Dedicated to my wife and my son.

23267

OIL DISCOVERY AND ITS IMPACT ON OIL REFINERY IN ABADAN (IRANIAN CASE)

A Master's Thesis

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ABSTRACT

OIL DISCOVERY AND ITS IMPACT OIL REFINERY IN ABADAN
(IRANIAN CASE)

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M.S. in Regional Planning
Supervisor: Inst.Dr.Gülden BERKMAN
May, 1992, 118 pages

The history of the city of Abadan is definitely linked to the development of the oil industry and the key linkage has been materialized through the location of the oil refinery in this city.

It is also essential to understand the history of oil Discovery (Iran) in order to persue the discussion further in up coming chapters (i.e Chapter two).

Chapter Three will Present the history of the city of Abadan itself and other related factors such as climate, geography, location, and socio-economic structure.

In the chapter four this study will assess the impact of oil refinery on the Abadan, and will explore to what extend the oil refinery has effected this city's configuration.

Chapter Five will encompass analysis of the development strategy and conclusion in Chapter Six including a synthesis discussion to overall arguments.

Keywords: Iran, Oil Discovery Abadan Oil Refinery
Science Code: 601.06.01

ÖZ

PETROLÜN BULUNMASI VE PETROL RAFİNERİSİNİN ABADAN KENTİ ÜSTÜNDEKİ ETKİLERİ

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Tez Yöneticisi: Öğr.Gör.Dr.Gülden BERKMAN
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Abadan kentinin tarihi, petrol endüstrisinin gelişimi ile değişmiştir ve rafinerinin bu kentte kurulması kentin gelişmesinde anahtar rol oynamıştır. İlerdeki bölümlerdeki tartışmaların izlenebilmesi için petrolün bulunmasının tarihinin (İran'da) bilinmesi gereklidir (Bölüm 2).

Üçüncü Bölümde Abadan kentinin tarihi ile birlikte iklim, coğrafya, yer seçimi ve sosyo-ekonomik yapı gibi diğer faktörler incelenecektir.

Dördüncü Bölümde petrol rafinerisinin Abadan kenti üstündeki etkileri değerlendirilecek ve rafinerinin kentin yerleşme planını ve dokusunu ne ölçüde değiştirdiği araştırılacaktır.

Sonuç Bölümünde tüm ele alışların sentezini içeren bir tartışmaya yer verilecektir.

Anahtar Kelimeler: İran, Petrolün Bulunuşu, Abadan Petrol Rafinerisi.
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I am indebt to the Iranian ministry of higher education for their guidence and also their effort in introducing me to following institutions: Ministry of housing and city planning, ministry of oil. Iranian National Oil Company; Central Bank of Iran; Statistical center, ministry of agriculture; plan and Budget organization.

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TABLE OF CONTENTS

Page

ABSTRACT ii

ÖZ iii

ACKNOWLEDGEMENTS iv

LIST OF TABLES viii

LIST OF FIGURES xi

LIST OF NOMENCLATURE xiii

CHAPTER I: INTRODUCTION..... 1

CHAPTER II: IRANIAN CASE (OIL DISCOVERY)..... 3

2.1. Economic Implication of Oil Discovery..... 3

2.1.1. Back Ground to Concession..... 4

2.2. Growth of Oil Nationalization..... 5

2.2.1. "1933 Agrement"..... 7

2.2.2. Oil Nationalization Act and Consortium Argreement (1951-54)..... 9

CHAPTER III: KHUZISTAN PROVINCE (ABADAN)..... 13

3.1. History..... 13

3.2. Geography..... 17

3.2.1. Climate..... 19

3.2.2. Location..... 19

3.2.2.1. The Role of Abadan and its Importance to National Economy..... 25

3.2.2.2. The Importance of Abadan to Khuzistan Province..... 26

3.3. Socio Economic Structure..... 27

3.3.1. Provincial Disparity (1965-76)..... 27
3.3.2. Provincial Disparity (1976-and Post-Revolution)..... 33
3.3.3. Population.....39
3.3.3.1. National Trend.....39
3.3.3.2. Khuzistan..... 42
3.3.3.3. Abadan..... 44
3.3.3.3.1. Economic Activity..... 45
3.3.3.3.2. Employment..... 45
3.3.3.3.3. Age Structure.....46
3.3.3.3.4. Education.....47
3.3.4. Agriculture (Khuzistan)..... 50
3.3.4.1. Abadan Rural Area..... 57
3.3.4.1.1. Geography..... 58
3.3.4.1.2. Culture..... 61
3.3.4.2. Population 63
3.3.4.2.1. Economic Activity..... 64
3.3.4.2.2. Fishery and Animal Hasbandary..... 64
3.3.4.2.3. Age and Sex Structure..... 66
3.3.4.2.4. Education..... 66

CHAPTER IV: CITY FORMATION 69
4.1. Land Use..... 70
4.2. Uniqueness of Abadan..... 75
4.3. Impact of Iran-Iraq War..... 77

CHAPTER V: ANALYSIS OF THE DEVELOPMENT STRATEGY.....81
5.1. General Development Strategy.....81
5.2. Big Push Strategy.....84

5.3. Indirect Influences.....84
5.3.1. Pre-Revolution (1949-77).....85
5.3.2. Post-Revolution (1978-92).....87
5.4. Direct Influences.....90
5.4.1. Backward Linkage and Employment.....92
5.4.2. Forward Linkage.....96

CHAPTER VI: CONCLUSIONS.....100

REFERENCES.....108

APPENDICES 111
APPENDIX A. Table 112

LIST OF TABLES

Page

Table 2.1. Net Production, Exports, Sales of Crude Oil in Iran, and Government Revenue 1911-51 6

Table 2.2. Production, Net Profits of APOC/AIOC Iranian Royalties 7

Table 2.3. Net Production in Metric Tons 9

Table 2.4. Interrelationship Between the Consortium Participants 11

Table 3.1. Location Climatic Data of Abadan 20

Table 3.2. General Characteristics of three Categories of Iranian Provinces, 1976 30

Table 3.3. The Population of Iran and its Urban/Rural Distribution (1901-1940) 39

Table 3.4. Changing the Population in Compare to Urban/Rural Area (1951-89) 40

Table 3.5. Total Urban and Rural Population and Basic Indicator of Urbanization in Iran 41

Table 3.6. Total Urban and Rural Population of Khuzistan Province 43

Table 3.7. Population of Abadan 45

Table 3.8. Economic Activity of Abadan Population 46

Table 3.9. Employee Structure of Abadan 46

Table 3.10. Distribution of Employment in Different Sector of Economy Abadan 47

Table 3.11. Distribution of Khuzistan Province land 50

Table 3.12. Crops of Khuzistan Province 52

Table 3.13. List of Permanently Plants in Khuzistan Province..... 55
Table 3.14. Average Population of Rural Settelment in Khuzistan Province Compare to Abadan Rural Districts..... 64
Table 4.1. Distribution of Abadan Land Use..... 70
Table 4.2. Population, number of Quarters and Districts Related to Oil Industry (Abadan)..... 77
Table 5.1. Per Ton Revenuses of Persian Government and (AIOC) Profits for Selected Years..... 86
Table 5.2. Estimates of the Iranian Budget by Major Components (1937-49)..... 87
Table 5.3. Iran Lost of Oil Revenue (1980-88)..... 91
Table 5.4. Employment in the Iranian Oil Industry, 1939-50..... 94
Table 5.5. Employment and Production in the Iranian Oil Industry.....95
Table 5.6. Employment in the Abadan Oil Industry.....96

Table A.1 Provincial Socio-Economic and Demographic Indicators, 1976.....113
Table A.2 Estimates of Sources and Uses of Funds for the First Seven-year Plan, 1949-55.....114
Table A.3 Sources and Uses of Funds by the Plan Organization during the Second Plan, (1956-62.....115
Table A.4 Sources and Uses of Development Funds during the Third Plan, 1963-67.....116

Table A.5 Sources and Uses of Funds of Plan Organization during the Fourth Plan Period 117

Table A.6 Sectoral Contribution to the Gross Domestic Product at Constant Price (Per Cent) 1967-1977.....118

LIST OF FIGURES

Page

Figure 3.1. Persia, Achaemenid Empire's Administrative capital (Susa)..... 14

Figure 3.2. Location of Abadan, Port City of Mohammerah and Basra..... 16

Figure 3.3. Geography, Location of Iran and Abadan... 18

Figure 3.4. The Boundary of Khuzistan Province and Major Townships..... 23

Figure 3.5. Abadan Major Roads 24

Figure 3.6. Three Categories of Iranian Provinces, 1976..... 28

Figure 3.7. Mobility of Province Within Provincial Hierarchy, 1966-76..... 31

Figure 3.8. Upwardly and Downwardly mobile Provinces, 1966-76..... 32

Figure 3.9. Mobility of Provinces Within Provincial Hierarchy, 1976-84..... 35

Figure 3.10. Upwardly and Downwardly Mobile Provinces, 1976-84..... 37

Figure 3.11. Age Structure of Abadan..... 48

Figure 3.12. The Boundary of Abadan Township and its District..... 59

Figure 3.13. Age Structure of Abadan Township Rural District 67

Figure 4.1. Process of Urban Development Abadan..... 71

Figure 4.2. Abadan Land Use 74

Figure 4.4. The Wasted Billions, Oil Export Revenues 91
Figure 5.1. Iranian Gas Trunkline 99
Figure 6.1. Street Plans of Section of Four Iranian Cities 106
Figure 6.2. Street Plan of Yazd City 107

NOMENCLATURE

APOC	Anglo Persian Oil Company
NIOC	National Iranian Oil Company
RDP	Relative Developed Province
IP	Intermediate Province
LDP	Least Developed Province
PBO	Plan and Buget Organization

CHAPTER I

INTRODUCTION

The aim of this study is to assess the impact of the oil refinery on the process of Abadan's Formation.

The discovery of oil in the late 19th century has played a significant role in human Technological Knowledge and progress.

The beginning of the oil industry's activity, that modern oil exploration in the Middle East was first near the Masjid-i-Sulaiman, which is located in the southern province of Khuzistan.

The discovery of the oil has become one of the major source of energy. This new member of the fossil fuels was going to have an international significance. Within the special category of fossil fuels, "oil" plays a different role, because it has also become a political factor in the international relation.

Although, fuel oil was considerably more expansive than coal, it had many undoubted, advantage-its cleanliness, the elimination of the need for strokers, and it much higher power to weight ratio than coal [Venn (1986:30)]. And as a consequence, even the coal-rich nation of Europe (namely Great Britain) switched to oil for substantial part of their power source in Middle East, where production cost were extremely low.

After the primary prosperity of "oil" as an industrial material from 1863 in U.S.open new chapter in industrial world, this single source of energy use as a valuable commercial, industrial, and an exterme profitable colonial good. Therefore, was introduce in the Business and trade of the international scale.

Iran's role among the Middle East oil producing countries has been a pioneer one. Iran is the oldest Middle East producer, and she was the first to nationalize her oil industry, and also the originator of the national oil company concept in the region.

CHAPTER II

IRANIAN CASE OIL DISCOVERY

2.1. Economic Implication of Oil Discovery

Iran is a country that can lay claim to 6.000 year of Persian culture (loomey, 1913:1).

Geograpnical, strategical, historical and cultural features distinguish Iran from other countries in persian Gulf region. The country is the second largest in Territory (after Saudi Arabia) and the first largest in population. It has the longest frontier with the former soviet union (1200 miles). Iran is only non-Arab country in the region.

Despite its glorious history, Persia was a weak and under-developed country in the nineteenth and early twentieth century. It has been subject to various external influences and intervention due to: (a) for an outlet to the persian Gulf and then Indian ocean, (b) proximity to oil filed of the persian Gulf (Fatemi, 1952: 15).

(Yergin (1991: 12) has pointed out that British bring up the "oil" as a new competitor, in place of coal and substantiated against other source of energy:

> "issue was whether to convert the British Navy to oil for its power source, in place of coal which was Traditional fuel. Many thought that such a conversion was pure folly, for it meant that the Navy could no longer

rely on safe, secure Welsh coal, but rather would have to depend on distant and insecure oil supplies from persia, (as Iran was then Known). However. There was no choice-in churcnill's words "Mastery itself was the prize of venture".

The discovery of oil in persia was a turning point in British policy toward Persia: for the first time strategic consideration gave up to commercial interests.

2.1.1. Background to Concession

In 1892 the French geological magazine "Annales des Mines" published a report on the prospects of oil investigation of French government scientific mission. Willian Knox D'Arcy who was the first British Financier who was granted the oil concession [Fesharaki (1976:3)]

The 1901 D' Arcy concession provided for a 60 years exclusive granted to "search obtain, exploit, develop, tender suitable for trade, carry away and sell natural gas, petroleum, asphalt" throught the whole empire, with exception of five northern provinces (Azarbayejan, Gillan, Mazandaran, Khorasan, and Asterbad) which were under influence of Russia. The concession embarced on an area of 500.000 square miles an area larger than that of France, Great Britain, and Germany put together.

All land taxes and import duties were waived and Article 14 of the concession bound the persian government to protect the Physical assets and personnel of the company [Mostofi (1961:105, 109)].

After unsuccessful drilling in North Western Iran during 1902-1905, the first successful effort occured in early 1908. Which

resulted in naming the first oil source as well M1. Two weeks later, on May 26, 1908, M1 having reached a depth of 1,100 feet, struck oil in a large quantities. This kept D'Arcy from going bankrupt. [Mangone, (1976:123)].

This was the extra ordinary account of the Iran oil discovery. Putting Masjid-i-Sulainan on the World oil map.

On 14 April, 1909 the concession was dissolved and Anglo-Persian oil Company (APOC) was formed, with an initial capital of £ 2 million (pounds).

2.2. Growth of Oil Nationalization

Anglo persian oil company (APOC) continued to exert financial and political influence in persia.

Because of the weakness of the centeral government during 1908-1920, and its inability to exercise effective control throughout its territory, the British used the opportunity and supported the independent minded Bakhtiari Khans, in order to assure production and transport of crude oil of (APOC). [venu, (1986: 28-29)].

This type of policy furthered their influences which resulted in obtaining Abadan as a Refinery location.

Table 2.1. Net Production, Exports, Sales of Crude Oil in Iran, and Government Revenue, 1911-51.

Period	Net Production [a]	Exports [a]	Internal Sales [a]	Iranian Govt. Income (£)	Exchange Rate (Rls./£)	Iranian Govt. Income (Rls.)
9/1/1911-3/31/1912	41,775					
1912/1913	82,097	37,000				
1913/1914	278,026	158,000				
1914/1915	382,010	134,000	6,000			
1915/1916	456,605	172,000	4,000			
1916/1917	654,409	390,000	3,000			
1917/1918	911,803	623,000	3,200	b		
1918/1919	1,124,170	828,000	2,500	1,325,552	27.70	36,717,790
1919/1920	1,407,531	936,000	2,500	468,718	25.50	11,952,309
1920/1921	1,771,536	1,398,000	5,300	585,290	34.00	19,899,860
1921/1922	2,364,566	2,307,000	5,400	593,429	51.29	30,436,973
1922/1923	3,006,511	2,604,000	5,400	533,251	56.56	30,160,676
1923/1924	3,773,818	3,177,000	8,900	411,322	47.28	19,447,304
1924/1925	4,403,480	3,577,099	11,011	830,754	42.00	34,891,668
1925/1926	4,629,270	4,052,123	12,089	1,053,929	43.50	45,845,912
1926/1927	4,909,336	4,518,505	11,229	1,400,269	48.60	68,053,073
1927/1928	5,443,777	4,754,468	30,705	502,080	49.25	24,727,440
1928 (9 month)	4,358,570	3,781,962	19,227	529,085	49.25	26,057,436
1929	5,548,587	5,416,305	26,576	1,436,764	48.03	69,007,775
1930	6,034,610	5,737,592	25,211	1,288,312	58.00	74,722,096
1931	5,842,776	5,539,203	28,400	1,339,132	89.00	113,182,746
1932	6,549,244	6,006,298	35,212	1,525,383	100.00	152,538,300
1033	7,200,426	6,654,699	60,603	1,785,013	103.00	183,856,339
1934	7,658,324	7,062,500	83,205	2,159,143	80.24	173,249,654
1935	7,607,852	6,917,768	96,306	2,191,952	79.21	173,624,518
1936	8,329,674	7,244,569	127,719	2,828,502	82.96	234,652,526
1937	10,329,842	9,302,064	153,243	3,444,439	80.00	275,555,120
1938	10,358,976	9,090,052	164,742	3,307,478	80.00	264,598,240
1939	9,731,590	8,207,860	235,193	c 4,270,814	78.93	337,351,596
1940	8,752,721	8,020,132	278,215	4,000,000	64.83	253,320,000
1941	6,701,274	5,239,787	269,324	4,000,000	85.29	341,160,000
1942	9,546,724	8,030,232	387,808	4,000,000	132.00	528,000,000
1943	9,861,517	8,304,694	716,472	4,000,000	128.00	512,000,000
1944	13,487,255	10,440,050	1,266,391	4,463,778	128.00	571,363,584
1945	17,109,713	14,177,283	842,423	5,623,161	128.00	719,764,608
1946	19,497,486	17,919,178	498,992	7,130,250	128.00	912,672,000
1947	20,518,905	17,725,155	603,537	7,103,795	128.00	909,285,760
1948	25,270,164	22,737,438	701,458	9,172,245	128.00	1,174,047,360
1949	27,236,729	24,632,589	828,172	13,489,271	121.57	1,639,890,675
1950	32,259,642	29,274,187	854,186	16,035,567	89.40	1,433,579,690
1951	16,885,764	14,032,337	907,278	7,000,000	89.40	625,800,000
TOTAL	332,321,085	291,160,129	9,351,127	119,828,678		12,033,413,012

Source: Data supplied by the National Iranian Oil Company. (a) In metric tons (b) Includes approximately £335.000 paid to Iran during the 1911-19 period (c) In 1940, an indemnity of £1.500.000 was paid to Iran for 1939 and a minimum payment of £4.000.000 was quaranteed by the company for the years 1940 and 1941, which was later extended to 1942 and 1943.

Table 2.2. Production, Net Profits of APOC/AIOC, İranian Royalties.

Year	Net Production (Thousand of metrictons)	Net Profits(a) Thousands of Pound Sterlin	İranian Royalties (b) (Thousand of Pound Sterling)
1913-14	278	27	10
1917-18	912	780	330
1921-22	2,365	3,779	593
1926-27	4,909	4,800	1,400
1929	5,545	4,274	1,437
1931	5,843	2,413	307 (c)
1936	6,330	6,123	2,580
1940	8,753	2,842	4,000
1944	13,487	5,677	4,464
1948	25,270	24,065	9,172
1950	32,260	33,103	16,032
1951	16,886	24,843	8,326

Source: Fereidum Fesharaki. "Development of the Franian oil industry" New York: Praeger Publishers (1976:15).
(a) After taxes and royalties
(b) In 1940 AIOC paid idennity of 1.5.
(c) After the 1933 agreement this figure was revised to £1.3 million.

Eventually, Iran's complaints about the method of profit sharing (see table 2.1). Became an embroyonic development for further tension, between Iranian goverment and company throught 1920's but showdown finally occured in early 1930's.

2.2.1. "1933 Agreement"

During the Great Depression, APOC's royalty payments to Iran had dropped from £ 1.4 million (pound) in 1929 to £ 307 thous and (pound) in 1931 (see table: 2.2).

On 27 November 1932 Reza Shah, unilaterraly cancelled the D'Arcy concession to prevent the risk of British intervention. Finally, the "1933 Agreement" was signed.

Under "1933 agreement": (1) the concession's area was reduced to only 100.000 square miles. and the company's monopoly on piplene construction and control was abolished; (2) the old 16 per cent formula was replaced by (a) a flat "royalty" rate of four shillings to be paid to the Iranian Govenment for every ton of oil sold in Iran or exported. (b) a "tax" of 6 pence to one shilling for each ton of oil exported, and (c) a payment to the Iranian government of 20 per cent of the annual declared dividends on ordinary shares in excess of £671.250; (3) Iran's original right to acquire the company's assets free of charge upon the expiration of the new agreement in 1933 was reaffirmed. The agreement futher provided that: (1) Iran's total annual income, under no circumstances be less than £750.000 (pound) in royalties and no less than £225-300 thousand (pound) in taxes; (2) domestic need for oil and oil products should be supplied by the company at prices prevailing in the Gulf of Mexico minus a discount; and (3) the company should pledge to (a) use the most modern techniques of oil production. (b) domestic employees, and (c) Train Iranian nationals for high-level position. APOC was renamed the Anglo-Iranian Oil Company (APOC).

However "1933 Agreement" did not completely eliminate source of difficulty between the company and persian Government it demonstrated by event in 1951.

Table 2.3. Net Production in Metrictons

Year	Iran
1941	6,710
1942	9,550
1943	9,860
1944	13,485
1945	17,110
1946	19,495
1947	20,520
1948	25,270
1949	27,235
1950	32,260
1951	16,845
1952	1,360
1953	1,490
1954	3,000
1955	16,355
1956	26,600
1957	35,020
1958	40,905
1959	45,195
1960	52,390
1961	59,305
1962	65,810
1963	73,555
1964	84,610
1965	94,125
1966	105,445
1967	130,580
1968	141,635
1969	168,490
1970	191,295
1971	226,830
1972	251,930

Source: Fioma Venn "Oil Diplomacy in the twentieth century" London, (1986:11)

2.2.2. Oil Nationalization Act and Consortium Agreement (1951-54)

Dr.Mohammad Mossaddegh, an Iranian lawyer and politician. Introduced a bill in 1944 which required: any further agreement must be approved by the majlis (parliament) For oil concession.

In April 1951, (AIOC) was nationalized, this resulted in great political an economic hardship in Iran, and even droven country

to the edge of bankratpey (see table 2·3).

During the Nationalization period, (AIOC) refused to accept the nationalization law and began to a series of collusive politico-commercial maneuvers with other major oil companies governments including: (a) Boycotting any purchase of or shipping of Iranian oil; (b) Frozed certain Iranian financial assets abroad, (c) placed an embargo on parts and equipment needed to maintain Iranian oil facilities as well as on "scarce" Iranian imports, (d) took legal action against independent buyers and shippers of Iranian oil.

Iran demanded 50-50 profit-sharing and training of more Iranians, equal-opportunity employment of local personnel in management. But (AIOC) refused to accept them until early 1951, when it was too late, for by that time the fevor of nationalization had become politically irressistible.

Downfall of Dr.Mossadegh's regime orchestrated via a military coup in sep.1953. This allowed the instalation of shah's regime with American support and formation of a consortium of international oil companies in 1954.

One of the original Iranian objections against the Anglo-Iranian Oil Company (AIOC) was that Iran was not satisfied with leaving her oil in the hands of a single company. But a closer look at the interrelationship between the consortium participants reveals that the real change in overall control of Iranian oil by foreign oil companies was negligible (See Table 2.4). The seven sister, plus CFP, controlled 100 per cent of Iranian oil.

Table 2.4. Interrelationship Between the Consortium Participants.

COMPANY	SHARE (%)	NATIONALITY
British Petroleum (BP)	40	British
Royal Dutch/Shell	14	Anglo-Dutch
Standard Oil of New Jersey	7	United States
Standard Oil of California	7	United States
Texaco	7	United States
Mobil	7	United States
Gulf	7	United States
CFP	6	French
IRI Com Group	5	United States
TOTAL	100	

Source: E.T.Penrose, The Large International Firm in Developing Countries - The International Fetroleum Industry London, 1968, p.151.

