	0.33	0.13	0.98	0.01	1.40	0.44
14	0.98	0.23	0.08	0.18	1.21	0.09	0.03	4.41	0.50	0.04	0.78	0.56	0.74	0.40
15	0.99	0.39	0.19	0.31	0.00	0.21	0.16	0.02	0.45	0.31	0.46	6.92	1.47	4.35
16	1.49	0.71	0.84	0.56	0.02	0.20	0.17	0.09	0.33	0.39	0.24	0.57	1.96	0.39
17	1.40	0.77	0.33	0.68	0.06	0.21	0.28	0.37	0.45	1.67	0.18	0.35	2.03	0.02
18	1.38	0.45	0.00	0.10	0.01	2.00	0.53	0.11	0.37	0.09	0.50	1.52	0.68	0.25
19	0.00	2.79	0.00	0.00	0.00	0.01	5.32	2.91	1.37	0.22	0.44	10.93	0.22	5.91
20	1.03	0.60	0.68	1.68	1.11	0.32	0.44	0.14	1.32	3.53	0.30	0.01	1.08	0.23
21	1.27	0.72	0.22	0.15	0.00	0.09	0.05	0.43	0.98	0.23	2.08	0.00	1.26	1.54
22	0.92	0.63	0.54	0.20	0.00	0.01	0.35	1.13	2.12	0.27	0.08	0.23	0.33	2.08
23	0.03	0.12	0.88	0.53	0.85	0.29	2.09	7.51	2.58	0.12	1.02	0.00	0.02	1.30
24	0.99	5.04	0.12	0.13	2.03	5.83	0.04	0.15	0.26	2.89	0.68	1.27	0.60	1.16
25	1.30	0.26	0.99	0.21	0.27	0.09	0.18	0.50	0.87	0.48	0.75	0.00	0.87	0.79
26	1.42	0.57	1.35	1.02	0.20	0.27	0.20	0.31	0.55	0.00	0.26	0.01	1.01	0.02
27	1.20	0.54	1.02	0.64	3.45	1.27	0.40	0.29	0.62	0.64	0.48	0.00	1.12	0.03
28	1.16	0.35	0.84	2.91	4.52	0.18	2.55	0.11	0.61	0.42	0.54	0.01	1.36	0.06
29	0.36	0.35	11.09	5.42	2.76	0.40	3.04	0.19	1.08	0.19	6.78	0.31	0.59	2.02
30	0.95	0.11	0.13	0.00	0.01	0.01	0.01	0.12	1.84	0.51	3.63	0.51	0.63	1.81
31	0.65	3.40	0.23	7.04	0.02	2.03	0.12	0.01	1.28	8.76	1.14	0.44	0.20	1.56
32	0.68	0.32	0.26	0.00	0.39	3.53	2.17	0.64	1.77	0.39	4.60	0.91	0.38	2.25
33	0.76	0.78	3.41	0.24	5.92	2.53	0.70	0.30	1.12	1.54	0.29	0.01	1.66	0.50
Base	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Source: Appendix 5