Industrial development in Qatar in a changing world.

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INDUSTRIAL DEVELOPMENT IN QATAR IN A CHANGING WORLD

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Abstract

The State of Qatar was established less than two average Qatari lifetimes ago and within less than a single lifetime it has changed from a poor, very small tribal society to a structured State with one of the world's highest per capita incomes, essentially as the result of crude oil production and export. In less than twenty years Qatar has adopted and implemented a policy of industrialization as a key element in a programme of planned socio-economic development. The introduction surveys the many internal and external changes which have affected the development of this mini-state economy. The basic factual background and brief resource inventory given in Chapter 1 is followed by a short analysis of Qatar's economy and the concept of industrialization as a necessary development process in Chapter 2. The factors involved in this process, physical and other infrastructural requirements and human resources are surveyed in Chapter 3 leading in Chapter 4 to a review of the goals and policies selected for planned industrial development, and in Chapter 5 of the various agencies established to implement these policies. The stages of industrialization upto the present and the start of a new phase based on Qatar's immense natural gas resources are dealt with in Chapter 6 leading to an assessment of the role of technology transfer in this process in Chapter 7, and of Qatar's emergence as a "newly industrialized country" in Chapter 8. Chapter 9 discusses the future prospects for industrial developemnt in Qatar in the light of present commitments and the need for a new planning approach. The first phase of industrialization has itself changed Qatar and happened during a period of great external uncertainty and change. The next phase will be more complex, more costly in terms of human and material resources and at least equally if not more sensitive to external changes and uncertainties, but the process of further industrialization is likely to proceed and succeed.

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DEDICATED TO

MY DEAR MOTHER

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LIST OF ABBREVIATIONS

AGS	Arab Gulf States
ASRY	Arab Shipbuilding and Repair Yard Company
BPSD	Barrel Per Day
BSC	British Steel Corporation
CAEU	Council for Arab Economic Unity
CD	Center Depth
CIA	Central Intelligency Agency
COIC	Gulf Organization for Industrial Consulting
CSO	Central Statistical Organization
DAP	Diammonium Phosphate
DID	Department of Industrial Development
DILC	Department of Industrial Licencing & Control
EC	European Community
ECWA	Economic Commission for Western Asia (UN)
ESCWA	Economic & Social Commission for Western Asia (UN)
FAO	Food and Agricultural Organization (UN)
GCC	Gulf Cooperation Council
GJ/Ton	Giga Joules/Ton
ha.	Hectare
HEP	High Energy Price
IBI 1985	International Business Information Incorporated
IDTC	Industrial Development Technical Centre
ILC	Industrial Licensing Control
IMF	International Monetary Fund
KTOE	Kilo Tonnes Oil Equivalent
KTPA	Kilo Tonnes Per Annum

MMBTU	Million British Termal Units
MMSCFD	Million Standard Cubic Feet Per Day
MTBE	Methyl Tertiary Butyl Ether
NODCO	National Oil Distribution Company
NPK	Nitrogen Phosphorous Potassium
OAPEC	Organization for Arab Petroleum Export Countries
OECD	Organization for Economic Cooperation and Development (7 Countries viz: USA, UK, Canada, France, Germany, Italy and Japan)
OPEC	Organization for Petroleum Export Countries
QACENCO	Qatar Clean Energy Company
QAFAC	Qatar Fuel Additives Company
QAFCO	Qatar Fertilizer Company
QAPCO	Qatar Petrochemical Company
QASCO	Qatar Steel Company
QGPC	Qatar General Petroleum Corporation
QIB	Qatar Investment Board
QIMCO	Qatar Industrial Manufacturing Company
QMA	Qatar Monetary Agency
QMCC	Qatar Metal Coating Company
QNB	Qatar National Bank
QNCC	Qatar National Cement Company
R & D	Research & Development
S & T	Science & Technology
S.P.A	Enichem (Italian Company)
SCFD	Standard Cubic Feet/Day
SITC	Standard Industrial Tariff Classification
UNIDO	United Nations Industrial Development Organization
WAES	Work on Alternate Energy Sources

MEASURES OF TIME, CURRENCY, COMMODITIES ETC.

I. Time

The Islamic Year is based on the Hijrah, the migration of the Prophet Mohammed from Mecca to Medina which took place on 16 July 622 of the Christian era. The Islamic Year is measured after the Hijrah - AH and is composed of lunar months. The Gregorian Christian calendar has been adopted for most statistical purposes, since the 1970s. 1396 AH almost exactly corresponded to 1976 AD and 1414 AH corresponds to 21/6/1993 - 10/6/1994.

II. Currency

Upto 1959 Qatar used the variable value Indian "paper" Rupee which, with various silver coinages, was in general Gulf use. A new Gulf Rupee issued by India was commonly exchanged until in 1966 a Qatar/Dubai Riyal (QDR) was introduced. The backing of a Qatar-Dubai Currency Authority under British sterling control allowed the QDR to be used extensively in the Gulf for monetary exchanges. Not until 1973, political independence and the setting up of its own Qatar Monetary Agency did Qatar have its own Qatari Riyal the value of which is pegged to International Monetary Fund's special drawing right (SDR). QR 4.7619 = 1 SDR.

III. Commodities

For all matters relevant to this study the weights and measures used in Qatar are either metric or other units used internationally viz:

Metric ton (ne)	=	1000 Kilograms
Long ton (UK)	=	1016 Kilograms
Short ton (US)	=	907 Kilograms.

Oil : The relationship between weight and volume in crude oil is determined by specific gravity (s.g.) which can vary between 0.80 and 0.92, according to UN standards. The Saudi Arabian crude oil average s.g. of 0.86 is frequently used in the Gulf. Production figures are usually quoted in US barrels of 42 US gallons, equivalent to 159 litres, or tonnes. One tonne is on average equivalent to 7.33 barrels.

Natural Gas : Production and reserves are usually measured in Cubic Feet or Cubic Metres but these units vary in energy equivalent with national standards.

Liquefied Gas : The usual ratios of weight to volume are as follows:

LNG (Liquid Methane)	-	1 Tonne	=	15 US barrels
LPG (Liquid Propane)	-	1 Tonne	=	12.5 US barrels.

A conversion rate of : 1 cu. m. to 35.3 cu. ft.
1 cu. ft. to 0.3 cu. m.
is generally acceptable. So, 1 mn (1,000,000) cu.m. = 35,374,667 cu. ft.
1 mn (1,000,000) cu.ft. = 28,317 cu. m

IV Numerical Systems

As noted above, while the metric system is used whenever possible, other measures such as cubic feet, barrels, tons etc. are used in some industries as carried over from other national practice and abbreviations may not always appear consistant. In this study the following are used as standard:

b as in b/d	=	US barrel (of oil) a day.		
t as in t/y	=	metric tonnes a year.		
m = metre as in cu. m. =		cubic metre		
k = abbreviation for 000				
mn = million	=	10^6		
bn = billion	=	000 million	=	10^9
T/tr = trillion	=	million million =		10^{12}
toe = tonnes (of) oil equivalent.				
GJ = Giga Joules	=	as in GJ/t	=	Giga Joules per metric ton
		(see p. 221)		

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INDUSTRIAL DEVELOPMENT IN QATAR IN A CHANGING WORLD

INTRODUCTION

I.1 General

Industrial development in the modern sense in Qatar is barely forty years old but even in such a short period many national and international changes, political, economic and social have occurred, which have influenced the way in which the development process has proceeded. In this study, most direct attention is paid to the facts of industrial development and to their analysis, and to the processes involved, but behind this lies a recognition of a balance of forces between a few constants and many variables, a balance which changes through time. In this introduction a necessarily brief and selective survey is made of the major internal and external changing forces and variables which form the context in which industrial development has to be seen.

The scale of the economic and social revolution which has occurred in Qatar as also elsewhere in the Gulf has first to be appreciated. Upto 1949 and the first export shipments of oil Qatar was a very small and very poor State dependent on extremely limited resources of land and fresh water (see Chapter 1) for poor pastoralism and small coastal oases of cultivation. Fishing, pearling and sea-trade supported a few coastal settlements which had the only economic activity which could be described as industrial - the construction of traditional types of wooden sailing craft. These small low-technology activities supported a population which in the 1940s is estimated at between 25,000 and 30,000, of which about 40% was non-Qatari and about a half of which lived in Doha and two or three other coastal settlements.

By 1990 the population of Qatar had increased to half a million and had a national income per head arguably the highest in the world. Qatar had also gone through a rapid growth of urbanisation and now almost 90% of its people live in Greater Doha (Riad 1981). In Chapter 2.2.3 a summary analysis of this great change shows that while most of it was the result of the boom in production, export and price-levels of crude oil, a significant sector of manufacturing industry had appeared. As examined in Chapters 6 and 7 a high and increasing proportion of this sector is of advanced technology in type. This industrial development is continuing in the 1990s and is planned to develop further.

This revolution has not taken and is not taking place in isolation and many changing factors and forces, historical and recent, have influenced the timing and nature of industrial development in Qatar.

I.2.1 Changing External Political Factors (Pre-Independence)

As noted in Chapter 1.4.2.1 the State of Qatar began to be formed in the second half of the nineteenth century. At this time however the Gulf was the scene of intense political rivalry between non-Arab powers, the Ottoman empire, the British empire, the Russian empire, Germany and France. Persia (Iran) although weakened by internal problems, Russian territorial aggression and British reaction (in 1907 Russia and Britain divided Iran into two spheres of influence), still claimed up to 1970 the territory of Bahrain on the Arab shore. The Ottomans, through the wilayet of Basrah, after 1870 extended their military control south into Kuwait, Al-Hassa (now in Saudi Arabia), Bahrain and Qatar. This nominal occupation which lasted until 1892 was opposed by the Al-Thani led Qatari sheikhs who at the same time tried to avoid domination by the British who were also opposing the Turks. German interest and support of Turkey in the west extended east to what became known as the Berlin - Baghdad railway and a link to the Gulf. Britain regarded this as a German reply to the Anglo-French control of the West-East shipping route of the Suez Canal.

Britain, which in most of the nineteenth century was the world's greatest trading and maritime power, regarded the Gulf as an area of particular importance especially in relation to the Indian Empire (Al-Abdulla, 1981). For Qatar the assertion of independence from Turkey led in 1913 to an Anglo-Ottoman agreement recognising an independent Emirate ruled by sheikhs of the Al-Thani family. World War I led to more British efforts to secure their interests in the Gulf through formal "protectorate" type agreements with the Arab Gulf States. In 1916 Qatar signed such an agreement which acknowledged legally its existence as a sovereign State but which gave Britain control of external affairs. The associated restrictions on Qatar's political and economic independence lasted, with later modifications, until 1971.

This last external political change which enabled Qatar to plan its own future was not simple and straight forward. Britain announced unilaterally in 1968 its withdrawal from the Gulf in 1971 and this led to an attempt to form a political federation of the smaller Gulf States, i.e. Qatar, Bahrain and the seven Trucial Emirates, increased security being a major reason. However as negotiations proceeded over the degree to which individual independence would have to be surrendered, the United Nations in 1970 turned down the Iranian claim to Bahrain and:

"it was highly predictable that Bahrain would opt for complete independence in view of the lifting of its basic fears regarding security and the general failure of the movement towards federation" (Zahlan 1979).

Qatar moved first and in September 1971 proclaimed itself to be an independent, sovereign State but as noted in I.2.3.3 below, the habit of consultation with other Arab Gulf States was already well established.

I.2.2 Changing Political Factors - Internal

Up to 1960 the internal political and administrative scene was dominated by the relationship between the Rulers and mainly British advisory officials. As the effects of oil wealth began to be felt a small number of government departments under the Emir's advisors were created but the Diwan al-Amir was all important. In 1961 the newly appointed Heir Apparent and Deputy Ruler, then Sheikh Khalifa Bin Hamad Al-Thani, became effectively the head of government and created not only a new administrative system but a new positive approach to development. For ten years before political independence, and supported by buoyant oil revenues, investment grew in physical and social infrastructure and in industry and other economic activities.

During the late 1960s Qatar also employed an advisor to draft a provisional constitution which, theoretically suitable for membership of a Gulf federation, was announced at the same time as the declaration of independence. This provisional constitution with minor amendments has served Qatar ever since and its main features relevant to this study are as follows:

The Government's chief executive body, presided over by the Emir, is the Council of Ministers who are appointed by the Emir. The Council of Ministers is assisted by an Advisory Council, members of which are appointed by the Emir. The Emir, who represents both legislature and executive parts of the Government, is Head of State, a function inherited within the Al-Thani family. By 1971 the Government of Qatar had organised itself for policy making and implementation independently of Britain and the major oil companies. The present Emir who took office in 1972 has been able to utilise this constitutional system to develop a transformation in the economic and social life of the country.

I.2.3 Changing External Political Factors - Independence

I.2.3.1 The 1960s

The achievement of political independence by Qatar took place during a period of turbulence in the Middle East: "The political and strategic environment of the entire Gulf region was also undergoing political changes at this time." (Zahlan, 1979).

The overthrow of the Iraqi monarchy in 1958 was followed in 1961 by an Iraqi claim to sovereignty over Kuwait and British military intervention. The 1960s also saw Egyptian and Saudi Arabian confrontation in the North Yemen civil war, the forced withdrawal of Britain from Aden and South Yemen and the beginning of the Dhofar rebellion in Oman.

All these events and others, including the 1967 Arab-Israeli war, also involved the cold war blocs. Russia became identified with the support of Egypt, Iraq and Syria, the U.S.A. with maintaining the regimes in Iran, and the Arabian peninsula.

I.2.3.2 1970 - 1990

The British announcement in 1968 of its withdrawal from the Gulf in 1971, against this background of instability, encouraged a movement towards mutual support and agreement between Arab Gulf States. In the newly independent emirates, without British intervention, new ways had to be found peacefully to agree on, for example, boundaries, transit rights, tariffs and migration. Without the British protectorate a security element had to be added because both Iran and Iraq were uneasy neighbours of the smaller States and Cold War involvement had to be guarded against - Russia and China were known to be active in the Yemens, for example.

Greater collaboration with other Arab States appeared to offer not only greater security but also greater political power. For example, the Arab-Israeli wars of 1967 and 1973 led to the political use of the "oil weapon", the denying of oil supplies by Arab producers to the U.S.A. and the cutback of oil production. This together with the takeover and nationalization of oil production and the success in the raising of oil prices (and see Chapter 6.19) gave all the Gulf States a feeling of being totally in command of their own affairs for the first time. This was soon followed by a return of political and strategic instability to the region.

In 1979 the Iranian revolution brought into power a regime which threatened the whole socio-political stability in the Gulf. This was immediately followed by the Russian invasions of Afghanistan and a year later the Iraq-Iran war broke out. For eight years this brought military conflict and foreign power intervention into the Gulf. The Iraq-Iran stalemate peace in 1988 was followed in less than two years by the Iraqi invasion of Kuwait and Saudi Arabia and a year of warfare in the Gulf again involving foreign military forces.

I.2.3.3 Qatar and Regional Political Cooperation

During the just over twenty years after Qatar and other Gulf States achieved independence, there has been almost continuous regional instability and insecurity, including ripples from distant Palestine. Qatar itself was never directly involved except in affairs of internal security mainly associated with the expatriate community. Nevertheless Qatar and its Arab neighbours were led in 1981 to formalise various pre-existing working agreements into the organization of the Arab Gulf Cooperation Council (generally known as the GCC). Partly concerned with collaboration over military security (El Azhary 1982 & Bulloch 1984) as well as with economic cooperation, by 1984 the GCC was discussing military collaboration and had held the first joint military exercises. As Douglas Hurd pointed out:

"The smaller Gulf States have been looking hard at their own security arrangements. Their instinct has been to think that since they are not individually strong they must cooperate in joint" (Hurd 1980).

In other words, Qatar, like the other smaller Gulf States has experienced considerable changes in the world outside but in order to maximise its freedom for independent action it has always had to give up some of that same independence - most recently through regional cooperative inter-dependence. This degree of political interdependence within the GCC is inseparable from a large measure of economic interdependence. Industrial development in Qatar may be designed as part of national economic policy but has to take place in the context of GCC agreements which have political as well as economic implications (see for example Chapter 4.3).

I.3 Changing Economic Factors - External

I.3.1 Pre-1949

"When the preliminary oil concessions were being signed in the 1930s nobody at that time, either in London, Delhi or the Gulf area, imagined that oil existed in great quantities inthe Gulf area" (Al-Abdulla 1981).

Up to the 1930s the main external factor influencing the economy of Qatar was British policy and this was mainly concerned to control Qatar's external affairs in all aspects. Both the British Foreign Office and the India Office were specially concerned with the arms traffic, British subjects trading in Qatar (mainly Indian), and the granting of concessions or territory as specified in the 1916 Anglo-Qatari Treaty.

During the 1930s these Articles were used by Britain to make sure that whatever oil concessions were made went to British and British controlled companies, as in the 1935 concession to Anglo-Persian. Up to 1971 therefore oil policy was determined by British dominated "oil-majors" rather than the Americans who controlled Saudi-Arabian oil. For example, during World War II development of the 1939 oil discoveries was halted until in 1949 external attention could be paid to Qatar.

I.3.2 The Oil Era, the Move to Economic Independence

OPEC statistics show that by 1970 86% of the oil production of the Arab Gulf Emirates was produced by the seven oil majors. In Qatar onshore production by QPC was owned by British Petroleum, Shell, CFP and other foreign shareholders whilst SCQ controlling almost all offshore production was owned by Shell.

The emphasis was almost entirely on crude production and export as determined by the oil companies but the internal political changes noted in I.2.2 also led to greater industrial and domestic consumption and processing of crude oil and associated natural gas. By 1970 a small oil refinery produced locally needed products, and gas was used for water distillation plants and a Government owned cement factory. Plans had also been announced for a hydro-carbon based fertilizer plant, and studies made for steel making. Qatar had already stated its intention to diversify into manufacturing industry before political independence and before the complete takeover by the Government of all oil concessions was finalised in 1976 (and see Chapters 4, 5 and 6).

I.3.3 Changing and Constant External Economic Factors

I.3.3.1 Qatar as a "Mini-State" Economy

The World Bank has recognized for a long time that many countries can be classified as having mini-state economies associated above all with small population size. (see Finance and Development, Vol 21, No.2, 1984). Even earlier the International Economic Association in 1960 devoted a major conference to the question of the size of nations

(Robinson 1960). Not only does Qatar have in world terms a small population of half a million but its total Gross Domestic Product is also small - in contrast to GDP per capita which is arguably the world's highest. Even with oil production daily rate at its peak in 1980/81 Qatar only accounted for 0.8% of the world total, insignificant when compared with Saudi Arabia's 16.6%. Qatar's exports of crude oil in the same year made up 1.7% of world crude exports.

It has to be accepted, therefore, that even since 1971 and purely in terms of international economic power, Qatar's ability to influence external economic events rather than be influenced by them has been extremely limited. What matters for Qatar's economic policy, and in this context, industrial development is concerned is how Qatar reacts to changing external forces. The constant factor is that Qatar has the structural characteristics of a mini-state economy. The variable factors are more complex.

I.3.3.2 Mini-State Economies' Characteristics Relevant to Qatar

"their basic structural characteristics: substantial openness to trade and financial capital, dependence on a few exports, price-taking behaviour with its attendant vulnerability to large real economic shocks" (Galbis 1984).

(a) Trade

While this is true of all mini-state economies, the position in these respects of Qatar and the other Gulf Emirates has been made more extreme by the way their economies and societies have developed.

Throughout pre-history and history, for 7000 years the life of Qatar has been dominated by trade and the sea. "It is clear that throughout the fifth and probably into the fourth millennium BC these sites in Qatar were visited by merchant-fishermen from Sumer" (Oates 1973).

Throughout later periods, as Hourani (1963) and Serjeant (1973) and all Qatari records note, Qatar was involved in the sea-trade which flourished within the Gulf and along the Gulf between the Indian Ocean, Mesopotamia and the Mediterranean. This "openness to trade" was not only a matter of sea-faring but of organizing and investing in maritime trading ventures. The merchant entrepreneurs who provided the capital, identified suppliers and developed the markets for the traded goods and the pearls fished were the key element in traditional economic life. This has persisted into the modern period and the strength of this merchant and trading element is an important factor in influencing the way in which private sector industry in particular has developed (see Chapters 3.3 and 6).

(b) Capital & Finance

The traditional trading era was also one of openness to financial capital movements. However limited in volume, capital in the form of bullion, currency or credit moved freely between merchants throughout the trading region. The position was changed in two fundamental respects by the arrival of oil wealth. First, oil revenues flowed into a central treasury controlled by the Ruler and Government and were then disbursed as the Government chose as capital or current expenditure or as savings. Secondly, the value of the State's capital assets in the form of oil reserves and more recently natural gas has been so great that Qatar, like the other Gulf Emirates, has very high international credit standing. Borrowing capital and attracting inward investment is relatively easy.

The financial and trading sectors have benefited greatly. The growth of banking and financial institutions noted in Chapter 3.2 has been helped by the continuance of the traditional policy of not restricting the flow of capital and currencies. This has also gone along with high volumes of capital transfers to and from overseas (see Tables 22 and 23). The free availability of international as well as domestic capital has been an important factor in public and private sector industrial development. For example one reason for inviting foreign participation in major projects such as fertilizer and petro-chemical plants has been the use of foreign capital (see Chapter 6.18 and 6.20).

The scale and type of private sector investment in industry has been affected by changes in the relative attractiveness of the different uses of available capital. As considered in Chapter 3.3, the overall size of the domestic market for manufactures may be small - one constant of a mini-economy - but the range of market opportunities, domestic and foreign, for different classes of manufactures is very varied. These opportunities have also been and are changing (see Chapter 3.3.2).

The inter-relationship between trading and profitable manufacturing opportunities is also complex and changing. The general constant is as described by Kuznets (1960):

"Foreign trade is of greater weight in the economic activity of small nations than in that of larger units. This is particularly true of nations that have developed and attained fairly high levels of per capita output and consumption. For at these levels the variety of goods demanded by ultimate consumers is far wider than that of domestic output of final goods."

The position in Qatar is that from 1950 to 1981, with hardly a break, per capita output and consumption grew suddenly and spectacularly. Government capital expenditure of all kinds directly created a demand for goods and services which could not be satisfied by local production. It also created a demand for labour which could only be met by immigrant expatriates. High levels of Government current expenditure in particular through wages, salaries and social welfare raised personal levels of consumption very rapidly from very low to very high levels. Local production could not satisfy the demand for more consumer goods of higher quality and variety. The value of imports by Qatar increased very considerably - from 134.7 million QR in 1960 to a peak of 7,087.5 million QR in 1982 (and see Chapter 2.2.6). The trading sector responded very rapidly to booming markets and the profitability of handling imports was far greater to private enterprise than the complex business of investing in local manufacturing. Private investment in industry has occurred but more slowly and on a smaller scale and has needed encouragement (see Chapter 6).

(c) Export Dependence

In these respects Qatar may be regarded as an extreme form of mini-state economy - open to trade on the basis of a very high level of export derived revenue and public and private expenditure. However, this position was reached as the result of changes in world demand for certain types of energy. Since 1982 the vulnerability of a rich but export dependent mini-state to other changes has also been demonstrated.

The dependence on export derived revenue to supply most Government revenue and pay for most domestic investment and consumption is exaggerated by the limited range of exports. Even in 1990 Crude Petroleum Oils made up 79% by value of exports. In this respect political independence did not bring rapid change.

Mainly because of Britain's established dominance in the Gulf, the first oil concession in Qatar signed in 1935 was with the Anglo-Persian Oil Company, in line with agreements made in Britain and the Trucial States. From then up to 1973 the volume of oil production, the direction of exports, and the revenues paid to the Government, were all under the control of the oil companies concerned. First in 1973 through participation agreements and then in 1976 with a complete takeover of QPC (onshore) and Shell Qatar (offshore), Qatar took control of its oil and gas industry. The industrial consequences of this move to economic independence following soon after the move to political independence are considered in Chapters 5 and 6.