The 1954 consortium agreement contains provisions recognizing that the entire assets belong to Iran, but also clearly laysdown the right of the foreign oil companies to operate these. NIOC and the Iranian government refer to the consortium agreement as an "agency contract" in their official publication, because they claim that the oil reserves and the assets belong to Iran and the consoritium is only operating these assets for Iran [Fesharaki (1976:431)]

50-50 plofit sharing and Iran was pay to the British with petroleum company (formerly AIOC) the sum of 25 million pounds sterling as compensation for nationalization of its assets. Under this agreement NIOC was to take over the "non-basic operations" which included health, housing and education.

The interesting point is that the agreement was to run for 25 years originall drawn from 1954 to run until 1979 that coincide with Iranian revolution. In 1979 the Iranian government nationalize the whole oil industry and before bear a fruit the Iran-Iraq 1980-88 was started which destroyed half of the Iranian oil industry in particular oil Refinery of Abadan.

CHAPTER III

KHUZISTAN PROVINCE (ABADAN)

3.1. History

Nature has been both kind and harsh to man in Iranian province of Khuzistan.

In antiquity, advantages for the irrigated agriculture and probably also for the maritime and overland trade of primitive man help the province under name of Elam (*) to become one of the cradles of civilization.

Ancient Elam competitor sumer and Babylon, and in Achaemenid, Sasanid and early Muslim time also the area flourished. Its chief town susa (know as shush) was the Achaemenid empire's administrative capital. (See Figure 3.1.)

[Bagley (1976:25) arques that "comtemporary geographers have left accounts of the thriving agriculture and especially sugar cultivation of the province, which acquired the name Khuzistan", (i.e. land of the Khüzi or Huzi people which is the plural of the Ahwaz, provincial capital of Khuzistan). The word "huz" is said to have originally meant "sugar cane".

* Elam ancient Kingdom at the nead of the persion Gulf just east of babylonia, in what is now the Western Iran [Macmillan Dictionary (1973:21)]

Figure 3.1. Persia, Achaemenid Empire's Administrative capital (Susa)

[Upham Pope (1969:16) has poimted out about south Western of Iran and Part of North Khuzistan Province:

> "The Persian Empire was established by 560 B.C., by cyrus the Great, the first Achaemenid. The whole of Western Asia was organized into the world's first great Empires. The Achaemenid Royal Road from susa to sardis covered over 1600 miles and its one hundred and eleven station for caravans enabled transportation of good throughout the Empire in less than ninety days; the routes from susa to persepolis and from susa to Ecbatana where even paved; All an anticipation of the Roman road."

South portion of the Khuzistan province, particularly Abadan Island from above point of view is poor. This poverty is due partly to unsuitable environmental condition and partly to its geographical location.

Although, it is belived that the city of "Ebadan" was destroyed in the early years of Islam (Seventh century), and except for a small part of it, nothing else remained. And this portion existed as a small village. But the evidence of the Arab tribes in this region is dated in the early ninth century. [Emcyclopedia of Iranian city in persian, (1983:30)].

Mohammerah which is port city located very close to Abadan and the importance of ever-increasing shipping at "shatt-el-Arab" (Known as Alvand Rod) and opportunte position of "Mohammerah" that caused to decrease or diminsh the significant of port city of Basra (See Figure 3.2).

"Erzurum agreement" of 1884 was signed between Iran and Ottoman Empire which is the first evidence to determine the boundaries of Iran (Khuzistan province) and Iraq. The interesting point is that indicating, there are Iranian tribes in that region who they speak Arabic.

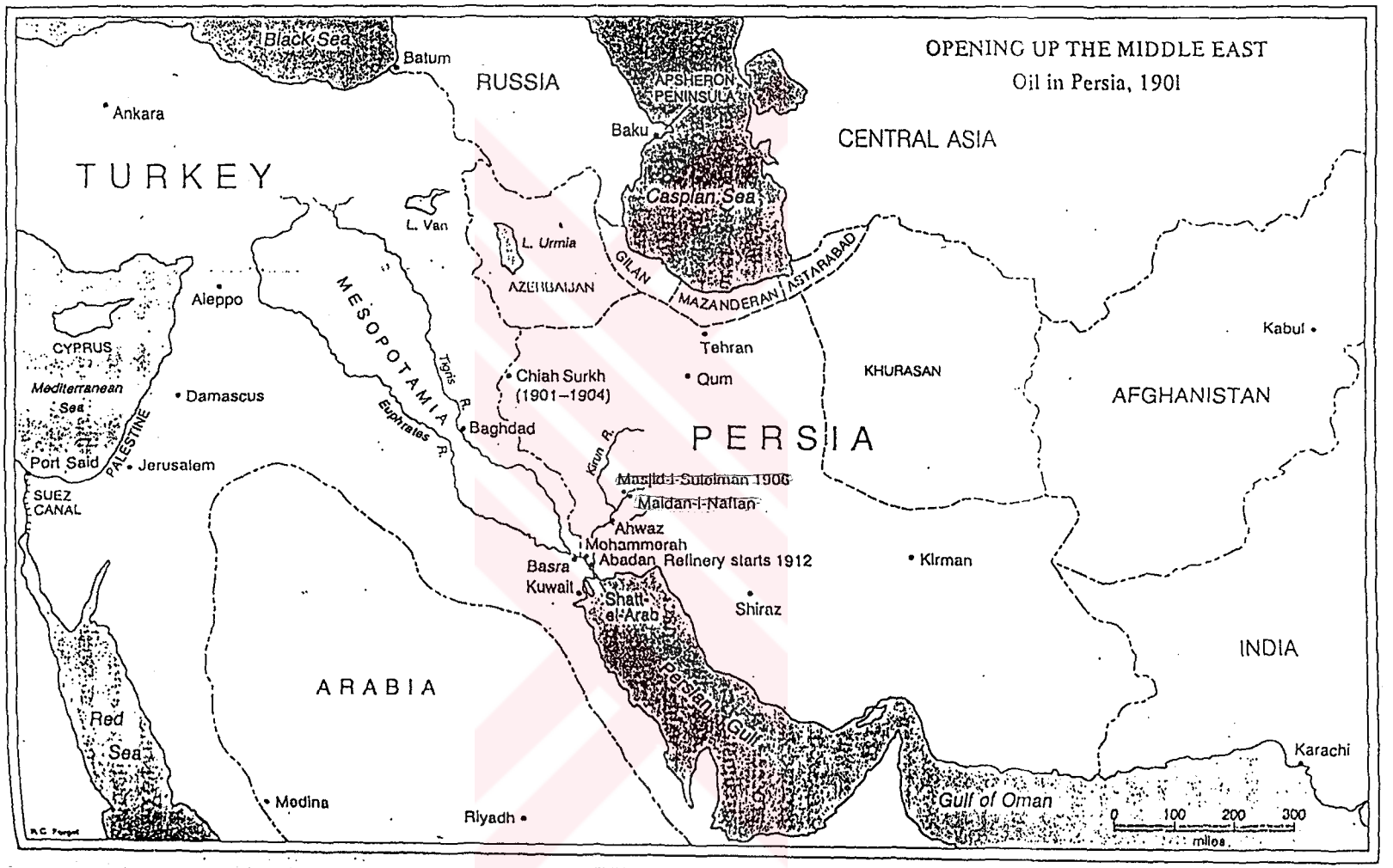


Figure 3.2. Location of Abadan, Port City of Mohammerah and Basra

With increasing the activity of oil explorations and construction of oil refinery in Abadan and since sufficient communication of a road networks were not erected, therefore, Karun river was play the main role as a mean of transportation for the British.

Another important. Concession given to the British, after oil concession was the "Riverboat concession" which was granted to Linch Brothers in 1927.

In 1931 more than 250 small and large ships which were belong to Anglo-Persian oil company (APOC) were traffic from Karun river to persian Gulf (encyclopedia of Iranian city, 1983:35).

"Ebadan" the present city known as "Abadan" was a small village which subsistence of inhabitants of this village were supported by fisheries and the take care of palm grove.

3.2. Geography

Iran has an area of about 618000 square mile (1.600.000 square kilometers). It lies between 25 and 40 degrees north latitude and 44 and 64 degrees east longitude. Consequently it experiences vast climatic differences which are due partly to its geographical and partly to its varied topography [morris, (1972:420)].

As shown in Figure 3.1 Iran can be easily divided into five major geographic planning region.

1. The Elburz and Sagros Mountain ranges, in the form of a reversed "U".
2. A high plateau within the "U".

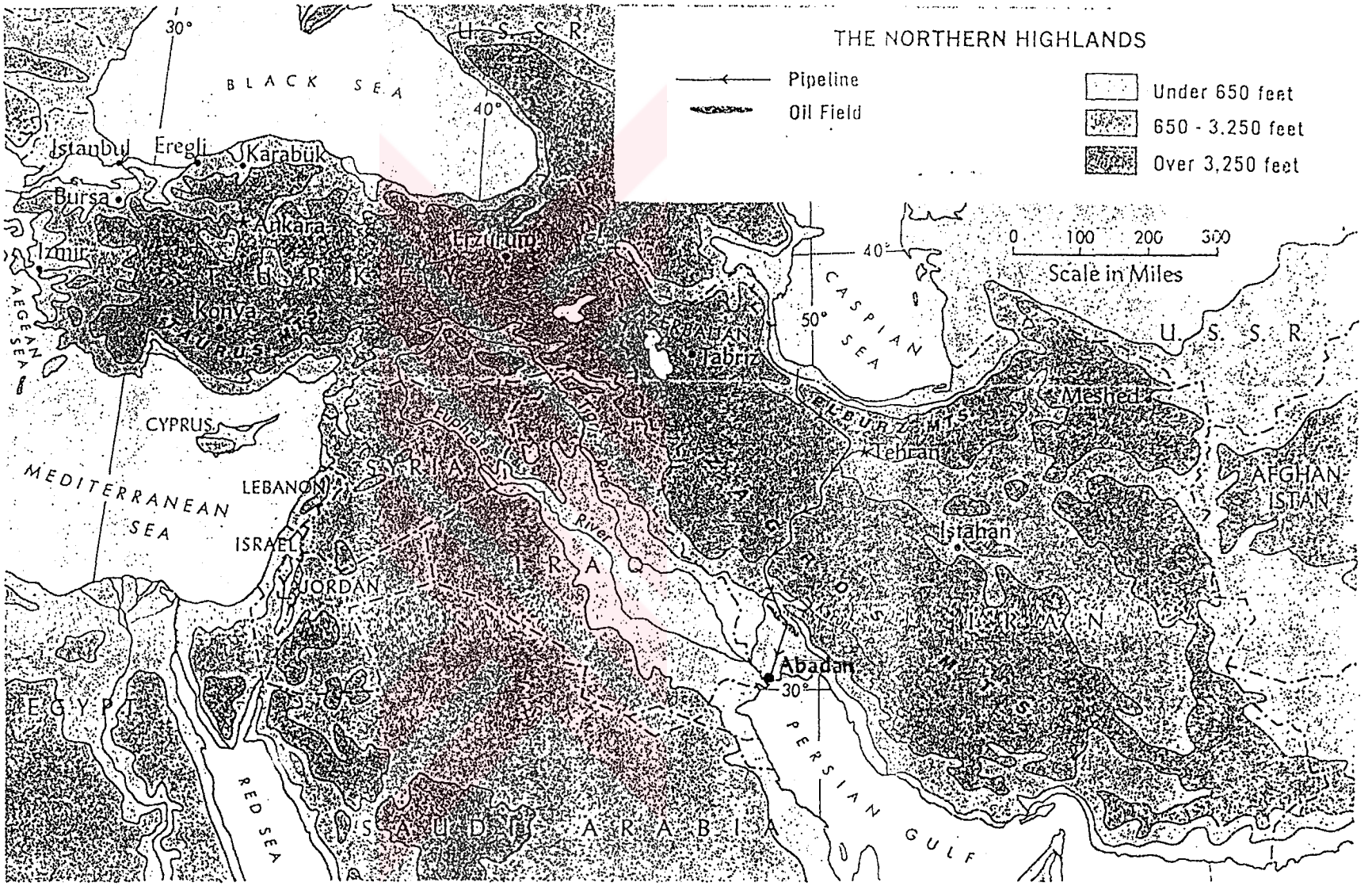


Figure 3.3. Geography, Location of Iran and Abadan

3. The low-lying plain of Khuzistan.

4. The caspian sea coast, which is below sea level in many parts, over 50 per cent of the total land surface of Iran is mountainous and rough.

5. Elburz and Zagros mountains shut off the central plateaus of Iran from the effects of the sea, causing arid conditions and producing a so-called "dead heart" (See Figure 3.3).

Consequently, the city of Abadan is located at extremity of North Western of Persian Gulf and South Western of Iran, with 30 (degree) 20' (munite) of North latitude and 48 (degree) 16 (munite) of East longtitude (See Table 3.1).

3.2.1. Climate

The province consist of the outer ranges and foot hills of a section of the Zagros mountains. Flood slope and Salt cause as it strentches to the Persian Gulf and to the frontier river which is called "Arvand Rod" in Persian and "Shatt-al-Arab" in Arabic. In summer, the duration intense heat, and near the coast the righ humidity (specially in Abadan). In winter, occasional freezing occur (See Table 3.1).

The Mountains receive heavy snow fall in winters, and flooding occures routinely.

3.2.2. Location

Abadan began to involve to location, due to the British activities and operation for oil discovery in the region.

Table 3.1. Location Climatic Data of Abadan.

City	latitude and longitude	Elev. (m)	Period of record	Temperature (C)								Ammual rain (mm)
				Avg.	Avg warmest month	Avg. Coolest Month	Absolute High	Absolute Low	Avg. annual High	Avg. annual Low		
ABADAN	30.20N,48.16E	3	9 yrs bef 1954	25	36 Jul	11 Jan	51	-4	48	0		169

Afterward, the British started to exploration to South Western persia. [Yergin (1990:42) has pointed out that British first, the well plugged at Chiah Surkh, the camp was closed, and the equipment-some forty tons worth-was dismantled, carried back to Baghdad, Shipped down the Tigris 26 back to Basra, then transshiped to the Iranian port of Mohammerah (Khown as Khorramshahr). Eventually it would be shipped by river, wagon, and mules (as many as nine hundred) to new sites, where there were also indications of oil (See Figure 3-2)

The new sites was Masjid-i- Sulaiman a last-ditch effort before their funds were totally exhausted.

The first three wells "spudded in" in early 1908, putting Masjid-i-Sulaiman on the world of oil map which then was called (Maidan-i-Naftan).

Finally, under British protection, Anglo Persian oil company (APOC) on 14 April, 1909 was formed.

An oil field at least ten miles square was soon proved in the area, creating a new problem-how to get the crude oil out and then get it refine.

A 140 mile pipeline, crossing two ranges of hills and desert plain-its route imitially marked out by sticks and calico flags-was buit in a year and half. Six thousand mules were enrolled in the effort [Yergin, (1990:30)].

Foregoing process resulted in a location decision for a refinery which happened to be the advantages of Abadan as a prime location. It can be summarized as follow:

1. Proximity of the Abadan shores to the raw material.

2. The excess of the Island as a tall stature made it suitable site as a harbour and loading terminal which are needed for transportation of raw material to the refinery and tranship of the refine material from refinery.

3. Since the littoral region of Abadan is not marshy the construction cost for refinery as well as for harbour is low.

4. Eventually, the location of shatt-al-Arab (Arvand Rod) river allows transhipment of raw material, equipment, and products.

5. The ecology of the Island with its green environment, makes living and working condition much more feasible. With flat and without slope and Island is all surrounding with palm grove.

6. Proximity of Bahman-shir river as a utilizable source of her drinking water, which is located North of the city. Also Island is faraway from earth quake line. (See Figure 3.4)

7. The form and location of Island is in a manner that: (a) it can be easily defended; (b) Because the proximity of persian Gulf and Shatt-Al-Arab (Arvand Rod) river.

8. Abadan's location was complemented by other potential sites for further oil industry activity. In fact, this was materialized by construction port of Mohammerah (Known as Khorramshahr)

9. Proximi of Abadan with Iraq gave an easy control to the British military of the whole region.

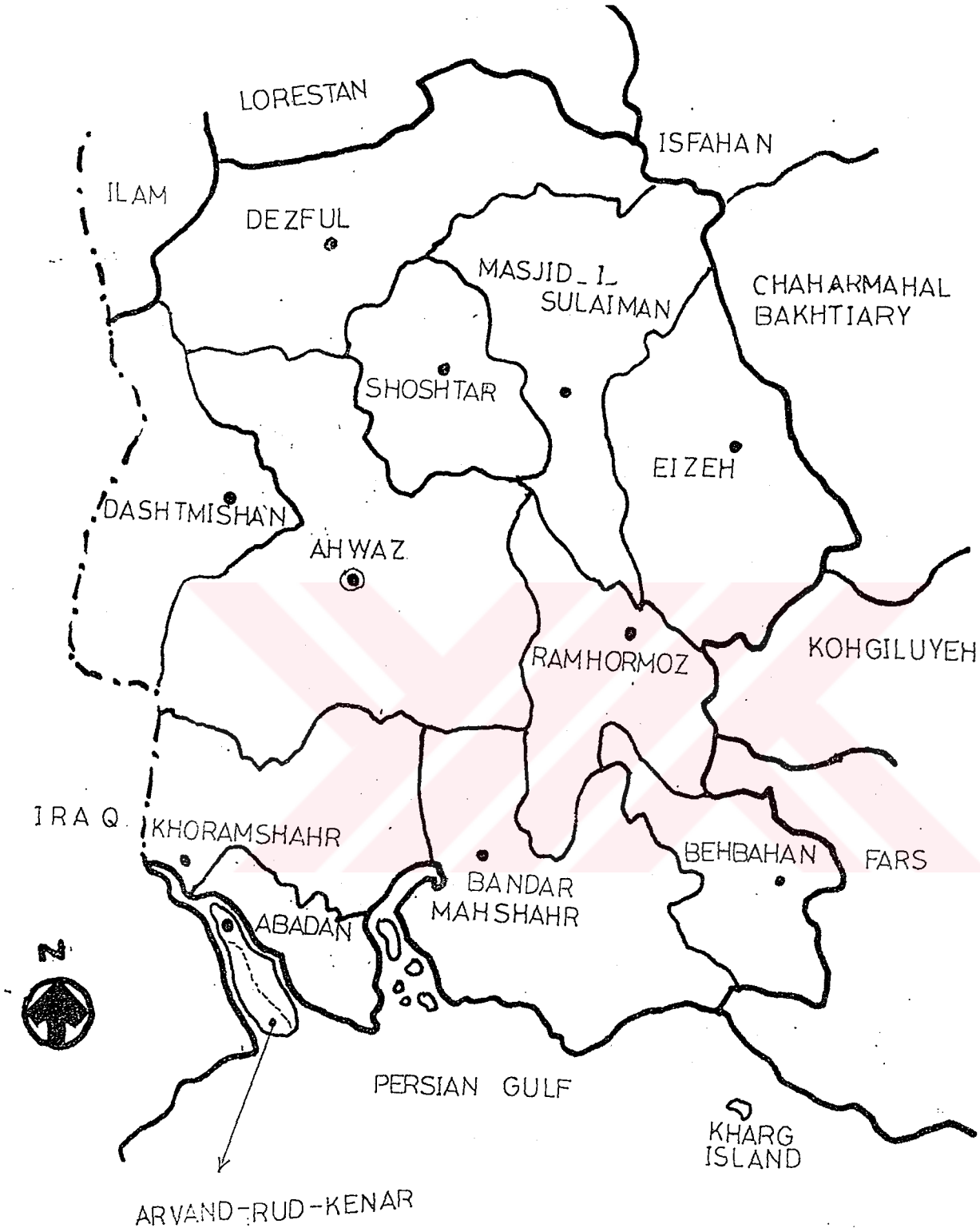
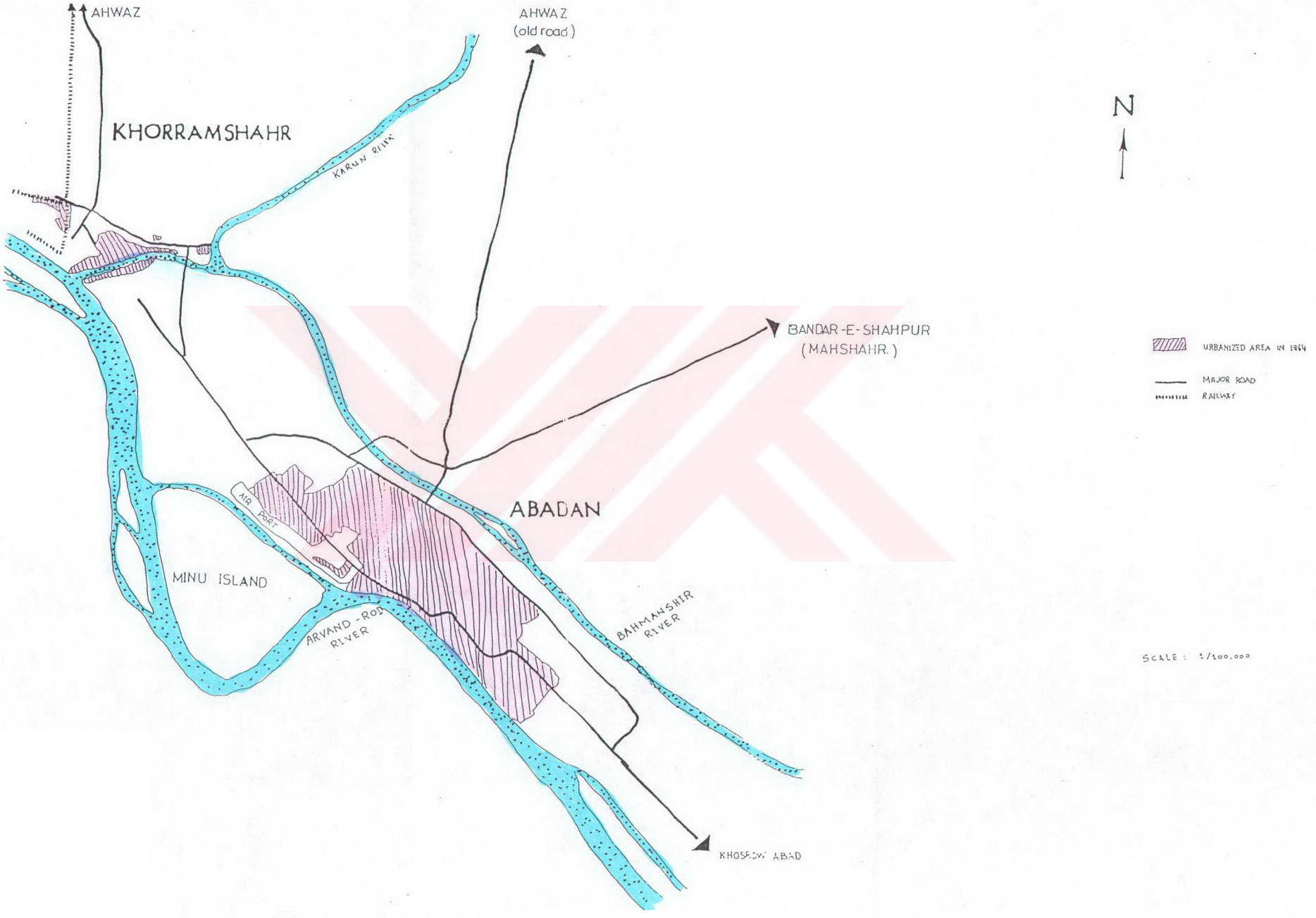


Figure 3.4. The Boundary of Khuzistan Province and Major Townships


AHWAZ
AHWAZ
(old road)
KHORRAMSHAHR
KARUN RIVER
BANDAR-E-SHAHPUR
(MAHSHAHR.)
ABADAN
AIR PORT
MINU ISLAND
ARVAND-ROD
RIVER
BAHMANSHIR
RIVER
KHOSROW ABAD
N
URBANIZED AREA IN 1964
MAJOR ROAD
RAILWAY
SCALE : 1/100.000

Consequently, a 140-mile long 400.000 Tons-a-year capacity pipeline was constructed from Masjid-i-Sulaiman to Abadan and a 120.000 tons a year refinery with storage tanks was built at Abadan.