From the financial point of view, however, Qatar now exchanged its dependence on the major oil companies for the level of its oil revenue for dependence on the new market forces which followed OPEC's campaign to raise oil prices. This is not the place to examine the effects of OPEC strategy but the economic consequences for Qatar State are clear. First, oil and total Government revenues, and total Government expenditure almost trebled between 1978 and 1982. Between 1982/83 and 1985/86 Qatar's total Government revenue fell by 74% (see Chapter 2.2.9) and its imports by 42% (see Table 16). DATASTREAM estimates quoted in the Financial Times 26/12/1993 are that the international purchasing power of "the average OPEC barrel of crude oil" further fell by 54% between 1985 and mid 1993, to a level about the same as 1972.

As far as reliance on crude oil exports is concerned, it is clear that Qatar as a relatively small producer is a "price-taker" and not a "price-maker". This was true in the days of dominance of the major oil companies and remains true in the days of OPEC and OAPEC negotiations over oil prices and production quotas. However, the discovery of the very large offshore reserves of unassociated natural gas has changed the scale of Qatar's economic importance and has introduced a new element into Qatar's formulation of economic policy (see Chapter 1.6.2).

In this background survey some constant forces and factors have been identified alongwith a series of internal and external changes in forces and factors influencing Qatar's economic life. As analysed in this study, the process of industrial development which has deliberately been adopted by Qatar since even before independence, is itself a process of social as well as economic change. One reason for adopting such a policy is to change the scale and/or the character of Qatar's economic dependence on the outside world.

II.1 Technical Considerations

II.1.1 Statistical Data - Time Series

Time-series available for most economic and social types of statistics are short and variable. According to Cummins (1955 & 1956) a number of official government departments were established from 1950 onwards and a few records, for example of customs dues and of Government assets are available for the period before 1960. Upto 1960/61 a British adviser headed the government departments and financial accounts were a matter for the adviser and the Ruler.

In 1961 the then Deputy Ruler Sheikh Khalifa bin Hamad Al-Thani began the establishment of a modern bureaucratic administration, and the new Government Ministries and agencies commenced in the 1960s to issue reports and statistical information. This information flow increased in the 1970s after independence. For example, from 1974 onward the newly established Qatar Monetary Agency began to act as a national monetary institution and to regulate banking activities. As such it issues regular reports on currencies, banking activities and the Balance of Payments. Since 1980, the Central Statistical Organization (CSO) has been responsible for the collection, often for the processing, and publication of national statistics. In this study CSO data which usually has the merit of statistical standardization is generally used to maximise comparability.

II.1.2 Statistical Uniformity and Availability

One problem facing the researcher in Qatar is that periodic reorganization has naturally taken place during the relatively short period of evolving government structures, within ministries and other agencies and in their areas of responsibility. In Chapter 5.0 and 5.1 the most recent changes of direct relevance to industrial development are summarized. There is also the problem associated with the emergence of three officially recognized economic sectors, the government sector, the private sector and the mixed sector, as noted in Chapter 6. Industrial activity in each of these sectors is covered by different requirements for data recording and availability. For example, in the private sector many of the financial and associated regulations summarised in Chapter 6.09 and noted elsewhere rely on the data supplied voluntarily by enterprises. The accuracy of this data, given on the one hand the effective absence of a general taxation system and on the other hand the freedom of movement of capital and currency, cannot be checked completely.

In government sector and mixed sector industries there are other problems of data availability. One example is in the area of inter-enterprise transfer prices. For instance, what are the true transfer prices of oil, oil products and gas between the many enterprises in which Qatar General Petroleum Corporation is involved ? (see Chapter 5.1.2).

There are also areas of sensitivity in sectors of government involvement for which data is not always available in detail. For example, the Ministry of Finance and Petroleum ceased publishing its figures of government oil revenue and of oil production after AH 1402 -1403 - 1981/82. This coincided with a particularly troubled time in the Gulf War between Iraq and Iran, and the beginning of disagreements between OPEC members over levels of national oil production. Similarly, published data is only available for limited periods and in limited classification types for population, labour and migration.

Government budgets are similarly restricted in detail. Most of the limitations in official information can be regarded as the equivalent of confidential "company" information and has to be understood in terms of Qatar's vulnerability to external forces and changes, as outlined in Section I.3.3 above.

Whenever possible the database for this study is not only derived from official documents but also reinforced by personal investigation, sampling and cross-checking analysis. The statistical evidence, whilst often not suitable for very detailed statistical manipulation, e.g. actual as distinct from nominal private sector investment in manufacturing, does allow an analysis of the significant processes of industrial development.

Other source-material is to be found in reports of regional and international agencies, for example ECWA, GCC organizations and the World Bank. The point has to be made however is that all the data ultimately has its origins within Qatar officially based organizations and is qualitatively the same as that published directly by and reported directly to the Government of Qatar.

Statistical data is sometimes presented here for overlapping short periods rather than for longer continuous periods. In some cases this is because there have been changes in statistical procedures, changes in base rates for constant price sequences, or corrections of data presented in one series by later series - for example in Tables 23 and 24 estimates for 1987 figures are later presented as firm measurements.

Two main problems, however are particularly hampering to the researcher. At the micro-level, because Qatar is a small country with a very small number of economic decision makers in the industrial field some types of information are not made public because they can too readily be associated with identifiable individuals or companies. The data presented in Chapter 6.4.3 regarding the licensing of particular groups of industries, for example, in some cases deal with only one enterprise in a particular ISIC code. The second is that especially since the Iran-Iraq war, instability in Iran and Iraq's invasions of Kuwait, some socio-economic data has became extremely sensitive and confidential, for example, national status, details of many of QGPC's activities etc. Whenever possible officially published data is utilized here but on occasions information obtained personally and non-attributable is also used.

CHAPTER 1

BASIC INFORMATION ABOUT THE STATE OF QATAR

1.0 Geographical Data
1.1 Topography and Geology
1.2 The Climate
1.3 People and Culture
1.3.1 The Inhabitants
1.3.2 The Capital - Doha
1.3.3 Umm Said
1.3.4 Al-Khor
1.3.5 Dokhan
1.4 Historical Background
1.4.1 Early History
1.4.2 The Al-Thani
1.4.2.1 The Al-Thani Rulers of Qatar
1.4.2.2 The Present Emir
1.4.3 Independence and Thereafter
1.5 Population and Labour Force
1.6 Natural Resources
1.6.1 Petroleum
1.6.1.1 Onshore Oil
1.6.1.2 Offshore Oil
1.6.2 Natural Gas
1.6.2.1 Associated Gas
1.6.2.2 Non-Associated Gas - The North Gas Field

CHAPTER 1

BASIC INFORMATION ABOUT THE STATE OF QATAR

1.0 Geographical Data

The State of Qatar is a peninsula situated in the middle of the western coast of the Arabian Gulf with its south-north length of about 160 kilometers, and at its east-west widest about 80 kilometers (see Fig. 1). The area of the State is about 11,437 square kilometers, including a number of islands situated close offshore, the most important of which is Haloul, which is a storage oil center. Qatar is bordered on the south by the United Arab Emirates and Saudi Arabia; the State of Bahrain lies to the west. Some of the frontier details are the subject of claims by some of the neighboring States but these are not relevant to the present study. The area of Arabian Gulf within Qatar's territorial limits is approximately 25,000 square kilometers off Qatar's north eastern extremity; Basra in Iraq is 650 kilometers away at the northern end of the Gulf, and the Straits of Hormuz at the entrance to the Gulf are located some 500 kilometers to the south-east.

1.1 Topography and Geology

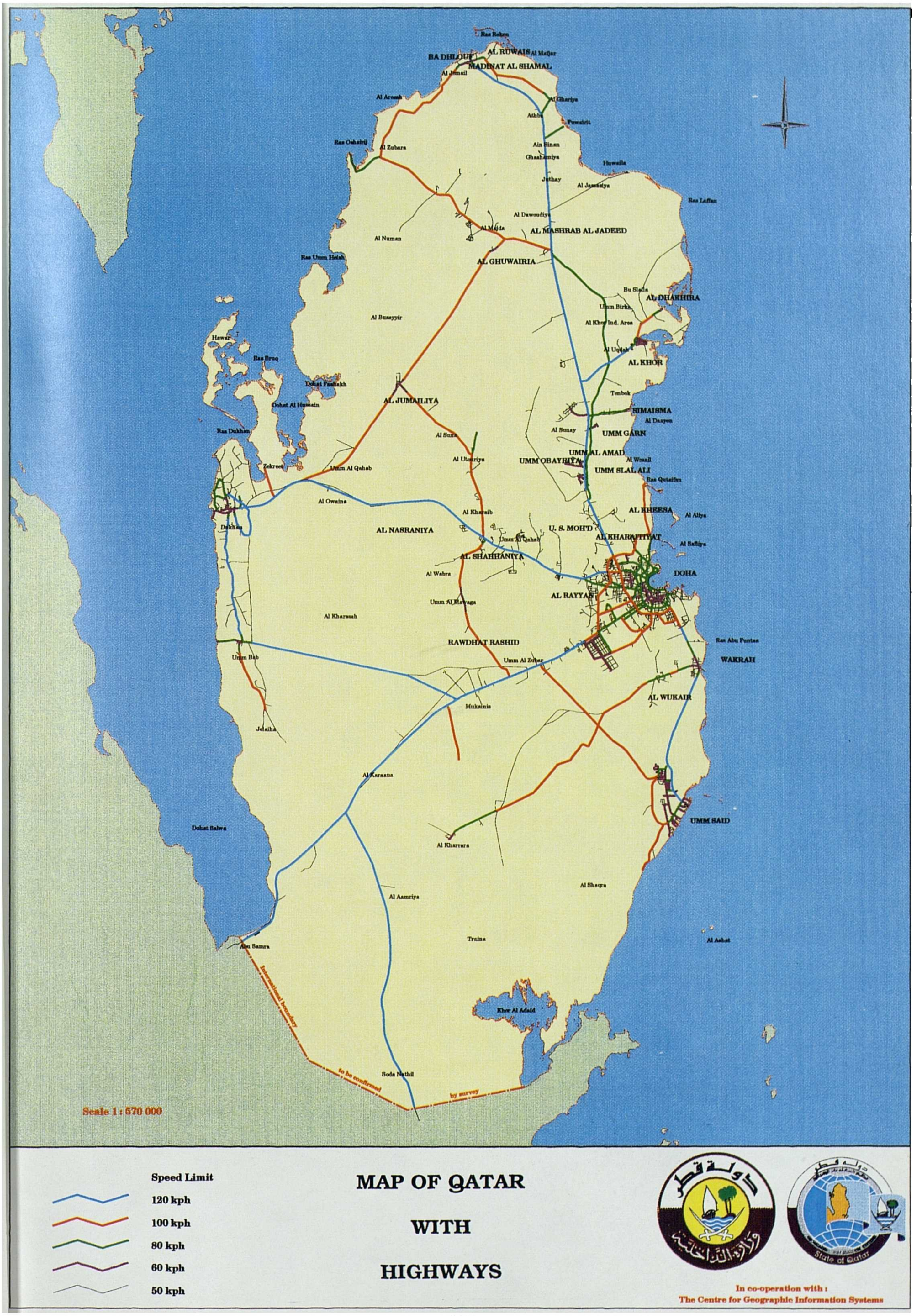
The land is predominantly desert and the terrain almost flat except for the Dukhan anticline in the west, the rocky outcrops in the east and the series of sand dunes in the south. There is a gentle rise from east to west with topographical features such as a central limestone plateau, valleys and basins with a few scattered sand dunes and limestone hills. The anticline of Dukhan rises from the west coast as a chain of separate hillocks upto 100 meters in height, about 56 kilometers wide, and covers the Dukhan oil field.

Almost all the classic desert land-forms are found within Qatar which include 'mesa' type flat-topped eroded hills, sand dunes of several different types, gravel outwash deposits, flint desert surfaces, limestone pavement surfaces, stony desert, collapsed depressions, and karst phenomena. Raised beaches, sabkha and some interesting examples of sand pits, coral reefs and mangrove are also found along the coast. Soils suitable for cultivation are extremely limited in extent.

1.2 The Climate

The climate of Qatar is sub-tropical hot desert. The summers are hot, long and humid, but the winters are comfortable and sometimes cold. Light rainfall occurs during these

FIG 1



AL RUWAIS
MADINAT AL SHAMAL
AL MASHRAB AL JADEED
AL GHUWAIRIA
AL DHAKHIRA
AL KHOR
SIMAISMA
UMM GARN
UMM AL AMAD
UMM OBAYRIYA
UMM SLAL ALI
AL KHEESA
U. S. MOH'D
AL KHARAITIYAT
AL JUMAILIYA
AL NASRANIYA
AL SHAHHANIYA
DOHA
AL RAYYAN
RAWDHAT RASHID
WAKRAH
AL WUKAIR
UMM SAID
Scale 1 : 570 000
Speed Limit
120 kph
100 kph
80 kph
60 kph
50 kph
MAP OF QATAR
WITH
HIGHWAYS
State of Qatar
In co-operation with :
The Centre for Geographic Information Systems

months. From June to October day time temperature rise to a maximum of 30°C to 47°C and are accompanied by relatively high humidity which may rise for part of the day upto 100 per cent. The annual average rainfall is 50 - 70 millimeters. Sudden rainstorms of short duration, however, are not unusual.

1.3 People and Culture

1.3.1 The Inhabitants

Table-1 shows that according to the last census carried out by the Central Statistical Organization in 1986, the population of Qatar was then 369,079. Table-3 shows the population by municipality and age groups as of 1986. The age group 0-19 numbering 116,537 constituted 32% of the population, whilst the population above age 59 constituted about 3%. Thus, people between the ages of 20 and 60 constitute 65% of the population.

TABLE - 1
POPULATION(1) BY SEX AND MUNICIPALITY
MARCH 1986 CENSUS

Municipality	Male	Female	Total
Doha	147342	69952	217294
Al Rayyan	61140	30856	91996
Al Wakrah	15042	8637	23682
Umm Salal	6833	4328	11161
Al Khor	6267	2726	8993
Al Shamal	2719	1661	4380
Al Ghwayriyah	1285	344	1629
Al Jumayliyah	5195	2022	7217
Jarian Al Batna	2026	701	2727
TOTAL	**247852**	**121227**	**369079**

C.S.O. Doha, 1988

(1) Not including 2784 Qataris residing abroad, (see Fig. 2)

Table-2 shows the population estimates by municipality between 1987 to 1991.

TABLE - 2
TOTAL(1) POPULATION ESTIMATES BY MUNICIPALITY
1987-1991

Year / Municipality(2)	1987	1988	1989	1990	1991
Doha	236131	251832	268753	284793	296821
Al Rayyan	99939	106584	113782	120573	125665
Al Wakrah	25747	27459	29292	31041	32352
Umm Salal	12111	12917	13804	14628	15246
Al Khor	9785	10436	11124	11788	12286
Al Shamal	4772	5090	5418	5742	5984
Al Ghwayriyah	1765	1882	2013	2133	2223
Al Jumayliyah	7820	8340	8924	9457	9856
Jarian Al Batna	2968	3164	3369	3570	3721
TOTAL	401038	427704	456489	483724	504154

Source : *C.S.O., Doha, 1992*
(1) *Midyear Estimates*
(2) *Assuming the same relative weight of 1986 census*

In 1986, 217,294 inhabitants lived in the capital city of Doha constituting 58% of population. The reason for the concentration of population in Doha and its suburbs is fundamentally the highly centralized nature of government and society in Doha - Qatar.

1.3.2 The Capital - Doha

Doha is situated on the east coast of the peninsula of Qatar and today has a sea-frontage of more than 10 km. extending from the port area in the south along the modern "Corniche" backed by Government buildings. In terms of built-up area one can recognize a Greater Doha which includes the northern half of the municipality of Al Wakrah and the eastern half of Al Rayyan municipality. Within this area is concentrated about 80% of the total population of Qatar, about 430,000. Table-5 provides some statistical illustration of the relative rates of growth of the chief urban centres.

Largely constructed and reconstructed in the 1970's and 1980's, modern Greater Doha, with the university campus on its northern fringe, has every residential, administrative, commercial, social and communication facility required in the urban heart of a small

TABLE 3

POPULATIION BY MUNICIPALITY AND AGE GROUP MARCH 1986

Municipality / Age Group (in Years)	Doha	Al Rayyan	Al Wakrah	Umm Salal	Al Khor	Al Shamal	Al Ghu-wayriyah	Al Juma-yiyah	J. Al Batna	Total
Less Than 1 Year	4464	2320	612	333	132	84	14	138	64	8161
1	4317	2269	573	316	127	50	21	125	45	7843
2	4447	2603	635	342	159	92	12	152	54	8496
3	4622	2443	635	357	138	83	24	191	55	8548
4	4382	2297	614	350	164	77	24	151	47	8106
5 - 9	19104	9435	2621	1450	683	415	94	637	205	34644
10 - 14	4778	6801	2078	1041	723	435	103	511	184	26654
15 - 19	12820	5924	1501	736	638	379	89	379	167	22633
20 - 24	18921	8682	1613	965	920	457	175	552	284	32569
25 - 29	31305	13945	2884	1399	1466	579	280	927	409	53194
30 - 34	33234	12772	3450	1314	1315	529	242	1013	383	54252
35 - 39	24852	8802	2686	1024	885	389	180	868	298	39984
40 - 44	15602	5541	1610	614	558	256	142	590	168	25081
45 - 49	10445	3423	977	373	374	185	97	432	157	16463
50 - 54	4688	2065	533	240	277	127	67	263	90	10150
55 - 59	3404	1025	281	114	159	69	32	114	38	5236
60 - 64	1950	698	156	83	113	67	12	81	42	3202
65 - 69	942	353	90	34	65	47	9	24	16	1590
70 - 74	549	266	62	40	47	19	4	37	8	1032
75 - 79	273	115	33	17	18	10	5	15	6	492
80 +	344	188	36	17	29	28	3	15	6	666
Not Stated	51	29	2	2	3	3	-	2	1	93
Total	**217294**	**91996**	**23682**	**11161**	**8993**	**4380**	**1629**	**7217**	**2727**	**269079**

الهرم السكاني موضحاً عليه الأشخاص النشطون اقتصادياً

مـــارس ١٩٨٦

POPULATION PYRAMID AND ACTIVE PERSONS

MARCH 1986

FIG 1

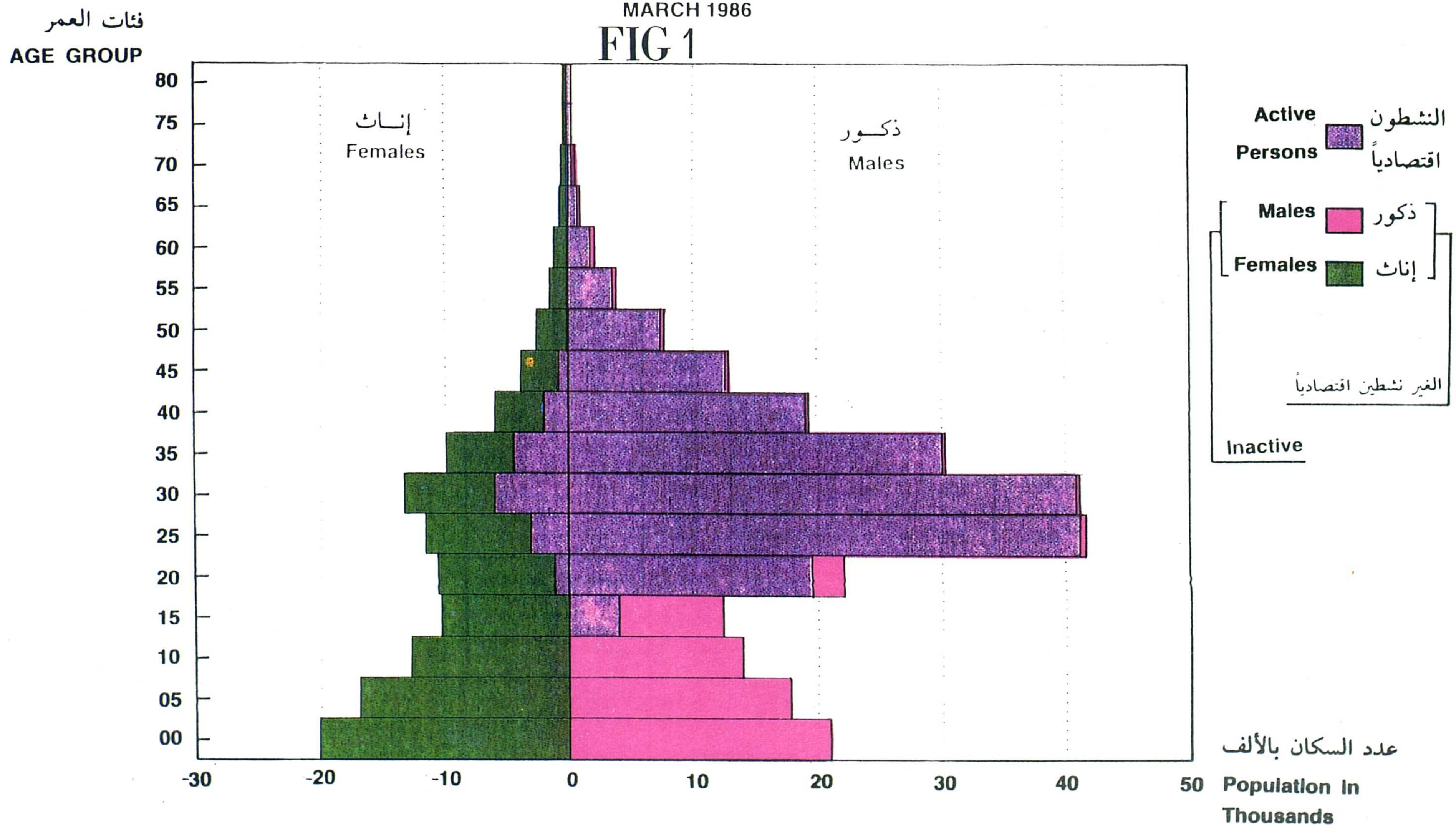


TABLE - 4
BUILDING PERMITS ISSUED(1) BY MUNICIPALITY (See Fig. 3)
1987-1991

Year / Municipality	1987	1988	1989	1990	1991
Doha	1095	990	1070	1042	1128
Rayyan	594	708(2)	905	691	932
Wakrah(3)	141	163	146	137	199
Al-Khor	118	77(4)	80	73	92
Umm Salal	121	-	-	-	-

Source : *C.S.O., Doha, 1992*

(1) *Not including fencing and repairs permits*

(2) *Not including January, February and March data*

(3) *Not including Umm Said town data*

(4) *Not including January and February data.*

country with arguably the highest GDP per capita in the world. It also includes, 5 km. north-west of the old sea port and trading centre, a purpose-built industrial area designed to segregate small and medium manufacturing industries.

1.3.3 **Umm Said**: Umm Said, planned in the 1970's as Qatar's industrial city, is situated on the coast about 45 kilometers from the capital to the south, originally Qatar's oil terminal. Most of the largest industrial units are now situated at Umm Said such as Qatar Steel Company, Qatar Fertilizer Company, Qatar Petrochemical Company, Oil Refinery, Natural Gas Liquids Plants and Qatar Flour Mills. The planned residential zone, however, has been stultified by the attractions of Greater Doha.

1.3.4 **Al-Khor**: Al-Khor is situated on the eastern coast, to the north of Doha, around an old harbour where small ships and fishing boats anchor and operate. This settlement has recently been substantially developed as a residential area by the Government.

1.3.5 **Dokhan**: Dokhan is the on-shore oil producing centre in Qatar, originally a "company town". Nearby Umm Bab's cement factory is the only industrial enterprise located on the shoal-bound west coast.