In 1910 the construction of refinery began. On its first test, in July 1912, the refinery immediately brokedown. Thereafter, it operated far below capacity (National Iranian oil co. bulletin 1964).

The first shipment of some 2200 tons of crude oil was made in August, 1912. For whole year oil export reached 43.000 tons (See Table 2.1).

The process of the urbanization was started with the initiation of the housing development Quarters for oil refinery employees in 1911.

In 1913 the first phase of refinery complex was completed. This was the beginning of the commercial shipment of the refine oil.

3.2.2.1. The Role of Abadan and its Importance to National Economy: City of Abadan is accessible by various modes of transportation. It is connected to the Capital City Tehran by a major road via Ahwaz.

Another major road conects the city to the coastal province and also province of Fars. It is accessible by railroad which linkes the city Khorramshahr) to the Northern regions. (See map 3.1).

The city of Abadan has also one of the major International air port. This Second largest air port (after Tehran), makes Abadan a significant airtrafic node between Iran and Gulf states.

Abadan oil refinery was one the largest in the world, and it played a national and an International role. And with capacity of 630.000 b/d (barrel a day) processing of crude oil, before Iran-Iraq War (1980-88).

Because of increase in the capacity of the tankers and need for deepwater terminal, Abadan become less important, especially after designation of Kharg Island oil terminal which provided a deepwater facility.

But Abadan has remained a Key refinery for the domestic market. And this shift occured when the oil companies switched to purchase of the crude oil. And this resulted in the decline of the city international role, since it was serving the national market.

Nonetheless, Abadan has been considered a vital and strategically important urban center from state point of view.

3.2.2.2. The Importance of Abadan to Khuzistan Province:

As a major urban center in the province of Khuzistan, Abadan attracted many Tourists as well as a sizeable population (at least before Iran-Iraq War).

In summary, Abadan continued to have great impact and an economic implication for the province of Khuzistan even today. (See Figure 3.4)

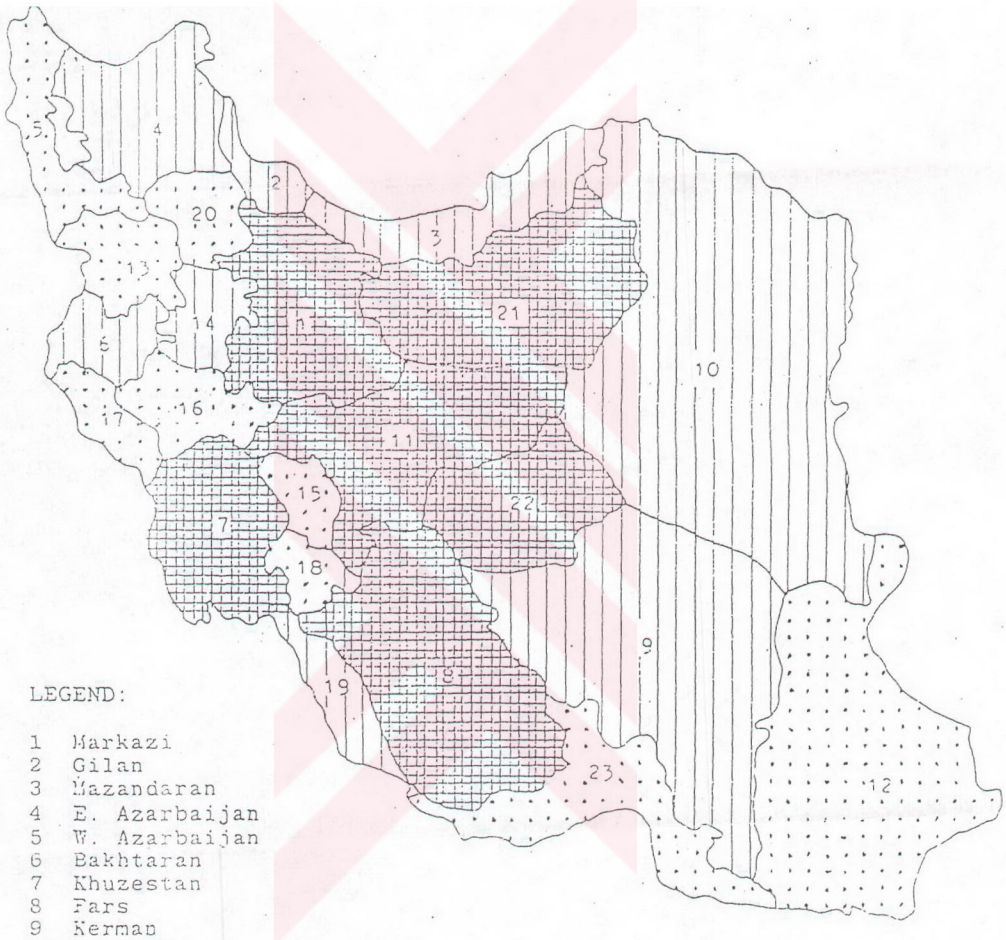


Figure 3.6. Three Categories of Iranian Provinces, 1976

3.3. Socio-Economic Structure

3.3.1. Provincial Disparity (1965-76)

Amirahmadi (1989:110) classifies the Iranian provinces on the basis of their development levels, relatively-developed, intermediate, and least developed. (See Figure 3.6)

Traditionally, studies of regional inequality in Iran and elsewhere in the third world have relied mostly upon regional per capita incomes or family consumption expenditures. However, lack of statistics made their operation impossible. Second, comparable data for a number of important indicators such as provincial per capita income and sectoral value added were not avaiable for many provinces. Third, in 1956 there were only 10 provinces, while number had increased to 24 by 1980. For this reason they selected 23 provincial administrative units in 1976.

Consequently, Atash and Amirahmadi (1987:156) used the following set of variables:

1. Percentage of urban population
2. Average total food and non-food consumption expenditure of an urban family per month (rial)
3. Average total food and non-food consumption expenditure of a rural family per month (rial)
4. Primary employment as percentage of total employment.
5. Secondary employment as percentage of total employment.
6. Value added per worker employed in large industrial establishments (1000 rials).

7. Percentage of population which is literate (6 years and over).

8. Number of physicians per 100 000 population

9. Number of hospital beds per 100 000 population.

10. Percentage of dwelling units with piped water.

11. Percentage of dwelling units with electricity.

12. Number of post offices per 10 000 square kilometres.

13. Number of public sector employees per 1000 population.

The values for these variables for the provinces is given in APP. Table A.1 and coefficient of variation and standardised score. Trends and rank analysis are also used particulary for provincial classification. Factor and correlation analysis were used in selecting the variables only. Discriminate analysis was performed to see if each class of province is sufficiently homogeneous.

Among the RDPs, Markasi, which includes Tehran, stood alone as the most developed province of Iran. In 1976 it had 20 per cent of the national population, 80 per cent of which lived in the urban areas as compared with 47 per cent for the nation. While Khuzistan, "the oil province" had a more service-oriented economy due to the activities of Abadan oil refinery and its port cities (Abadan and Khorranshanr).

The relative position of individual provinces within the provincial hierarchy and how they changed over time are present in Figure 3.6. During (1966-76) periods, over half of the provinces, including most in the intermediate category, either improved such as

province of Yazd or experienced no noticeable change in their relative position within the provincial hierarchy.

In case of our study province of Khuzistan which was characterized in RDPs in 1966, has experienced relative deterioration and has given rise to province of Yazd in 1976 (see Figure 3.7). It is therefore, possible to distinguish the upwardly mobile province from the downwardly mobile one for the 1966-76 period (see Figure 3.8).

One of the several important observations about the general characteristics of the three categories of Iranian provinces, is given in table 3.2.

Table 3.2: General characteristics of three categories of Iranian provinces 1976.

Characteristics	Iran	Relatively Developed Provinces	Intermediate Provinces	Last Developed Provinces
Population (% of National)	100.0	41.5	41.4	17.1
Area (% of Nation)	100.0	31.7	42.8	25.5
Density (per sq km)	20.5	26.8	19.7	13.6
Urbanisation	47.1	66.9	35.1	27.8

Source: Amirahmadi, H. "the state and territorial social justice in postrevolutionary Iran" International Journal of Urban and Regional Research (1989:115).

Table 3.2 indicates that the RDPs, together, account for 32 per cent of the Iranian land area and over 42 per cent of the

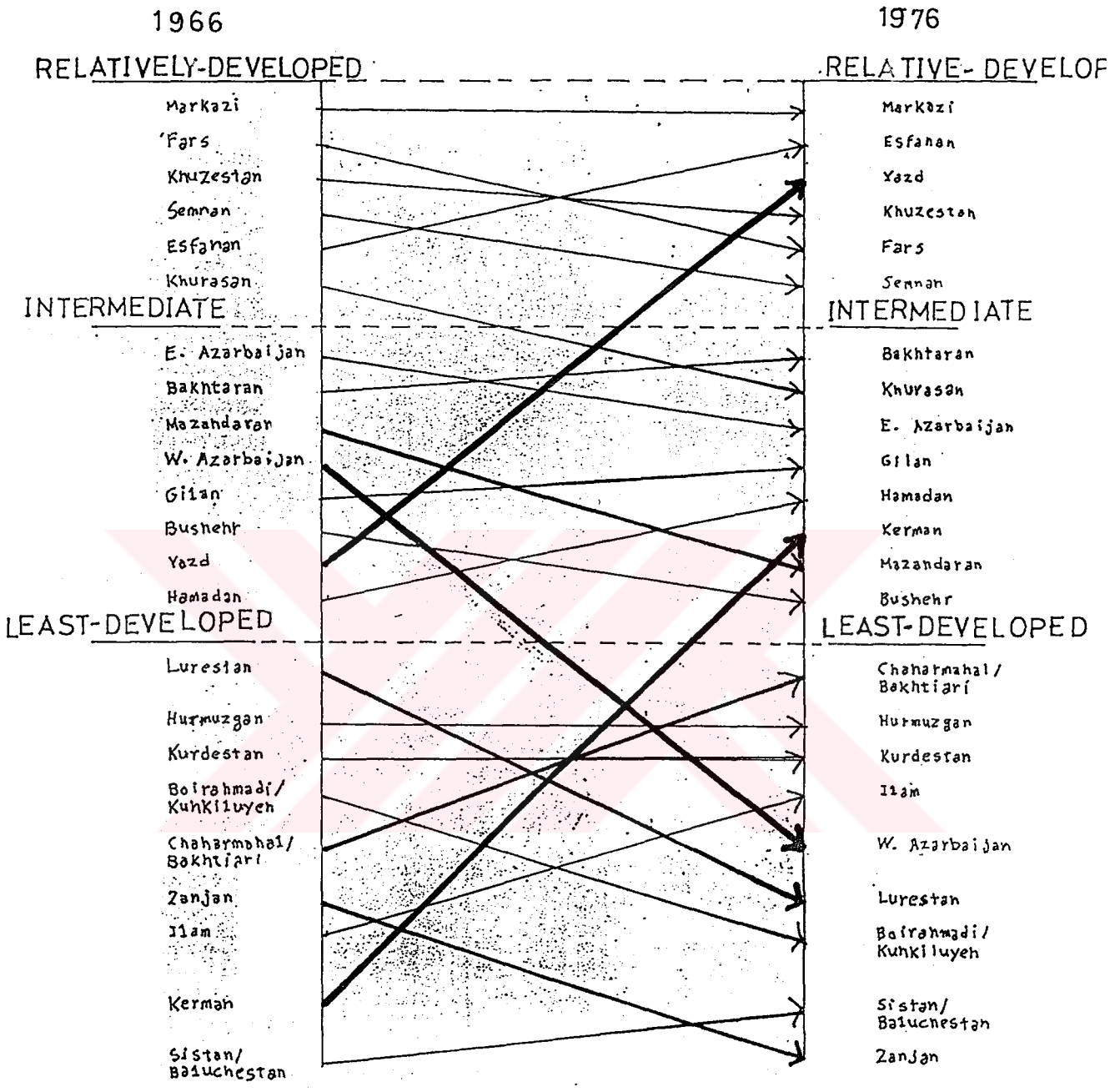
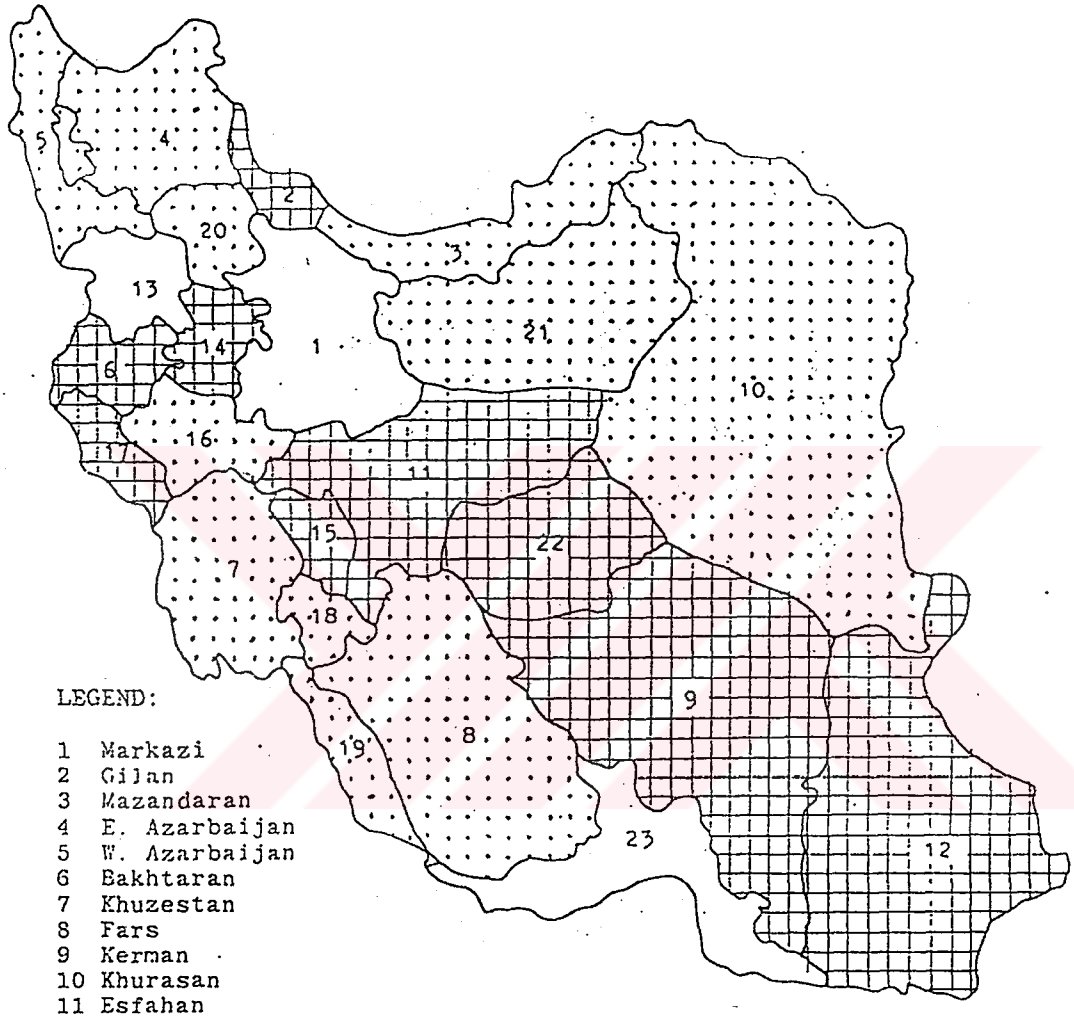


Figure 3.7. Mobility of Province Within Provincial Hierarchy, 1966-76



LEGEND:

1 Markazi
2 Gilan
3 Mazandaran
4 E. Azarbaijan
5 W. Azarbaijan
6 Bakhtaran
7 Khuzestan
8 Fars
9 Kerman
10 Khurasan
11 Esfahan
12 Sistan/Baluchestan
13 Kurdestan
14 Hamadan
15 Chaharmahal/Bakhtiari
16 Lurestan
17 Ilam
18 Boirahmadi/Kuhkiluyeh
19 Bushehr
20 Zanjan
21 Semnan
22 Yazd
23 Hurmuzgan

Categories of Provinces

Upwardly Mobile

Downwardly Mobile

Figure 3.8. Upwardly and Downwardly mobile Provinces, 1966-76

nation's population. Over 83 per cent of Iranian population live in the RDPs and IPs with over 15 per cent of land area. The corresponding Figures for the IPs are about 43 per cent and 41 per cent for LDs about 26 per cent and 17 per cent. An interesting observation reflected in table 3.2 is the correlation that exists between the level of urbanization and density, on the one hand, and the level of development on the other.

Other important observations may also be made with respect to the three categories of the Iranian provinces. First, the provinces within each category are, in most cases located next to each other, either in pairs or in groups of more than two (see Figure 3.5). Most of the RDs are located in the central part of the country where the majority of the persian-speaking population lives in. Only Khuzistan has Arabs as one-sixth of its population, who incidentally are the most disadvantaged among the population of the province.

3.3.2. Provincial Disparity (1976 and Post Revolution)

Thusfar, the limited availability of studies and statistics posed a constraint for a solid conclusion. However, the latest avaiable peice of article (Amirahmadi and Atash: 1987) demonstrates a severe disparity among the Iranian provinces. The following indicators are analyzed for this purpose:

1. Percentage of urban population
2. Average total food and non-food consumption expenditure of an urban family in per month (rials)
3. Average total food and non-food consumption expenditure

of a rural family in per month (rials)

4. Number of physicians per 100.000 population

5. Number of the hospital beds per 100.000 population.

You must addhere a reference Figure, like the one Fig. 3.5. (RD,I, LD) the extent of disparity seems to have decrease for all of the variables except number of physicians for which disparity has significantly increased. This may be due to the fact that following the revolution medical schools were closed for about three years and many physicians either left the country or have been sent to help the war efforts in the War zones.

During the 1976-84 period, over half of the provinces improved their relative position within the provincial heirarchy (see Figure 3.9). These include most of the IPs and LDPs. Among the RDPs, only Isfahan and Fars experienced improvement while Yazd and Semnan suffer the most. Thus Khuzistan is among the provinces that have experienced deterioration, while Fars, Isfahan, Hurmuzgan, and Bushehr have improved their relative position (see Figure 3.9).

Using a similar method of classification as before, we basically arrived at the same three catagories of provinces in 1984 as in 1976, with only few intercategory movements but significant shift of places within each category. Thus we can distinguish between the upwardly -mobile provinces and downwardly - mobile provinces for the period of 1976-84 (see Figure 3.10).

Impact of the War: On 22 September 1980 the Iraqi army invaded Iran along a front of 1352 km, penetrating at certain places

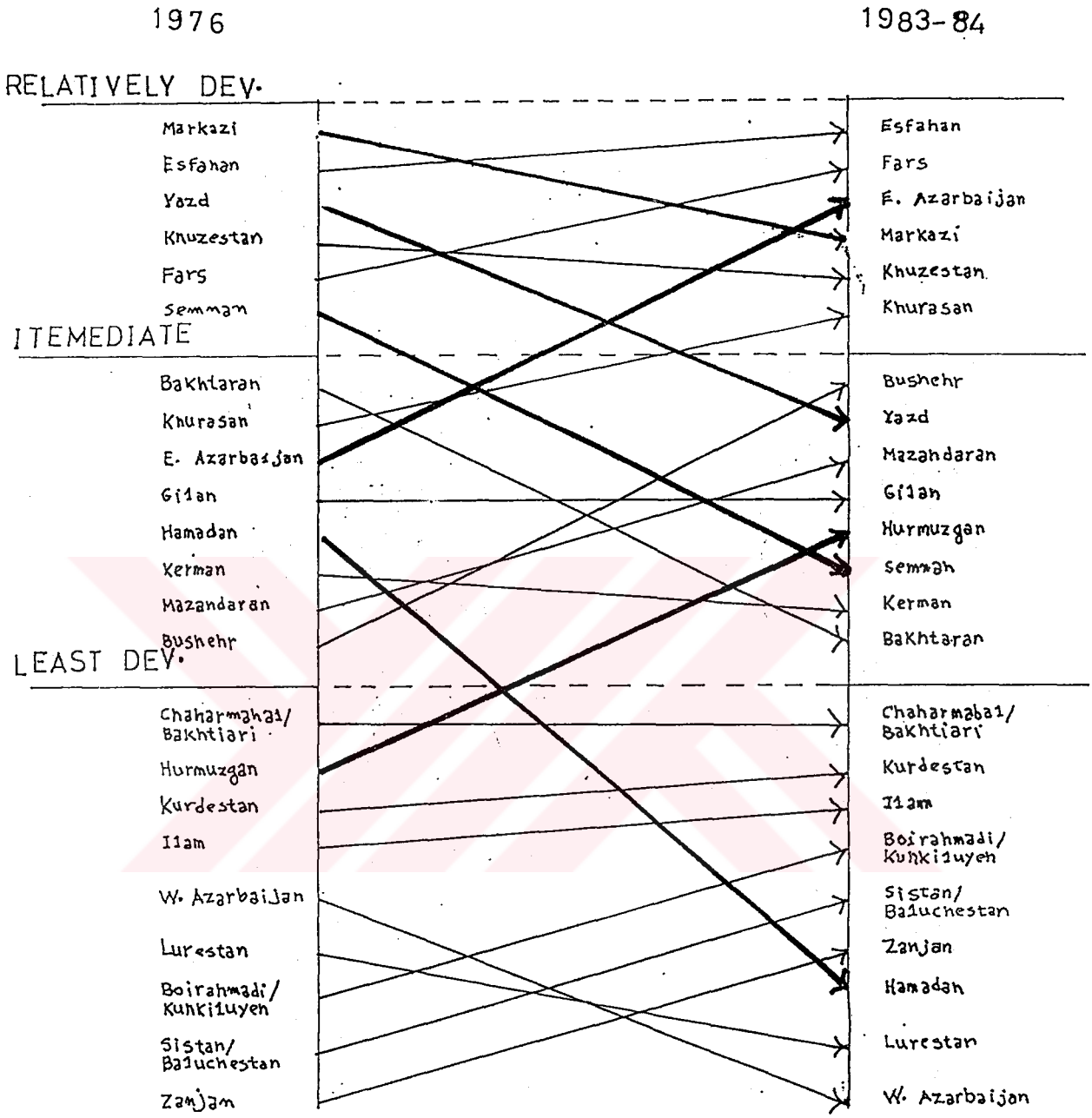
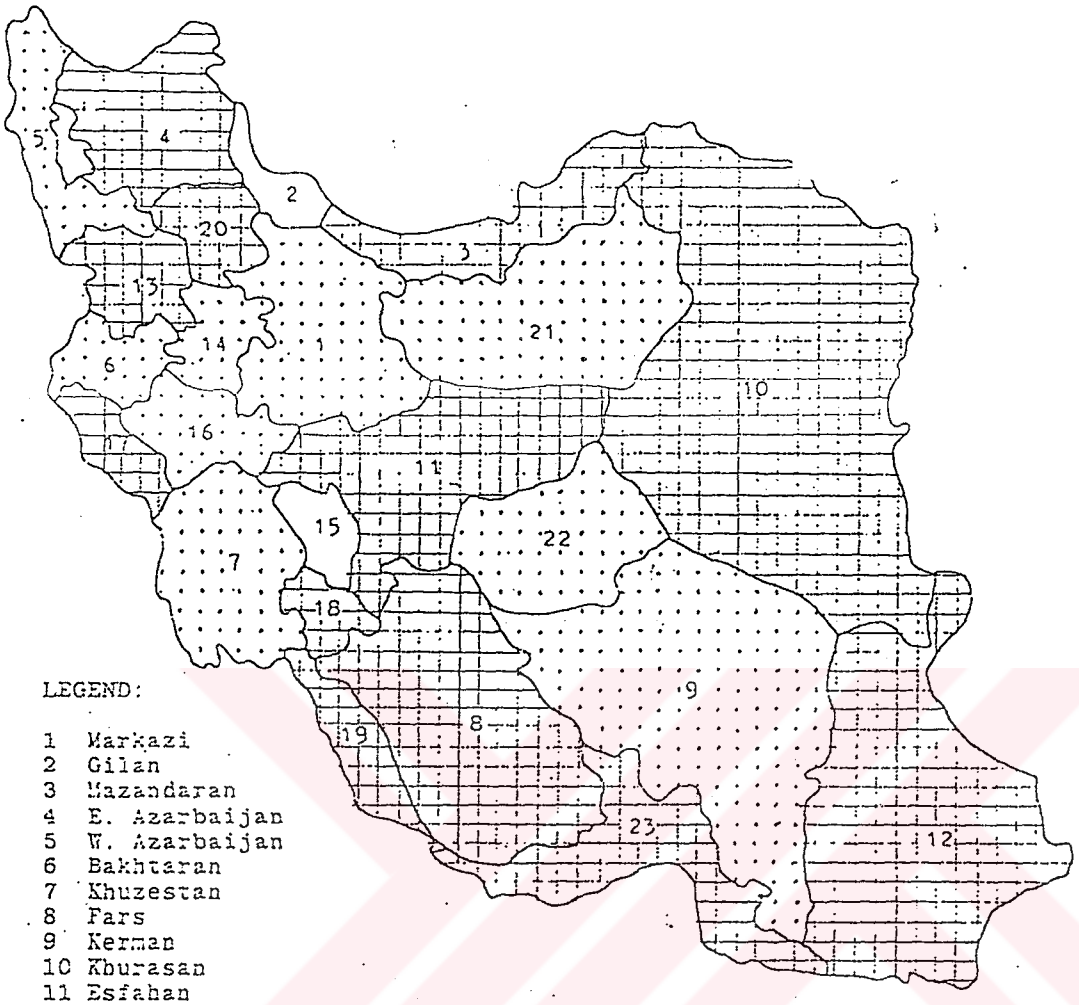


Figure 3.9. Mobility of Provinces Within Provincial Hierarchy, 1976-84

as deep as 80 km in to Iran in less than a few weeks, over 14000 km sq of the country were occupied in the five southern and southwestern provinces of Khuzistan, Bakhtaran, Ilam, Kurdestan and West Azarbaijan (see Figure 3.8). Parts of the last two provinces have also been involved in the fights between central government and the Kurdish people who are demanding regional autonomy. Damage to province of Khuzistan, which was among the few well-developed provinces of Iran as the oil capital of the country, has been extensive and its impact goes well beyond the provincial borders with drastic consequences for the national economy. These provinces are densely populated and most of the population are minorities (Azaris in Azarbaian; Kurds in Kurdestan; and Arab in Khuzistan).