Fig 3

FIG 3

Al Ruwais
BA Dhlouf
Madinat Al Shamal
مدينة الشمال
MADINAT AL SHAMAL
Al Mashrab Al Jadeed
الغويريه
Al Ghuwairiyah
الخور
AL GHUWAIRIYA
AL KHOR
Al Dhakhira
Al Khor
Hawar
Al Jemailiyah
Simaisma
Umm Garn
Umm Obairiya
أم صلال
Umm Slal Ali &
Umm Al Amad
UMM SLAL
Al Nasraniya
Al Kheesa
الجميلية
AL JEMAILIYA
Kharaitiyat &
Umm Slal Mohammed
Al Shahhaniya
Jazirah - Safiliyah
Doha
الدوحة
DOHA
Al Rayyan
Rawdat Rashed
الريان
AL RAYYAN
Al Wakrah
Al Wukair
Umm Said
الوكره
AL WAKRAH
جريان الباطنه
JERIYAN AL BATNA
CENTRAL STATISTICAL
ORGANIZATION
Municipalities and Cities
of the
State of Qatar
LEGEND
MUNICIPAL LIMITS
CITY LIMITS
ROADS
Scale: 1 : 850 000
Notes: The municipal limits of Umm Said (not shown) are presently under review.
Some islands are not shown at this scale.
In co-operation with:
The Centre for Geographic Information Systems

23

1.4 Historical Background

1.4.1 Historical Investigations

Archeological excavations have proved that Qatar has been populated for some 5000 years and the monuments at Qatar National Museum provided proof of contact with early civilizations to the north and east. Always with poor land resources Qatar's history has been one of a contact zone between the tribes of central Arabia and Gulf sea-farers.

Qatar emerged during the Islamic ages as a maritime country, whose people participated in Islamic conquests. It was exposed to all the Gulf regional movements and events until the arrival of Portuguese trade ships and warships at the beginning of the sixteenth century widened contacts with the west. Thereafter Qatar was exposed to the rule by the Portuguese, the Dutch, the French and the English. In such confused and unsettled conditions it is difficult to establish detailed records of the history of the country until late in the eighteenth century. Given the nature of local societies much of the records are essentially those of leading families.

1.4.2 The Al-Thani

Article (21) of the Amended Provisional Constitution of the State of Qatar defines the Rule of Qatar as hereditary within the family of Al-Thani. The family of Al-Thani is a branch of the Arab tribe Tamim, whose descent is traced back to Mudar Bin Nizar. This tribe inhabited the eastern parts of the Arabian peninsula. The name Al-Thani is derived from that of the family's ancestor, Thani Bin Mohammed, father of Mohammed Bin Thani who was the first Sheikh to rule over the Qatar peninsula during the mid19th century. Al-Thani were among a tribal group which settled for a long time at Jabrin oasis in southern Nejd before their arrival in Qatar during the early 18th century. Initially they stayed in the north of the peninsula after which they moved to Doha in the mid 19th century under the leadership of Mohammed Bin Thani.

1.4.2.1 Al-Thani Rulers of Qatar

The succession of Al-Thani rulers provides a useful framework for a brief summary of the evolution of the state and society of Qatar, the nature of both being relevant to the contemporary world of economic development.

Between 1850 and 1878 Sheikh Mohammed bin Thani established at Doha a centre of social stability and safety in the midst of tribal turmoil which gave him pre-eminence among other tribal and clan leaders. His authority was such that he was able to negotiate with the Ottoman power, based in Iraq and penetrating deep into the Gulf, on behalf of all local tribes. This allowed a short peaceful period of Ottoman military presence and exemplified the careful diplomatic balancing of relations with other states and powers in the Gulf which become characteristic of Qatar.

Sheikh Qassim Bin Mohammed Al-Thani (1878-1913) succeeded his father as ruler of Qatar at a period notable for its changing situations at both regional and international levels. His firmness and strong personality were the most effective elements in the formulation and realization of social cohesion of Qatari society. Such cohesion was the basis for the independent line adopted by Qatar in securing balanced relations with the great powers dominating the Gulf region at the time, mainly the Ottomans and the British. Sheikh Qassim is considered the true founder of the Emirate of Qatar and was frequently referred to as such in the archives of the Ottoman Empire in Istanbul. Sheikh Abdullah Bin Qassim Al-Thani (1913-1949) assumed leadership in 1905, during his father's life time.

During his long reign, a number of notable events took place, some of which were the Turks' evacuation from Qatar, the signing of a protection treaty with Great Britain in 1916 and the discovery of oil 1939. The first export of oil was delayed by the onset of World War II and Qatar remained relatively poor, unlike her immediate neighbours and Kuwait until the 1950's.

His son Sheikh Hamad was well known for his effective leadership, wisdom, piety and powerful personality, but unfortunately died during his father's lifetime in 1948. One year later, the father abdicated the Emirship in favour of his son Sheikh Ali Bin Abdullah Al-Thani.

Sheikh Hamad Bin Abdullah was the father of the present Emir of Qatar, H.H. Sheikh Khalifa Bin Hamad Al-Thani.

Sheikh Ali Bin Abdullah Al-Thani became the Emir of Qatar in 1949 whilst already old. During his reign, oil production was increased and the country took great strides towards modernization. Sheikh Ali abdicated in 1960 and handed over the affairs of state to his son Sheikh Ahmad, passing over the claims of the much more experienced Sheikh Khalifa bin Hamad, his cousin. On the accession as Emir of Sheikh Ahmad Bin Ali Bin Abdullah Al-Thani, Sheikh Khalifa was declared Heir Apparent and Deputy Ruler. In effect he controlled Qatar, as Prime Minister, Minister of Finance, Petroleum and Foreign Affairs. It was he who announced Qatar's independence in September 1971. In

February 1972 Sheikh Khalifa Bin Hamad Al-Thani assumed the Emirship of the country, in so doing receiving the full support of the Al-Thani family, the people of Qatar and the armed forces.

1.4.2.2 The Present Emir

Sheikh Khalifa Bin Hamad Al-Thani (1972 -), the present Emir, had made an invaluable and dynamic contribution towards the progress and prosperity of the country even before becoming ruler. The impact of his positive leadership is demonstrated by the developments in the political, economic, social and cultural life of modern Qatar, which became more and more obvious after 1971.

Qatar achieved its independence on the 3rd September 1971. The declaration of independence together with the abrogation of the Treaty of Protection signed with Great Britain in 1916 are considered first steps towards the establishment of a modern Qatar.

A new era of development, security and stability has been characterized by cautious but always positive statecraft and development planning. Decision making has remained relatively centralized and the ultimate responsibility for handling the enormous increase in national wealth during the 1970's and later remained in the hands of the Emir. The result has been an evolutionary transformation of the whole of society.

1.4.3 Independence and Thereafter

Following independence, the State of Qatar joined many Arab countries' associations and the United Nations Organizations and other international organizations and associations.

The efforts made in the 1960's by H.H. Sheikh Khalifa for the establishment of a federation of Southern Gulf States, even though Qatar finally withdrew in 1970 from the proposed federation, were paralleled by active interest in the formation and workings of the Gulf Cooperation Council (GCC). The latter is particularly relevant through the operations of the Gulf Organization for Industrial Consulting (GOIC) with its headquarters at Doha (see Chapter 4.3.1).

1.5 Population and Labour Force

The rise in oil prices during the first half of 1970's and the increase of the State's national income through the sale of oil, enabled the State to promote the policy of developing the country in various sectors and laid foundations for developments involving the diversification of sources of income from dependence on only one source viz: crude oil, which is subject to large price fluctuations, has low added value and, above all, is a finite and ephemeral resource. Development produced a need for an increased expatriate labour force because the indigenous labour force was neither large enough nor suitably trained for carrying out development programmes and projects with the rapidity required.

There has long been a tradition of labour migration to the Arab Gulf as noted by Seccombe (1983) but the great increase in State revenues during the 1970's produced an explosion in demand. By 1980 it was estimated by Seccombe (1986) that the non-nationals share of total employment was 79.4% in Qatar. The size of the expatriate labour force fell as State revenues collapsed in the period 1981 to 1983 (see Chapter 2.2.3), but even so, whilst GDP reached a low in 1986 the foreign labour requirement remained high.

Available census statistics shown in Table-5 indicate that the registered labour force in the country totalled 180,756 males and 19,482 females in 1986. The Qatari citizens numbered 20,807 which equals 12% and non-national 88%; of the expatriates 19% were Arabs. Table-6 shows that out of the total 20,807 Qataris, 15,220 (73%) were engaged in community, social and personal services followed by 1,429 (7%) in mining and quarrying, followed by 1,373 (7%) in electricity, gas and water. The implications of this for industrial development past and future are considerable.

In absolute terms the indigenous Qatari population and labour force have been and remained small. Cultural tradition until very recently has virtually barred the female population from employment outside the home. The male population of working age until recently was not only small but ill-trained. The first secular school was opened in 1951 and twenty years later there were less than 1000 boys enrolled for secondary education. Whilst education and training has been given very high priority in Qatar for the last 30 years, not only is there still a great shortage of educated males in the over 35 year age-groups, the promotion of further and higher education has removed from the labour market a large number of under 25s.

One consequence of the above has been that in the process of creating modern Qatar the main flow of educated Qatari manpower has been into the government sector - non-industrial - and the mixed sector i.e. state-owned industries and technical services.

Even by the end of 1987 the CSO recorded a Qatari male work force of 12,265 employed by government departments of which 5,774 had received no formal education. The mixed sector employed 366 male Qataris including 139 with no formal education.

Tables 5 and 6 illustrate statistically the labour force situation at the 1986 census, the last to publish a detailed breakdown by nationality, employment etc.

TABLE - 5

ECONOMICALLY ACTIVE POPULATION(1) (15 YEARS AND ABOVE)
BY NATIONALITY, SEX AND EMPLOYMENT STATUS
MARCH 1986 CENSUS

Nationality & Sex / Employment Status	Qataris		Non-Qataris				Total	
			Arabs		Foreigners			
	M	F	M	F	M	F	M	F
Employer	859	1	249	8	506	2	1614	11
Own Account Worker	499	1	350	4	1072	5	1921	10
Employee	16370	2971	34398	3096	126262	13391	177030	19458
Unpaid Family Worker	24	1	12	2	35	-	71	3
Not Stated	81	-	18	-	21	-	120	-
TOTAL	**17833**	**2974**	**35027**	**3110**	**127896**	**13398**	**180756**	**19482**

(1) *Not including newly unemployed persons*

TABLE - 6

ECONOMICALLY ACTIVE POPULATION(1) (15 YEARS AND ABOVE) BY NATIONALITY, SEX AND ECONOMIC ACTIVITY MARCH 1986 CENSUS

Nationality & Sex / Economic Activity	Qataris		Non-Qataris				Total	
			Arabs		Foreigners			
	M	F	M	F	M	F	M	F
(1) Agriculture and fishing	120	2	1409	1	4750	1	6279	4
(2) Mining & quarring	1421	8	809	52	2402	115	4632	175
(3) Manufacturing	404	22	2091	35	11296	66	13791	123
(4) Electricity, gas and water	1372	1	281	-	3611	1	5264	2
(5) Building & construction	272	1	2921	25	37215	89	40408	115
(6) Trade, restaurant & hotel	1064	4	2686	79	17897	234	21647	317
(7) Transp & communication	533	15	1010	99	5532	168	7075	282
(8) Finance,insu, & r/estate	197	3	930	161	1723	143	2850	307
(9) Comm, social & p/service	12304	2916	22817	2654	43201	12574	78322	18144
(10) Not classified activities	146	2	73	4	269	7	488	13
TOTAL	**17833**	**2974**	**35027**	**3110**	**127895**	**13398**	**180756**	**19482**

(1) *Not including newly unemployed persons*

It is clear that in terms of industrialization:

a. Qatar will continue to depend to a very large extent both on technically trained and professional expatriates as well as on non-national labourers.

b. The selection of future manufacturing projects will have to take into account the volume and type of labour input as well as other more obvious economic and resource factors.

c. The internal market for manufactured products is far from homogeneous (see Chapter 3.4). The Qatari population has a large proportion of households with high disposable incomes, the skilled expatriate population has a high aggregate income but much of this is remitted overseas as savings, whilst the low income majority of expatriates has a high remittance rate and a skewed expenditure mainly on basics such as accommodation and food.

d. Private consumption has equally varied demands for imported goods and services but there remains the permanent paradox that development of import-substitution industries also demands a growth in the labour-force which raises the general level of import demands - in particular for agricultural and food products.

These themes are explored later in the context of past and future plans for industrial development.

1.6 Natural Resources

The State of Qatar has increasingly attempted to make the best use of natural resources through scientific methods of discoveries, evaluation and in applying advanced technology in exploiting them. In 1977, a law was issued to control exploitation of natural resources in the country. This law specifies the usage of scientific studies and procedures necessary to secure the best possible exploitation and investment in that exploitation. The law also obliges taking precautions to avoid damage or environment pollution. A summary inventory is given below of some of Qatar's natural resources and their development.

1.6.1 Petroleum

Onshore petroleum production is concentrated in the Dukhan area on the west coast of Qatar. Offshore production comes from four main fields. Midan Mahzam, Al-Ad Al-Sharky, Bolhanin, and Al-Bondok, all lying to the east of Qatar peninsula (see Fig. 2).

Onshore production started in earnest in 1949 and supplied 88.6% of the total production in 1964. However offshore production, which started in 1965, quickly rose to equal onshore by 1972. Thereafter offshore production has surpassed onshore production during the following years, except in 1981. The proven reserves of oil are estimated to be 3,434 million barrels.

This oil wealth has been owned by the State since 1973 -74. It is now managed by Qatar General Petroleum Corporation, which is concerned with production processes, extraction, storage, and marketing. Table-7 gives statistics of crude oil production between 1949-1990.

TABLE-7
Crude Oil Production 1949-1990
(000 Barrels)

Year	Production/Day	Production/Year
1949	2.0	730
1950	33.6	12268
1955	115.0	41983
1960	174.0	63908
1965	232.6	84902
1970	262.4	132261
1973	570.3	208160
1975	437.6	159724
1980	471.4	172541
1981	414.0	151110
1983	294.0	107310
1984	325.0	146730
1985	290.0	105850
1986	333.0	121545
1987	293.0	106977
1988	319.4	116435
1989	380.0	138700
1990	382.0	139430

1.6.1.1 Onshore Oil

The only onshore oil field was discovered in Dukhan in 1949. It contains four main reservoirs of oil and associated gas, in three of which are stations for separating oil and gas and units for pumping oil and sending it through pipelines to Umm Said, the export terminal. The area of Gabal Dukhan field is about 125.8 square miles and contains oil of high quality with a low percentage of sulphur - 1.1%.

1.6.1.2 Offshore Oil

Offshore exploration for oil started in 1953 and in 1960 the oil fields of Al-Add Al-Sharky and Midan Mahzan were discovered about 50 miles east of Qatar. In 1969 and 1974 the Bul-Hanine and Al-Bunduq were discovered successively, the last on the maritime boundary between Qatar and Abu Dhabi. Al-Bunduq production is divided equally between the two States. Offshore oil is generally of lower density than offshore and has a slightly higher sulphur content - 1.4%. An oil and gas gathering pipeline system connects the fields to Halul island and Umm Said.

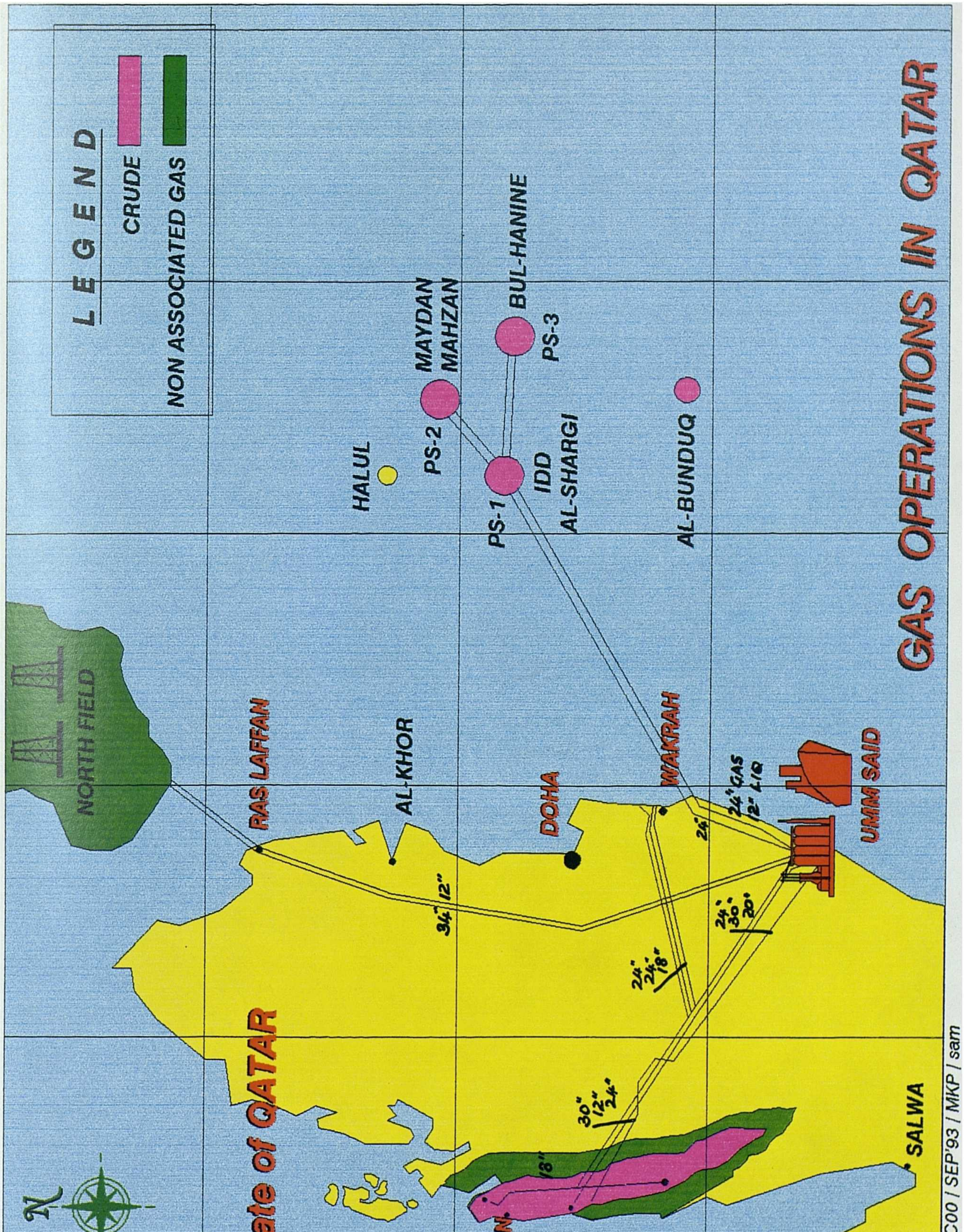
1.6.2 Natural Gas (see Fig. 4)

The use of natural gas in Qatar dates back to more than thirty years ago, used for generating electricity at Ras Abou-Aboud since 1963. Gas is of great and growing importance as a fuel and raw material, first derived from oil fields i.e. associated gas, or non-associated gas from the later discovered gas resources.

1.6.2.1 Associated Gas

Operations for obtaining and utilizing gases associated with crude oil produced from onshore fields began in 1971. Exporting natural gas liquids (NGL) began from the onshore field in 1974, and from the offshore fields in 1980. The NGL plants are situated at Umm Said (Fig.4) where the gas produced from onshore and offshore fields is directed and liquids such as propane, butane and natural gasoline are recovered. The associated gases are essentially used for providing raw materials such as ethane rich gas necessary for petrochemicals, and methane rich gas for the ammonia/urea fertilizer units at Umm Said. In addition fuel gas for factories and stations for generating electricity is also recovered, and distributed through pipelines. It is possible to exploit the associated gas in producing other petrochemicals in addition to exporting as liquefied natural gas (LNG) to international markets.

FIG 4



LEGEND
CRUDE
NON ASSOCIATED GAS
GAS OPERATIONS IN QATAR
State of QATAR
NORTH FIELD
RAS LAFFAN
AL-KHOR
DOHA
WAKRAH
UMM SAID
DUKHAN
SALWA
HALUL
MAYDAN MAHZAN
PS-2
BUL-HANINE
PS-3
PS-1
IDD AL-SHARGI
AL-BUNDUQ
24" GAS
12" L/G
24"
34" 12"
24" 24" 18"
24" 30" 20"
30" 12" 24"
18"
MAPSEC00 / SEP'93 / MKP / sam

1.6.2.2 Non-Associated Gas - The North Gas Field

Discovered offshore in 1971 to the north-east of the Qatar peninsula, the North Field is possibly the largest single concentration of natural gas on earth. It covers a surface area of approximately 6,000 square kilometers in water depths of 15-17 meters. Its proven and recoverable reserves exceed 250 trillion cubic feet (TCF) of non-associated natural gas while gross estimates are 380 TCF. The gas was discovered in the Khuff formation, in depths of 2,470-2,830 meters under sea level.

In order to ensure optimal utilization of the North Field's huge non-associated gas reserves, QGPC has laid out a development plan, the result of elaborate and extensive studies. Phase-1 of the development plan, launched in mid-1987, encompasses the production of 800 million cubic feet per day of non-associated gas. It will make available 750 MMSCFD of lean gas for satisfying local needs, exports and for use by new industries. Some 48,000 BPD of gas liquids and condensates will be used for industrial purposes and exports to foreign markets.

Future phases aim to establish the following projects:

- Production for export of gas as LNG or via pipelines to neighbouring and foreign markets. For this purpose, Qatar Gas Company (QATARGAS) was established in November 1984. Its target is to produce, market and export six million tonnes of LNG a year.

- Industrial ventures that use the field's gas output as fuel or feed stock to produce products with high added value such as chemical fertilizers, petrochemicals and minerals.

Phase-1 development has been completed and actual production started in September 1991. This included marine facilities, pipelines between the production zone and Ras Laffan the new mainland gas terminal, while two others, extending from Ras Laffan to the industrial estate of Umm Said have been completed to carry dry gas and condensates. A total of 16 wells were established by 1989. In addition, a new LPG plant was completed and commissioned in September 1991.

From the offshore production zone, whose facilities include platforms for gas drilling and treatment, utilities, living quarters and a flare, Phase 1's output of gas and condensates are delivered to Umm Said after being separated and dehydrated at the marine complex. At Umm Said, liquid components of condensates, such as light and heavy naphtha are separated while the gas is processed to recover natural gas liquids viz: propane, butane and natural gasoline.

This offshore gas development marks the entry of Qatar into what can be called a new hydrocarbon age. The immense scale of the North Field gas reserves as well as their offshore location has raised extremely important questions as to how and for what purposes they should be exploited. The demands made on capital and on Qatari manpower have been and will continue to be enormous (and see Chapter 6.6.0).

1.6.3 Agriculture Resources

1.6.3.1 Agriculture Development

The State exerts strenuous efforts of assisting and encouraging agricultural production growth in terms of output and contribution to the country's Gross National Product. The aim of the State's general policy in this sector is to promote the use of available agricultural resources - cultivable land, capital, water and animal wealth - in an attempt to reduce total dependence on imports. And, despite natural obstacles and constraints such as limited area of cultivable land, scarcity of underground water and high soil salinity, considerable progress has been made, particularly at the organizational level, towards the achievement of this goal.

To overcome the basic handicaps of severe deficiencies of soil and water, the State has acted in several basic directions, starting with the classification of all available cultivated and cultivable lands. The aim here has been to improve soil quality, monitor and enhance productivity, and determine the quality of and rationalize the utilization of water irrigation resources. The handicap of limited cultivable area for conventional farming has been subdued by the establishment of intensive model farms and industrial style production.

The latest statistical information shows that the total technically cultivable area in Qatar is 650,000 dunums (165,000 hectares), of which 57,000 dunums or 8.8% is cultivated. In terms of crops, 36% of the cultivated area is used for vegetables, 25.4% for fruits and palm trees, 19.2% for green forage and 18.8% for cereals.

The total value of agricultural production at local market prices, according to the Ministry of Municipal Affairs and Agriculture rose from some 292 mn. QR in 1985 to 340 mn. QR in 1990. This represented in each case about 42% of the QR value of imported food and beverages. However virtually all food cereals are imported, the value of total domestic meat production is only some 20% of the value of meat and live animal imports, whilst, excluding dates, the value of domestic vegetable and fruit production represented 5% of the cost of imports of these commodities.

1.6.3.2 Agricultural and Livestock Production Projects

The State manifests an interest in the establishment of selected major productive schemes which carry out production of food related commodities and meet a large portion of the consumer's needs. Outstanding projects that have been implemented include:

Qatar National Fishing Company - The State became sole shareholder of the company after having been restructured in 1980. Instead of the traditional, net casting fishing methods, the venture now operates a modern fleet of vessels which are involved in catching fish and prawn. A total catch of 8,196 tons of fish was achieved in 1989. Table-8 shows the fish catch from 1987-91 which shows a very big rise from 2,979 tons in 1987 to 8,196 tons in 1991.

The State also participates in research carried out by the Doha-based Regional Programme for the Survey and Development of Fisheries, set up by the Arab Gulf States back in 1975.

The Arab Qatar Poultry Company - Set up as a joint venture between the government, the private sector and the Arab Livestock Development Company, this pilot project is designed for implementation by stages. In the first stage, the annual capacity of the present poultry farm at Umm Qarn was raised through expansion to 36 million eggs and 3.5 million broiler chicks. This now meets 80% of domestic demand and reduces dependence on imports. The agro-industrial complex comprises several units equipped with facilities for egg incubating, selecting, grading and packaging; automatic slaughtering, chicken-feeding and storage.

Table-9 gives poultry and eggs production for the years 1987-91. It may be seen that there has been an excellent increase in poultry and eggs production during these years.

Fresh Milk and Dairy Products Project - Another joint venture between the government, the private sector and the Arab Livestock Development Company, this project specializes in cattle breeding. It comprises several units with facilities for dairy and beef herd breeding, milk production and pasteurization, in addition to units for the production of other dairy products. The project which produces five tonnes of raw milk per day had an output of 19,352 tonnes of dairy products in 1989.

TABLE - 8

QUANTITY OF FRESH FISH AVAILABLE IN THE LOCAL FISH-MARKET 1987-1991

(Quantity : Tons)

Kind / Year	1987	1988	1989	1990	1991
Greasy Grouper	245	294	394	928	1148
Red Snapper	112	93	138	129	172
Emperor	687	704	1054	1095	1602
King Mackerel	140	150	204	515	661
Shrimp	187	182	260	571	374
Spine Foot	135	133	180	244	327
Trivially	215	160	219	245	182
Barracuda	84	81	124	41	52
Cobia	55	67	69	49	51
Common Mojarra	35	60	107	90	162
Monecel Bream	17	47	20	6	38
Banded Grunt	77	61	98	265	567
Jack	43	55	52	28	49
Longspine Seabream	89	96	130	138	172
Grey Mallet	19	24	65	26	24
Golden Travally	63	76	114	210	285
Silver Pomfret	108	104	149	232	213
Picnic Seabream	60	77	94	59	59
Others	608	648	899	1215	2058
TOTAL	**2979**	**3112**	**4370**	**6086**	**8196**

Source : Ministry of Municipalities and Agriculture

Abu Samra Sheep Farm - The farm was established by the State to produce high-quality ewes for distribution to breeders in order to develop the country's livestock wealth.

TABLE - 9

POULTRY AND EGGS PRODUCTION
1987 - 1991

Year / Kind	1987	1988	1989	1990	1991
Chickens (No. by thousand)	1557	1786	2820	2632	3344
Layer Chickens (No. by thousand)	220	180	334	340	332
Eggs (Ton)	1379	1522	3131	3384	3295

Source : Ministry of Municipalities and Agriculture

1.6.3.3 Agriculture and Industry

The relevance of agriculture, fisheries and associated sectors to this study may be summarized as follows:

a. Qatari agricultural production is and will remain too small to form a basis for domestic food-processing industries. Similarly, fish processing on anything other than a craft scale is not viable, whilst there is no resource basis either for plant fiber textile production or timber using manufacturing. Wool and hide production is also too small and unspecialized to support viable manufacturing.

b. Agriculture, although it contributes an insignificant proportion of GDP, makes significant demands on two other limited resources. Given the relative shortage of experienced and technically trained Qataris the diversion of some of these into the agricultural private and public sectors is not necessarily the best use of manpower. More important is the fact that irrigated agriculture since the late 1970's has consumed the only natural water resource - groundwater - at an unsustainable level (FAO, The Water Resources of Qatar, 1981). All other demands for water, domestic and industrial, have to be met by some form of the desalination of sea water. This in turn produces demands for energy which involve a range of upstream and downstream uses for oil and gas resources.

1.6.4 Water Resources (see Fig. 5)

With very low mean annual rainfall in Qatar ranging from 80 mm in north to 50 mm in the south, the only natural water resource which can be drawn on is ground water.

Shallow aquifers only 10 to 40 metres below the surface were recharged by what rainfall fell and up to about 1955 this was sufficient to balance the low abstraction rates by a small population and very limited agricultural use. Deeper aquifers contain fossil-water i.e. ground water 30,000 - 40,000 years old slowly permeating from the west the eastward dipping older cretaceous sedimentary rocks of the Arabian peninsula, (Bowen-Jones, 1983).

Since 1954, the demand for water by an increasingly urbanized and high income population, by industry and by an explosion in irrigation farming has had to be met more and more by distillation and desalination. These essentially industrial processes supplied 44% of total water consumption by 1980. Between 1964 when the first modern flash evaporation plant at Ras Abu Aboud in Doha came on stream and 1980 total water consumption rose six fold. By 1985 fresh water production had risen by another 50%, only 3% of which came from ground water fields; 1991 onward this contribution has fallen to little over 2% - see Table-10.

TABLE - 10

QUANTITIES OF WATER PRODUCED BY ELECTRICITY AND WATER DEPARTMENT

1987 - 1991

(Unit Million Gallons)

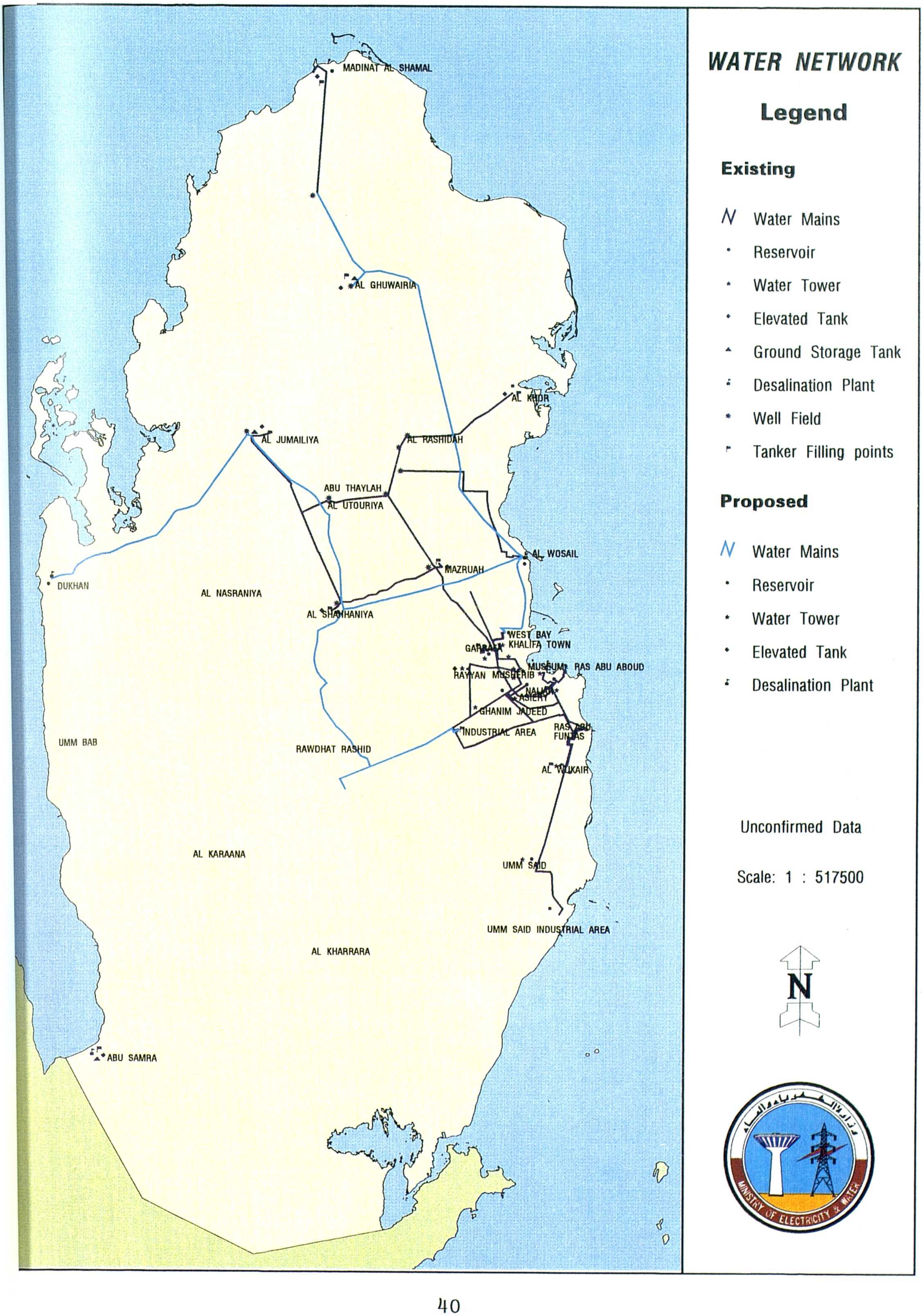
Year	Desalination Plants			Well Field Water	Grand Total
	Ras Abu Aboud	Ras Abu Fontas	Total		
1987	2365.7	14340.1	16705.8	836.7(1)	17542.5
1988	2365.7	14340.1	16705.8	836.7(1)	17542.5
1989	2026.7	14789.3	16816.0	887.6(1)	17703.6
1990	1779.9	15347.9	17127.8	532.0(2)	17659.8
1991	1144.8	16365.6	17540.4	416.3(2)	17956.7

(1) Well Field and Reverse Osmosis and Blending Wells

(2) Well Field Osmosis and Blending Wells.

The water resources of Qatar today are manufactured products of industrial plants which use the hydro-carbon energy of the oil and gas reserves to produce water in association with electricity generation. An increased recycling of effluent liquids to produce water

FIG 5



MADINAT AL SHAMAL
AL GHUWAIRIA
AL KHOR
AL JUMAILIYA
AL RASHIDAH
ABU THAYLAH
AL UTOURIYA
AL WOSAIL
MAZRUAH
DUKHAN
AL NASRANIYA
AL SHAHANIYA
WEST BAY
KHALIFA TOWN
MUSEUM
RAS ABU ABOUD
RAYYAN
MUSHERIB
ASIERY
GHANIM JADEED
INDUSTRIAL AREA
RAS ABU FUNTAS
AL WUKAIR
UMM BAB
RAWDHAT RASHID
AL KARAANA
UMM SAID
UMM SAID INDUSTRIAL AREA
AL KHARRARA
ABU SAMRA
WATER NETWORK
Legend
Existing
Water Mains
Reservoir
Water Tower
Elevated Tank
Ground Storage Tank
Desalination Plant
Well Field
Tanker Filling points
Proposed
Water Mains
Reservoir
Water Tower
Elevated Tank
Desalination Plant
Unconfirmed Data
Scale: 1 : 517500
N
MINISTRY OF ELECTRICITY & WATER

for non-potable consumption is further proof that the water resources available for all purposes in Qatar are determined only by the availability of energy and capital and government social and economic policies (see Fig. 5).

1.6.5 Other Mineral Wealth

The mineral wealth of any country is an important element in the establishment of industrialization. Geological studies date back to 1908 and went on in order to search for oil. In 1970, the Ministry of Finance and Petroleum commissioned the first geological studies referring to metal, stone and economic sediments.

In 1980 the erstwhile Industrial Development Technical Centre (IDTC) prepared a geological and geophysical land and natural resources survey for the whole country in order to estimate mineral wealth, and the possibility of its economic exploitation. Gypsum was found in great new deposits along with clays which are rich in Atapulgite that can be used in brick manufacturing and in petroleum industries as a drilling aid. There are also large quantities of Celestite (strontium sulphate) which is used in electronic, heat and heavy digging industries.

Apart from oil, gas and water the following mineral materials are currently extracted locally:

- Recrystallized and Dolomitized Simsima Limestone of Upper Dammam (Middle Eocene) Age is obtained by quarrying, ripping and hand-picking. Hand picking of hard surface boulders is also carried out near the main roads in order to supply the road builders with additional aggregate. Quarrying of Simsima Limestone for building aggregate is principally done at the government quarry near Umm El Afa'i and there are also smaller operations run by private contractors. These quarries supply most of the building aggregate requirements of Doha.

- White Chalky Limestone of Lower Simsima Age is quarried near Umm Bab for use at the Qatar National Cement Plant.

- Green Calcareous Clay of Lower Dam Subformation Age is mined at a quarry at Wadi Huwaila, immediately to the north of the Khraij Mesa for use at the Umm Bab Cement Plant.

- Crystalline Gypsum quarried at An Nafkah in the Upper Dam Formation is used in the cement manufacturing facility at Umm Bab. A unit to manufacture gypsum powder and gypsum boards started production in mid-1993.

- Sand for the building industry is extracted and cleaned at a government sand washing plant and a newly established plant near Umm Bab in private sector. Calcareous Beach Sand is quarried in areas immediately to the north of Doha, south of Wakrah and near Khor, whilst aeolian sand is quarried from dunes near Umm Said and from a dune south of Abu Nkhala for fillings and trench linings.

1.6.6 Fish and Pearls

The waters surrounding Qatar peninsula, in terms of marine resources have the whole range of characteristics found in the Arab Gulf. Midway between the Straits of Hormuz and the Indian Ocean and the freshwater entry of the Shatt Al-Arab, with depths varying from shoal water to over 80 metres and a wide range of salinity from over 45% to less than 3%, the territorial waters are rich in species.

1.6.6.1 Fish

There are about 136 kinds of fish in Qatar's territorial waters, including about 54 families divided into 36 groups, of which 21 groups live at the bottom and 15 groups free-swimmers, in addition to 4 groups of non-vertebrates such as crabs, lobster and prawns. Certain kinds of fish are particularly prized e.g. Hamour - grouper - and Kanaad - king mackerel.

At present there are three main fishing centers in Qatar; Al-Wakhra, Al-Doha and Al-Khor in addition to some small centers in Al-Rowais and Abu Al-Dalouf. Today most fishing craft are crewed by South Asian expatriates. About 80% of the local consumption of fish is supplied from Qatari waters. Table-11 gives meat and fresh fish production for the years 1987-1991.

The Industrial Development Technical Centre (IDTC) in 1974, studied the possibility of fish farming and made a survey of some regions suitable for this purpose. Given the local preference for fresh fish and the severe world competition for processed products there seems to be no viable basis for manufacturing.

TABLE - 11

MEAT AND FISH PRODUCTION
1987 - 1991

(Unit : Ton)

Kind \ Year	1987	1988	1989	1990	1991
Bovine Meat	1710	1734	1805	1943	2077
Poultry Meat	1500	2629	2145	2923	3745
Fish	2678	3085	4374	5702	8136

Source : Ministry of Municipalities and Agriculture

1.6.6.2 Pearls

Fishing and pearl diving played an important role in Qatar's economy earlier this century. The number of workers in fishing and pearls in Qatar was three thousand in 1904. Pearling beds are still found on the north, east and south coasts of Qatar and around the isles of Das and Haloul 20 to 60 miles offshore at a maximum depth of about 25 meters. From a peak of over 800 pearling ships at the beginning of this century, pearling has now become an insignificant activity mainly because of competition from cultured pearls.

1.7 The Resource Setting for Industry

In summary, the resource setting for Qatar industrialization can be evaluated as follows:

a. The range of natural material resources of any significant size is extremely limited. Qatar has no metallic mineral wealth and even its rock composition is restricted to recent calcareous sandstones. There is no wealth of evaporates. Timber apart from that obtained from the date-palm is absent and as noted earlier the only materials locally available for textile making are camel, goat and sheep hair and wool. Traditionally, craft industry was further restricted by a shortage of fuel. In conventional terms, Qatar can be described as very poor in material natural resources for industry except for hydro-carbons and these have only been exploited during the last 50 years.

b. Hydro-carbon resources in the form of petroleum and natural gas, however, have a high and rising global value and, relative to the size of the state and population of Qatar are extremely large. In addition, whilst oil and natural gas are both very flexible forms of energy both for use and transportation, they also provide a wide range of chemical raw materials - feedstock - for many manufacturing processes. As such, they are in great demand especially in the technologically advanced world.

c. By 1980 the growing possibilities of moving from the relatively simple conversion of oil into refinery products in the oil producing countries to higher added-value processes were being recognized in the Gulf. For example in 1982 the GOIC presented a statement (GOIC Oct. 1982) pointing out the recent re-evaluation of natural gas production and a greater range of utilization of all the properties of hydro-carbons by the Gulf producer countries.

d. The human resources indigenous to Qatar although qualitatively being rapidly improved by education and training will remain small in absolute terms. Industrial development policy has to recognize this critical limiting factor against which has to be balanced the great wealth of hydro-carbons which can be transformed both into working capital and into manufactured products. Conversely the domestic market for manufactures is small in size and therefore as with the export of crude oil in the past so with the export of manufactured products in the present and future, Qatar is dependent on world markets.

e. Lastly, Qatar is and will be in any case dependent on imports to supply most consumer and capital goods. In this respect Qatar will have changed little - except in vastly increased living standards for its people - from the dependence on and involvement in trade which long before the discovery of oil characterized Qatar alongwith other Gulf States.

CHAPTER 2

THE PERCEIVED NEED FOR THE INDUSTRIALIZATION OF THE STATE OF QATAR

2.1 Industrialization and Development

2.2 Aspects of Qatar's Economy Relevant to a Policy of Industrialization

2.2.1 Historical Background

2.2.2 The Recent Period

2.2.3 Gross Domestic Product (GDP)

2.2.3.1 Share of Oil in GDP

2.2.3.2 Services Sector

2.2.3.3 Banks & Insurance

2.2.3.4 Building and Construction

2.2.3.5 Manufacturing Industries

2.2.3.6 Agriculture and Fishing

2.2.3.7 Electricity and Water

2.2.4

2.2.5 Foreign Trade

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2.3 Development Policy and Development Practice - A Preliminary Survey

CHAPTER 2

THE PERCEIVED NEED FOR THE INDUSTRIALIZATION OF THE STATE OF QATAR

2.1 Industrialization and Development

Since the 1950's almost all theories and policies for economic development have included as an essential element the need for countries to industrialize (see for example Hirschman, 1958). That is to move towards a full range of economic activities extending from primary production at one extreme through manufacturing to a variety of service activities including finance and trade. General theories of economic development have almost all considered that the rapid growth of manufacturing industry in particular is essential if economic development as measured by GNP and GDP per capita is to be raised to desirable levels.

Supporters of industrialization have included not only western economists but also Third World analysts such as Bhagwati (1966) of India who noted "the fairly strong empirical association of industrialization and high national incomes". Most Arab development economists have tended to agree with Ghantus (1982) that "industrialization provides usually a focal point in the development strategy of developing countries", and Kuborsi (1984) "a number of considerations have arisen recently that lead the policy makers of the Arab Gulf countries to give serious thought to the desirability of greater emphasis on manufacturing in general and non-oil manufacturing in particular".

2.1.1 Behind the general theory that economic diversification, i.e. balanced growth including a significant industrial sector, is associated with high national income lie a number of associated phenomena not all of which support the argument that this linkage between economic diversity and national wealth is absolute. It is ironic that in November 1992 the IMF declared Qatar to have the highest income per head in the world whilst at the same time the true contribution of oil and gas to the GNP i.e. dependence on primary natural resources, was of the order of 80%. True economic diversification is only achieved when each of many sectors of activity is capable of producing wealth in its own right without cross-subsidization by other sectors within an interlinked system.

However, "Dissent on Development" was early being expressed by some analysts (Bauer 1971), and a 1972 survey of contemporary thought illustrated the range of argument concerning development processes (Johnson and Kammerschen, 1972). Even recently doubts have been expressed concerning the relevance of classical development theories to the Gulf States (e.g. Townsend, 1984).

There may be other reasons why industrialization may be regarded as desirable even though independently viable manufacturing activities may not always be feasible. The more than 7 years spent up to 1993 on the so-called "Uruguay Round" of GATT negotiations show very clearly that the protection of some economic sectors of industry and services through trade tariffs and quotas and internal subsidies is very widespread. On the other hand, the events of 1991 and 1992 in the centrally planned economies of the USSR and socialist countries of Eastern Europe demonstrate that ignoring market forces in closed economic systems does not create long-term wealth but rather destroys it.

Industrialization as a path to diversification of the economy is one theme to be examined in this study.

2.1.2 In some situations, not only in the economies of large countries such as India but also in small countries such as Malta and Hong Kong, industrialization may also be seen as necessary to provide employment.

"In 1959 the Maltese Islands embarked on a planned programme of economic diversification having manufacturing industry as its main pillar. The aim of this programme was primarily to provide employment" (Busuttil, 1970).

This aspect of employment or the productive use of human resources is a second theme which is of relevance to Qatar industrialization.

2.1.3 In 1977 an EEC statement identified two other relevant elements in the control of world trade (EEC Nov. 1977).

"The international redistribution of industrial activities to give developing countries a greater share of world industrial production, thus enabling them to satisfy their own domestic needs;" and "the access for manufactured products from developing countries to markets".

These two quotations illustrate the industrializing countries' desire to reduce dependence on the importation of manufactured goods and to increase their exports of such goods. Here too, import substitution and the building of export industries are relevant to the Qatar case.

2.1.4 Lastly, industrialization has often been regarded as desirable because of its associations with the transfer of technology (e.g. Lewis, 1955, 1966 and Bowen-Jones, 1978). This aspect is considered more fully in the context of Qatari experience in Chapter-7. The question of technological transference is also closely bound up with the matter of human resources.

2.1.5 There is also a regional perspective to the perception of industrialization in Qatar. In 1976, the Arab Gulf States (including Saudi Arabia and Iraq) set up the Gulf Organization for Industrial Consulting (GOIC). Following the 1981 establishment of the Gulf Cooperation Council comprising Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates, GOIC, with its office located at Doha, (without Iraq since Dec. 1990) has become even more important in influencing industrial development in the Gulf region as examined in more detail in Chapter 4. Although individual States can and do proceed independently with policies and projects, the financial contributions held under the auspices of the GCC and the joint funding of the GCC's Gulf Investment Corporation since 1984, ensure that industrial development remains high on every Gulf country's agenda. Further, it is also expected that industrial development remains evenly distributed between GCC States.

2.1.6 Industrialization and its Institutions in the State of Qatar

Since the early 1970's the State of Qatar has accepted the argument that industrialization is necessary for development and diversifying sources of income, see Chapter 4.1 & 4.2. A unified strategy for industrial development of the GCC countries is based on the same principles and was adopted during the Sixth Summit Conference of GCC which was held in Muscat in November 1985. The approach is to choose industrialization which is economically effective and beneficial, not only in diversifying sources of income, but also for constructing a society which is aware of the importance of industrialization for the nation's life, whose people exert great effort to acquire technical skills and get acquainted with the modern technology and applying it in such a way as to ensure continued economic development and provide prosperity for all the citizens of the GCC States (GCC, Nov. 1985).

The Conference of the Industrialists of the Arab Gulf States held in Doha in December 1985 endorsed the choice for industrialization as the best way for development in the Gulf area. It also commended the industrial achievements which had been realized in the fairly short time, and everything that accompanied it, whether accomplishing or developing the infrastructure of these countries.