The war has affected the settlement system in other ways. Preliminary reports of the 1986 National Census of Housing and Population (Amari, Gozideh-e-Matalebe 1987) indicate that the population of Iran increased to 49.764.914 in 1986. From the 1976 Figure 33.108.144, an average annual growth rate of over 3.6%. The populations of all provinces have inreased, except those in the war zone. Khuzistan in particular, has grown at an average annual rate of only 1.77%, less than 50 % of the national average. In sharp contrast, the comparable figures for Markazi Province (excluding the city of Tehran) and Bushehr, a province adjoining Khuzistan, were 8.7 and 5.5 % respectively.

The lower population growth rate in the war zones may be attributed to a number of causes including death, destruction and migration. This latter factor has been particularly critical in



LEGEND:

1 Markazi
2 Gilan
3 Mazandaran
4 E. Azarbaijan
5 W. Azarbaijan
6 Bakhtaran
7 Khuzestan
8 Fars
9 Kerman
10 Khurasan
11 Esfahan
12 Sistan/Baluchestan
13 Kurdestan
14 Hamadan
15 Chaharmabal/Bakhtiari
16 Lurestan
17 Ilam
18 Boirahmadi/Kuhkiluyeh
19 Bushehr
20 Zanjan
21 Semnan
22 Yazd
23 Hurmuzgan

Categories of Provinces

Upwardly Mobile

Downwardly Mobile

Figure 3.10. Upwardly and Downwardly Mobile Provinces, 1976-84

population resdistribution within war-damaged areas and between them and the rest of Iran. Inter-provincial migration in the war zones has been characterized with the movement of population from village areas and smaller towns and cities to refugee camps and larger urban centers, particularly the provincial capitals where people have been better protected.

While there is no information on the magnitude of the inter-provincial migration an estimated 2.5 million have left their province of residence in the war zones for settlement in large cities and refugee camps in war free areas (Gouzideh-e-Mataleb-e Amari 1987).

Abadan and Khorranshahr which no longer reported ranks among the largest cities with a population of 200.000 or more) (Salnaneh-e Amari 1984:59).

The post-revolutionary government has been paying special attention to agriculture and rural areas (Haghayeghi, 1990:35). And the wars have led to increase imports and thus to the promotion of provinces on the coastal area with port facilities (except the Abadan and Khorramshahr). Finally it appears as though the more developed provinces have in general suffered more from impact of the revolution and its consequences than the lesser-developed areas, perhaps because they had more to lose and also because of favourable attention that the lesser-developed provinces have been receiving since the late 1970s.

3.3.3.1. National Trend

The labour force prior to 1940 during the period under study-the population of Iran increased from 9.92 million in 1901 to 14.55 million in 1940, which has been presented in (Table 3.3). This indicate that prior to 1934 there was no significant net rural/urban migration. After 1934, however, there was a change to be noted between urban and total growth rate. Signifying a net rural/urban migration. An important factor for this development was probably the new economic policy of the Reza Shah, which resulted in an increase in manufacturing capacity and drew "peasants" to urban area.

Table 3.3: The Population of Iran and its Urban/Rural Distribution (million)

Year	Total	Urban	Percent %	Rural	Percent %
1901	9.92	2.08	21	7.84	79
1911	10.66	2.24	21	8.24	79
1921	11.47	2.41	21	9.06	79
1934	13.35	2.80	21	10.52	79
1940	14.55	3.20	22	11.35	78

Source: Industrialization in Iran, FAO 1900-1940.

Table 3.4. Changing the Population in Compare to Urban-Rural Area (thousand)

Year	Total	Rural	Urban	Urbanization %
1951	16,237	11,301	4,936	30,4
1961	22,372	14,654	7,718	34,5
1971	30,020	17,622	12,398	41,3
1981	38,784	18,699	20,085	51,8
1986 a	49,857	22,611	26,991	54,1
1989 b	55,000	n.a	n.a	n.a.

Source: Iranian statistical center 1983

a- bank markazi Iran 1988
b- economist May 26,1990

After 1951 and especially in 1961 there is a change to be noted between urban and total population growth, signifying a net rural-urban migration (table 3.4). Amuzegar (1971) argued that an important factor for this development was the rapid modernization through the decade of the 1960's including Iranian land reform of 1960. After 1971 country witnessed very high increase in the rate of urbanization (i.e. 10 per cent).

Table 3-5. Total Urban and Rural Population and Basic Indicator of Urbanization in Iran

Population/Measure	census Year				
	1956	1966	1976	1986 -a	1988 -a
Total Iran's Population	18, 954, 704	25, 788, 722	33, 591, 875	49, 857, 522	53, 161, 000
Average Onnual growth rate (per cent)	n.a	3.1	2.6	3.6	3.5
Total Urban Population	5, 953, 563	9, 714, 521	15, 698, 543	26, 991, 232	29, 633, 000
Total Rural Population	13, 001, 141	16, 069, 647	17, 893, 332	22, 866, 290	23, 528, 000
Urban Population (per cent)	31.4	37.7	46.7	54.1	55.8
Annual Rate of Urbanization-b	-	2.0	2.4	1.57	1.57

Source: Population census of Iran 1956, 1966, 1976

a- 1986 and 1988 statistical data extracted from Bank of Markazi Iran

b-

$$r = \frac{U - Uo}{Uo} \times 100/n \qquad (1)$$

Where Uo and U refer to the per cent of urban population in the first and second census respectively and n is the number of years between two census.

Data in table 3.5 also shows a continous increase in the level of urbanization between 1956 and 1988. The method to measure the rate of urbanization is based on the percentage change of urban population between two previous census. This is known as "conventional index" for comparison over different time periods. The annual rate of urbanization in (table 3-5) shows that the pace of urbanization was greater in the decade 1976-1986 as compared to 1956-1966 and 1966-1976. The rapid growth of urban population and

percentage of population living in urban areas has occured through: (a) the increase in population of existing urban places as a result of natural increase and migration from rural to urban areas (b) post-Islamic revolution of 1979 witnessed a lack of family planning and birth control policy. (c) Iran-Iraq war of 1980-88, which caused reallocation of several millions of people. To this another million Afghan refugees, can be added.

3.3.3.2. Khuzistan

Population growth rate of Khuzistan province during 1966-76 census was about 3.1 per cent. Where at same year under study the national population growth rate was about 2.71, which, indicates about 0.39 per cent faster population growth compared to national level (Ministry of Housing and City Planning Statistical Center (1976).

The mobility of population in this region has been affected by two main factors: (a) Iranian revolution 1979; (b) Iran-Iraq war (1980-88),

Nonetheless, the population study for this province has been based on three census of 1966, 1976, and 1986.

As demonstrated in Table 3.6, the rate of urbanization increased during decade of 1966-76. Whereas, the rate of urbanization decreased between 1976 and 1986 due to factors indicated earlier.

These changes can be explained by inter and intra-provincial migration due to the war of 1980's, which resulted in intensive evacuation of population from Khuzistan's major cities. One of the

main policies of Iranian government has been the reconstruction of the war zones and restablishment of residential areas. And this policy was sucessful in attracting people back to their homes and cities.

In the case of Abadan the oil refinery was operating with capacity of 650.000 (b/d). when the war occured (1980-88), the operation and capacity of oil refinery droped to zero and more than 80 per cent of the oil refinery and the petrochemical plant were damaged. Before the war, Iran was the net exporter of crude oil and oil process related product whereas, during the war period Iran has become a net importer of refined oil product, which was importing more than 300.000 (b/d).

Table 3.6: Total Urban and Rural Population of Khuzistan Province

Population	Census Year		
	1966 (b)	(b) 1976	1986 (a)
Total Khuzistan's Population	1,708,040	2,177,781	2,681,978
Total Urban Population	883,057	1,265,291	1,485,356
Total Rural Population	824,983	9,124,90	1,196,622
Urban Population (Per cent)	51,7	58,1	55,3
Annual rate of Urbanization (c)	n.a	1,23	-0,48

Sources: (a) Plan and Budget organization 1988 Khuzistan Province
(b) Plan and Budget Organization Statistical Center of Iran November, 1977
(c) Author calculation

$$r = \frac{U-Uo}{Uo} \times 100/n \qquad (1)$$

(See table 3-3 for detail.)

Consequently, the importance of Abadan oil refinery made it one of the main issue of central government. On April 1988 government decided to rebuild the oil refinery. in spite of lack of foreign experts. But the first phase of refinery was compeleted and operated after 5 months with a capacity of 130.000 (b/d). And second phase was also reached to operating level on April, 1991 with a capacity of 125.000 (b/d) and petrochemical plant with a capacity of 50.000 tons and attracted about 5000 households to this city (personal communication and interviews with several official employees of national Iranian oil company).

3.3.3.3. Abadan

Before the constraction of the oil refinery, "Ebadan" was a small village. With the inception of oil refinery in 1910 the urbanization process became an obvious trend and after 7 decades population increased to more than 300.000.

As indicated in table 3-7 the rapid population growth occured during the decades of 1940-56 due to the rapid expansion of oil industry in conjunction with urbanization. Whereas, during the decade of 1956-66 the population growth reached 1.6 per cent annually. This can be explained by decrease of oil production due to 1951 oil nationalization act. (see chapter II, table: 2.3, p.13), which is accompanied by the out-migration to the other Iranian cities. Finally, the population decreased in the decade of 1966-76 to the lowest point of one per cent..

During the period of 1966-1980 we see no significant change in population growth (see Table 3•5). However, during 1980-86 even indicated the negative population growth, has been occured due to: (a) Iran-Iraq war; (b) proximity of region to war zone.

Consequently, during the period of 1986-1991 city's rapid population growth of 15.6 per cent was an indication of its importance to national economy.

Table 3.7: Population of Abadan (thousand)

	Year								
Population	1933	1940	1956	1966	1976	1980	1986	1991	1992
Abadan	40	40	226	271	298	356	22	100	100
Annual Population Growth rate (per cent)	n.a.	o	5.2	1.6	0.9	1.6	-24.0	15.6	0

Sources: Statistical data for (1933-1960) from Victor Shower's "The World in Figures" (1917)
- 1980-1986 statistical data ministry of housing and city planning. 1980 Figure is before war
- 1991 data from personal conversation Ministry of National Iranian Oil Company, Center of Refining Section, 1991.

3.3.3.3.1. Economic Activity as table 3-8 notes according to the census of 1966 32.9 per cent of total population were economically active, and from this about 83.2 per cent were employed and 16.8 per cent were unemployed. Where in 1976 census

31.8 per cent of total population about 87.7 per cent were employed and 12.2 per cent unemployed.

Table 3.8: Economic Activity of Abadan Population

Year	Abadan Total Population	Total Active Population from 10 Year of Age and more			Per Cent [%]	
		Total	Employed	Unemployed	Employed	Unemployed
1966	271,000	89,159	74,180	14,978	83,2	16,8
1976	298,000	94,764	83,108	11,561	87,7	12,2

Source: The Figures extracted and calculated from statistical center 1966-1976 Census:Khuzistan Province; Budget and Planning Organization

According to the 1976 census, the number of total employed in Abadan was 83.108 were 51.5 of this were engaged in government sector, and 47.4 per cent employed by private sector. Where, the oil industry employed 19.773 people which Translates to 46.2 per cent of public sector's share of employment (See Table 3.9).

Table 3.9: Employee Structure of Abadan (1976)

Total Employees	Government Employees	Per cent (%) from Total Employee	Private Sector	Per cent (%) from Total Employee	Oil Industry a	Per cent (%) from Government Employee
83,108	42,800	51.5	40,308	47.4	19,773	46.2

Source: Statistical Center 1976
a- National Iranian Oil Company 1976

3.3.3.3.2. Employment: Oil Complex employed around 19,778 people according to the 1976 census (National Iranian Oil Company).

In another word this encompassed 23.8 per cent of Abadan's total employed population. However, directly about 76.2 per cent of total employed population were not related to the oil industry (See Table 3.8)

Table 3.10. Distribution of Employment in Different Sectors of the Economy of Abadan 1976 (Per Cent)

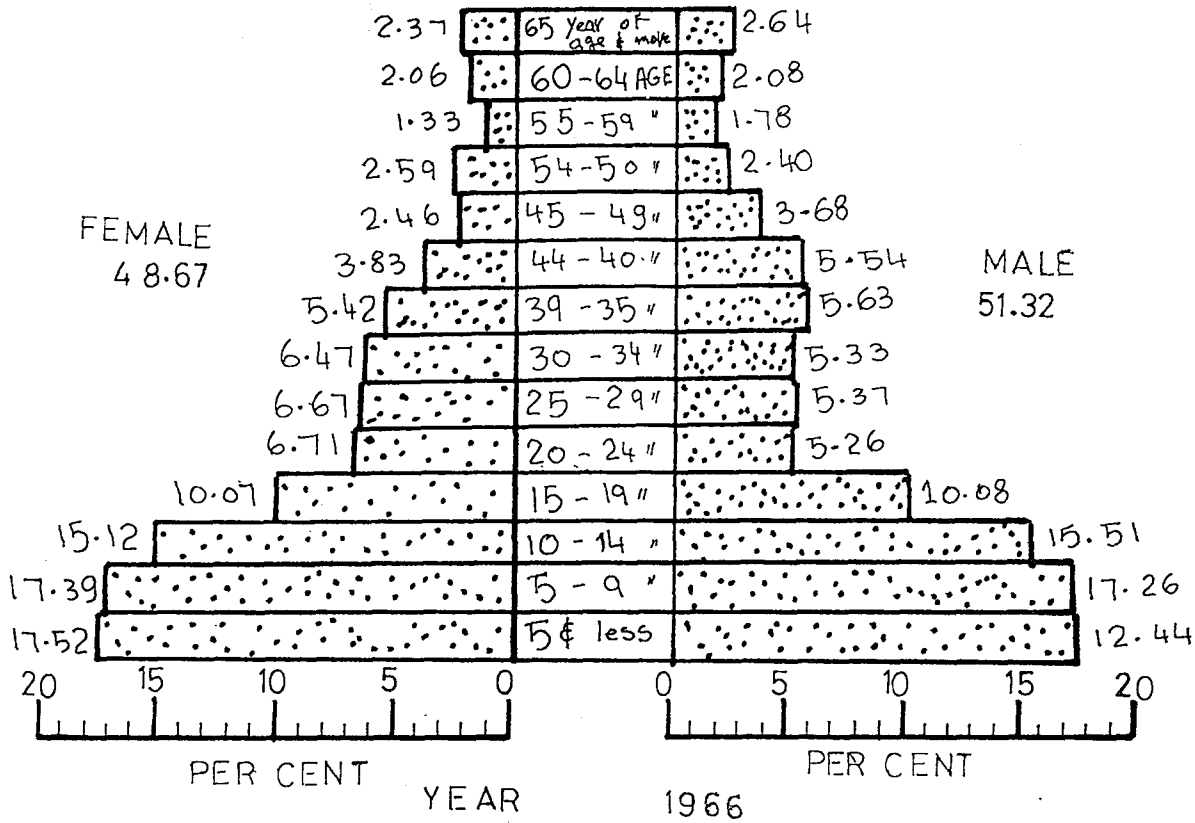
Total Employment	Oil Refinery	Petrochemical	Transportation and Construction	Services	Agriculture and Fishery	Tourist	Small Industries	Others
83,108	14,460	5,318	26,677	22,439	1,412	1,662	6,233	4,907
% 100	17,4%	6,4%	32,1%	27,00%	1,7%	2,0%	1,5%	5,9%

Source: Statistical Center (Budget and Planning Organization 1976).

3.3.3.3.3.1. Age and Sex Structure: Age structure of Abadan population during decade of 1966 and 1976 consists of 51.3 per cent male, and 48.7 female; and 50.76 per cent male and 49.23 per cent female respectively (See Figure 3.10).

Data in Figure 3.10 inidicated that in 1966 about 50 per cent of population of Abadan age structure consisted of 14 year of age and less. Although, in 1976 this ratio decreased to 43 per cent which indicates the generating migration of some of populated households and accepting new settlers as a unmarried and also as less populated households.

In 1966 about 67 per cent of Abadan inhabitant was born in Abadan and 25 per cent of population were born outside of Khuzistan province. This ratio in 1976 was changed which about 10 per cent of



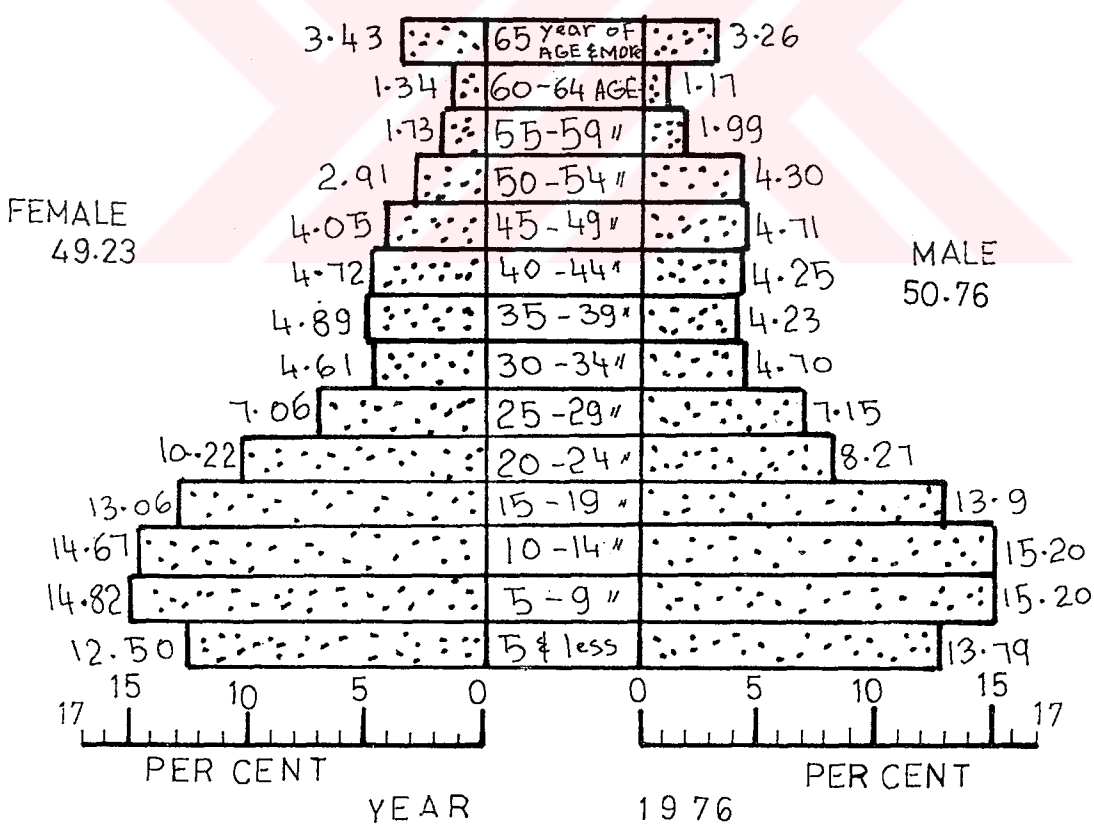


Figure 3.11. Age Structure of Abadan

birth was in Abadan and 20 per cent from outside of Khuzistan province (Statistical Center 1966-16).

3.3.3.3.4. Education: Abadan has always enjoyed a high level of litteracy rate compared to national level. In 1966 57.5 per cent of population of (7 years and above) were litterate, and about 42.5 per cent was illitterate. In 1976 this ratio reached to 72.8 per cent litterate and 27.2 per cent illitterate, (Statistical Center 1966-76).

Of course, Abadan's Institute of Oil Technology Contributed to the level of education as well as the college of Nursery School where there are proviously located and functiong in Ahwaz (Khuzistan province center).

3.3.4. Agriculture

Khuzistan province with 3.81 per cent of Iran's area, also possesses 37 per cent of country's water flow. Currently, only 18.65 per cent of total land of province is under cultivation, and 55 per cent of the land is under dry irrigation. About 44,000 hectars of the land is under agro-industry operation. The unclutivated land and potentially cultivated land is about 34.93 per cent. In addition, there is an extensive portion of the land with no utilization procidure, unless there is an introduction of irrigation system (See Table 3.11).

Table 3.11: Distribution of Khuzistan Province Land

Description of Land		Area in Hectare Land	Per Cent (%) From National Land	Per Cent (%) From Province Land
Area of Nation		164,800,000	100.0	-
Area of Province		6,465,400	3.81	100.00
Total Agricultural Land in Operation	1-Irrigated farming	431,022	-	18.65
	2-Dry Irrigate	518,44	-	
	3-Fallow and Rotati.	256,188	-	
Pastures		2,500,170	-	38.67
Natural Forest		500,000	-	7.74
Artificial Forest		1,350	-	0.01
Cun cultivated land (utilizeable and unutilizeable land)		2,258,929	-	34.93

Source: Ministry of Agriculture 1976

Table 3.11 and 3.12 demonstrate the production level of cultivated land in Khuzistan Province in 1973 and 1983 respectively. Comparatively, these two tables portray that the indisposition in cultivation area is an obvious ramification of the war.

Table 3.12: Land Use Area Under Khuzistan Province 1973.

Kind of Crop	Area Under Cutivation (Hectare)	Per Cent from Total area Under cutivation	Per Cent of Under Cultivation	
			Irrigated	Dry Irrigated
Wheat	618,369	65.00	23.3	41,72
Barely	174,514	18.3	5.8	12,51
Paddy Rice	42,925	4.55	4.5	-
Corn	573	0.06	0.06	-
Bean	4,399	0.46	0.45	0.02
Grains	8,891	0.94	0.92	0.02
Sun Flower	160	0.02	0.01	-
Other Oily Seeds	8,049	0.85	0.84	-
Cotton	1,485	0.15	0.15	-
Sugar Beet	2,467	0.25	0.25	-
Water Melon, Melon	22,774	2.5	2.5	-
Potatoes	148	0.02	0.02	-
Onion	2,414	0.25	0.25	-
Tomato	3,912	0.43	0.41	-
Vegetables	5,532	0.58	0.58	-
Alfa Alfa	2,947	0.32	0.31	-
Clover	1,124	0.2	0.1	-
Provender	4,049	0.43	0.25	0.17
Other Crop	9,744	1.03	1	0.03
Total	914,546	96.33	41.85	54.48

Source: Ministry of Agriculture 1973.

It can be noted from table 3.12 that total of 950.000 hectare land is under cultivation in Khuzistan province. About 88 per cent of this land is allocated to farms for corn, wheat, barley and grains, where only 8 per cent of the land is allocated to other crops.

Table 3.13: Production and Area Under Cultivation 1983

Kind of Crop	Area Under Cultivation (1000 Hectare)			Production (Ton)			Productivity in Hectare (Kilograms)	
	Irrigated	Dry Irrigated	Total	Irrigated	Dry Irrigated	Total	Irrigated	Dry Irrigated
Wheat	174,3	368	542,3	225,757	184,262	410,019	1,295	500
Barely	46,1	108,7	154,8	52,950	46,980	99,930	1,148	4,32
Roug Rice	20,2	-	20,2	37,975	-	37,975	1,877	-
Broad Bean	7	-	7	8,737	-	87,737	1,250	-
Bean	2,2	-	2,2	2,156	-	2,156	1,001	-
Vetch	1,2	-	1,2	1,139	-	1,139	938	-
Grain	0,12	-	0,12	120	-	120	1,000	-
Corn	0,09	-	0,09	340	-	340	3,777	-
Sesame	1,5	-	1,5	1,239	-	1,239	799	-
Linseed	0,79	-	0,79	790	-	190	1,000	-
Provender	3,9	-	3,9	29,065	-	29,065	1,367	-
Water Melon	15,1	-	15,1	264,348	-	264,348	17,525	-
Melon	4,8	-	4,8	68,320	-	68,320	14,349	-
Cucumber	7,9	-	7,9	84,425	-	84,425	10,663	-
Sqmash	0,3	-	0,3	2,020	-	2,020	6,622	-
Potato	0,47	-	0,47	3,760	-	3,760	8,000	-
Onion	3,9	-	3,9	63,065	-	63,065	16,047	-
Tomato	1,9	-	7,9	108,470	-	108,470	13,784	-
Vege tables	4,5	-	4,5	43,358	-	43,358	9,665	-
Sugar beet	2,2	-	2,2	68,000	-	68,000	30,909	-
Sugar cane	21,9	-	21,9	1,810,000	-	1810,000	82,818	-
Cotton	0,05	-	0,05	175	-	175	3,500	-

Source: Ministry of Agriculture 1983
Permanent planting have a special Character in

Khuzistan Province. For example, the most important permanent planting are citrous in North and Pulm farming

Table 3.13: List of Permanently plants in Khuzistan Province

Kind of Plant	Area Under Operation	Per Cent (%) from Total Land
Citrous	2,519	0.26
Palm	24,623	2.59
Grapes	1,845	0.2
Bearing Trees	2,203	0.23
None Bearing Trees	3,732	0.39
Total	34,922	3.67

Source: Ministry of Agriculture 1973.

One of the major agro-industrial joint venture in Khuzistan province was, Iran-California Agricultural company, which was under operation in 1970's. Their main production was fruits and vegetables for the Iranian market, and via Abadan air Terminal to the persian Gulf states and Europe. A canning factory with freezing facilities was under construction in the days before revolution. In addition, there was a plan to breed live stock, and to grow fodder crops for livestock and local sale. They began exporting asparagus by air to Europe in 1971.

Historically, the palm farming are located in the South part of Khuzistan province. Palm farming is one of the main feature of permanent planting in this region. It countains 25.5 per cent of area under cultivation of national level. Whereas, 32 per cent of total national production is located in Khuzistan region. In 1973 the

Ministry of Agriculture estimated about 10 million palm trees in Khuzistan where the production of date was about 70.000 tons.

Due to Iran-Araq war the agriculture sector of Khuzistan region was heavily damaged. Specially the Abadan and Minu İsland where the sufficient number of palm trees were. However, with personal communication of agriculture export in region. around one million of these palm trees were demolished during the war where most of these trees are located in Abadan and Minu Island and Khorramshanr.

Animal husbandary, in the region is distinguish by three methods: Tribal, rural, and Industrial type. The most particular type is tribal's type. However, there is no statistical data about the production of this type. In case of industrial type there were some units in Abadan, Khorramshanr and Ahwaz where by start of the war has been destroyed. Total animal husbandary activities in province were about 3.5 million before war and there is no exact information about the numbers of them. In rural type where a few numbers of animals were kept in house and the production takes in a place of household consumption and not for market.

The most important source of proteins in Persian Gulf is Fishery around the Arvand-rud river in Abadan and some areas in Khorramshanr. Again, during 8 years war the the facilities in Abadan, Khorramshahr are destroyed. The persian Gulf coast is about 224.000 square kilometer where the fishing productivity in each hectare is about 2.5 to 3.00 kilogram. Whereas, the fishing productivity in Abadan and Khorramshahr were about 200 to 250 tons aday; of many kind

fish where now the production in both cities is zero (Ministry of agriculture, 1984).

In the case of Khuzistan province and its present oil wealth may exhausted by coming centuary. Fortunately, it has other great potentialities but these can only be realized through the application of technology and capital on huge scale. Fortunately, Khuzistan possesses not only oil and gas but also another natural advantage which 20th centuary Technology can utilize. For example, construction of dams would serve the two purposes of water storage for irrigation and flood control in the plain, and of hydroelectric power generation.

3.3.4.1. Abadan (Agriculture)

Total agricultural rural area of ABadan is about 15.400 hectare (pulm grove included). The total palm grove is about 14.161 hectare which indicates the importance of this activity. The total number of palm trees in Island estimated by ministry of agriculture in 1980 (before the war) was about 4 million. Therefore, just 8 per cent of total area is related to other than production of date. From the total area, under cultivation, about 2.320 hectare is located outside of the Island along the Bahmanshir river, and the rest which is about 13.080 hectare located inside the İsland-around the Arvand-rud river.

The rest of the land in this area is cultivated with fruit trees, such as (apricot, ficus, carica, tangerine, and planting vegetable such as, tomatoes, cucumber, and okra). The ministry of agriculture has encouraged cultivation of alfalfa for its

profitibility and to feed domestic animals in 1976. And also a sufficient portion this product was exported to Gulf states. The other exporting products included tomatoes, cucumber, dates, okra which also sold in the domestic market (Ministry of agriculture 1976).

Some of the other income earning means of Abadan rural area has been by agriculture, fishery, and animal husbandary. However, before the revolution of 1976, the main source of income was by sailorship of smuggled goods from Arab States of persian Gulf which causes harmful to economic of region due to profitibality of this business.

The Rural-Urban migration coincided with the advent of the war, which has caused the decline in agriculture, fishery and animal husbandary as well as the damage to infrastructure. For example, all the water channels were damaged which cause the deterioration of the land and transformation to marshy land. This process has also caused the "Trunk putrefaction" of palm trees which intensified by transfer of salty water from the Gulf (i.e. ebb and flow).

3.3.4.1.1. Geography: Rural area of Abadan township is located in fringes of Bahmanshir and Arvand-Rud rivers in a linear and joint fashion.

Also during the decade of 1966-76, some villages of Abadan township with distinguish boarder lines formed Arvand-Kenar districts (See Figure 3.12). And rarely they have any boundaries to distinguish from each other. However, the boundaries are distinguishable by local custom (Plan and Budget Organization Statistical Center Khuzistan province 1988).

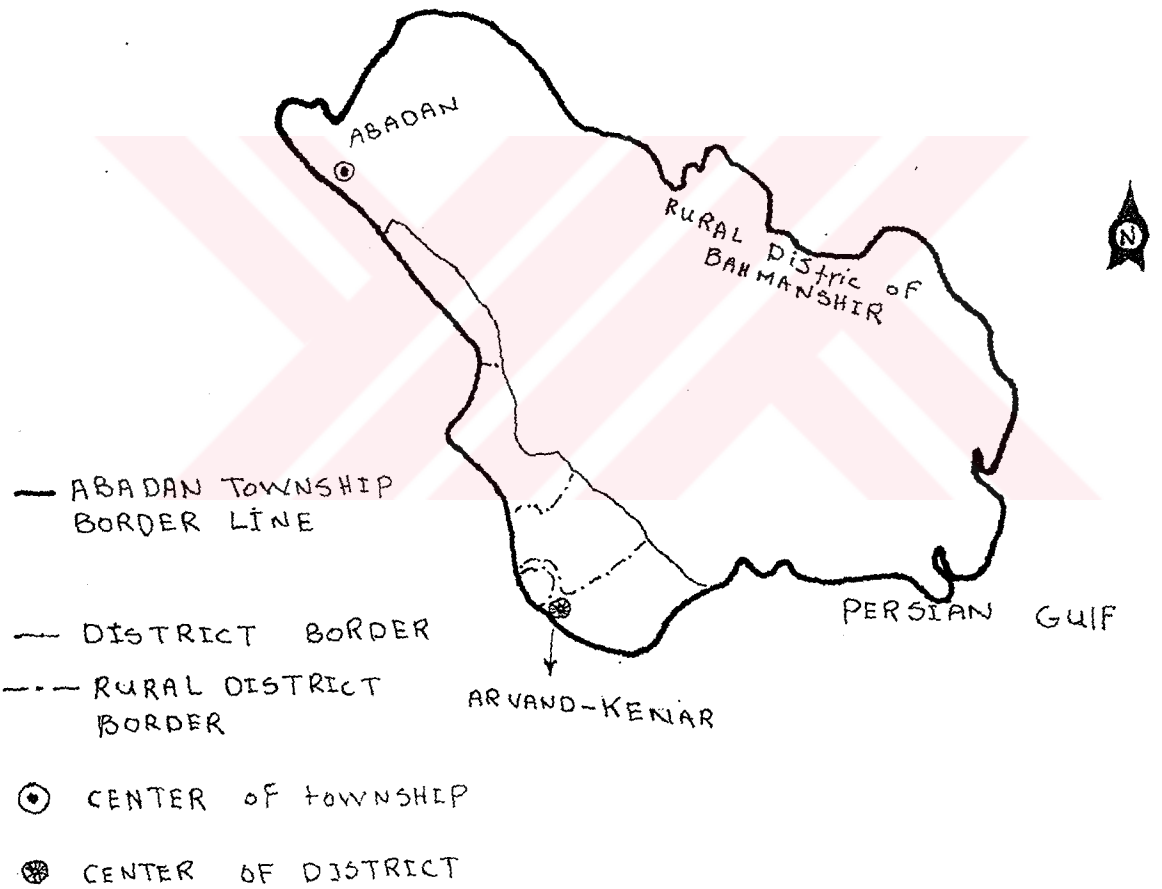


Figure 3.12. The Boundary of Abadan Township and its District

The population density of rural area is very insignificant, and the population growth rate in rural area is higher than the urban population.

The most part of Abadan's rural area is located in the Island. The climatology is hot and dry with humidity of 20 % per cent minimum and 80 % per cent maximum. Average rainfall for the past 12 years reach to about 40 to 52 centimeter, and during the June, July, and August it reaches to zero (ministry of agriculture, 1980).

There are water irrigation channels alongside of Abadan Island with distance of about 50 kilometer long which supported by two rivers: 72 water channels from Arvand-rud and 87 canal from Bahmanshir rivers. There are rural settelments alongside these water canals and Arvand-rud river; the formation of the rural settlement in Bahmanshir is linear alongside the river due to less dispersion of pulm grove. And about 70 per cent of total land in Abadan Island is uncultivable, due to its saltyness. Most of these salty lands created a dry rectangular segragated settelment pattern in both side of Island. (See land use map).

The main source of drinking water in Abadan and rural areas are utiliazed from Bahmanshire and Arvand-rud.

Rural area of Abadan township is decreasing according to different census. This may be explained by the joining of rural township in order to form larger districts. In 1966 the number of rural township were estimated to be about 137, whereas in 1976 it declined to 82 (statistical center of Khuzistan 1976).

With the begining of war (1980-88), most of the rural population were evacuted, which can be explained by two factors: (a) the proximity of most of these rural areas to Iraqi fires; (b) Evacution of Abadan itself has had a psychological effect on rural areas.

The impact of the war can be seen by the pattern of evacuation. For example, settelments near Bahmanshir river did not affect as highly as settelments by the Arvand-Rud river. Consequently, the latter settlements were subject to complete evacuation.

Rural area of Abadan's region are considered as one of the depressed regions. For instance, none of the rural settelments had bathing facilities; none had any secondary educational services. Despite, the extensive water facilities-water pumps, power enginnes, and motor boats-rural area remain unaffected. This continued to be the case regardless of the presences of various technological and industrial establishments. The source of drinking water utilized from two rivers Arvand-rud and Bahmanshir directly, and this method was subject to pollution which occured by the flow of the sewage and waste from the city and industrial complexs. By 1966 there was only one rural settelment with the drinking water facility, while the rest were dependent on the direct use of the rivers.

3.3.4.1.2. Culture: Inhabitant of Abadan rural district nicludes Arabic speaking from different Tribes. The Past history of Khuzistan indicates that tribal and clan relations were donimant. The major economic activities and earnings were based on fisheries. Animal husbandary, and pulm farming.

The relations of production was a Feudal system which still is valid. This unique Feudal relation was known as "Shaikh". "Shaikh" is the major landowner and he also runs various social affairs. "Shaikn" also reeives a portion of the agricultural production and some forms of taxing is also in place. "Shaikh" always has absolute authority to judge make decision in relation to conflicts or disagreements between the peoıple of the tribe. "Shaikh's" assisstance to the tribes is limited to some financial support.

"Shaikh" as a big land loid who has absolute power over of Pulm Farm. However, this relation was enforced before the revolution and after the revolution "Shaikh" authority has been undermined to some extend.

The main importance of Arab tribes in South of Khuzistan province is in a way which is different from other Iranian tribes, and they don't have the summer and winter resorts. The primitive settlement shaped as a tent dwelling (nomadism) immobile and then remained constant.

Since the population of rural Area in Abadan is formed by Iranians who speak arabic and father is the head of household, however, when the father is not able to operate the household the oldest son gets in a place of him. When the son gets married therefore lives with his family and organized a small economic unit, who's everyboday has certain duties. In a case of girls when she get married she goes to home of another father with the same characters.

Every household ownes a parcel of land which every member of the family share the labour for the land.

Marriage takes in early ages is a common practice in tribes and most of these marriages are in families and take a place in tribe. Consequently, tribe is a large social unit at same time effect the the importance of social life.

Traditional patterns are still practiced and followed. For instance, tribal system is still a norm, where several households organized into a tribe and a tribal leader (shaikn) rules and conducts most of the social affairs.

Traditional patterns in households is in a way that the men's work less and women's work more at same time the head of households ruled by men's. Women's role as a producer and Seller of products and usally the men don't involve in a such a activity.

3.3.4.2. Population Abadan of Rural Area

Abadan township has been formed by numerous villages with distinguished border lines which makes up the "Arand-Kenar" district (See Figure 3.13). As Figure 3.13 indicates, district of Abadan's township region are located around "Arvand-rud" and "Bahmanshir" rivers margins.

In table 3.14 the average population of rural settelment in Khuzistan province is given, which indicates the populated and dispersed patterns of settelment of Abadan's township rural districts was estimated around 72.000 inhabitant (Ministry of housing and city planning 1980)

Table 3.14. Average Population of Rural Setlement in Khuzistan Province Compare to Abadan Rural Districts.

Region	Average of Rural Setlelment Population		
	more than 250	Less than 250	Average
Khuzistan Province	552	88	186
Khorram Shanr Township	543	115	283
Abadan Township	141	169	630

Source: Ministry of health (Malaria eradiction 1976)

3.3.4.2.1. Economic Activity of Abadan Rural Districts: 38.8 per cent of total population-aged 10 years and above-were-accounted to be active according to the 1966 census. In 1976 this declined to 36.8 per cent. The sex structure of the active population in 1966, accounted as 97.3 per cent male and 2.7 per cent of the total population were. Famle and economically active, compare to 99.3 per cent of male. (Statistical center, Khuzistan Province 1966-1976).

One of the main reason for female labour force decline, has been the influx of industrialization of the fishing methods. This process exacerbated by smuggling (i.e. illigal influx of fishing equipment namely fishing net). which has become a revenue generating activity. The Economic activities are divided to following sectors: 29.2 per cent in agriculture, 28.00 per cent in transportation, 16 per cent in fishing, and 10 per cent in construction.

3.3.4.2.2. Fishery and Animal Husbandary: There are about 700 to 3000 sails boats and about 500 to 1500 small boats. The capacity of sails is between 20 to 100 tons and each has about 10 to 20

seamen. The total earning from each fishing voyage divided between the owner of sails and the other sailors. The active population involves in this business numbered about 7000 to 14000 persons which is their economic activity in this region (personal communications in Abadan and Ahwaz).

The reason for involvement of this many population in this sector of economy can be explained by the profitability of this business which accompanied with from smuggling goods from the Gulf states.

The value added in fishery was estimated about 47 per cent pulm farming 25.5 per cent, other related farming 13.5 per cent, and animal husbandary 14 per cent in 1976. (plan and Budget organization, Khuzistan province).

In case of animal husbandary, according to the 1980 study of ministry of agriculture the total number of animal were estimated about 13 thousands heads of cattles, which 60 per cent of them were cows and the rest were water buffalos, which is a native animal of region. Generally, animal husbandary is not considered as a major source of income in any rural area, but animal products are consumed by rural households.

The drinkable water consumption of rural area include about 47 units of drinking water pipe in 1980. Nontheless, the water problem remained to be acute in rural areas. The water problem continued up to present time regardless of Abadan's oil refinery and its operation and quality.

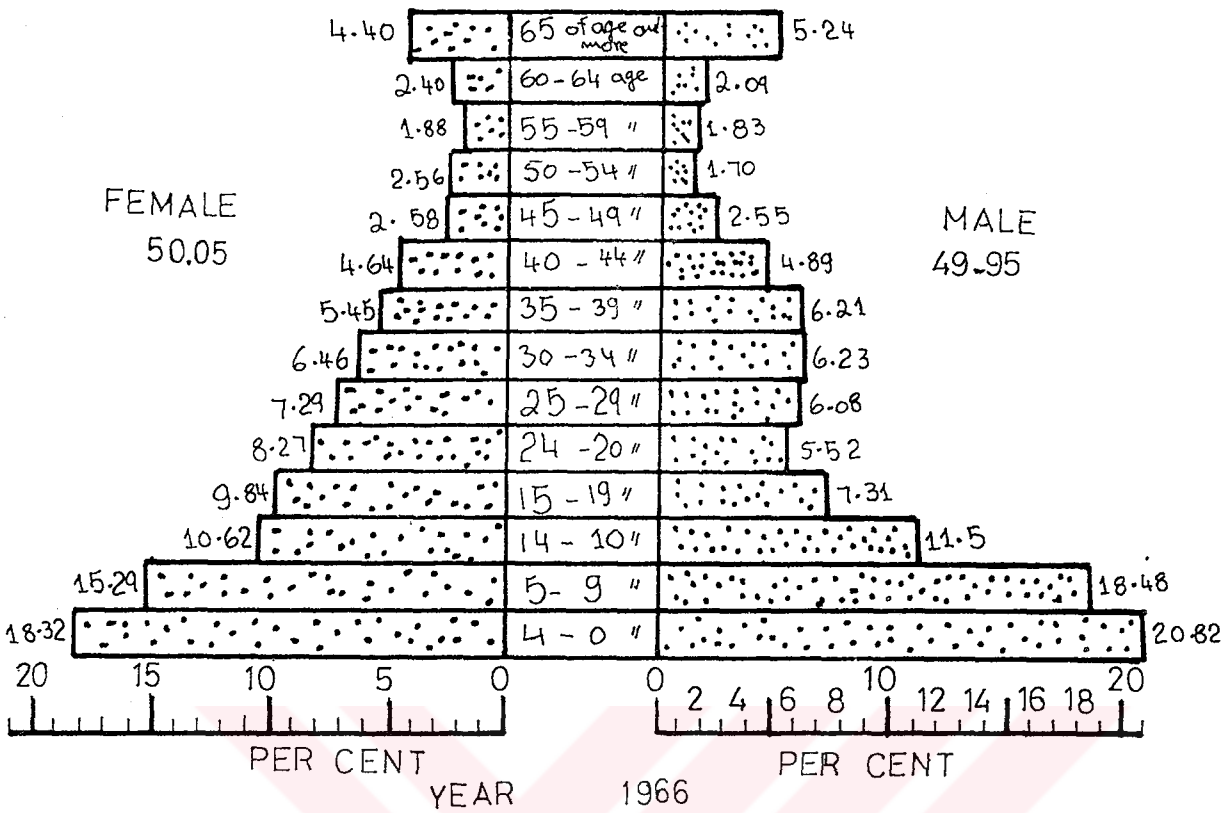
3.3.4.2.3. Age and Sex Structure: Due to the lack of adequate and vital statistics, this study has relied upon the age and sex structure of 1966 and 1976 census.

The sex structure of Abadan township rural districts by 1966 was reported to be 49.95 per cent male and 50.05 per cent female. These figures were reported to be 49.98 per cent male and 50.02 per cent female by 1976 (See Figure 3.14). Also according to the (Figure 3.14) 47.51 per cent of the total population were categorized as 15 years of age in 1966, and 48.89 per cent as 15 years of age in 1976. As result, the age structure averaged 16 years old which indicates the youthness of the population structure.

3.3.4.2.4: Education of Abadan Rural District: Literacy rate in rural distric of Abadan is in decline due to following factors: a) Linguistic problems due to minorities different language, and absence of curriculum in native tribal languge (i.e., in this case arabic). b) disparity of rural settelments.

According to the 1966 census 9.4 per cent was the literate rate for the total population with 7 years of age and above. By that time, 87.3 per cent of the population were illitrate. Iliteracy rate was high for the female population. According to the 1976 census, 45.2 per cent of males and 14.6 per cent of females were reported to be literated. (Budget and planning organization, statistical center of Khuzistan province 1966-76).