The second conference of the United Nations on Industrial Development that was held in Lima (the capital of Peru) in 1985, later issued a statement known as the "Lima Declaration" (UNIDO, 1985). It confirmed the necessity of exerting the greatest possible effort to increase the share of industrial production of developing countries to 25% of total industrial production by the year 2000.

This argument for pursuing policies of industrialization economic activities is rooted in the fact that industry aims at converting raw materials from less valued to higher valued and more useful products, that is, it tries to change the form of raw and intermediate materials into new and more valuable commodities.

At the same time, manufacturing industry represents the continuing practical application of scientific and technological processes which signify the scientific and technological progress of a country, and does so at more rapid rates than those of any other economic sector.

Industry also needs a wide range of economic resources such as labour force, capital, energy, raw materials and various intermediate materials. Industrial progress depends on taking inputs from from other sectors, in return for providing the various economic sectors involved with the products of industrial development. These growing relationships between the various economic sectors in a diverse and balanced economic structure in turn give rise to growth in linkage activities such as financial services and transportation.

Added to this is the role of industry in creating a new generation of skilled workers with additional benefits such as discipline, accuracy in work, importance of time, punctuality and carrying out duties and responsibilities which reflect on the development process as a whole. In short "it helps to create modern, qualified disciplined man power" (Lewis, 1955, iv.3.c).

Whilst this is the basic theory, in the case of State of Qatar it must be said that economic sectors of the State, other than the gas and oil sectors, do not enjoy the same advantages as the industrial sector. The agricultural sector in Qatar is limited in its operations and in its potential because of soil and water deficiencies, as exposed by the series of FAO Reports produced between 1969 and 1981 (FAO, 1981). The extensive research studies and trials carried out in the FAO supported Water Resources and Agricultural Development Project and more recently in the 1980's by the Department of Agriculture and Water Research, and several Ministries have shown what possibilities exist in agriculture. However, the technical progress involved requires more and more reliance on artificial environments e.g. computerized irrigation in cool greenhouses, poultry and egg production under battery and coolhouse conditions. This in turn turns farming into a relatively high technology industrial process heavily dependent on energy, high cost capital equipment and skilled management and labour (Annual Reports of Dept. of Agriculture and Water Research).

Even so, the resultant production in this modernized agricultural sector has not prevented a continued rise in the value of imported food commodities (see Chapter 2.2.6.1) and costs have been high.

The other economic sectors, such as construction, trade, transport, banking, insurance, hotels and others are all minor sectors and are all dependent on oil, the industrial sectors and on government expenditure. Most of them aim at rapid profits with least investment possible. In this way they differ from industrial projects on which financial investment has to be long-term to create capital assets which take some time and greater effort to yield returns in production.

Policies and goals of industrialization as they have finally been determined pragmatically are considered further in Chapter 4.

Industrial development of Qatar is now mainly the function of Ministry of Energy and Industry (see Chapter 5.1). The above function is supported by other Ministries such as Ministry of Electricity and Water, Ministry of Municipality, Ministry of Commerce and Trade as well as other national and international agencies such as the University, Dept. of Education, Gulf Organization for Industrial Consulting (GOIC), United Nations Industrial Development Organization (UNIDO), Banks and Financial Institutions etc. (see Chapter 3).

2.2 Aspects of the Qatar Economy Relevant to a Policy of Industrialization

2.2.1 Historical Background

The economy of State of Qatar is closely linked with the main natural resources viz. oil and natural gas. The only other material which is in abundance is limestone, necessary for cement industry and production of lime, and limited quantities of gypsum, atapulgite and dolomite. As noted in Chapter 1.6.3, Qatar suffers from fundamental resource deficiencies for agricultural production. Severe limitations in the availability of fresh water have always characterized Qatar and it was marine wealth which allowed fishing and pearl diving to be the most important activities in the past. However, after the discovery of hydrocarbons, fishing as a means of livelihood was abandoned whilst the competition of artificial pearls from Japan made pearl diving uneconomic and non-competitive from the 1930's onward.

2.2.2 The Recent Period

From the beginning of the oil era in 1939, a new stage of economic development in the State of Qatar took place with a continuous rise in the importance of oil and an equally continuous decrease in the importance of most other activities. Production of petroleum further grew significantly after the discovery of the off-shore oil fields in 1964, which boosted the oil revenues further. This in turn increased the potential of the country to undertake socio-economic development and average per capita income reached $ 27,720 in 1981 which was the highest in the world at that time. The big increase in the production of oil and natural gas along with the successive rise in prices after 1973 led to the doubling of oil revenues of the country. National income rose from QRs. 8,927 million in 1396 Hejirah (1976) to QRs. 22,442 million in 1402/03 Hejirah (1982/83), an annual rate of increase of some 16%. Oil exports constituted about 91% of the total exports at the peak of oil boom and the fraction of Government income obtained from oil was about 85% in 1983.

It is possible to make a first analysis of the impact of the associated developments which took place in Qatar's economy by examining the main economic indicators, viz.

- The value of local production
- Foreign trade
- Public finance indicators for the State.

2.2.3 Gross Domestic Product (GDP)

Estimates of Qatar's GDP for the early years of independence have to be treated with caution but statistics quoted by the UNIDO study "Long-Term Prospects of Industrial Development in Qatar" (1980) point to a "fantastic annual growth rate of 71.5%" between 1970 and 1975 (current prices). This was a rise from 159 mn. US $ to 2,359.5 mn. One Qatari estimate of total 1975 GDP in Qatari Riyals suggests 10,488 mn. QR., of which 73% was contributed by oil production (IDCAS, Qatar, Country Study, 1979). Another estimate originating in the CSO, Qatar, is of 9,877 mn. QR. in 1975, rising to 26,631 mn. in 1980.

What is certain is that during the 1970's GDP in Qatar increased at an extremely rapid rate, creating the revenue potential not only for high consumption and expenditure on social and physical infrastructure but also for large investments in development projects in manufacturing industry.

The early 1980's saw the peak in GDP - 31,527 mn. QR in 1981 - and then a very rapid decline by 12% in 1981-82, and a further 15% between 1982-83. Total GDP fell to 18,393 mn. QR in 1986. Estimates of GDP at current prices broken down by Economic Activity are shown in Table-13 for the period 1987-1991. During these five years GDP at current prices showed a recovery, but neither in real terms nor current prices did it rise to the heights achieved in 1981.

As examined later in Chapter 6.03 and elsewhere the period of extremely rapid growth in GDP between 1970 and 1981 allowed a major expansion in industrialization and associated infrastructure.

2.2.3.1 Share of Oil in GDP

Throughout the first period of extremely rapid growth up to 1975 the oil sector's annual contribution to GDP never fell below 60% and in 1974 rose to 82%. Moreover as the 1980 UNIDO statement pointed out, in 1975 "Exports constitute some 65% of GDP and some 99% of this export is crude oil".

By 1986 the proportion of GDP contributed directly by the oil-sector had fallen to less than 30% and since 1990 the whole hydro-carbon sector may be estimated as making up directly about one-third of Qatar's GDP as normally computed. This, however conveys a somewhat misleading impression of a decline in the economic dominance of the oil and gas sector.

It is true, as shown in Table-7 that the volume of annual crude oil production in Qatar peaked in 1973. Although it has since recovered from the low of 1983, it is likely never again to rise above the 1989-90 level of about 139 mn. barrels annually. All the evidence suggests that crude oil production will in fact fall fairly steadily in the future. However, as noted in Chapter 2.2.9.2 and 2.2.9.3 the budgetary estimates of government revenues, show a steady increase from 1989 through the projections for 1993/1994. Government revenue and expenditure remains the dynamo which drives the Qatari economy, but many of the economic activities classified in GDP statistics as in non-oil sectors are mainly or in some cases wholly dependent on wealth creation by the oil sector.

TABLE -12

ESTIMATES OF GROSS DOMESTIC PRODUCT BY ECONOMIC ACTIVITY
AT CURRENT PRICES
1987 - 1991

(Unit : Million Q.R)

Year / Economic Activity	1987	1988	1989	1990	1991
1. Agriculture and Fishing	237	232	214	210	215
2. Mining and Quarrying	5869	5591	7103	10187	8250
3. Manufacturing	2100	3138	3333	3451	3120
4. Electricity and Water	362	365	349	411	415
4.1 Electricity	73	92	-	-	-
4.2 Water	289	273	-	-	-
5. Building & Construction	993	1030	972	1130	950
6. Trade, Restaurants and Hotels	1319	1338	1618	1480	1528
6.1 Trade	1128	1177	1468	1309	1350
6.2 Restaurants	90	82	78	81	83
6.3 Hotels	101	79	72	90	95
7. Transport & Communication	508	659	669	683	697
7.1 Sea Transport	38	30	37	26	30
7.2 Air Transport	73	71	76	73	75
7.3 Land Transport	193	209	209	211	212
7.4 Communication	204	349	347	373	380
8. Finance, Insurance, Real Estate and Business Services	1988	2236	2455	2553	2610
8.1 Banks	640	673	732	798	825
8.2 Insurance	48	62	36	43	44
8.3 Exchange Agencies	28	22	23	22	23
8.4 Real Estate	1143	1342	1538	1564	1590
8.5 Business Services	129	137	126	126	128
9. Social Services	214	233	222	251	255
10. Imputed Bank Service Charges	-533	-540	-571	-629	-644
Total Industries	13057	14282	16364	19727	17396
11. Government Services	6425	7321	6848	6651	6460
12. Household Services	213	233	259	268	286
13. Import Duties	130	143	145	146	147
Grand Total	**19825**	**21979**	**23616**	**26792**	**24289**

Source : CSO

TABLE - 13

GROSS DOMESTIC PRODUCT BY ECONOMIC SECTORS 1986 - 1990

(Value in Millions of QR)

Economic Sectors	1986			1987			1988			1989			1990*			Average 1986-90	
	Amount	Proportion %	Change %	Amount	Proportion %	Change %	Amount	Proportion %	Change %	Amount	Proportion %	Change %	Amount	Proportion %	Change %	Proportion %	Change %
1. Oil Sector	5395	29.3	-43.8	5869	29.6	8.8	5591	25.4	-4.7	7103	30.1	27.0	9020	33.6	27.0	29.6	2.9
2. Non-Oil Sectors	12998	70.7	1.5	13956	70.4	7.4	16388	74.6	17.4	16513	69.9	0.8	17845	66.4	8.1	70.4	7.0
Agriculture & fishing	237	1.3	11.3	237	1.2	0.0	232	1.0	-2.1	214	0.9	-7.8	225	0.8	5.1	1.0	1.3
Manufact. Industries	1777	9.7	0.4	2100	10.6	18.2	3,138	14.3	49.4	3333	14.1	6.2	3780	14.1	13.4	12.5	17.5
Electricity & Water	363	2.0	90.1	362	1.8	-0.3	365	1.7	0.8	349	1.5	-4.4	350	1.3	0.3	1.7	17.3
Building & Constru.	1054	5.7	-19.7	993	5.0	-5.8	1030	4.7	3.7	972	4.1	-5.6	1095	4.1	12.7	4.7	-2.9
Trade, Rest. & Hotels	1149	6.3	-3.1	1319	6.7	14.8	1338	6.1	1.4	1618	6.9	20.9	1697	6.3	4.9	6.5	7.8
Transport & Commu.	410	2.2	-8.9	508	2.6	23.9	659	3.0	29.7	669	2.8	1.5	679	2.5	1.5	2.6	9.5
Finance, Insurance & Real Estate Services	1972	10.7	3.8	1988	10.0	0.8	2236	10.2	12.5	2455	10.4	9.8	2548	9.5	3.8	10.2	6.1
Other Services	6036	32.8	4.4	6449	32.5	6.8	7390	33.6	14.6	6903	29.2	-6.6	7471	27.8	8.2	31.2	5.5
Total	**18393**	**100**	**-17.9**	**19825**	**100**	**7.8**	**21979**	**100**	**10.9**	**23616**	**100**	**7.4**	**26865**	**100**	**13.8**	**100**	**4.4**

* Preliminary Figures

Source : Central Statistical Organization

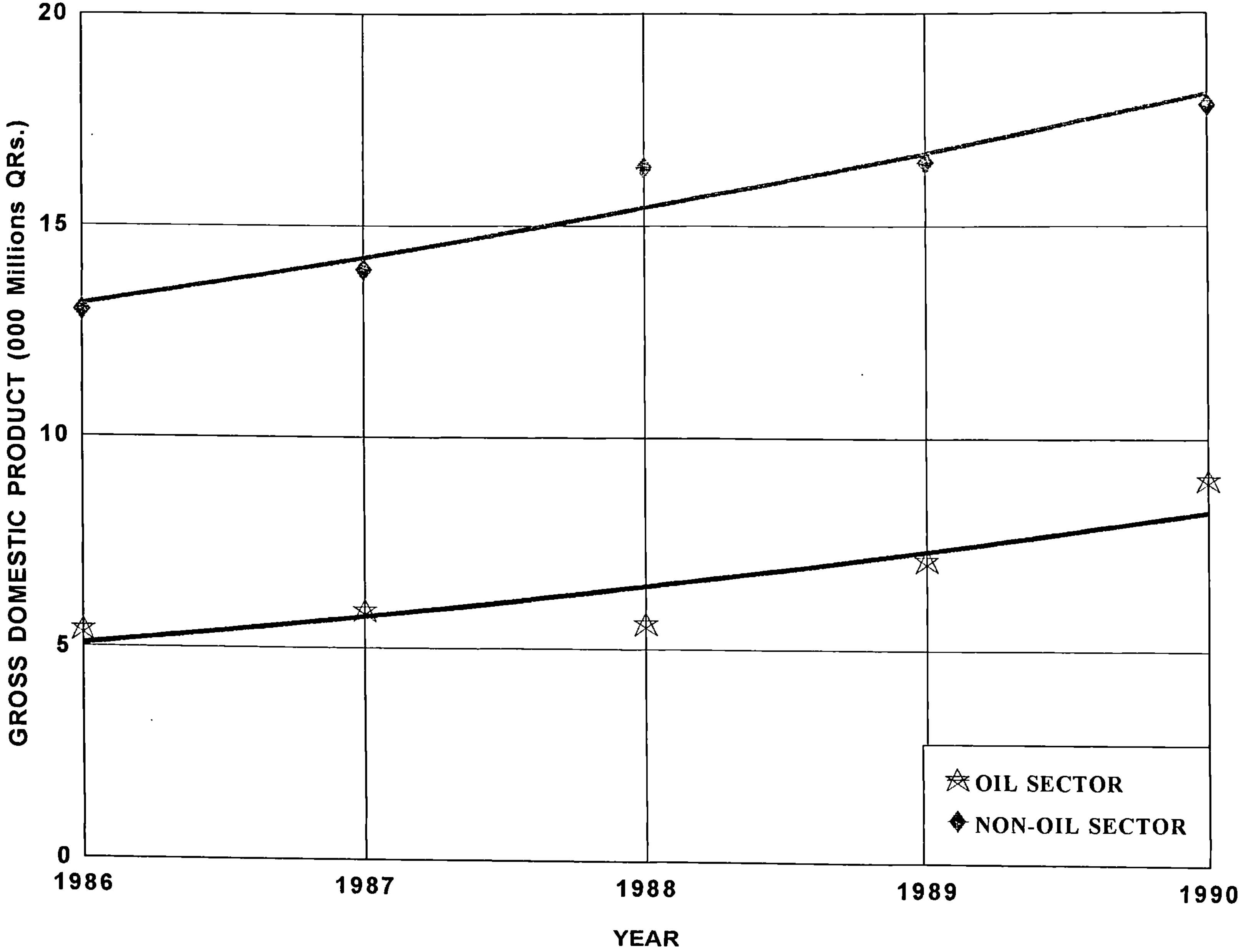


FIG. 6 GROSS DOMESTIC PRODUCT BY ECONOMIC SECTORS

This is especially true in an economy such as Qatar's where revenue from the oil sector flows first directly into the hands of the State and then is distributed both as capital and current expenditure by the State. It can be argued that even today some 70% of the value of all local production measured in GDP figures still originates in the production and sale of oil and now increasingly of gas by the State. Detailed figures however cannot be computed because data on the volume and value of oil exports have not been published officially since 1982/83 and the Gulf War between Iraq and Iran.

It is expected that the importance of this sector will remain as it is in future until more growth is realized in other economic sectors excluding oil and gas. The developmental mechanism of the Co-operation Council of the Gulf countries (GCC) will to some extent direct these developments to more suitable goals for all the countries of the Council in view of its coordinating role of increasing balanced development in all economic sectors, particularly in the industrial sector (see Chapter 4.3).

2.2.3.2 Services Sector

After the oil sector the Government services sector is next in importance with its share increasing from 622 Million Riyals in 1975 to 3,267 Million Riyals in 1980 and 5,660 Million Riyals in 1984.

2.2.3.3 Banks & Insurance

The third in order is the share of the banks and insurance sectors whose share has risen from 743 Million Riyals in 1975 to 1,705 Million Riyals in 1980 and 1,935 Million Riyals in 1984. The development of this sector is due to the socio-economic development programmes which the State has carried out including infrastructure provision. The share of this sector in GDP began to recede after 1982, influenced by the prevailing economic downturn. Between 1986 and 1990 the contribution of the finance, insurance and real estate sector varied between 10.0 to 10.7% with an average of 10.2%.

2.2.3.4 Building and Construction

The building and construction sector is the fourth in order of GDP contributors. The value of its share in total GDP rose from 766 Million Riyals in 1975 to 1,556 Million Riyals in 1980. It then decreased to 1,056 Million Riyals in 1984 because of the receding economic circumstances which accompanied the fall in oil prices after 1983. This caused a reduction in the demand for housing and buildings, associated with a decline in the size of the foreign work force, and a slow down in infrastructural expenditure by the State.

The building and construction sector generally had negative growth between 1986-1990 with the most serious set-back in 1986 as shown in Table-13, however, in 1990 growth re-started.

2.2.3.5 Manufacturing Industries

The manufacturing industrial sector has shown consistent improvement. Its share increased from 255 Million Riyals in 1975 to 943 Million Riyals in 1984. Between 1986 to 1990 the increase was from 1,777 to 3,780 Million Riyals constituting 9.7 and14.1%of GDP. Such an increase is due to the industrial development programmes which the State has carried out to exploit natural resources more broadly and to diversify sources of income.

2.2.3.6 Agriculture and Fishing

As for the agriculture and fishing sector, its share in GDP has remained constant at about 1% in spite of the growth in this sector through the carrying out and developing existing agricultural projects and improving means of fishing. The contribution of agriculture and fishing to the GDP was 220 Million Riyals in 1984, compared with 150 Million Riyals in 1980, and 71 Million Riyals in 1975. Between 1986-1990 it had negative growth but appears to have staged a recovery in 1990.

2.2.3.7 Electricity and Water

The share of electricity and water sector in GDP was relatively small, not exceeding 145 Million Riyals in 1984, compared with 64 Million Riyals in 1980 and 31 Million Riyals in 1975. Between 1986 and 1990 it varied between 313 and 350 Million Riyals constituting between 2.0 and 1.3% of GDP.

2.2.4 In summary the State of Qatar managed to realize great growth in all economic sectors between1973 and 1981. Oil revenues provided the fundamental basis for growth in all economic sectors in the State as well as in requirements of the population concerning social, health and educational services and other services. The national economic recession which followed was caused by a fall in oil prices associated with increased global production. Most of the countries of the world, both developed and developing, have become involved in major changes in the world economy and enormous changes in regional and world patterns and trends in energy supplies and demands.

2.2.5 Foreign Trade

Foreign trade is one of the main indicators of economic activity as it influences and is influenced by national economic characteristics of production, income, investment and consumption. Foreign trade is an especially important economic activity of all countries whose national income essentially depends on export of hydrocarbons and industrial products based on hydrocarbons such as fertilizers, petrochemicals and refined oil products etc. The balance of payments of any State becomes an essential factor is determining development policy. The foreign trade sector is particularly important in Qatar as the State satisfies most of its income needs through exports, and imports practically all of its consumption needs of all kinds. With basic revenues realized through exporting hydrocarbons which until recently received only the minimum of value-added processing, there is a clear incentive to industrialize for import substitution as well as to raise the value of exports.

2.2.6 Balance of Payments and Imports

Table-14 gives the balance payments estimates for the years 1987-1990, a period of relative stability after the wild variability of national income between 1972 and 1986 (and see 2.2.8 below).

TABLE - 14
BALANCE OF PAYMENT ESTIMATES 1987 - 1990

(Unit : Million QR)

Year / Items	1987	1988	1989	1990
Total Exports (F.O.B)	7224	8045	9967	14161
Total Imports (C.I.F)	-4000	-4613	-4827	-6169
Trade Balance	3224	3432	5140	7992
Services and Private Transfers	-3704	-4382	-5153	-6877
Current Account Balance	-480	-950	-13	1115
Capital Transfers (Official and Private	-1031	-900	-92	-142
Surplus or Deficit	-1511	-1850	-105	973

Source: Annual Statistical Abstract, 12th Issue, 1992

Table-15 shows how the imports of Qatar have greatly increased during the last twenty years as a result of great growth in the demand for consumer, intermediate and capital goods partly to satisfy the needs of economic development plans. Imports reached maximum value in 1982, after which they fell in line with the general trend of the local economy.

TABLE - 15
IMPORTS OF QATAR
1971 - 1986

(Unit : 000' QR)

Years	Value	Yearly Change %
1971	515869	--
1972	607263	17.7
1973	778440	28.2
1974	1068945	37.3
1975	1609800	50.6
1976	3300337	105.0
1977	4850095	46.9
1978	4589723	-5.4
1979	5377700	17.2
1980	5267922	-2.1
1981	5524891	4.9
1982	7087505	28.3
1983	5298642	-25.2
1984	4229558	-20.2
1985	4146546	-2.0
1986	3999679	-3.5

Source : Annual Statistical Abstract, July 1987

The growth in the value of imports is associated with the following factors:

1. The economic policy of the State, which encouraged the establishment of more industries and investment projects in different economic sectors as well as accomplishing infrastructural projects according to the most modern designs and systems.

2. The climate of the region together with rising social expectations. Due to the heat and excessive humidity of the country, equipment such as cars, refrigerators and air conditioners became regarded needed as necessities of life, as elsewhere in the Gulf, creating an explosion in particular in the demand for electricity (see Chapter 3.1.3).

3. The increased availability of funds. In addition to personal income growth, there was a rapid growth of financial organizations to provide the necessary capital for trading firms to carry out business in imported commodities.

4. The increasing demand for imported goods as a result of the rise in the personal incomes as well as increasing expenditure on advertisements for such commodities through modern means of communications such as television (and see Chapter 3.3.2).

5. Aggressive marketing from exporting countries vying for a share of the growing wealth of the oil States.

2.2.6.1 Imports by international blocs and commodities

Total imports for 1971-86 are given in Table-15· These years covered both boom and slump as noted in Chapter 2.2.9, the effects of which on imports is obvious.

Considering the commodity structure of Qatar's imports as shown in Table-16, we find that the largest group of imports during 1981-86 were machines and transport equipment together with percentages ranging from 39.8% in 1981 to 35.0% in 1986.

Other manufactured goods occupied the second rank of imports, 28.9% in 1981, falling to 23.7% in 1986. Consumer goods (non-food) were in 3rd rank with 17.9% in 1981, 19.5% in 1983 and 21.5% in 1986.

In the fourth rank of Qatar's imports come foodstuffs and live animals, 12.4% in 1981, 13.9% in 1983 and 18.2% in 1986.

Chemical substances were in the fifth rank as Qatar has imported 4.7% during 1982, 4.9% in 1983 and 5.8% in 1984 compared with the total imports of those successive years.

2.2.6.2 Trends During the Past 5 Years

Tables-17 shows the imports for the years 1987-91 by international blocs. Table-19 shows imports by main sections of the S.I.T.C. R-2.

TABLE -16

IMPORTS BY BROAD ECONOMIC CLASSIFICATION
1981 - 1986

(Unit : Million QR)

Economic Categories	1981		1982		1983		1984		1985		1986	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
1. Food and Beverages	685	12.4	662	9.3	735	13.9	849	20.1	691	16.7	728	18.2
11. Primary	333	6.0	299	4.2	348	6.6	429	10.2	304	7.3	367	9.2
111. Mainly for Industry	199	3.6	175	2.5	221	4.2	257	6.1	154	3.7	239	6.0
112. Mainly for Household Consumption	134	2.4	124	1.7	127	2.4	172	4.1	150	3.6	128	3.2
12. Processed	352	6.4	363	5.1	387	7.3	420	9.9	387	9.4	361	9.0
121. Mainly for Industry	11	0.2	17	0.2	14	0.3	30	0.7	27	0.7	19	0.5
122. Mainly for Household Consumption	341	6.2	346	4.9	373	7.0	390	9.2	360	8.7	342	8.5
2. Industrial Supplies Not Elsewhere Specified	1596	28.9	1892	26.7	1342	25.3	983	23.2	993	23.9	949	23.7
21. Primary	82	1.5	157	2.2	114	2.1	127	3.0	117	2.8	127	3.2
22. Processed	1514	27.4	1735	24.5	1228	23.2	856	20.2	876	21.1	822	20.5
3. Fuels and Lubricants	54	0.9	47	0.7	48	0.9	37	0.9	33	0.8	36	0.9
31. Primary	1	-	2	0.1	2	-	1	-	-	-	1	-
32. Processed	53	0.9	45	0.6	46	0.9	36	0.9	33	0.8	35	0.9
321. Motor Spirits	-	-	-	-	-	-	-	-	-	-	-	-
322. Other	53	0.9	45	0.6	46	0.9	36	0.9	33	0.8	35	0.9

Economic Categories	1981		1982		1983		1984		1985		1986	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
4. Machinery & Other Capital Equipment (except transport) and Accessories thereof.	1286	23.3	2023	28.5	1151	21.7	680	16.1	813	19.6	697	17.4
41. Machinery and Other Capital Equipment	1150	20.8	1840	25.9	837	15.8	459	10.9	532	12.8	470	11.7
42. Parts & Accessories	136	2.5	183	2.6	314	5.9	221	5.2	281	6.8	227	5.7
5. Transport Equipment & Accessories thereof	911	16.5	1354	19.1	925	17.5	677	16.0	714	17.2	705	17.6
51. Passenger Motor Cars	406	7.4	566	8.0	537	10.1	388	9.2	395	9.5	408	10.2
52. Other	78	1.4	102	1.4	194	3.7	131	3.1	149	3.6	116	2.9
521. Industrial	59	1.1	74	1.0	176	3.3	122	2.9	142	3.4	110	2.7
522. Non-Industrial	19	0.3	28	0.4	18	0.4	9	0.2	7	0.2	6	0.2
53. Parts and Accessories	427	7.7	686	9.7	194	3.7	158	3.7	170	4.1	181	4.5
6. Consumer Goods (Non-food)	987	17.9	1096	15.5	1034	19.5	965	22.8	873	21.1	858	21.5
61. Durable	473	8.6	528	7.4	478	9.0	427	10.1	391	9.4	355	8.9
62. Semi-Durable	277	5.0	316	4.5	310	5.9	286	6.8	252	6.1	257	6.4
63. Non-Durable	237	4.3	252	3.6	246	4.6	252	5.9	230	5.6	246	6.2
7. Goods Not Elsewhere Specified - Goods Imported by Passengers	6	0.1	13	0.2	63	1.2	39	0.9	30	0.7	26	0.7
Grand Total	**5525**	**100.0**	**7087**	**100.0**	**5298**	**100.0**	**4230**	**100.0**	**4147**	**100.0**	**3999**	**100.0**

The total imports between 1987 to 1991, a period of national income recovery, have been steadily rising as follows:

Year	Total Imports (Million QR)	% Increase
1987	4,177	
1988	4,613	11.17
1989	4,826	4.6
1990	6,169	12.78
1991	6,261	1.5

For the years 1988-1991 the imports grew at an average of 7.5% p.a.

2.2.6.3 Sources of Imports

It may be seen that European Economic Community contributes the largest percentage of imports ranging from 35.7 to 41.0%. Asian countries contributed between 27.1% to 31.7%. The third important group is American countries contributing between 11.9 to 14.5% followed by Arab countries contributing between 8,7 to 13.1% (U.A.E alone contributing 10.9% in 1991).

Among the EEC countries United Kingdom has maintained the lead followed by Germany. The imports from U.K. ranged from 11.7 to 16.0% and those from Germany ranged from 7.2 to 8.6%. The United States of America (USA) maintained a share between 8.8 to 11.9%.

Among Asian countries Japan dominated with a share between 14.7 to 18.8%. The U.A.E. steadily increased from 3% in 1987 to 4.2% in 1991, Saudi Arabia having a similar share of imports.

The most significant feature of these figures is the dependence of Qatar on the technologically advanced countries, not only for manufactures including capital goods but also for raw materials and foodstuffs.

TABLE - 17

IMPORTS BY INTERNATIONAL BLOCKS
1987 - 1991

(Unit : 000 QR)

Year / Countries	1987		1988		189		1990		1991	
	Value	%	Value	%	Value	%	Value	%	Value	%
1. Arab Countries	360257	8.7	463490	10.0	539059	11.2	735353	11.9	821536	13.1
a. C.C.A.S.G.	259878	6.3	336753	7.3	437144	9.1	532036	8.6	629112	10.0
United Arab Emirates	123058	3.0	142777	3.1	212600	4.4	183091	3.0	266449	4.2
Saudi Arabia	109554	2.7	137448	3.0	138144	2.9	250646	4.1	255233	4.1
Kuwait	17799	0.4	23770	0.5	33838	0.7	25048	0.4	3919	0.1
Bahrain	5745	0.1	22977	0.5	35647	0.7	58956	0.9	84563	1.3
Sultanate of Oman	3722	0.1	97181	0.2	16915	0.4	14295	0.2	18948	0.3
b. Other Arab Countries	100379	2.4	126737	2.7	101915	2.1	203317	3.3	192424	3.1
Syria	21043	0.5	36555	0.8	22952	0.5	99434	1.6	40504	0.7
Lebanon	38504	0.9	37316	0.8	27019	0.5	32093	0.5	39687	0.6
Jordan	24704	0.6	29548	0.6	17529	0.4	33932	0.6	70586	1.1
Other	16128	0.4	23318	0.5	34415	0.7	37858	0.6	41647	0.7

Countries / Year	1987		1988		189		1990		1991	
	Value	%	Value	%	Value	%	Value	%	Value	%
2. European Economic Community	1575380	38.2	1649571	35.7	1790339	37.1	2527761	41.0	2320180	37.1
United Kingdom	661527	16.0	637980	13.8	562335	11.7	895173	14.5	739964	11.8
Federal Rep. of Germany	295336	7.2	364860	7.9	350055	7.2	476277	7.7	534946	8.6
Italy	203694	4.9	197478	4.3	376049	7.8	577376	9.4	353271	5.6
France	176518	4.3	183733	4.0	225804	4.7	290302	4.7	324404	5.2
Nertherlands	101932	2.5	115475	2.5	127216	2.6	123328	2.0	130689	2.1
Denmark	64141	1.5	53974	1.2	55206	1.1	62829	1.0	51547	0.8
Belgium	45218	1.1	52525	1.1	62362	1.3	65834	1.1	159432	2.6
Greece	15701	0.4	29519	0.6	17734	0.4	21603	0.4	12062	0.2
Other	11313	0.3	14027	0.3	13578	0.3	15039	0.2	13865	0.2
3. Other European Countries	208270	5.1	229681	4.9	217507	4.5	297722	4.8	269494	4.3
Switzerland	48544	1.2	52402	1.1	42872	0.9	77146	1.3	75638	1.2
Sweden	48245	1.1	40466	0.9	68343	1.4	62122	1.0	51035	0.8
Spain	44239	1.1	41638	0.9	37627	0.8	57285	0.9	66068	1.0
Austria	18063	0.4	30222	0.7	18348	0.4	22045	0.4	22843	0.4
Norway	11748	0.3	8954	0.2	7030	0.1	15198	0.2	17547	0.3
Other	37431	0.9	55999	1.2	43287	0.9	63926	1.0	36363	0.6

Year / Countries	1987		1988		189		1990		1991	
	Value	%	Value	%	Value	%	Value	%	Value	%
4. American Countries	602264	14.6	597703	13.0	590390	12.2	733965	11.9	909746	14.5
United States of America	491016	11.9	429024	9.3	425721	8.8	584520	9.5	727782	11.6
Brazil	89674	2.2	127048	2.8	107143	2.2	99111	1.6	104649	1.7
Canada	10556	0.2	18162	0.4	15814	0.3	16882	0.3	24473	0.4
Other	11018	0.3	23469	0.5	41712	0.9	33452	0.5	52842	0.8
5. Asian Countries - Except Arab Countries	1173309	28.4	1396790	30.3	1531099	31.7	1690947	27.4	1694295	27.1
Japan	674494	16.3	811975	17.6	905603	18.8	903813	14.7	852275	13.6
India	63225	1.5	71340	1.5	80775	1.7	109817	1.8	110379	1.8
Singapore	52889	1.3	67866	1.5	82327	1.7	123122	2.0	91401	1.5
Taiwan	57464	1.4	78262	1.7	75724	1.5	75967	1.2	97295	1.6
Turkey	60866	1.5	49592	1.0	27799	0.6	31570	0.5	27365	0.4
Pakistan	36714	0.9	44585	1.0	50139	1.0	62252	1.0	55136	0.9
South Korea	60709	1.5	76781	1.7	90898	1.9	87959	1.4	101046	1.6
Thailand	28159	0.7	35022	0.8	33216	0.7	49938	0.8	68802	1.1
Peoples Rep. of China	50118	1.2	42822	0.9	47353	1.0	60819	1.0	79987	1.3
Hong Kong	15972	0.4	16160	0.4	23532	0.5	29169	0.5	44196	0.7
Other	72699	1.7	102385	2.2	113733	2.3	156521	2.5	166413	2.6

Year / Countries	1987		1988		189		1990		1991	
	Value	%	Value	%	Value	%	Value	%	Value	%
6. Oceania	110153	2.7	150057	3.2	143303	3.0	160889	2.6	230949	3.4
Australia	102274	2.5	140997	3.0	128471	2.7	150497	2.4	217375	3.5
Newzealand	7879	0.2	9060	0.2	14832	0.3	10380	0.2	13551	0.2
Other Oceania	-	-	-	-	-	-	12	0.0	23	0.0
7. Africa-Except Arab Countries	6263	0.2	7208	0.2	10007	0.2	13147	0.2	13199	0.2
8. Other Countries	92008	2.2	118646	2.6	4948	0.1	9571	0.2	1753	0.0
Total	**4127904**	**100**	**4613146**	**100**	**4826652**	**100**	**6169355**	**100**	**6261152**	**100**

TABLE - 18

IMPORTS BY MAIN SECTIONS OF THE S.I.T.C. R-2
1987 - 1991

(Unit : 000 QR)

Sitc R-2 Sections / Year	1987	1988	1989	1990	1991
(0) Food and Live Animals	706201	794024	727566	963010	950786
(1) Beverages and Tobacco	79283	73106	77558	77834	78092
(2) Crude Materials, Inedible Except Fuels	111948	140854	182500	196076	190056
(3) Mineral Fules, Lubricants and Related Materials	32376	33763	37896	43394	43575
(4) Animal and Vegetable Oil, Fats and Waxes	24035	25467	32496	27350	32817
(5) Chemicals and Related Products	261756	297739	289338	338334	388751
(6) Manufactured Goods Classified Chiefly by Materials	709234	870379	1155774	1123288	1192438
(7) Machinery and Transport Equipment	1666892	1820766	1786254	2763269	2656443
(8) Miscellaneous Manufactured Goods	509283	535816	534881	622982	724883
(9) Commodities and Transactions Not Classified in the SITC	26896	21232	2389	13818	3311
Total	**4127904**	**4613146**	**4826652**	**6169355**	**6261152**

2.2.7 The Exports

2.2.7.1 Export of Oil

Analysis here is difficult because in the last decade figures for the volume of crude oil exports and their value have been kept confidential. We know that oil still constitutes more than 90% of the total exports of Qatar and the main source of income to the State. In 1982, total exports were worth 16,405 mn. QR of which oil was worth 15,339 mn. QR constituting about 94%.

During 1983 total exports were worth 12,002 mn. QR, of which 10,883 mn. QR concerned petroleum exports 90%. Most of the oil was exported to West European countries, which occupied the first rank among the countries importing from Qatar during 1980's. After 1983, the Asian countries, mainly Japan, were the main oil importers, as they imported 51.1% in 1982 and 57.9% in 1983, whereas the imports of West European countries decreased and were only 35.4%, and 30.5% during the same period. Japan alone took 40.7% of Qatar's oil in 1982 and 47% in 1983.

Between August 1990 and January 1991 oil prices went up to US $ 35/barrel as a result of Iraqi aggression on Kuwait. But even before the Gulf war Feb/March 1991 the prices came down with OPEC trying to peg the price around US $ 20/barrel. However, this price could not be maintained due to several OPEC countries exceeding their quotas. Even, in 1993 the prices were still are well below US $ 20/barrel and the chances are that until 1995 the prices will remain around $ 15-16 a barrel.

2.2.7.2 Non-Oil Exports

As for non-petroleum exports of Qatar, most of them are industrialized commodities produced by Qatar national industries, such as chemical fertilizers, petrochemicals, iron and steel, liquefied natural gas and others. Non-oil exports have realized an annual average growth which was 11% from 1979 until 1983. During this period the value of such exports has risen from 722 Million Riyals in 1979 to 1,109 Million Riyals in 1983. This result in itself is considerable achievement along the road of industrial development.

However, the value, quantity and exports of the main industrial products of Qatar for years 1988-90 given in Table-19 show the dominance of the hydro-carbon sector as a whole, gas and oil products making up 80% of the 1990 total. The contribution of the industrial sector to exports has recently been rising at the rate of about 12% per year.

TABLE - 19

VALUE, QUANTITY & EXPORTS OF THE MAIN INDUSTRIAL PRODUCTS OF QATAR

Year	1988		1989		1990	
Products	Quantity 1000 MT	Value Million Riyals	Quantity 1000 MT	Value Million Riyals	Quantity 1000 MT	Value Million Riyal
1. Iron & Steel:						
Reinforcing Bars	492.2	579.8	497.1	608.6	540.5	592.6
2. Chemical Fertilizer:						
Ammonia	275.5	84.8	245.4	59.4	262.8	85.2
Urea	810.6	359.1	711.1	272.7	811.2	341.6
3. Petrochemicals:						
Ethylene	88.8	143.1	122.5	190.0	97.3	190.9
Polyethylene	150.6	705.7	197.0	617.5	179.2	533.9
Sulphur	32.2	11.7	59.6	20.6	51.0	16.6
4. Natural Gas Liquefied	797.5	*	867.0	*	901.5	*
5. Petroleum Products:	1334.6	*	1788.5	*	2026.4	316.0
Total	**3959.0**	**1884.2**	**4488.2**	**1768.8**	**4869.9**	**2076.8**

* Not Available

2.2.8 Qatar Balance of Payment

Table-20 gives a summary of balance of payment estimates for the years 1975-79. It may be seen that from 1975 to 1979 the balance of payments surplus increased by more than 300% i.e. from QRs. 865 Million in 1975 to 2746 in 1979. Crude oil exports in 1979 contributed almost 95% of exports.

TABLE - 20
SUMMARY OF BALANCE OF PAYMENTS ESTIMATES

(In Millions of QR)

Particulars	1975	1976	1977	1978	1979
1. Trade Balance	5333	5423	3428	4659	9277
Crude Oil Exports (F.O.B)	6932	8436	8130	8936	13933
Other Exports (including (re-exports)	201	287	144	313	722
Imports (C.I.F)	-1800	-3300	-4850	-4590	-5378
2. Services, Private and Official Transfers	-891	-1473	-1108	-1079	-4419
3. Current Account Surplus (1 - 2)	4442	3950	2316	3580	4858
4. Capital and Official Transfers	-3577	-1597	-1958	-2167	-2112(1)
5. Change in Reserves (3 - 4)	865	2353	358	1413	2746

Source : *Qatar Monetary Agency, Annual Report, 1979*

(1) *Includes capital transfers only. Current official transfers are classified in item (2) for the year 1979.*

Table-21 gives a summary of balance of payments for the years 1978-1982. It may be seen that the trade surplus reached an all time high of QRs. 15,748 million in 1981, the balance of payment surplus also reaching peak of QRs. 3,287 million in 1981. From 1982 onwards, however, the decline in balance of trade started due to the lower value of national exports, reaching the lowest value of QRs. 6,730 million in 1986 as a result of reducing both the quantity and the price of exported oil.

Table-22 shows the balance of payments for the years 1983-87. It may be seen that the trade balance went up and down with the lowest trade balance of QRs.2,730 million in 1986. The lowest deficit in balance of payments however was not in 1986 but in 1983 the figures being -2,169 and -1,772 respectively. This reflects the fact that between 1983

TABLE - 21
SUMMARY OF BALANCE OF PAYMENTS ESTIMATES

(In Million of QR)

Particulars	1978	1979	1980	1981	1982
1. Trade Balance	4659	9277	15522	15748	9305
Exports (F.O.B)	9249	14655	20787	21272	16405
Oil Exports	8936	13933	19645	20006	15339
- Crude Oil	8936	13933	19423	19283	14866
- Refined Products	-	-	189	193	-
- Liquefied Gas	-	-	33	530	473
Non-Oil Exports	313	722	1142	1266	1066
Imports (C.I.F)	-4590	-5378	-5265	-5524	-7100
2. Services and Private Transfers	-1079	-4419	-5843	-7069	-5214
3. Current Account	3580	4858	9679	8679	4091
4. Capital Transfers (Private and Official)*	-2167	-2112	-7055	-5392	-6866
5. Balance of Payments Surplus or Deficit (3 - 4)	1413	2746	2624	3287	-2775
6. Change in Reserves (Increase -)	-1413	-2746	2624	-3287	2775

Source : *Qatar Monetary Agency, Annual Report, 1982*

TABLE - 22
QATAR'S BALANCE OF PAYMENTS

(In millions of QR)

Particulars	1983	1984	1985	1986	1987*
1. Trade Balance	6703	8015	7130	2730	3224
Exports (f.o.b)	12002	12245	11277	6730	7224
Imports (c.i.f)	-5299	-4230	-4147	-4000	-4000
2. Services and Private Transfers (Net)	-5212	-4995	-5132	-3417	-3704
3. Current Account (1 + 2)	1491	3020	1998	-687	-480
4. Net Capital Transfers (Private and Official)	-3660	-2005	-2360	-1085	-1031
5. Surplus or Deficit in Balance of Payment (3+4)	-2169	1015	-362	-1772	-1511
6. Change in Reserves (Increase -)	2169	-1015	362	1772	1511

Source : *QMA, Annual Report, 1987.* ** Estimates* and 1987 the net service and private transfers as well as net capital transfers were reduced, thus reducing the impact of the lowest level of exports in 1986.

Rising from QRs. 358 million in 1977 to QRs. 3,287 million in 1981, a growth of almost 10 times was experienced in the balance of payments surplus. In 1982, the balance of payments underwent a drastic change to a deficit of QRs. 2,775 million.

The deficit in balance of payments continued between 1983 to 1987 except for 1984 when there was a surplus of QRs. 1,015 million. The deficit continued till the year 1989. This is despite the fact that the trade surplus continued to increase from a low of QRs.2.730 million in 1986 to QRs. 4,953 million in 1989. Only in 1990 could a positive balance of payments of QRs. 706 million be realized due to a substantial increase in trade balance of QRs. 6,678 million as against QRs. 4,953 million in 1989 as shown in Table-23.

TABLE - 23
QATAR'S BALANCE OF PAYMENTS

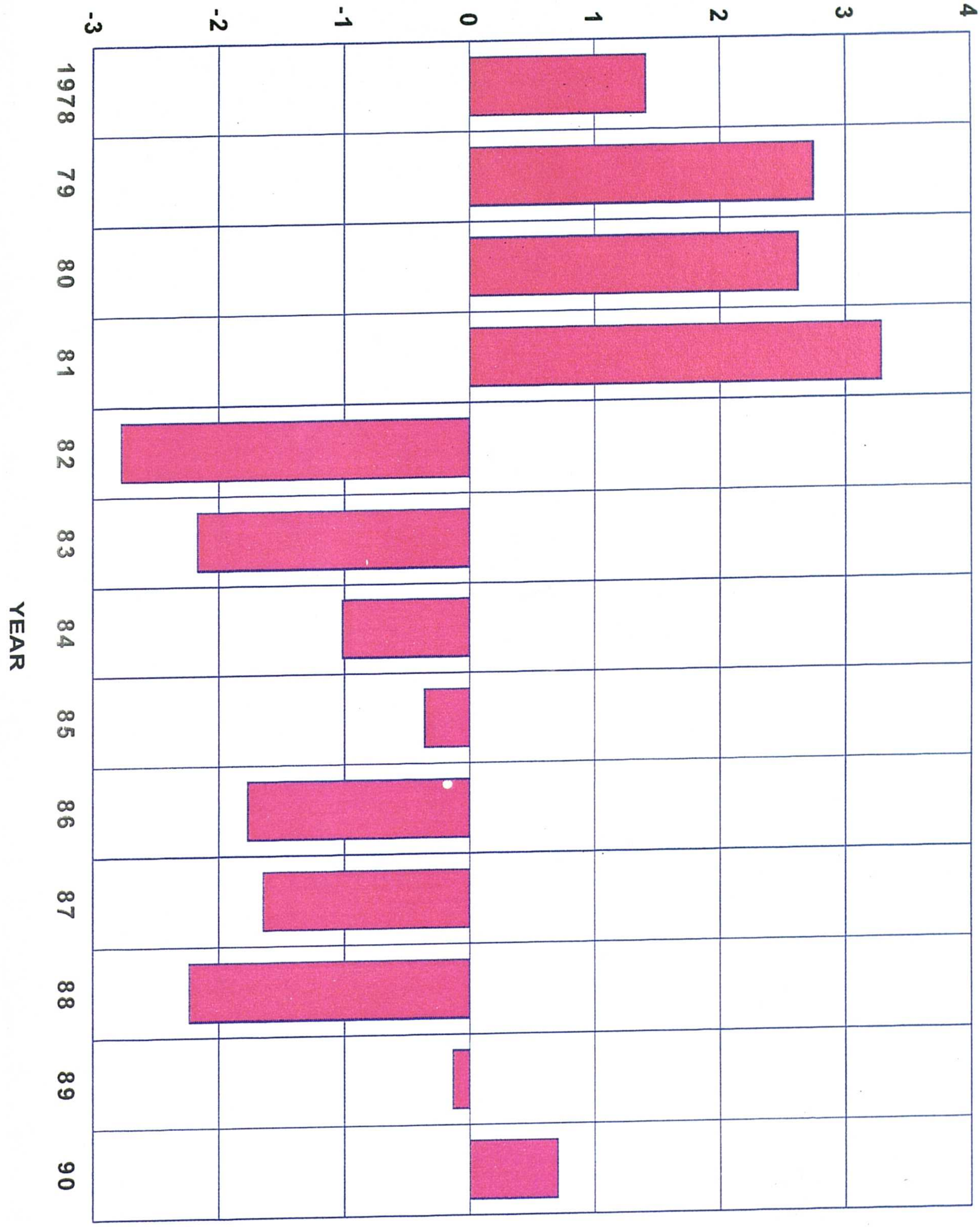
(In Millions of QR)

Particulars	1986	1987	1988	1989	1990*
1. Trade Balance	2730	3307	3432	4,953	6678
Exports (F.O.B)	6730	7435	8045	9780	12847
Imports (C.I.F)	-4000	-4128	-4613	-4827	-6169
2. Services and Private Transfers (Net)	-3417	-3923	-4382	-4997	-5830
3. Current Account (1 + 2)	-687	-616	-950	-44	848
4. Net Capital Transfer (Private and Official)	-1085	-1031	-1286	-92	-142
5. Surplus or Deficit in Balance of Payment (3 + 4)	-1772	-1647	-2236	-136	706
6. Change in Reserves (Increase -)	1772	1647	2236	136	-706

Source : *QMA, Annual Report, 1990*

* *Estimates*

BALANCE OF PAYMENTS (Million QRs.)