Educational services in rural areas of Abadan are limited to elementarys and primary education-with no secondary level of services. The dispered pattern of the rural settlements have caused the lack of concentration of the educational institutions. This type



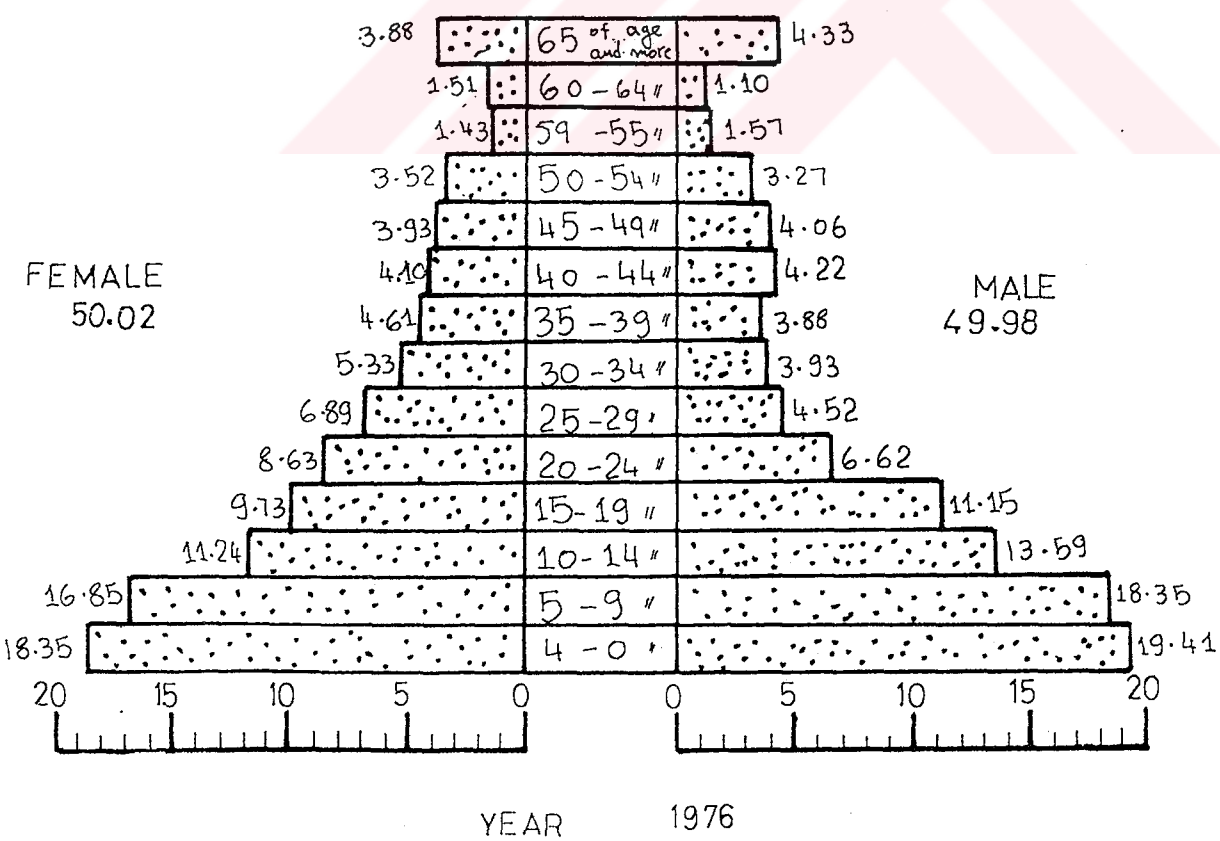


Figure 3.13. Age Structure of Abadan Township Rural District

of locational problems have become a discouraging factors for students which otherwise requires a long journey to the schools.

By 1976 there were 54 elementary and 7 primary with improper school building and limited class spaces.

CHAPTER IV

CITY FORMATION

With establishment and construction of oil refinery during 1900's, the first residential units were initiated which resulted in Abadan's further urbanization. By the years, 1941-1951, (before oil nationalization act) extensive portion of Abadan oil industry and related installations were built. This included residential sites related to oil industry, and various other dwelling units during upcoming years (i.e., 1970's).

The indigenous population of the city of Abadan was initially located in "Shatit" and "Bahmanshir" which constitute the fringe areas of the city (Encyclopedia of Iranian city 1976). With inception of oil industry operation in the city, the flood of migration (i.e. in seek of work) occured from various regions of the nation. In less than 40 years, Abadan has become one of the largest cities with a population of more than 200,000.

One of the distinguishing feature of the city was its foreign residents (AIOC), namely British, who were directly involved in the building and operation of the largest oil refinery.

The city configuration and its land-use pattern is depicted in map 4-1. After the construction of oil refinery the first residential area was named "sikhlane" (located in south west of oil

refinery), because of the majority of the labourers were Indians, from Burman's Rangoo refinery. As it is included the main and extensive site which related to oil industry, was built during the years of 1941-1950; and the large portion of regular urban dweller sites were built during 1970's (See Figure 4.1).

4.1. Land Use

The land-use inventory of city of Abadan consists of: Residential area, road network, air port, oil industry, services Salty land, and palm grove (intercity). The total area under different uses is 4224 Hectars. Table 4.1 demonestrates the land use pattern in the city of Abadan.

Table 4.1. Distribution of Abadan Land Use

Land Use	Area (hectar)	per cent (%)
Housing	907.8	21.49
Services	252.4	5.97
Road Network	475.9	13.76
Oil Industry	912	21.59
Uncultivated and Unutilized land (Innercity)	843.4	19.96
Pulm Grove (inner city)	463	10.96
Air Port	370	8.76
Total	4 224.5	100.00

Source: Ministry of Housing and City Planning (1983).

As can be denoted from table 4.1, about 40 per cent of the land is allocated to residential, services, and road net works, 40

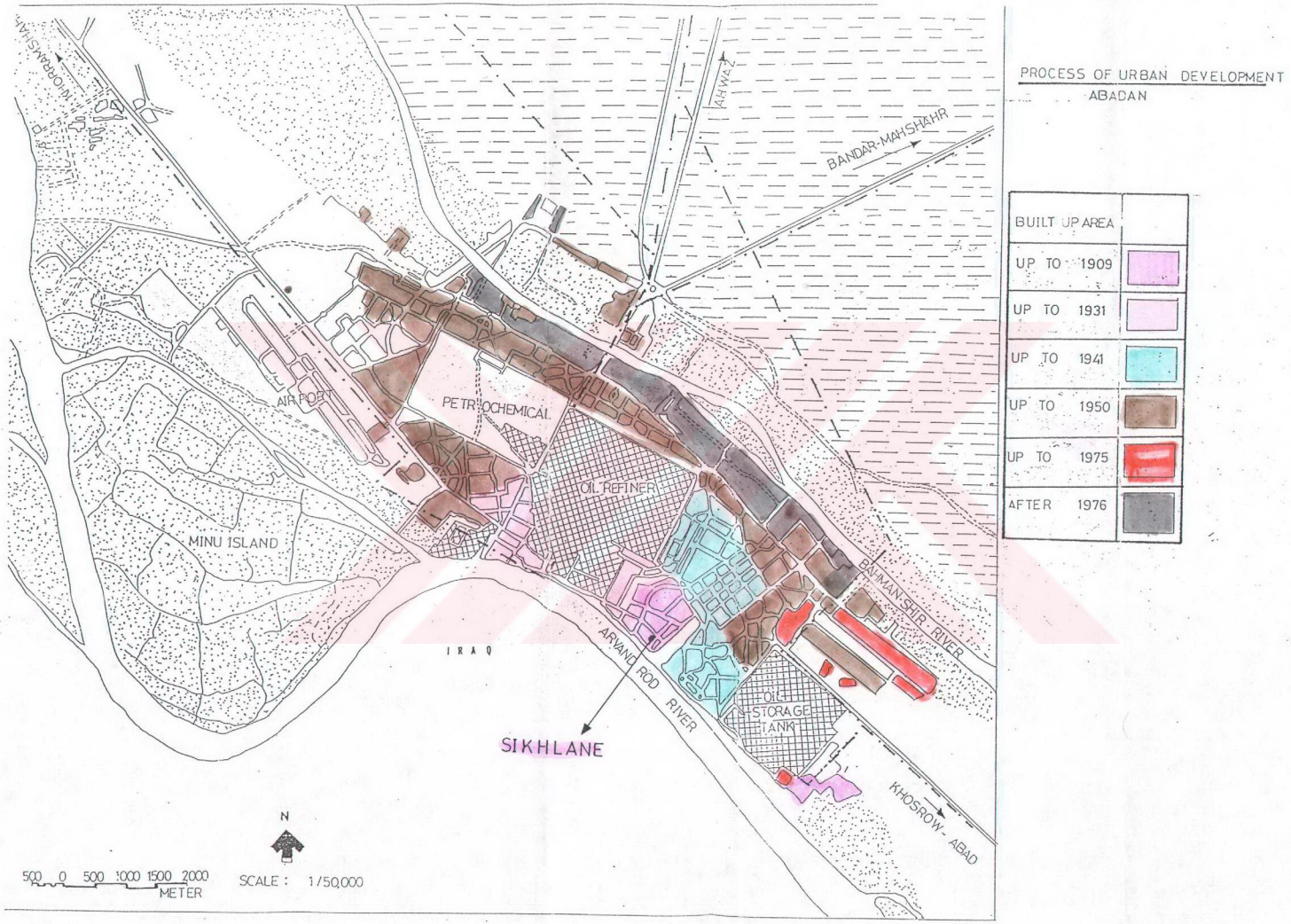


Figure 4.1. Process of Urban Development Abadan

per cent of the total land use is assigned for others instalations. And the remaining 20% is idle. Where, the oil industry activities: refinery, petrochemical, oil storage tanks, oil terminals and other related instalation absorbed about 21.59 per cent of the city land use. The extensive amount of unutilized land in the "inner city" section indicates the disparity between unutiliazed land and palm groves area.

The city is differentiated into: (a) Industrial sites; (b) residential zones; (c) palm grove; and (d) miscellaneous use. (See Figure 4.2).

Industrial sites consist of: (1) oil refinery and petrochemical plants in the heart of the city. The refinery complex is located in the center with area of about 487 hectares; (2) the administrative area is occupied in south face of the refinery; (3) the harbour and oil terminal are located in the south part of the city behind the refinery in Arvand-rud-river fringe; (4) the storage tanks located in the South East of the refinery which occupies an area of 254 hectares; (5) the petrochemical plant is on the west part of the refinery which occupies about 27 hectars.

Residential zones include two distinct sub-divisions: (1) oil related employee quaters which-qualitywise segmented into white collar/blue collar and top level management sections. The high ranking quarters located in the south and south western part of the petrochemical and refinery plant (indicated by numbers of 1 and 2 known as a "Helal-e-Brian" and "Brian", see map 4-2). Other high ranking quarter is about one and a half kilometers far from south eastern of oil refinery and just beside south eastern of the oil storage tank (marked in Map 4.2, as numbers, 3-south Bovardeh and 4-

North Bovardeh). Low ranking and labour quarters are located on the north of refinery and countinued about 4 kilometers along the north west axis (indicated by numbers 5, 6 and 7 known as Valiasr and Ghods). Labour quarter is located on the North Eastern part of the refinery (number 8, known as Bahmanshir, see Map 4.2). The total area of oil industry residentials consist of employee, labour quarter is about 1.000 hectares.

(2)- Rest of the city dwellers: Most portion of the residential sites are built during the 1970's. The residential sites are located along south of Bahman shir river; 9 kilometers long and average width of 500 meters (numbers 9, 10 (Fiyeh) and 11, 12, 13 and 14 (Saden)). Also the quarter of (19 Ahmad Abad), (18- Karun), (20-Kafshiyen) with area of 108 hectars. Although, area of (15- Shatit), is located on south Eastern of storage tanks and (village of Berian-21), is located on the Eastern part of air port, the total area of regular city dwellers would be around 1000 hectare.

(c) Palm groves which are located in the margins of Arvand-Rod and Banmanshir rivers, capture about 11 per cent of total city land.

(d) Miscellaneous use: All the service sector is located in center of city (17) and some located in (19-Ahmadabad), (20-Kafshiyen), (18- Karun), and (11, 12, 13, 14, Sadeh). All the small industries and services facilities (g.e., bank and repairshops), are located in the non-oil related sectors of the city.

The present configuration of the Abadan is influenced by the natural geographic and topographic nature of the city. Second, factor that produced the present land use system has been the result

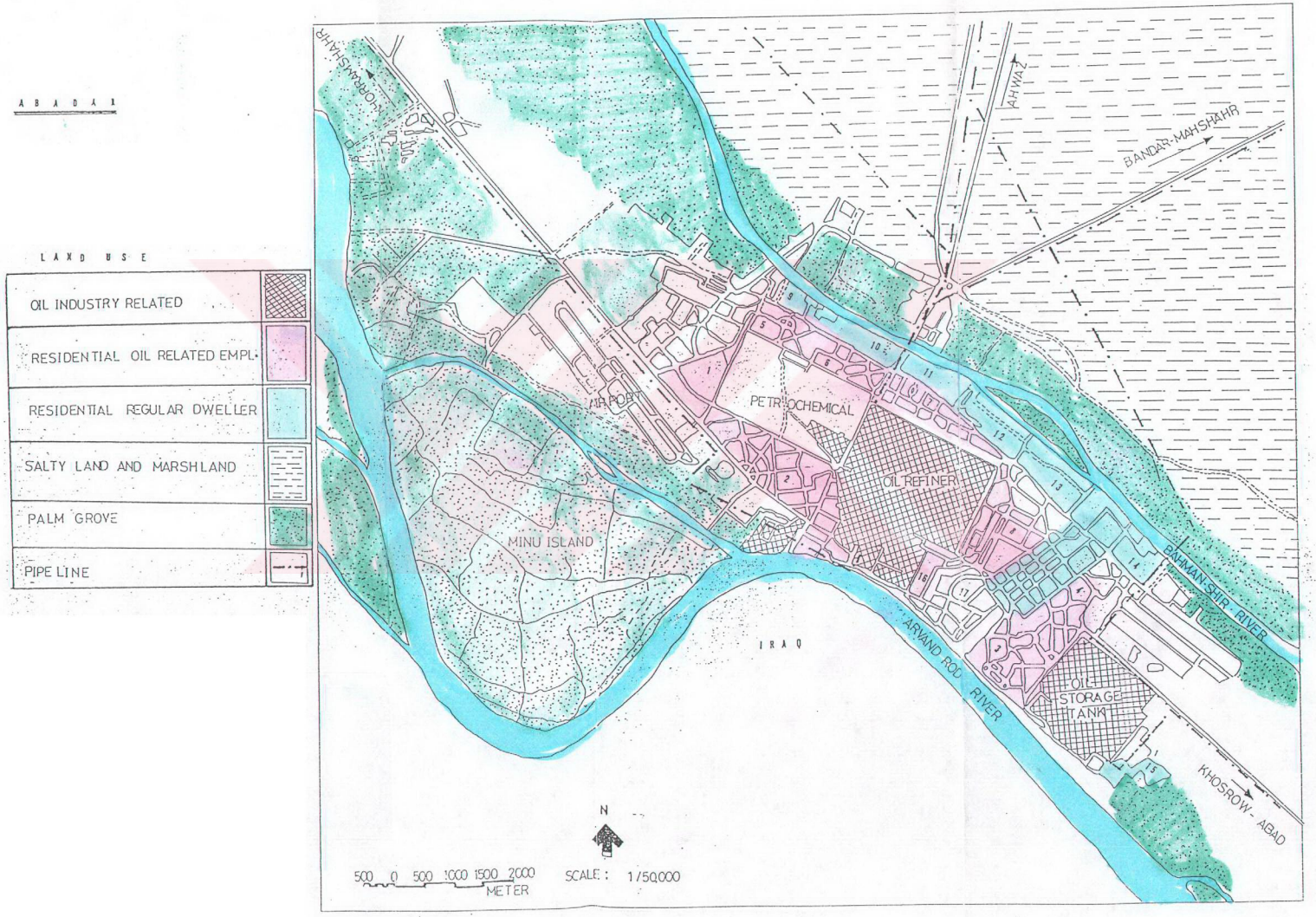


Figure 4.2. Abadan Land Use

of location of storage tanks and the refinery. As can be seen in the Map 4.1 the logical location of storage tanks and the refinery is obvious because of the proximity to the oil terminals. Interestingly, the agllomeration of various activities in this particular fashion is reinforced with the existance of the the drinking water resourse accessible to mentioned activities.

Consequently, the present land use charachteristics are in close relation to the main activities (refinery). And this type of formation provided highly accessible and intractive relationship within all the elements (economic activities water resources and transportation).

Finally, based on foregoing description the city has grown to form which linear configration is dominant form. (Also see Figure 4.1).

4.2. Uniqueness of Abadan

With the establishment and operation of oil refinery in Abadan, its urbanization process intensified. Population growth and burgeoning migration resulted in a typical formation which identified this city with its unique segregated residential patterns. Therefore, city was divided into two distinct sections: (a) section that was housing oil industry related dwellers and; (b) the protion which inhabited by non-oil industry related households.

The intraurban inequality is the uniqueness of this city. For example, the total area of residential site-related to oil industry-is equall to total area of reqular urban dwellers site not with standing the size of latter section.

Testimony to such inequity can be seen when one looks at the population, size in two sections. The oil related sector has about 60,000 residents compare to non-oil related sections of 285,800 people. This makes the population density in the regular quarters 3.5 time higher than the oil related areas. (See Table 4.2).

In the report by ministry of housing and city planning total population of Abadan was estimated to be about 345,800 on August 1980. From this, about 17.35 per cent where engaged in oil industry activities.

Housing quality is also another aspect of the city which oil related dwellings enjoy a higher level of amenities in compair to the rest of the city. In table 4.2, it can be noted easily that even the density of population in highranking residential areas is lower than the low ranking and labour quarters. (See Figure 4.2).

Such a segregated pattern is reflexed in the quality of service provision to different parts of the city. For instance, Abadan's process of growth and development has also produced a peculiar land use pattern. For instance, the residential land use developed based on segregated quarters, high ranking officials, engineers, and low ranking labour quarters. This type of land-use pattern has been practiced up to 1979 Revolution. And with the eruption of Iran-Iraq war, the opportunity to examine such a pattern was lost.

Table 4.2. Population, Number of Quarters and Districts

Related to Oil Indust

High Ranking Quarters			Low Ranking and Labour Quarters			Labour Quarters			
Districts	Houses Number	Total Pop.	District Name	Hauses Number	Total Pop.	District Name	Houses Number	Total Pop.	Grand Total Pop.
HELA-E-BRIAM 1	316	a 1800	VALIASR 5	1259	7170	BAHMAN SHIR 8	2202	12600	
BRIAM 2	970	5550	VALIASR 6	1117	6380	SIKH LANE 16	519	4500	
SOUTH-BOVARDEH 3	563	3200	GHODS 7	1912	10920				
NORTH BOVARDEH 4	520	2960							55060

Source: Ministry of Housing and City Planning 1980

a) Dimension of Household in Oil Industry Quarter is About 5.7 Where the Reqular Residential Area is 8.5.

4.2. Impact of Iran-Iraq War (1980-88)

Araqi troops originally crossed the Karun after Sunset on October 10, 1980. With tanks and other armoured Vehicles, engineers and bridding units. By sunset on October Iraqi forces had driven 15 kilometres inland from the east bank and cut the two main roads from Abadan to Ahwaz and Bandar-e- Mahshahr (See Figure 4.3). And they cut the hightension power lines, and the pipelines carring both crude and refined oil from Abadan refinery to the rest of Iran.

Khorramshahr was renamed "Muhammarah" by the Iraqi's as soon as they captured it. Abadan remained under Iranian control; from the city, Iranian artillery was able to shell Basra and control all movement on Arvand-rud (Shattal-Arab). Thus, Abadan was under Iraqi artillery fire, shell and Aircraft attack which destroyed oil installations in the city.

Due to immidiate evacuation of Abadan's inhabitant and, an untenanted quarter in town accelerated the pace of exhaustion of those residential sites. Due to the Iraqi artillery fire, which had no exact target, most of the structures were damaged and become vulnerable to further deterioration by harsh environment in this particular region.

The only avaiable information about the effect of war on Abadan is a report submited by ministry of housing and city planning in 1984. This report categorized the Abadan's residential sites, by three sections: (a) damages less than 20 per cent; (b) damages of 20 per cent up to 50 per cent; (c) damages of more than 50 per cent and ruination.

In addition some quarters seemingly are standing well, infact they have received an internal damage by explosion of bomb, to their foundation due to vibration. These structures may appear in a sound condition, where an examination reveals the dislocation of their vertical direction. However, these sort of buildings are not scarce, and they can be grouped as buildings with damages of more than 50 per cent and ruination. One can add another category to damaged areas which seem with healthy structure and foundation, but with partial damage. (See Figure 4.3).

MINOR DAMAGED	
DAMAGE LESS THAN 20 %	
DAMAGED OF 20 TO 50 %	
DAMAGED OF 50 % AND MORE (RUINATION)	

Percentage of Damaged to Residential Units By War (oil and non-oil relted)

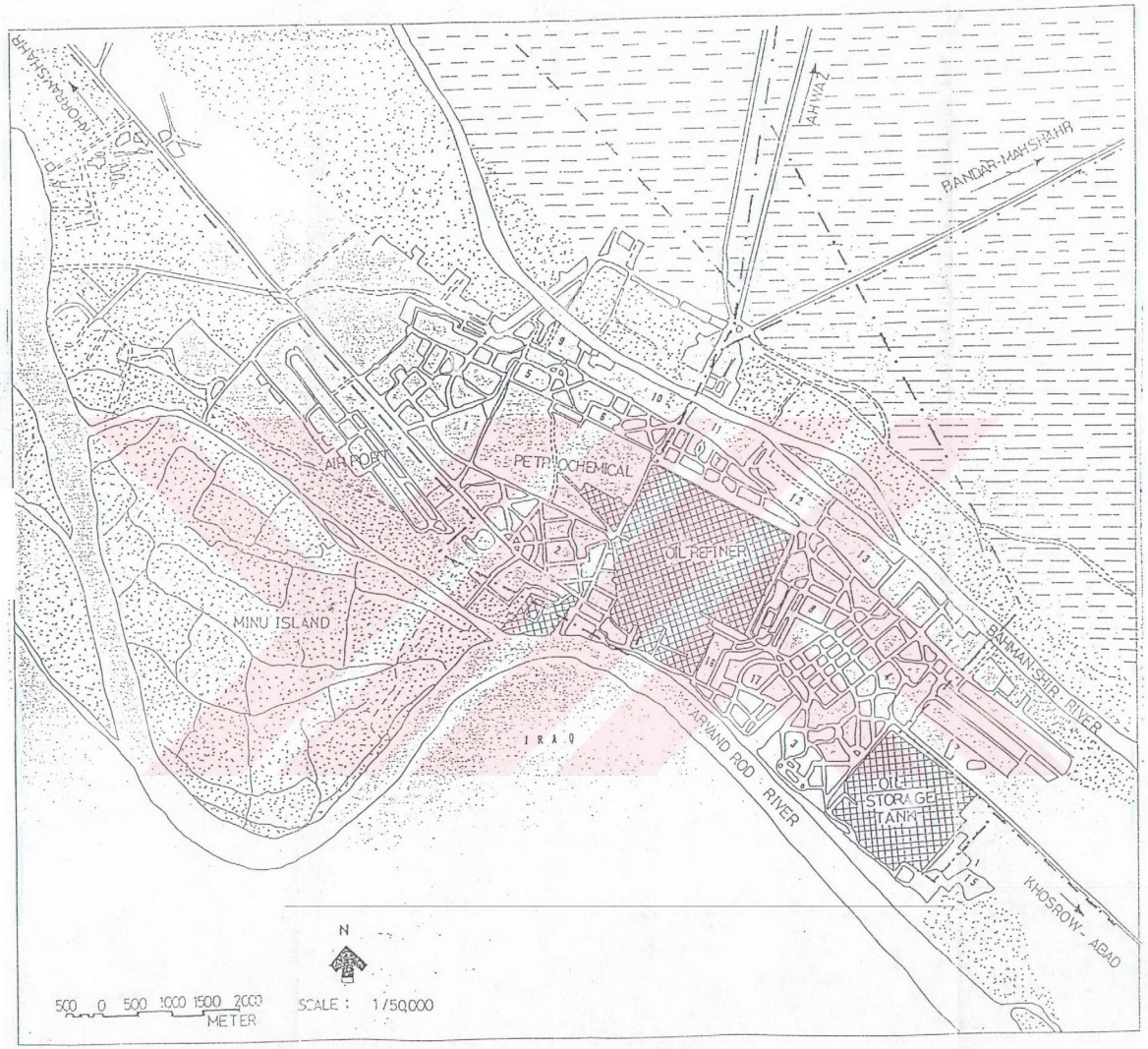
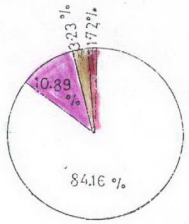
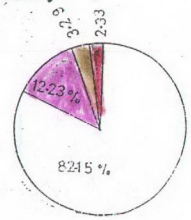


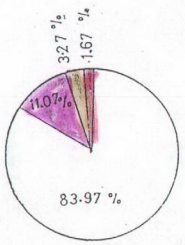
Figure 4.3.



INDICATION OF DAMAGED RESIDENTIAL UNITS (non-oil related)

INDICATION OF DAMAGED RESIDENTIAL UNITS (oil related)





INDICATION OF DAMAGED STRACTURAL UNITS IN THE URBAN AREA (non-oil related)

The information and charts presented in the Map 4.3 indicate that the percentage of the damage is more than 50 per cent for the oil related quarters. This situation qualifies more than 200 units of these quarters for demolition. For compete moreover, about 82.15 per cent (i.e., 1000 units) need partial repair. (See Table 4.2).

CHAPTER V

ANALYSIS OF THE DEVELOPMENT STRATEGY

5.1. General Development Strategy

Rostow (1962, P:25) argues that, economic development has been generally led by the so called growth centers or leading sector. The growth sector in some cases has been no more than a single industry-cotton textiles in the British "take off" from 1783 to 1803 or railroads in France from 1830 to 1860. The leading sector is provided by the supply of low-cost product for consumer, or by stimulating output in other industries, or by creating external economies that can be captured and integrated into other sectors or industries.

There are, broadly two accepted strategies of development: (a) the "incremental pull", and the (b) "big push". The incremental strategy focuses relationship, it relies essentially on free markets and price system. The "big push" strategy favors governments intervention in the allocation of resources, and this becomes a means for rapid economic development. (Kindleberger; 1965 p-209).

Myint (1964, p.99-120), argues that, the case against the incremental approach to development of the emerging nations rests on the struggle that price system, at least in less developing countries, does not work; or if does work, it usually gives the wrong

signals. The market mechanism it is argued, may work well where: (a) The economy is sufficiently monetized and reasonably competitive, so that prices can be held as a fair measure of demand-supply conditions; (b) changes in supply-demand relationship are only incremental, taking place at the margine, that is to say no large movements of resources in a "big push" are called for; (c) niether internal nor external economies are of an immense magnitude.

In developing countries, where often a sizeable portion of the economy is nonmonetized, where large-scale movements of factors are frequently necessary to break the vicious circle of poverty and productivity, where bottlenecks are enormous, and where externalities are abundant, the price mechanism usually fails to stimulate growth.

Hirschman's (1961, pp.469-476), in his view, creating decision-causing imbalance growth in order to reach balanced growth. To him imbalance are corrected through "profit opportunities" which guide the private investor to the right expansion path. These "profit opportunities" are created through the so-called "backward" and "forward linkages".

Maxcy and Silberston (1959; pp.20-30), argues that about direct foreign investment, such foreign-based industries as petroleum production, mining, even some manufacturing car industry, that are established in developing countries with the aid of foreign capital may fail to stimulate the indigenous economy because of low domestic demand and supply elasticities. Such industries frequently become so foreign-oriented that they may obtain their required materials, skill personnel, and even general labour force from abroad.

National economy characterized by such foreign based industry, which reflected two distinct sectors: (a) highly developed, capital-intensive, usually raw materials sector, and relatively underdeveloped, slowmoving indigenous sector, which give a rise to "dual economy".

Rollins (1956; 80-235) has made an empirical investigation of the effects of foreign investment in extractive industries in Bolivia he concluded that: (a) direct influences and; (b) fiscal influences. All those influences that result from direct influences contact of the mineral project with the sectors of the economy. The second includes those elements that enable the state to contribute to the growth process. Under "direct influences", the expansion of markets and income resulting from forward and backward linkages receipts placed at the disposal of country concerned.

In case of Iran and oil as a leading sector, the operation of the Anglo Iranian oil company (Al OC)-in days before oil nationalization. Theoretically could have two major effects: (1) Indirect influences via royality payments to Iranian governments (2) Direct impact through input and output complementarities with other industries in indegenous sector.

The fiscal influence of the oil revenues has a two consisting parts which affected the Iranian economy: (a) It provides a source of income for the government to supplement its budgetary expanditures and, (b) the oil revenues are channled through the Plan and Budget Organization (PBO) for investment projects.

5.2. Big Push Strategy

The Big Push type of strategy development and industrialization was financed by oil revenues during 1970's.

The idea was patterned after the works of Nurske, (1953) and Rodan, (1964), and evolved from the concept that economic development was constrained by certain "vicious circles". To break these vicious circles, it was argued that the state needed to industrialize on a wide and diversified front so as to ensure a ready market for the output of new industries. Economics of scale associated with modern technology dictated a plant size requiring a relative large market, and therefore, it was not possible to industrialize piecemeal. In fact, these ideas were to be specifically applied to consumer oriented industries such that the wage earners of the first industry would become the consumers for all industries from the second through the nth; thus setting up n industries simultaneously ensured an effective demand for the output of these same industries. This was known as the big push.

5.3. Indirect Influence

In Hirschman's view unbalanced growth changed balanced growth, in the Iranian case. As study discussed previously also refering to Table 2:1 and 2:2 the royality that received by operation of (APOC)-indays before oil nationalization-was not sufficient in order to be compatible which his thesis and actually was divorced from rest of the Iranian economy. Thus can be noted easily, only a very small portion of this profitable business export product accured to the producing country (See Table 5.1).

The fiscal (revenue) or indirect influences of the oil revenues through the ordinary and development budgets is not the purpose of this chapter. But to give a brief assessment following is the case:

5.3.1. Pre-Revolution (1949-77)

The percentage of contribution of the oil revenues of the total expenditure in the days before nationalization-act is negligible. Whereas, taxes played a crucial role as a source of finance in the Iranian budget. (See Table 5.2).

Between years of 1949-1978 the planning process in Iran gradually evolved from a series of ad hoc actions in the direction of economic development (mainly due to oil revenue) into a formal and complex development through a unified and comprenensive planning approach. And the Iranian economy experienced a magnificant growth rate in the 1960's and 1970's (See also Appendice: first, second, third, fourth and fifth development plan).

Table 5.1. Per Ton Revenues of Persian Government and (AIOC) profits for Selected Years (Pound Sterling)

Year	Persian Government Revenue per Ton	AIOC Revenues (Profits) Per Ton
1913-14	0.04	0.10
1919-20	0.34	1.34
1925-26	0.23	0.96
1930	0.22	0.64
1931	0.05	0.42
1933	0.26	0.37
1935	0.30	0.47
1940	0.47	0.33
1945	0.33	0.34
1945	0.37	0.50
1950	0.50	1.06

Source: Fereidum Fesharaki, Development of the Iranian Oil Industry; 1971, p.15

Table 5.2. Estimates of the Iranian Budget by Major Components; Sources and Uses of Funds, 1937-49 (Million of Rials)

	1937	1942	1945	1947	1949
Sources Total Taxes (included incom, excise, custom, and others)	1.164	1.939	2.906	3.816	5.455
Public enterprises	118	349	798	139	1.047
Oil Payments	206	347	512	677	901
Other Revenue	156	109	196	327	382
Total Budgetary Receipts	1.644	2.744	4.412	5.559	7.785
Uses Development Expenditure	662	512	313	991	1.638
Other expenditure	976	2.251	4.099	7.130	9.479
Contribution of Oil Revenues to Total Expenditure (Per Cent)	13	13	12	8	8

Sources: Amuzegar J. and Fekrat A.Iran: Economic Development (1971; p.19).

5.3.2. Post-Revolution (1979-92)

There was not an economic planning system in the post-revolution (1979-92), as it was in the period of (1949-77). Nontheless, a sound planning and economic management which was the responsibility of the (PBO), failed could not be achieved.

In the course of preparation of the first development plan (1983-87), based on new ideological terminologies to define issues, of self-sufficiency, and growth targets. The plan considered issues of social justice, property relations, public management, land reform, regional development, nationalization of foreign trade, the role of co-operatives, and the management of plan and population

control. This last issue was not even considered, because of its non-Islamic nature.

The Iran-Iraq war and Ideological battle among conservatives, radicals, and paragmatists over the direction and extent of post-revolutionary social change ultimately killed the plan, which finally was revised by government in 1983. The new version tried to be more specific about the stages of development, but remained silent on the ideologically sensitives issues of property relations and reforms. (plan Budget organization 1986).

Razavi (1983) argued that legal managerial, material, and physical bottlenecks were blamed as obstacle to progress, as was especially the lack of a consistency system of statistics, information, planning, absence of suitable organization and structure.

The revised plan was accepted by majlis (parliament) after one further year of discussion in 1984. It declared agriculture to be an "axis" of development. However, agreement could niether be reached on numerical targets nor on defining the government's role in economic management, the limits of private sector, and opening toward the outside world.

The government adopted a paragmatic, quick-fix approach to the economy until brought up short by a foreign exchange crisis in 1986, when oil price declined sharply. Foreign exchange earning that year amounted to $5.800 million, against a projected $ 15.000 million. The dramatic fall promoted conservations to agree with policy of privatisation and reduce government control. (Centeral bank, 1986)

With the event of Gulf war ceasfire in August 1988, a new proposal put forward for the post-war reconstruction.

Moussavi then a prime minister in the previous cabinet, proposed a plan for 1983-93 period which visualized an economic recovery program. The plan included three phases to achieve expected growth based on self-sustaining and independent of oil exports. But the government changed before it could become a law, and a new government with Rafsanjani leadership emerged.

The Rafsanjani plan, with new cabinet, decided on a felxible and more market-oriented strategy. The plan streeses economic growth through increased industrial production. Proposed total fixed capital investment IR 12.478.600 million. As industrial production expand, unemployment and inflation rate are expected to moderate and per capita income to increase. Oil export will provide some 12 per cent of foreign exchange, non-oil export 17 per cent and foreign capital 11 per cent (Iran centeral bank, 1989).

Nevertheless, the plan places a ceilling on the foreign exchange liabilities that such projects can bring -$3.200 million in the oil sector, $3.000 million for dams and $ 2.200 million for petrochemical industries. (MEED, 1991).

Technically the first development plan of Islamic government could be considered to have not become effective until (1989-94) period.

As the Zanoyan 1988, noted that the war, cost Iraq up to $ 90 billion in oil lost revenue and non-oil revenues; Iran's oil lost revenue before war was already $ 30 billion. Mr.Zanoyan estimates

the total cost of war - just the use of weaponary for Iraq was about $ 150 billion, and nearly $ 66 billion for Iran. (See Figure 4.4).

The oil revenue did not play a crucial role in order to finance the economic planning in the years of 1979-89. And economic development in the post revolution period was regarded in the second stage. Iranian economy was divorced from this huge oil revenue and the unbalance growth of Hirschman's view is not applicable either during decade of 1979-89. Whereas, the future of economic planning in Iran still is under question.

5.4. Direct Influence

Beginning of the oil production and export from Khuzistan province occured in 1912 with 42.000 metric ton a year. This amount reached to 82.000 tons a year by 1913, and to 278.000 tons a year in 1914, finally, to 1.407.000 tons in 1920. By 1930, almost 17 years after the oil explolation, the production reached to 6.000.000 tons a year and placed Iran ranking fourth among oil producing countries in the world. By that time, total employee of (APOC) was not exceeded more than 20.000. In 1962 the production reached to 60.000.000 ton a year. In another word the production has increased 1000 times during the last 50 years. The oil production reached 280.000.000 or (6.500.000 b/d) before the Iranian revolution of 1979.

The oil refinery in Abadan was constructed in 1910, and took about three years to be prepared. During the post nationalization act, and by assisstant of consourtium agreement of 1954, the Abadan oil refinery was restructured by the new technology.

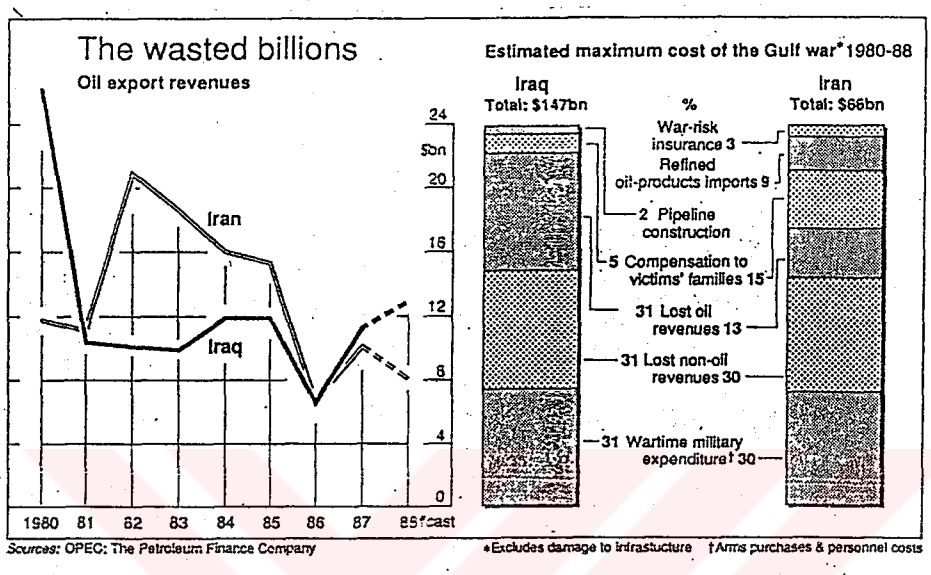


Figure 4.4. The Wasted Billions; Oil Export Revenuse.

As Amuzegar (1971-23), argued that by the end of 1950 (nationalization of oil industry in Abadan) the (APOC) had fixed investment of £ 90 million with a market value of about £ 200 million in Iran. More than the four-fifths of this amount however, was the resul f reinvestment from the company's profits and not from fresh capit

In a manner similar to that observed by Rollins 1956 in Bolivia, the company's direct impact on Iranian economy were therefore, minimal.

The (APOC) had discovered approximately 13 billion barrels of proved crude reserves, drilled 453 wells, laid 2.177 miles of pipeline, 243 storage tanks with capacity of more than 21.000.000 barrels, and built three major ports (Abadan and Khorramshanr). (National Iranian oil company). To add to this 2.500 kilometers of motor road, 14.000 houses numbers of schools, clubs, stores, clinic, hospital in Abadan. Yet the actual operation of the company were such which to substantially can be distinguished from rest of the Iranian economy and Abadan. The mentioned activities (various infra-structural ventures) took place due to their essentiality for further oil related operations. For this reason, the infrastructural expansion, to cover these non-oil related areas, were not considered any further.

5.4.1. Backward Linkage and Employment

Backward linkage constitue the leading industry's demand (APOC) for good and services provided by National economy.

Since the oil industry is capital intensive, and the degree of capital intensity is rising overtime by installation of sophisticated, automatic machinery in refineries (Fesharaki 1976:143), would have not been able to provide such capital equipment for the industry.

In the case of Abadan, due to the oil concession of 1910, and according to the terms of its agreement (APOC), all land taxes and import duties were waived. And the (APCO) was free to import its needs and mostly exempt from custom duties and other excise taxes. Taking and advantage of this, the company chose to purchase almost all its needseven food, beverages, construction materials such as bricks, and even labours. According to Iranian allegation, much of the company's household need (ie. food items) and parts of its industrial and residential supplies (i.e. cement, brick) were imported from Basra in Iraq. This took place regardless of availablity of most of these goods locally. Therefore, there was little effort to company's to create demand for the local capital and domestic goods/services as well as native managerial talent. This lack of direct influence was exacerbated by the nature of oil industry (i.e capital intensive) and inability of the domestic market to supply the sophisticated machinery. Moreover, the consortium itself did not try to create a by-product industrial link to supply the requirements of the oil industry; but rather they relied on imported goods consistently.

The oil industry's demand for labour is another backward linkage. According to company's own Figures (1939-50), of 50.000 employees less than a per cent were salaried which included technical commercial, supervisory, and senior staff; The rest were wage earners

which categorized as unskilled workers. Among the Salaried personnel, the number of "graded" (nigh-ranking) Iranian employees were about one third of the foreign (mostly British Staff). There was no Iranian assigned to a key managrerial position within the company. (See Table 5.4).

Table 5.4. Employment in the Iranian Oil Industry, 1939-50

Year	Iranian	Non-Iranian	Not Specified	Total
1939	15.060	2.723	-	17.763
1940	13.380	2.273	-	15.653
1941	10.986	2.079	-	13.065
1942	11.654	1.803	-	13.457
1943	16.389	2.864	-	19.253
1944	16.485	3.380	-	19.865
1945	21.781	4.030	12.143	37.954
1946	24.889	4.520	12.461	41.370
1947	28.221	4.228	11.065	43.514
1948	29.917	4.306	12.189	46.412
1949	32.011	4.477	16.410	52.898
1950	31.875	4.500	n.a.	36.375

Source: L.Nahal and C.L.Kimbell. The Petroleum Industry or Iran 1963; p.20. The data for 1950 have been taken from "Iran Presents its Case for Nationalization", 1956 p.86

Due to the capital intens of the oil industry, the level of employment has actually fallen while the production has increased. Table 5.5 shows employment in oil industry, 1958-72. First, despite the reduction in the labour force of the oil industry, the number of Iranian have nearly doubled in this period, indicating the expansion of (NIOC) and the subtitution of Iranians for foreign staff. Second, the drastic reduction in manual labour force during this period illustrates the efforts of the oil industry to raise productivity and introduce automation in the production and refining activities.

Table 5.5. Employment and Production in the Iranian Oil Industry.

Year	Staff Iranian	Staff Foreign	Manual Labour	Cantractor a	Total	Production in Thousad Cubic Meter
1958	8.1319	693	48.477	4.724	62.033	47.767
1961	10.188	847	39.638	1.619	52.292	68.581
1964	9.888	447	31.564	727	42.653	98.343
1967	11.659b	n.a	29.426	1.385	42.470	150.681
1970	12.547b	n.a	26.952	1.917	41.416	222.180
1972	12.831	497	24.931	2.166	41.812	294.100
1986c	18.712	288	n.a	n.a.	58.943 d	412.280
1991e	n.a.	n.a	n.a	n.a.	63.943 f	412.330

a- Excluding foreign employees of contractors.
b- Including foreign staff
c- Due to countination of war Abadan refinery was not under operation.
d- Total employee of Iranian oil industry, employees of Abadan excluded.
e- Include operation of first phase of Abadan refinery on August 1988 with 130.000 (b/d) and second phase on March 1991 with capacity of 125.000 (b/d)
f- Operation of Abadan refinery Added 5000 to total employment.

Sources: For employment figures up to 1967, M.Nezam-Mafi, "Role of oil in the Iranian Economy" for employment figures from 1967 to 1972 fereidun Fesharaki "Development of Iranian oil industry", 1976. For employment figures 1986 Ministry of oil-statistical center 1987. For 1991 total production added 255.000 b/d from Abadan oil refinery operation (private conversation ministry of oil; refinery section 1992).

Table 5.6 indicated employment in the Abadan by the consortium during decade of 1958-1970. It can be seen that the number

of foreign employees by the consortium has greatly diminished from 258 in 1958 to 45 in 1970. This period illustrates the efforts of the oil industry to raise productivity and introduce automation in the production and refining activities due to the "consortium Agreement". Therefore, in case of Abadan the backward linkage on employment was very fair.

Table 5.6.4 Employment in the Abadan Oil Industry

Year	Abadan Operation Iranian	Foreign	Total
1958	24.661	258	24.919
1961	22.634	346	22.980
1964	18.016	112	18.128
1967	14.979	88	15.067
1970	10.818	45	10.863
1972	9.923	b	9.923
1991	5.000	n.a.	5.000

b- No Iranian/Foreign Devision was Made in 1972

Source: For employment figures up to 1967, Nezam-Mafi M. "Role of oil in the Iranian Economy" (1910-22). For employmet figures from 1967 to 1972 Fesharaki F. "Development of Iranian oil industry" 1976. The data for 1991 is unofficial figure private conversation with ministry of oil, refine section.

With construction of Iranian gas Trunkline, during 1961, Iranian government decided to build a gas pipe plant in Ahwaz. The plan was to purchase 50.000 tons of gas pipe from domestic market. This plan was hampered because of the need to import foreign raw materials which increased the cost of domestic production. Incompaire to imported gas pipes. Therefore, this plan did have a little backward linkage impact. (See Figure 5.1).

5.4.2. Forward Linkage

Petrochemical has potential to become an important force in creating forward linkage as an export activity. And at the same time it can supply the domestic market with productions such as: Fertilizers, plastic products, and other related materials.

In the case of Abadan, the petrochemical plants was constructed with the American joint venture in 1960s. This process was not seen to take place when the British were actively involved in the oil related activities. The basic idea behind investment in petrochemicals is similar to export refineries to capture the value added. But the difference is that the value added in petrochemical is substantially higher than that of refining. At the same time, export refineries are complementary to petrochemicals as the former's output is an important feed stock for the latter. Whereas, (APOC) did not materialized important linkage in the petrochemical industry in case of Abadan. And the petrochemical plant in 1989 was reconstructed and put in operation with capacity of 50.000 ton a year.

Also forward linkages represent the flow of low cost fuel from oil industry to the national economy. In the Iranian case, the availability of easily accesible quantities of gas caused the government to build the 1.100 kilometer pipeline (known as IGAT-1 Trunkline) to the former soviet union. This pipeline was completed in 1971 and serves two purpose: First, it is used to export gas to Russia, which in exchange paid for the former Russia construction of the Esfahan steel mill. And second it will provide natural gas for the main center of consumption (such as industries and residentials). Therefore, the forward linkages during 1970's was effective (See Figure 5.1).

Also the second gas schemes (Known as a IGAT-2), which originates in Khuzistan oil fields was intended for exports to the former soviet union, but construction was stopped in 1979 (Iranian revolution) and therefore, construction finished by 1989 and run parralle to IGAT-1 and then taken west toward Turkey.

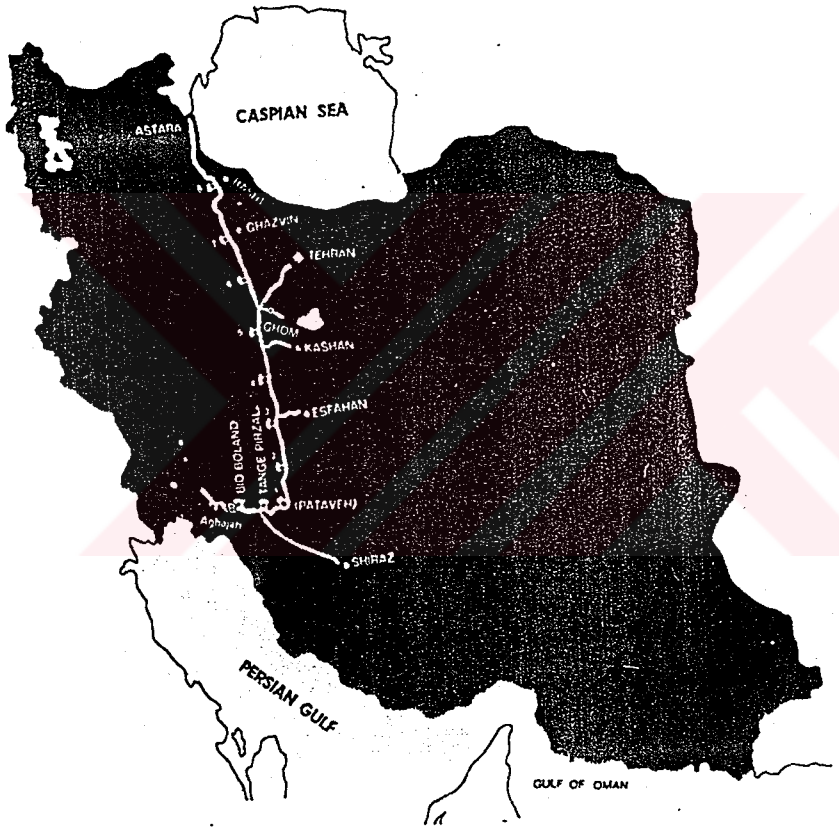


Figure 5.1. Iranian Gas Trunkline

CHAPTER VI

CONCLUSION

According to (APOC) agreement in 1910 the campany's household needs, Industrial and residential supplies were waived.