1.2.9. Public Finance of the State

1.2.9.1 The Government Budget:

Oil income has constituted the major part of total government income in the period shown in Table-24, as the average contribution was 90% during this period, excluding the years 1402 and 1403 AH during which the percentage was 85%. This annual rise in income averaging 16% was accompanied by another rise in actual government expenditure, the latter rising from QRs. 5,809 million in 1396 AH to QRs. 20,672 million in 1402 and 1403 AH, thus realizing an annual average growth about 23% during that period. From 1404/05 the decline in total revenues started and reached the lowest level in 1406/07 with QRs. 5884 mn. In 1989/90 the calendar year was changed to the Gregorian system. By 1990/91 there had been a steady improvement in the revenues to QRs. 12,008 mn. although this was still only about 50% of 1402/03 revenues.

What is remarkable is that Qatar was able to survive a period of great economic shocks lasting 8 years during which government revenue first rose by 173% between 1398 and 1402/03 and then fell by 74% by 1406/07. This phenomenon is itself an indicator of the peculiar character of the economy of Qatar and a very few similar States, a feature which is considered elsewhere in this thesis as relevant to development processes.

In spite of the rise of government total expenditure, as shown on Table-24, due to the rise in revenue, particularly oil income, the surplus balance increased from QRs. 3.118 million in 1396 AH, to QRs. 8,067 Million in 1400 AH, thus realizing an annual growth of about 26% (but see Chapter 3.2). The value of this surplus began to retreat since the beginning of 1401 AH, in parallel with a fall in oil prices; it fell in 1402 and 1403 AH to QRs. 1,770 million, a reduction of about 22%, compared with the surplus realized in 1400 AH.

As noted in Chapter 3.1 a considerable amount of investment in physical infrastructure as well as in State industries (Chapter 6.3) required a steady flow of government capital expenditure which became relatively inflexible in the short-term. However, much of current expenditure, i.e. on transport, building and machinery renovation and many other elements, became almost equally inflexible since it was consequentially linked to the more obvious forms of capital expenditure. The scope for financial maneouvre in total governmental expenditure was, and even now is therefore limited, locked in as it is to almost every aspect of development in Qatar. This is of considerable relevance to the process of industrialization.

TABLE - 24
QATAR GOVERNMENT REVENUE & EXPENDITURE

(mm QR)

Particulars	1398#	1400	1402/03*	1404/05	1406/07	1408/09	1989/90**	1990/91
Total Revenue	8,225	19,004	22,442	13,610	5,884	7,688	9,057	12,008
Oil Revenue	7,421	17,454	19,032	n/a	n/a	n/a	n/a	n/a
Total Expenditure	6,472	10,937	20,672	12,173	10,433	14,382	10,524	11,388
Capital Expenditure	2,536	3,260	5,457	3,063	2,521	2,626	1,569	1,755
Surplus	1,753	8,067	1,770	1,437				620
Deficit					4,549	6,694	1,467	

Source : Ministry of Finance

* *Hijra Year from 1st Moharram 1402 - 30th Jamad 1403*

** *Change from Hijra Year to Calendar Year.*

\# *1398 AH - 12 Dec. 1977 to 2 Dec. 1978*

n/a Not available

2.2.9.2 Budgets

Table-25 gives the estimates and actual state budgets for 1405/06 - 1407/08. It may be seen that though estimates were for deficit budgets, however actual budget out-turns showed a marginal surplus of QR 19 million in 1405/06 and less than the estimated deficits for the years 1406/1407.

Table-26 gives the estimated and actual budgets for the years 1408/09 (1989/90) and 1990/91. It may be seen that the deficit estimates for 1408/09 QR 6,106 million were lower than actual figures -QR 6,695 million. However, 1989/90 deficit estimates were much higher than the actual figure and in 1990/91 the actual figures were also for much smaller deficits than previously estimated.

It may thus be seen that with conservative budgetary planning and strict controls, Qatar has emerged out of budgetary deficits from 1989/90 onward.

TABLE - 25
ESTIMATED AND ACTUAL STATE BUDGETS FOR 1405/06 - 1407/08H*

(In Millions of QR)

Particulars	Estimates			Actual Figures		
	1405/06	1406/07**	1407/08	1405/06	1406/07	1407/08***
Total Revenues	9737	-	6745	10393	5884	6387
Total Expenditure	15607	-	12217	10374	10433	9985
Recurrent Expenditures	11807	-	9451	8691	8949	8535
Capital Expenditures	3800	-	2766	1683	1484	1450
Surplus or Deficit	**-5870**	**-**	**-5472**	**19**	**-4549**	**-3598**

Source : QMA, Annual Report, 1987

* *The Hijri year starts in Rajab and ends in Jumadi II (AH)*

** *The projected State Budget for 1406/07 was not issued.*

*** *Preliminary Figures.*

TABLE - 26
ESTIMATED AND ACTUAL STATE BUDGETS FOR 1408/09* H - 1990/91**

(In Millions of QR)

Particulars	Estimates			Actual Figures		
	1408/09	1989/90	1990/91	1408/09	1989/90	1990/91 ***
Total Revenues	6336	5835	7786	7688	9300	10182
Total Expenditure	12442	11482	11709	14383	10525	10365
Recurrent Expenditures	9826	9969	9920	12694	9511	9319
Capital Expenditures	2616	1513	1789	1689	1014	1046
Deficit	**-6106**	**-5647**	**-3923**	**-6695**	**-1225**	**-183**

Source : *QMA, Annual Report, 1990*

* *The Hijri year starts in Rajab and ends in Jumadi II*

** *State budget based on Gregorian calender year, starts April 1st and ends March 31st.*

*** *Preliminary Figures.*

2.2.9.3 **Budget for 1993-94**

A 5.4% increase in the State's general expenditure, including a large 25% enhanced outlay on capital projects, was announced in Qatar's budget for 1993-94, Table-27.

TABLE - 27
QATAR'S BUDGET FOR 1993-1994

(Figures in Million QR)

Particulars	1993-94	1992-93
Total Revenue	10,373.2	9,606.6
Total Expenditure	13,076.5	12,399.2
Capital Spending	2,708.2	2,165.6
a) Public Services & Infrastructure	994.4	911.3
b) Economic Services	1058.5	834.5
c) Social and Health	552.4	401.4
d) Education & Youth	102.9	138.3

Source : *Ministry of Finance*

The budget estimates an income, chiefly from oil sales, of QR 10.37 bn - 7.9% up on the previous year's estimates of QR 6.91 bn - and an expenditure of QR 13.07 bn - 5.04% up, producing a deficit, including commitments outside the budget, of QR 2.92 bn - less than QR 3.01 bn for 1992/93.

A major part of the increased spending goes to finance a host of new post-North Field downstream and infrastructural projects aimed at diversifying the Qatari economy, improving the already high standard of life of Qatari citizens and leading the oil-sustained economy into the gas age (see Chapter 6.21 and following sections).

This translates into a 25% jump in capital spending which rises by 542.4 mn from QR 2,165.6 mn in 1992/93 to QR 2,708.2 mn. in 1993/94.

New projects proposed during the financial year include power and water network extension, electrification of the proposed new Doha International Airport and a container port, a children's hospital, dental clinic, new roads, sewerage facilities, 13 new schools, and big expansion of housing projects.

The substantial increase in capital expenditure is expected to keep the Qatari market economy well-supplied with liquidity and guarantee enough jobs for the private sector. Beside higher outlay on new projects the government has given priority to completion of ongoing schemes and setting up complementary facilities to boost their efficiency.

2.3 Government and Private Final Consumption of the GNP

The Qatar Government's investment and spending policies are obviously key elements in determining the level of GDP consumption. One aspect of this has been the way in which Gross Capital Formation (at constant 1988 prices) grew between 1986 and 1990 by 14%. Because of the conservative nature of the management of Qatar's economy it is not likely that the real asset valuation of Gross Capital Formation has depreciated significantly. In contrast to some other countries Qatar is unlikely to have suffered any significant loss over the last decade as the result of falling values of investment. Qatar's credit-worthiness remains high and other things being equal it can negotiate very good terms for inward investment and joint projects. This is especially important for new industrial investment which requires high rates of capitalisation and long lead-times, for example LNG and other associated projects (see Chapter 6.20).

The faster growth of the proportion of GDP taken up by private final consumption compared with Government consumption - 27% rising to 30% compared with 47% to 40% - during the period 1986-1990 is also significant. Assuming the accuracy of estimates of the national population of 504,000 in 1991, this represented an average gross figure of 14,330 QR per head per annum and with a history of rapid growth from 5,840 mn QR in 1986 to 7,007 mn QR in 1990. Even these basic approximate figures indicate the considerable size of the domestic market for goods and services in Qatar. In Chapter 3.3.2 further analysis of this market and its relevance to industrial development is carried out.

2.4 Development Policy and Development Practice - A Preliminary Survey

In the Chapters which follow more detailed analysis is made of sectoral developments with special reference to manufacturing industry. It is already clear, however, that Qatar's freedom of action to apply classical development policies has been severely limited. Twenty years of considerable investment of capital and effort have achieved a great deal but the constraints imposed by several factors have prevented the kinds of fundamental transformation of the economy and society hoped for theoretically.

2.4.1 First, major industrial development projects in the public sector have been mainly confined to low and middle technology processing of hydro-carbons (see Chapter 6.18) and steel and cement making driven by local and regional construction demands.

Secondly, industrialization in the private sector is still mainly in its technological infancy and almost totally dependent on imported raw and intermediate goods (see Chapter 6.17).

Thirdly, in Qatar there has never been reason to regard industrialization as valuable in providing mass job opportunities for a mass of poor unemployed job-seekers. Qatar has suffered in fact from a shortage of an indigenous labour-force (see Chapter 1.5) and had to rely on imported non-Qatari labour. The CSO Survey of Employment in the Private Sector in 1983 provides the most recent data but all the evidence suggests little change a decade later. Qataris make up 3% or less of the manufacturing labour force in the private sector. In the public and mixed sectors the proportion is probably about 12%.

Fourthly, partly because of limited local natural resources, although the industrial drive has produced some import substitution e.g. some constructional steel, cement, some plastic products and clothing, the total direct and indirect effect so far has been to raise the level of importation. For example the clothing industry had 56% of the total of all private sector industrial establishments in 1990; relevant fabric imports in 1990 were valued at almost 99 mn. QR., an increase of the order of 80% since 1970. Indirectly, the large expatriate labour demand by industry has created a larger demand for imports - mainly for consumer non-durables but also in construction and public utility sectors. As examined later, it is normal for rapidly industrializing economies to experience a rapid growth in demand for imported capital goods but in Qatar this has meant not only major items of manufacturing plant but most ancillary items ranging from electrical circuitry to paper-clips.

Lastly, whilst there has been a noteworthy increase in exports of manufactures, in 1990 13% of all exports were of manufactured products of hydro-carbon origin, 79% was contributed by crude oil and 3% by LPG (CSO Trade, 1991). Qatar is still dependent on world trade in hydro-carbons and their products.

It has to be accepted therefore that whilst some of the aims of industrial development have been fulfilled, even this preliminary survey of general economic data suggests that: not all of the main hopes were totally realistic; many of them have not been met; and lastly that perhaps not all of them <u>can</u> be met. In the event Qatar has proceeded pragmatically and cautiously, attempting to take a long-term view even during the many world changes in the less than half a century - one generation - which has passed since oil exploitation made national planning possible.

CHAPTER 3

OTHER FACTORS IN THE INDUSTRIAL DEVELOPMENT PROCESS

3.1 The Physical Infrastructure
3.1.1 Transport
3.1.1.1 By Sea
3.1.1.2 By Air
3.1.1.3 By Road
3.1.2 Communications
3.1.3 Electricity
3.1.4 Water
3.1.5 Pipelines Network
3.2 Capital and Liquidity
3.2.1 Banking
3.2.2 Capital and Investment
3.3 Markets and Marketing
3.3.1 General
3.3.2 Marketing of Industrial Products
3.3.2.1 Market Research
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3.3.2.3 Pricing and Costing
3.3.2.4 Advertising, Distribution and Sales/After Sales Services
3.4 The Domestic Market in Qatar for Industrial Products
3.4.1 The Domestic Market as Indicated by Imports - Consumer Goods
3.4.2 Intermediate and Capital Goods

3.5 Export Markets

3.5.1 Gulf Cooperation

3.5.2 Qatar's Industrial Exports by Commodity Group

3.5.3 Qatar's Industrial Exports by Destination

3.5.4 Gulf Markets

3.6 Human Resources for Industrial Development

3.6.1 The Quantitative Factor

3.6.2 The Qualitative Factor

CHAPTER 3
OTHER FACTORS IN THE INDUSTRIAL DEVELOPMENT PROCESS

3.1 The Physical Infrastructure

3.1.1 Transport

3.1.1.1 By Sea

The State of Qatar has three principal ports - Doha, Umm Said and Haloul, excluding the small harbours for traditional sailing ships. The harbour of Doha is essentially used for imports whilst the port of Umm Said, 40 kilometers south of Doha, is used for exporting Qatari industrial products and oil as well as importing iron ore and other raw materials for Qatar Steel Company. The harbour of Haloul is for exporting the off-shore oil production of Qatar.

The oil exports from Umm Said and Haloul harbours reached the maximum in 1973 at 27 million tons. The change which occurred in international oil markets and the resulting fall in prices led to a decreasing of exports to 13 million tons in 1983.

The traffic handling capacity of Qatar's ports is in all cases greater than present demands, whilst delays and overloaded harbours, common in the 1970s, exist no more. Table-28 shows the number of arriving vessels, gross and net tonnage by type and country of last port during 1991.

3.1.1.2 By Air

Doha International Airport during recent years has averaged some 27 international aircraft arrivals daily. The regional airline "Gulf Air", owned by Qatar, U.A.E., Bahrain and Oman has headquarters in Doha. Its services extend over Europe, the Middle East, India and the Far East, together with providing many excellent services to the Gulf Cooperation Council countries. Doha International Airport has been modified recently providing more facilities and spacious passengers' halls in arrival and departure areas. Although preliminary work on the building of a new international airport has been initiated, the present economic situation may delay the completion on schedule. Table-29 gives aircraft, passenger and cargo activity at Doha International Airport for the years 1987-91.

TABLE - 28

NUMBER OF ARRIVING VESSELS, GROSS AND NET TONNAGE BY TYPE AND COUNTRY OF LAST PORT 1991

Country of Last Port	No. of Vessels Gross & Net Tonnage	Type of Vessels								Total
		Crude Oil Tankers	General Cargo	Contai-ners	Bulk	Live Stock	Auto Carrier	Cement Carrier	Other	
C.C.A.S.G.	No. of Vessels	126	134	289	47	6	117	-	3	722
	Gross Tonnage	13526154	1002150	193906	459151	159366	2281485	-	40696	17662908
	Net Tonnage	9128681	627807	90185	299371	77874	1025739	-	23171	11272828
Other Arab	No. of Vessels	3	6	-	5	-	1	-	-	15
Countries	Gross Tonnage	124148	23095	-	64506	-	7588	-	-	219337
	Net Tonnage	70888	12461	-	37221	-	4304	-	-	124874
European Countries	No. of Vessels	8	5	-	3	-	-	-	-	16
(Excluding The Socia	Gross Tonnage	711843	15176	-	190580	-	-	-	-	917599
list Countries Block)	Net Tonnage	551433	8313	-	136843	-	-	-	-	696589
European Socialist	No. of Vessels	-	1	-	-	-	-	-	-	1
Countries	Gross Tonnage	-	1600	-	-	-	-	-	-	1600
	Net Tonnage	-	1098	-	-	-	-	-	-	1098
Asian Countries	No. of Vessels	160	21	2	35	1	2	-	40	261
	Gross Tonnage	14374398	87739	1726	558291	9623	14560	-	79620	15125957
	Net Tonnage	8954158	529521	1106	280178	5628	8211	-	25058	9327290

Source : 12th Annual Statistical Abstract, 1991, Doha 1993

Country of Last Port	No. of Vessels Gross & Net Tonnage	Type of Vessels								Total
		Crude Oil Tankers	General Cargo	Contai-ners	Bulk	Live Stock	Auto Carrier	Cement Carrier	Other	
African Countries	No. of Vessels	-	4	-	3	-	-	-	-	7
	Gross Tonnage	-	14380	-	35282	-	-	-	-	49662
	Net Tonnage	-	8225	-	18655	-	-	-	-	26880
North American Countries	No. of Vessels	4	-	-	-	-	1	-	-	5
	Gross Tonnage	303238	-	-	-	-	39043	-	-	342281
	Net Tonnage	238950	-	-	-	-	11712	-	-	250662
South American Countries	No. of Vessels	6	-	-	4	-	-	-	-	10
	Gross Tonnage	912138	-	-	258567	-	-	-	-	1170705
	Net Tonnage	722040	-	-	185614	-	-	-	-	907654
Oceania Countries	No. of Vessels	-	2	-	5	8	-	-	-	15
	Gross Tonnage	-	29078	-	62961	52991	-	-	-	145030
	Net Tonnage	-	18114	-	39840	296874	-	-	-	87638
Countries Not Specified	No. of Vessels	1	-	1	1	-	-	-	-	3
	Gross Tonnage	30480	-	285	6060	-	-	-	-	36825
	Net Tonnage	21692	-	75	3534	-	-	-	-	25301
Total	No. of Vessels	308	173	292	103	15	121	-	43	1055
	Gross Tonnage	29982399	1173218	195917	1635398	221980	2342676	-	120316	35671904
	Net Tonnage	19684842	728969	91366	1001256	113186	1049966	-	48229	22720814

Source : 12th Annual Statistical Abstract, 1991, Doha 1993

TABLE - 29

AIRCRAFT, PASSENGER AND CARGO ACTIVITY AT DOHA INTERNATIONAL AIRPORT 1987 - 1991

Particulars	1987	1988	1989	1990	1991
Aircrafts:					
Arriving	9501	9996	9820	9625	8428
Departing	9502	9996	9820	9625	8428
Passengers:					
Arrivals	488511	520478	542896	547598	526833
Departures	473387	508843	532329	554624	525520
Transit	425525	453126	365258	302825	295187
Cargo and Mail (Tons):					
Received	21144	18999	19206	19791	18006
Despatched	4423	5666	5867	6118	6606

Source : Annual Statistical Abstract 1991, Doha , 1993

3.1.1.3 By Road

Road building and maintenance is a continuous operation all over the country. Roads for rapid four or six lane traffic form a national network, joining Doha with Umm Said, Abu-Samara, Dokhan, Al-Rowais and Al-Khor. The total length of these arterial roads is more than 1000 miles. (see Fig. 1)

The urban road network in Doha, Umm Said, Al-Wakrah and elsewhere is continually being developed, particularly that in the industrial area of Salwa for commercial traffic.

The international road network includes the Salwa - Halouf Road which passes into Saudi Arabia, and onward to Jordan and West Europe passing through Kuwait, Iraq and Turkey. A second 415 kilometer road link joins Qatar with the United Arab Emirates and Oman. The flyover bridge, which connects Al-Bahrain with Saudi Arabia, acts as a linking ring to connect the State of Qatar with the other GCC countries. The development of these roads is strongly linked with Qatar's non-petroleum export and import traffic, particularly Qatari iron and steel products since most of them are marketed in the countries of the GCC.

3.1.2 Other Communications

The State of Qatar is connected with other countries in the world by an excellent telecommunication network. There is an earth/satellite station for transmission located 35 kilometers west of Doha. This provides direct telephone links with more than one hundred and fifty countries, as well as direct colour television international transmission. Domestic and international telex and fax services are wide spread. Table-30 shows the telephone, telex and cable services operated during the years 1987-91. By the end of 1987 the number of telex subscribers peaked at 1035 compared with 557 in 1991, the reason for decline being the growing popularity of fax services.

The telephone network in the State of Qatar has developed from a limited network until it covers the whole country, using highly developed technical systems. In 1984, about 65,000 lines were operated. During the same year there were 23 million telephone calls, with an average of 70-90 minutes for every individual. Table-30 shows the increase in telephone lines from 77474 in 1987 to 96320 in 1991. Telegraph services are provided, but compared with telex, fax and telephone services, they are relatively few. In 1984, about 128,000 telegram were sent abroad. Between 1987 and 1991 this service remained more or less static around 90 - 100,000 telegrams per year.

TABLE - 30
TELEPHONE, TELEX AND CABLE SERVICES
1987 - 1991

Particulars	1987	1988	1989	1990	1991
No. of Stations	121124	129291	134823	139214	145736
No. of Working Telephone Lines	77474	83215	88913	92071	96320
International Tele-phone Calls (1000's)	5604	6900	7998	8925	10218
International Tele phone Mins. (1000's)	31299	36350	39676	41285	45486
Number of Telex Subscribers	1035	977	800	660	557
International Telex Mins. (1000's)	1748	1493	1003	807	1013
International Telegrams (1000's)	99	103	92	89	95
No. of Car Telephones	2676	2805	3012	3703	4050

Source : 12th Annual Statistical Abstract, 1991, Doha 1993

Postal services have also developed rapidly in the State of Qatar. Table-31 shows post offices, agencies and mail boxes 1987-1991. Table-32 shows post services 1987-1991. There were 28 post offices working daily in 1991 compared with only three in 1963. The urgent post "Al-Mumtaz" has been introduced to guarantee the arrival of correspondences at most important international cities within 24 hours. A new general post office with excellent facilities and automatic sorting was built and inaugurated in 1987, its pyramid-like structure now a land mark at the West Bay Doha Corniche.

In all respects, Qatar now has a communications infrastructure capable of supporting any national and international demands arising from industrial development.

TABLE - 31
POST OFFICES, AGENCIES AND MAIL BOXES
1987 - 1991

Particulars	1987	1988	1989	1990	1991
No. of Post Offices	25	26	26	26	28
No. of Agencies	7	7	5	5	17
No. of Mail Boxes	201	208	237	241	258
No. of P.O.Boxes for Subscribers	14922	30380	32240	32240	33460

Source : 12th Statistical Abstract, 1991, Doha 1993

3.1.3 Electricity (see Fig. 8)

In 1954 the installed capacity for generating electricity was only 2 million kilo watt hours (KwH). By 1970 generated electricity rose to 277 million KWH and by 1984 to 3563 KWH, the rate of growth slowing down most recently. Table-33 shows the status of installed capacities, peak loads and utilization co-efficient for electricity for the years 1987 to 1991.