As was outlined in Chapter 5, the Oil sector in Iran during the 1910-50 period failed to produce the type of responses called for in the Hirschman thesis. The unbalanced growth of the oil sector had no widespread repercussion on the economy either directly or indirectly.

The Post-Nationalization act 1954, the oil industry has been the backbone of Iranian economic and capital formation by indirect influences as well as, the indirect influences for increased domestic investment was practised.

In the pre-revolution periods, the Iranian Development Planning (i.e PBO), has aimed at increasing the direct and indirect influences of the oil industry on the other indigenous sectors.

This study indicates that during the 1910-50 period, the oil sector remained virtually divorced from the rest of the Iranian economy and the Abadan-a conclusion which is some what inconsistent with the Hirschman doctrine of unbalanced growth. However, the post-1951 (Nationalization Act), a conclusion which is in agreement with the general Hirschman thesis reached.

During the Iranian revolution of 1979 and event of Iran-Iraq war 1980-88 period, the Hirschman doctrine of unbalanced growth was minimum or with no responeses.

The establishment of such projects as petrochemicals, natural gas, and fertilizers that have a direct and relatively high linkage with oil may be taken as an indication that the Planners are approaching advanced stage of self generating development.

The Big Push, when applied to Iran an oil-producing country especially following the oil hike of 1973. The Big Push theory acquired another aspect. It was no longer a vicious circle of poverty theory. Rather it was a concertrated effort on all parts, financed by oil revenue, to pull a country upward. In fact, if too Big Push is made, financially under such conditions, it may create inflation and excess demand, as output lags behind expenditures. In the case of Iran the constraints become infrastructural or human rather than financial and ended with 1979 Iranian revolution.

In the agricultural sector, with establishment of few modernized agro-industry in region, with assisstant of foreign capital. The backward linkage impact remained minimal. This was due to primitive way of farming which was dominant in the rural area.

The oil related industries have provided services and infrastracture which were crucial in the success of various oil related operations in the region and Abadan. For example, communication system telephone network, electricity, sewage system, and aminities were entirely and exclusively under control of (APOC) in Abadan. But the positive externalities for urban dewllers remained minimum. This attitude and manner of thinking was practiced even in the post-

T.C. YÜKSEKÖĞRETİM KURULU
DOKÜMANTASYON MERKEZİ

nationalization period by (NIOC), and it did not change the whole framework. Despite the fact that the presence of oil-related facilities resulted in a dual-character in Abadan, the policy of post-revolution government should not affect the oil-related facilities in a destructive way. But rather, government can upgrade the non-oil related areas to match with rest of the facilities.

Also, oil industrial growth in the Abadan introduced the concept of "external economies" to account in part for factory agglomeration. External economies involve firms benefiting from aspects of the local environment. In case of Abadan this was minimum.

Consequently, the huge oil refinery initially was designed as an export oriented plant, and without given any attention to national interest. Therefore, the backward and forward linkage before nationalization act was minimum. For example, even British used the Indian labour force for construction of refinery and they received payments in non-Iranian currency until 1924.

As we discussed before, petrochemical is a good example of forward linkage but this has never materialized under the (APOC). And whereas, Abadan petrochemical was materialized by American-Iran joint venture consurtium in 1966.

The impact of oil industry on agricutural of the region was minimum. As has been discussed, petrochenical can become an effective forward linkage to supply the local market with cheap fertilizers, and this could support the agricultural productivity in the region. However, this did not materialize and never plaid crucial role. Whereas, during the operation of (APOC) more than thousand kilometer of motor-roads from refinery to oil rich field of Khuzistan was

built. But it has never considered agricultural sector as a potential in region in order to transport their goods to this market. Even the fruits, vegetables, and dates of (APOC) personnel were imported, therefore, it did not have impact on local economics. Also (APOC) has its own dariy farm in order to produced their own dariyes for higher ranking employees.

The physical structure of most of the traditional Iranian cities can be identified as regular and orthognal streets. Whereas, Abadan has been structured in an irregular pattern.

As Bonine (1979-208) described that, the basic morphology of traditional Iranian cities was created by houses filling in adjacent rectangular fields and orchards (See Figure 5.2 and 5.3).

Consequently, two important question arise from the foregoing, argument. First, the physical structure of Abadan is an outcome of delibrate urban planning procedure, second, it is a product of oil industry related activities.

Johnson (1980:171), argued colonial city as "where a small alien elite dominates and maintains the major lineaments of the intra urban spatial structure.

In case of Abadan the role this dominant class played by British. Therefore, the residential segregation or in other words, known as "colonial city" were practised. Income differences reflected residential differences. Sites can easily be distingushed from each other. In the case of Abadan the oil employee's residential sites have been segregated from regular urban dwellers and denied access to those sites by using a variety of practices such as pipelines, fences, open water channels, open spaces and etc.

Whereas, traditional patterns are still practiced and followed. For instance, tribal system is still a norm, where several households organized into a tribe and a tribal leader who (shaikh) rules and conducts most of the social affairs. The indigenous people who occupied the developed dwellers have indeed been less receptive to modern changes. They have not embraced the Westernised urban values on which half of the city were developed.

As Burgess and Gold (1982,2) have observed critically, large scale environmental change not instituted by the inhabitants them selves, and outside their control. Often seems disturbing, disruptive and divisive.

Historically, Abadan has always been a divided city. The indigenous people as a urban regular dwellers who occupy the disintegrated quarters has to be integrated with modern part of city (oil related residential) sites while improving the indigenous quarters by means of open spaces, population density, and amenities. Where, the relatively planned, physically developed "progressive" oil related employee residential sites need not to be differentiated, from the rest of city.

Based on the described, housing and zoning policies, a dualistic character indentifies the city. And present configuration of the Abadan is result of natural geographic and topographic condition of the city's location. Therefore, an exclusive zoning for the oil related employees isolated, which, did not have any integrity impact upon the rest of city. For instance, Article 14 (contract between APOC and Iranian government) Provide free import tax for these exclusive quarters. Thus, there were not been any commercial

and Business relation between this section with rest of the city. In terms of services the exclusive zone enjoied high quality facilities (hospital, recreation, schools, better infra-stracture and aminities). From planning point of view city was subjected to a type of development which is not identified as an strategic and integrative planning.

As explained through the configuration of Abadan, the city is an example of "new towns" developed in various areas in the region.

As (Beaumont et al, 1976:213) "described new towns established during the last hundred years are essentially European in style and layout, owing little to local urban traditions. The oil town of Dhahran in Saudi Arabia. The Iranian Oil Port of Abadan, founded in 1910, displays a similar European impress though on far larger scale."

Again, in the case of Abadan the city formation and planning pattern dominated by western style which did not allow low cost Traditional Pattern. As (Beaumont et al, 1976:213) noted "it is astonishing how slavishly western styles of architecture and urban form are followed when traditional styles and techniques might be adapted to give greater comfort at lower cost".

Nonetheless, Abadan demainds the biggest and the most significant of the recent new towns which has designed to serve the purposes, of an oil refinery and oil exporting facilities. In fact it is laidout as a garden city (Encyclopedia of Urban Planning, 1974:564).

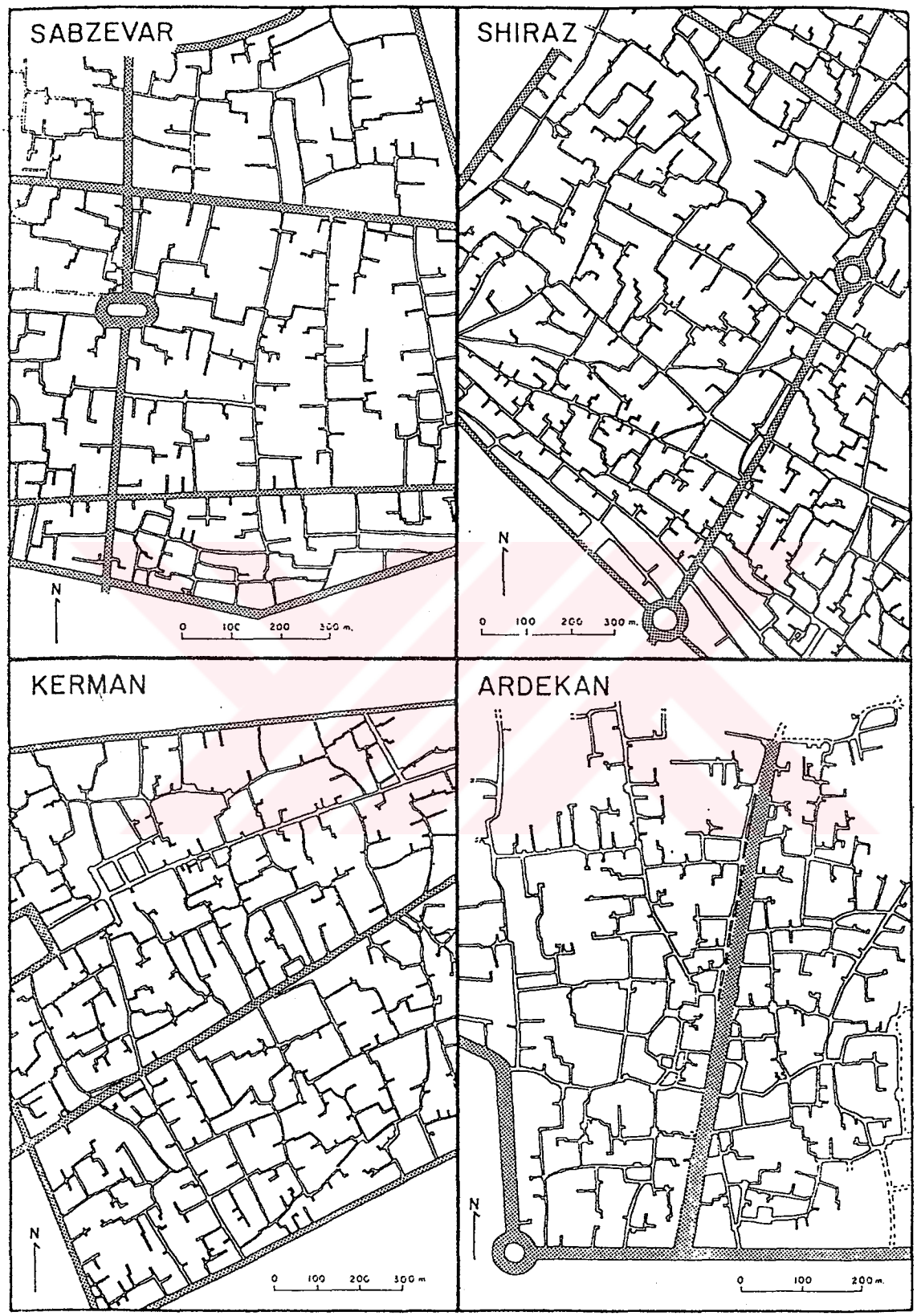


Figure 6.1. Street Plans of Section of Four Iranian Cities

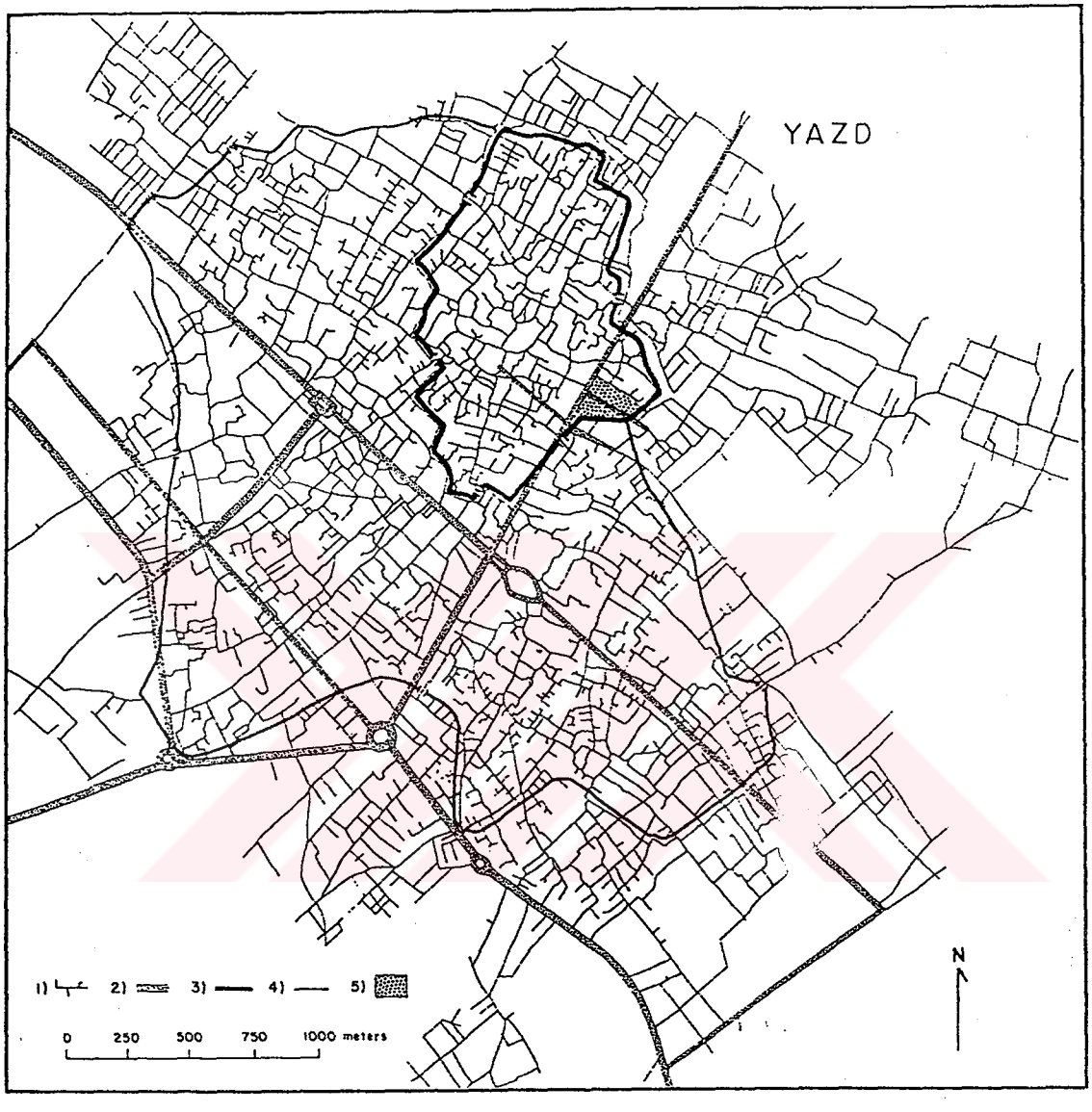


Figure 6.2. Street Plan of Yazd City

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APPENDICES

APPENDIX A

TABLE

Table A.1 Provincial socio-economic and demographic indicators,1976

Province	1	2 (a)	3(b)	4	5	6	7	8	9	10	11	12	13
Markazi	79.9	49996.7	25707.0	11.7	35.8	933	65.9	94.3	338.3	80.8	80.8	23.4	33.2
Gilan	29.2	59669.5	34177.3	44.6	21.5	280	50.7	24.1	142.6	19.1	31.7	36.7	38.3
Mazandaran	32.5	43229.1	25707.2	52.4	20.9	421	47.0	21.6	95.1	37.1	46.1	16.9	34.4
E.Azarbaijan	37.2	42098.4	38836.0	38.0	38.5	686	36.3	21.9	110.1	43.1	35.9	9.7	30.0
W.Azarbaijan	31.7	41566.9	26630.3	54.0	22.6	560	38.3	19.7	94.3	41.8	29.1	9.6	35.3
Bakhtaran	42.9	43063.1	14079.4	38.8	28.8	521	42.3	21.4	97.3	50.9	36.6	17.9	47.3
Khuzestan	58.3	54889.4	23341.6	31.9	27.9	991	50.3	39.1	167.1	65.2	65.1	6.9	67.6
Fars	42.9	38414.6	18979.8	35.6	32.9	656	49.5	33.6	125.8	58.4	48.6	4.7	48.0
Kerman	32.2	41960.2	17152.1	44.9	34.2	587	41.8	20.9	76.5	42.6	33.1	2.5	50.7
Khurasan	38.1	32545.9	17749.5	41.8	35.4	532	40.0	27.2	150.6	45.1	35.9	3.7	33.5
Esfahan	63.1	40458.3	26037.7	24.1	48.8	345	52.9	42.5	197.2	59.4	68.9	8.7	57.5
Sistan/Baluchestan	24.5	44502.5	16680.7	58.3	21.8	130	29.4	19.1	57.5	26.1	15.4	1.8	35.6
Kurdestan	24.3	50704.8	19050.1	43.2	36.4	156	29.7	16.2	56.1	37.6	18.7	7.2	34.4
Hamadan	29.9	45673.7	24002.7	41.1	37.6	306	37.0	14.4	81.5	35.7	35.9	13.4	25.6
Chaharmahal/Bakhiari	35.6	33227.4	18020.6	39.4	47.9	274	37.2	23.4	52.8	46.9	32.6	12.1	22.9
Lurestan	31.5	49102.9	22810.1	51.9	26.9	798	34.4	15.6	47.3	38.2	28.3	7.1	29.3
Ilam	19.8	66648.3	17729.8	68.6	17.6	c	27.3	13.1	24.4	54.6	24.9	7.7	27.0
Boirahmadi/Kuhkiluyeh	12.6	67348.6	11502.6	72.9	13.6	136	31.1	15.2	20.5	26.6	11.5	5 6	23.2
Bushehr	34.3	56921.5	20249.7	28.4	31.9	777	39.0	31.7	55.6	34.6	37.6	5.1	51.3
Zanjan	24.9	39288.5	16361.3	49.6	34.8	830	30.4	12.4	35.3	32.8	20.9	5.1	18.8
Semnan	38.7	37549.1	33944.7	35.6	31.5	474	57.2	29.3	90.4	58.2	54.4	3.7	76.3
Yazd	61.2	31982.6	44749.3	28.5	49.8	321	52.5	33.4	191.9	67.9	66.8	3.7	40.6
Hurmuzgan	26.7	66001.2	18194.1	34.3	28.5	365	32.8	25.1	39.1	38.1	24.4	4.9	54.8
IRAN	47.1	45462.0	24036.3	35.1	33.1	740	47.5	39.8	160.1	51.9	51.7	6.7	49.6

Note For the list of variables see page 157 Exchange rates between rial and US dollar: 1976: 70 r. per $; 1979/80:90 r. per $.

a: Figures are for 1980 not 1976 Figure for Markazi is weighted average of Tehran (78%) and Markazi (22%) provinces. The weights are percent of family surveyed in the two provinces as indicated in the 1984 Statistical Yearbook.

b: Figures are for 1979 not 1976

c: Ilam is included in Khuzestan

Source: Amirahmadi H. and Atash F. "Dynamics of Provincial Development and Disparity in Iran" 1987; p.155.

Table A.2. Estimates of Sources and Uses of Funds for the First Seven-year Plan, 1949-55 (Billion Rials)

	Amount	Percent
Sources		
Oil revenues	7.80	37.1
Liquidation of government assets	1.00	4.8
Participation by private organizations	1.00	4.8
Bank Melli loan	4.50	21.4
IBRD loan	6.70	31.9
Total	21.00	100.0
Uses:		
Agriculture	5.25	25.0
Roads, railroads, ports, and airports	5.00	23.8
Industry and mines	3.00	14.3
Oil industry	1.00	4.8
Communications	0.75	3.6
Social projects	6.00	28.5
Total	21.00	100.0

Source: Plan Organization, Report on the Second Seven-year Development Plan (Tahran, 1343 (1964), in Persian.

Table A.3. Sources and Uses of Funds by the Plan Organization during the Second Plan, 1956-62 (Million Rials)

Sources		Uses	
Cash brought forward from the First Plan	624	Development payments	75.233
Revenues	63.996	Agriculture and Irrigation	23.463
Oil income	60.990	Transportation and communication	29.940
Interest received on loans and deposits	191	Industry and mines	8.824
Exchange rate differential	618	Community development	13.006
Grants-in-aid	611	Other payments	16.587
Miscellaneous revenues	1.586	Administrative and personnel payments	2.939
Loans and credits	29.847	Repayment of loans	7.623
Loans	25.607	Interest and commission	3.673
Short-term credits-Bank Markazi Iran	3.670	Payment of taxes to Ministry of Finance	566
Short-term credits-Bank of Industrial Credits	550	Payment of debts from First Plan	1.654
Other receipts	20	Miscellaneous payments	132
		Balance carried forward to the Third Plan	2.665
Total receipts	94.485	Total payments	94.485

Source: Plan Organization, Report on the Second Seven-year Development Plan, Appendix 18.

Table A.4. Sources and Uses of Development Funds during the Third Plan, 1963-67 (Billion Rails)

	Amount	Percent
Sources:		
Oil revenues	144.9	62.5
Oil (Bonus)	8.4	3.6
Treasury securities	13.8	5.9
Domestic borrowing	30.0	12.9
Foreign borrowing	20.8	9.0
Other	14.1	6.1
Total	232.0 (53.093 million)	100.0
Uses:		
Development expenditures	204.6	88.2
Repayment of domestic loans	1.3	0.6
Repayment of foreign loans	8.7	3.7
Interest on Treasury securities and domestic loans	3.8	1.6
Interest on foreign loans	5.5	2.4
Administrative expenditures	3.3	1.4
Other	4.8	2.1
Total	232.0 (53.093 million)	100.0

Source: Plan Organization, Report on the Performance of the Third Development Plan (Tehran, 1347 (1968) in Perisian.

Table A.5. Sources and Uses of Funds of Plan Organization during the Fourth Plan Period (Billion Rials)

	Amount	Percent
Source:		
Oil income (80 percent of total)	385	63.1
Foreign borrowing	150	24.6
Income from gas and petrochemicals	21	3.4
Domestic borrowing	50	8.2
Other	4	0.7
Total	610	100.0
Uses:		
New development Projects	480	78.7
Third Plan Projects	45	7.4
Gas transmission	5	0.8
Foreign debt repayment	47	7.7
Domestic debt repayment	28	4.6
Administrative and other	5	0.8
Total	610	100.0

Source: Plan Organization, Fourth National Development Plan 1968-1972 (Tehran, 1968), p.62.

Table A.6. Sectoral Contribution to the Gross Domestic Product at Constant price (Per Cent)

Sector	End of third plan (1967)	End of Fourth Plan (1972)	End of Fifth Plan (1977)
Agriculture	24.5	18.1	8.0
Oil	13.8	19.5	48.7
Industry Famining	21.3	22.3	16.1
Services	40.4	40.1	27.2
GDP at factor cost	100.00	100.00	100.0

Source: Fifth Development Plan of Iran Plan Budget Organization (1975)