About 80% of all generated electricity comes from the combined plants for electricity and desalinating water. Ras Abu Fontas station, about 10 kilometers to the south of Doha, produces 80% of this, the remainder coming from Ras Abu Aboud within Greater Doha. The power generating capacity as well as desalination capacity has to be developed further in the State of Qatar to satisfy the increasing needs of these utilities especially during the summer months when electric power consumption - for air-conditioning - reaches its peak. Two new 117 MW gas turbine stations installed at Al-Wajbah raised the installed generating capacity to 1284 MW. Further plans are underway to promote a private sector organization viz. Qatar Electricity & Water Company (QEWC) to take care

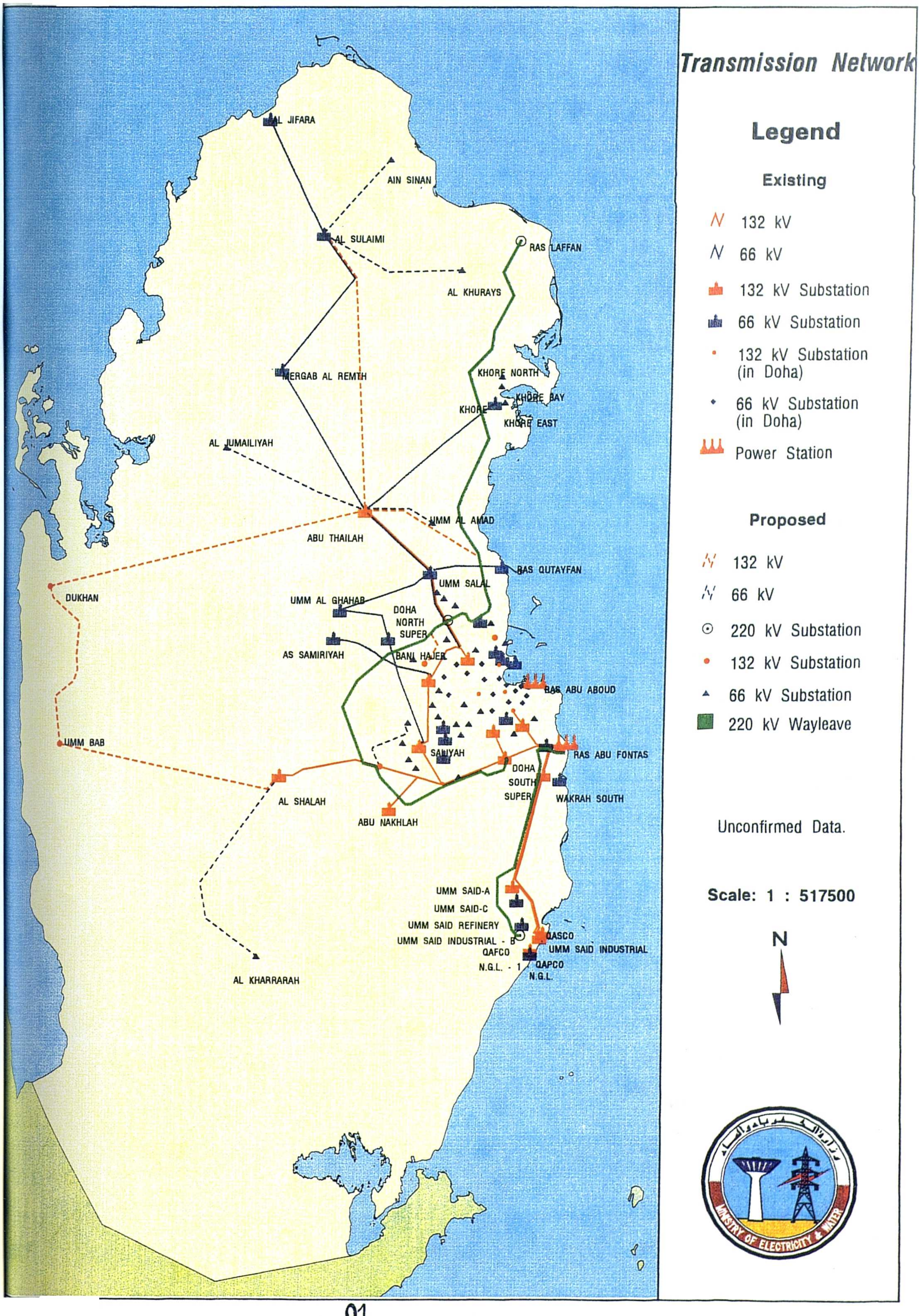
TABLE - 32

POST SERVICES 1987 - 1991

Particulars	Unit	1987		1988		1989		1990		1991	
		Recd.	Desp.	Recd.	Desp.	Recd.	Desp.	Recd.	Desp.	Recd.	Desp.
Weight of Airmail	Kg.	404300	576800	417000	549100	401400	392700	378100	349100	334800	292000
Parcels	Kg.	111900	404500	100000	393400	102000	242600	97500	211400	93300	175700
Letters, Postcards & Other Materials	Kg.	292400	172300	317000	155700	299400	150100	280600	137700	241500	116300
No.of Airmail Letters, Cards & Other Airmail Materials	1000	20468	10339	15850	6228	14970	9006	16518	8967	14789	8750
No.of Air and Sur face Mail Parcels	Par-cel	29900	39600	26800	35300	25000	36000	22400	32000	19500	25700
No.of Registered Airmail Letter	Let-ter	323300	838200	368100	743700	360500	711700	316300	670400	297600	611100
No.of Airmail Parcel Post	Par-cel	33200	41900	42100	52100	42300	52800	25700	16200	24500	13700
Mumtaz Post	Item	28300	29100	44400	35200	29800	31500	29000	29200	31500	27400
Weight	Kg.	21700	19100	36400	26100	28300	19000	28200	17400	29500	14600
Inte Post	Let-ter	30	122	48	161	280	288	137	327	58	273

Source : 12th Annual Statistical Abstract, 1991, Doha 1993

FIG 8


Transmission Network
Legend
Existing
132 kV
66 kV
132 kV Substation
66 kV Substation
132 kV Substation (in Doha)
66 kV Substation (in Doha)
Power Station
Proposed
132 kV
66 kV
220 kV Substation
132 kV Substation
66 kV Substation
220 kV Wayleave
Unconfirmed Data.
Scale: 1 : 517500
N
MINISTRY OF ELECTRICITY & WATER
AL JIFARA
AIN SINAN
AL SULAIMI
RAS LAFFAN
AL KHURAYS
MERGAB AL REMTH
KHORE NORTH
KHORE BAY
KHORE
KHORE EAST
AL JUMAILIYAH
UMM AL AMAD
ABU THAILAH
RAS QUTAYFAN
UMM SALAL
DUKHAN
UMM AL GHAHAB
DOHA NORTH SUPER
AS SAMIRIYAH
BANI HAJER
RAS ABU ABOUD
UMM BAB
SALIYAH
RAS ABU FONTAS
DOHA SOUTH SUPER
WAKRAH SOUTH
AL SHALAH
ABU NAKHLAH
UMM SAID-A
UMM SAID-C
UMM SAID REFINERY
UMM SAID INDUSTRIAL - B
QASCO
QAFCO
UMM SAID INDUSTRIAL
N.G.L. - 1
QAPCO
N.G.L.
AL KHARRARAH

of future generation of electricity and water. In the meanwhile Ministry of Electricity and Water issued a Letter of Intent in Dec. 1993 to a German organization to instal additional capacity of 600 MW of electricity and 35 MGD per day of desalinated water as an expansion of Ras Abu Fontas station. The first of the units to be installed here will be operative by May 1995 so that there will be no difficulty to meet the peak demand of the consumers.

TABLE - 33
ELECTRICITY AND PEAK LOAD
1987 - 1991

Year	Load Factor(2)	Utilization Coefficient(1)	Generation (Mil.KWH)	Peak Load (M.W)	Installed Capacity (M.W)
1987	55.0	82.8	4366.0	907.0	1095.2
1988	55.6	85.9	4592.3	941.0	1095.2
1989	54.6	88.3	4624.0	967.0	1095.2
1990	55.7	90.1	4818.3	987.0	1095.2
1991	53.2	91.0	4642.8	997.0	1095.2

Source : 12th Annual Statistical Abstract, 1991, doha 1993

(1) Utilization Coefficient $= \dfrac{\text{Peak Load} \times 100}{\text{Installed Capactiy}}$

(2) Load Factor $= \dfrac{\text{Generation} \times 100}{\text{Total Hours in Year} \times \text{Peak Load}}$

Total Hour in Year = 8760 Hours
(For Leap Year = 8784 Hours)

The sources of generating electricity and its network for distribution have become completely reliable. Attempts are being made to avoid the technical breakdowns which may occur sometime somewhere in Qatar.

In 1984, electricity consumption in industry was about 594 million kilo watt hours equivalent to 17% of the total generated power. Some major industrial companies have private facilities for generating electricity to meet their own requirement, and the surplus is transmitted to the public network for local distribution. Electricity consumed by the industrial sector in 1991 rose to about 696 million kilowatt hours constituting about 16% of total generated as shown in Table-34.

TABLE - 34
ELECTRICITY CONSUMED BY SECTORS 1989 - 1991
(MKWA)

Year / Sector	1989	1990	1991
Government	1781.7	1799.5	*2927.9
Commercial	1491.1	1506.0	*365.6
Industrial	634.0	678.4	696.0
Power Stations	432.2	436.6	-
Roads & Street Lighting	62.4	63.0	-
Loss	222.6	193.6	261.5
Total	**4624.0**	**4677.1**	**4251.0**

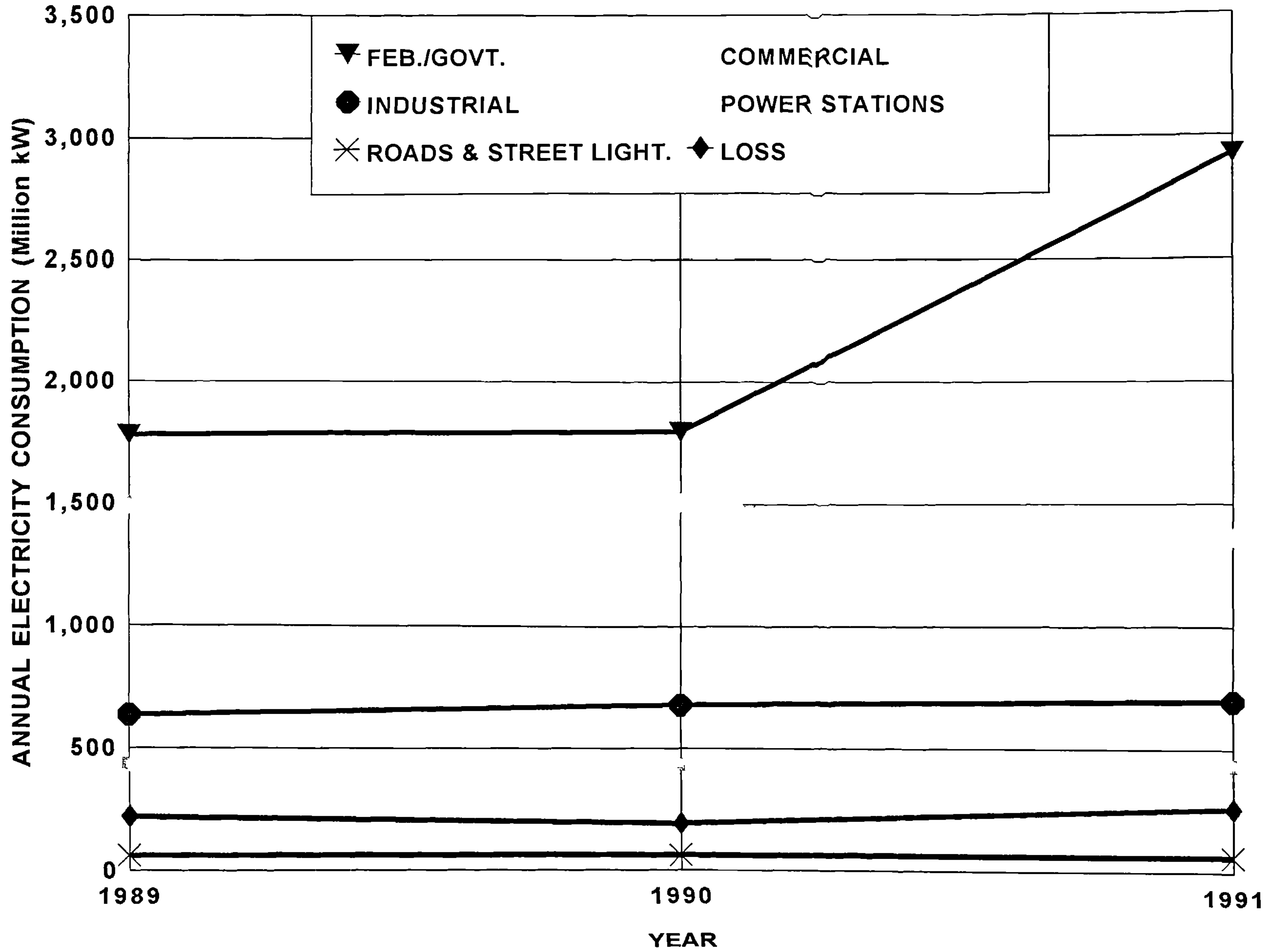
Source : 12th Annual Statistical Abstract 1991, Doha 1993

* *Changes in classification.*

3.1.4 Water

As noted in Chapter 1.6.4, Qatar's natural water resources are limited and not sufficient to meet all needs. For all purposes, excluding agriculture, water is now supplied by dual purpose units, generating electricity and desalinated water. The desalinated water is mixed with small quantities of well water to produce water for local potable consumption. The present total production of water is some 68 mn. gallons per day, of this, 58 mn. gallons produced at Abu-Fontas station and 10 mn. gallons at Ras Abu-Aboud. Table-35 shows quantities of water produced by the Electricity and Water Department (1987-1991), whilst Table-36 shows water consumed by sectors (1989-1991).

Charges to the consumers of electricity and water have been fixed a long time ago, and have been the same ever since. The electricity charge to domestic consumers of six dirhams for each kilo watt hour is a relatively small percentage of the cost of generating electricity and the price of distributing it. The consumption of electricity has greatly increased with the growth of personal incomes and styles of life, the demands in housing and commercial use as well as industrial usage. In addition there are growing activities in the government sector and the provision of public utilities such street lighting etc. All these trends produced a growth in electricity demand of about 6% annually between 1987 and 1991 and about 13% for water. The per capita electricity consumption in Qatar has now become one of the highest in the world, as Qatar like other GCC countries has actually fixed the water and electricity charges according to principles which encourage consumption. If higher charges are imposed, the rate of future increase in demand for electricity and water could be reduced to some extent.



ANNUAL ELECTRICITY CONSUMPTION (Million kW)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1989
1990
1991
YEAR
FEB./GOVT.
COMMERCIAL
INDUSTRIAL
POWER STATIONS
ROADS & STREET LIGHT.
LOSS

TABLE - 35

QUANTITIES OF WATER PRODUCED BY ELECTRICITY AND WATER DEPARTMENT 1987 - 1991

(Unit : Million Gallons)

Year	Desalination Plants			Well Field Water	Grand Total
	Ras Abu Aboud	Ras Abu Fontas	Total		
1987	2365.7	14340.1	16705.8	836.7(1)	17542.5
1988	2365.7	14340.1	16705.8	836.7(1)	17542.5
1989	2026.7	14789.3	16816.0	887.6(1)	17703.6
1990	1779.9	15347.9	17127.8	532.0(2)	17659.8
1991	1144.8	16365.6	17540.4	416.3(2)	17956.7

Source : 12th Annual Statistical Abstract, 1991, Doha, 1993

(1) Well Field and Reverse Osmosis and Blending Wells.

(2) Well Field Osmosis and Blending Wells.

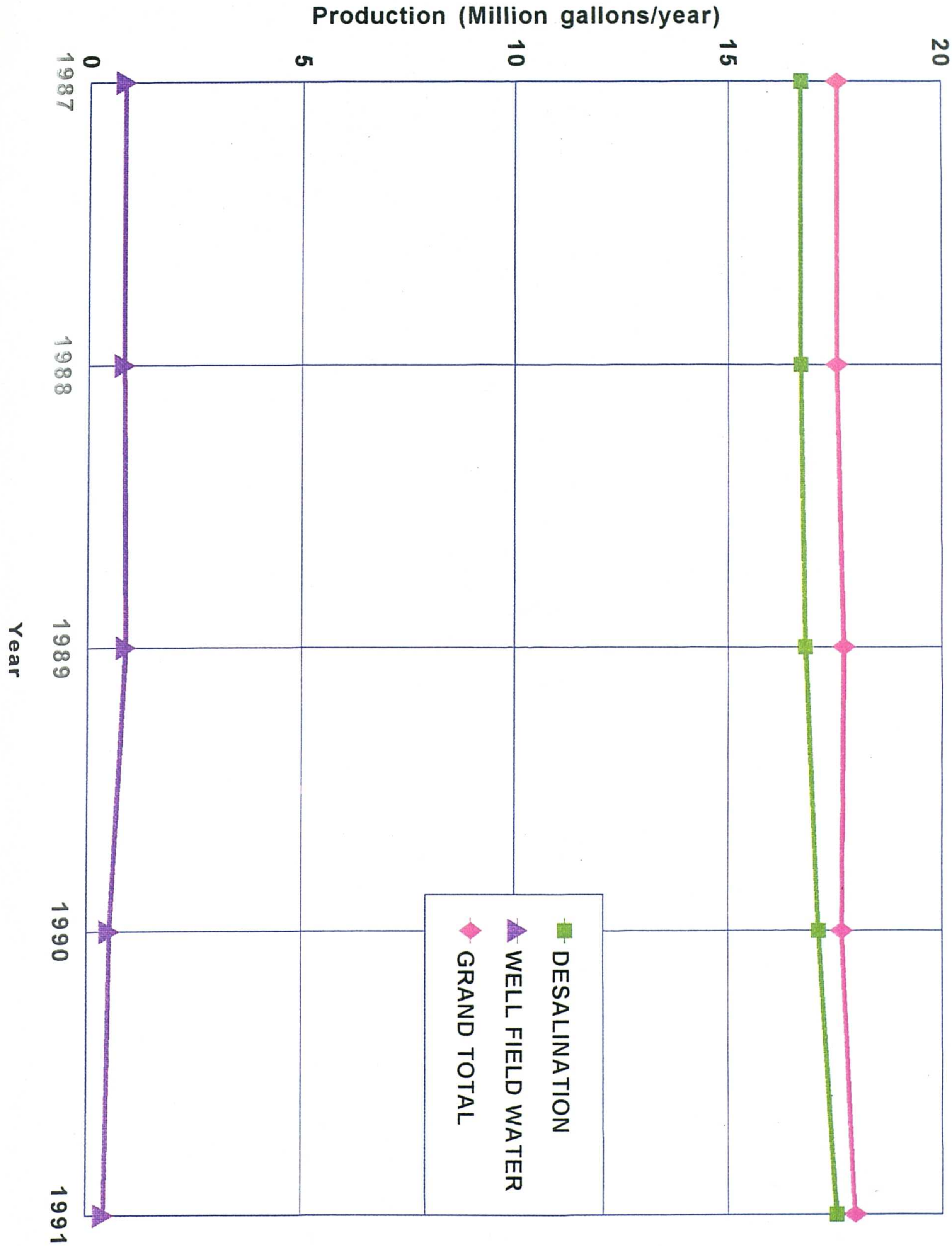
TABLE - 36

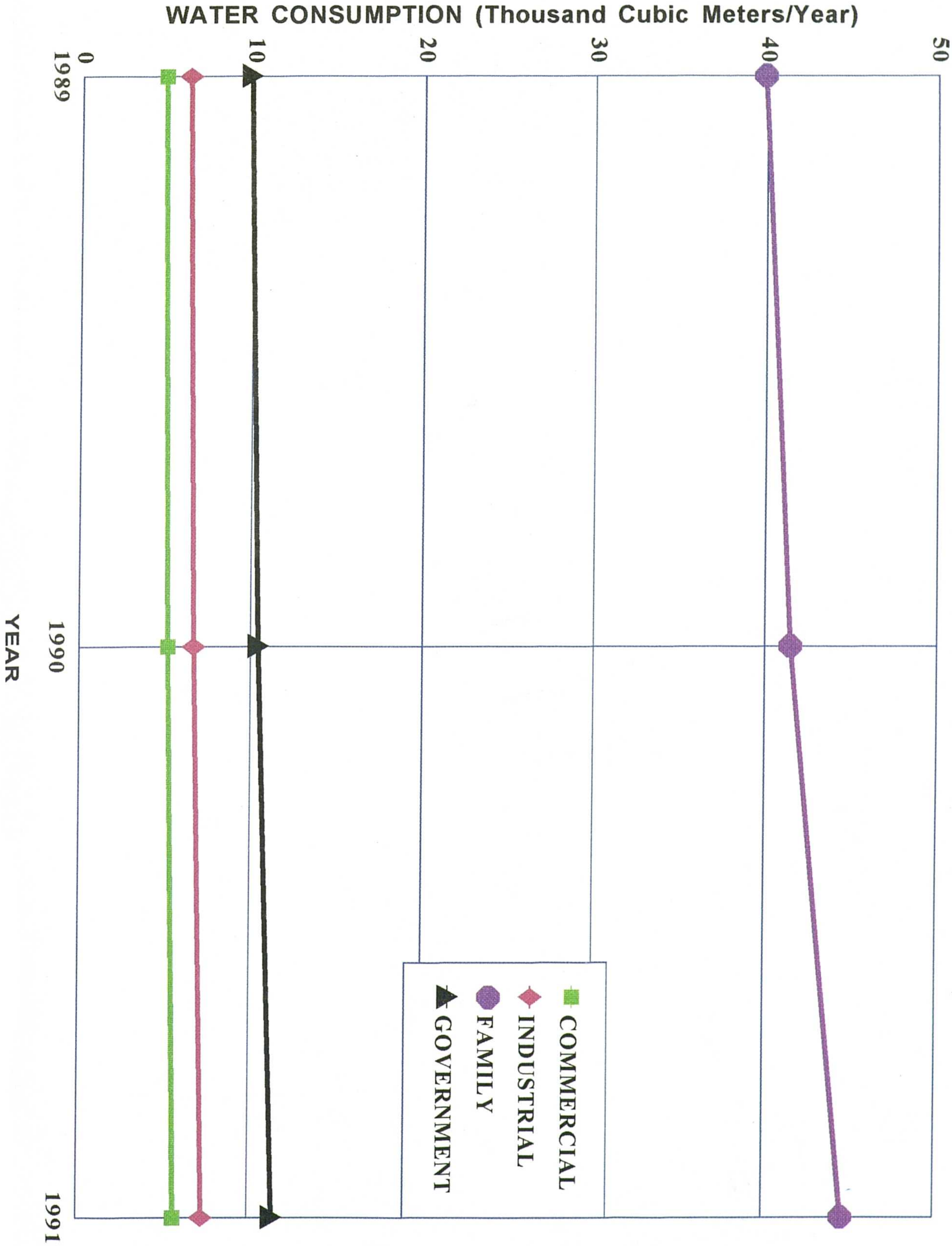
WATER CONSUMED BY SECTORS 1989 - 1991

(Unit : 000 Cubic Meters)

Year / Sector	1989	1990	1991
Commercial	4900.0	5194.0	5689.0
Industrial	6307.2	6685.6	7325.6
Family	39898.8	41494.8	44638.8
Government	9845.1	10435.8	11430.6
Total	**60951.1**	**63810.2**	**69083.6**

Source : 12th Annual Statistical Abstract, 1991, Doha 1993


Production (Million gallons/year)
0
5
10
15
20
1987
1988
1989
1990
1991
Year
DESALINATION
WELL FIELD WATER
GRAND TOTAL


WATER CONSUMPTION (Thousand Cubic Meters/Year)
0
10
20
30
40
50
1989
1990
1991
YEAR
COMMERCIAL
INDUSTRIAL
FAMILY
GOVERNMENT

The need for such consideration became obvious during the late 1970s and 80s because the essential source of energy for the power and water desalination plants was originally the associated gas from the Dukhan oil field and, later, increasing amounts from the offshore fields. At the same time there were the growing demands for energy and feedstock gas from the new and expanding chemical, fertilizer and steel plants. This combination of demands for associated gas came during a period when the Dukhan oil-field's production capacity peaked and began to fall, and the high cost of gas-recovery from offshore oil fields coincided with cessation of growth in onshore oil production. Any further major growth in industrial development and general power consumption would clearly need other energy sources. This was an essential factor in the lengthy deliberations on whether, when and how the very large non-associated gas resource of the North Field was to be exploited (see Chapters 1.6.2 and 6.2).

3.1.5 Pipeline Network (see Fig. 12)

Oil and gas are transported through a pipe network of pipelines to most of the major heavy industries such as liquefied natural gas plants, the oil refinery, power stations, desalinated water plants, fertilizers, cement, iron and steel projects and petrochemical industries. This basic network is established in three main regions - Dukhan where on-shore crude oil is produced, Haloul where off-shore oil export is located and at Al-Khaf which lies in the area of land operations at Dukhan. The refined products are transported through a pipeline from the refinery at Umm Said to Abu Hamur at Doha.

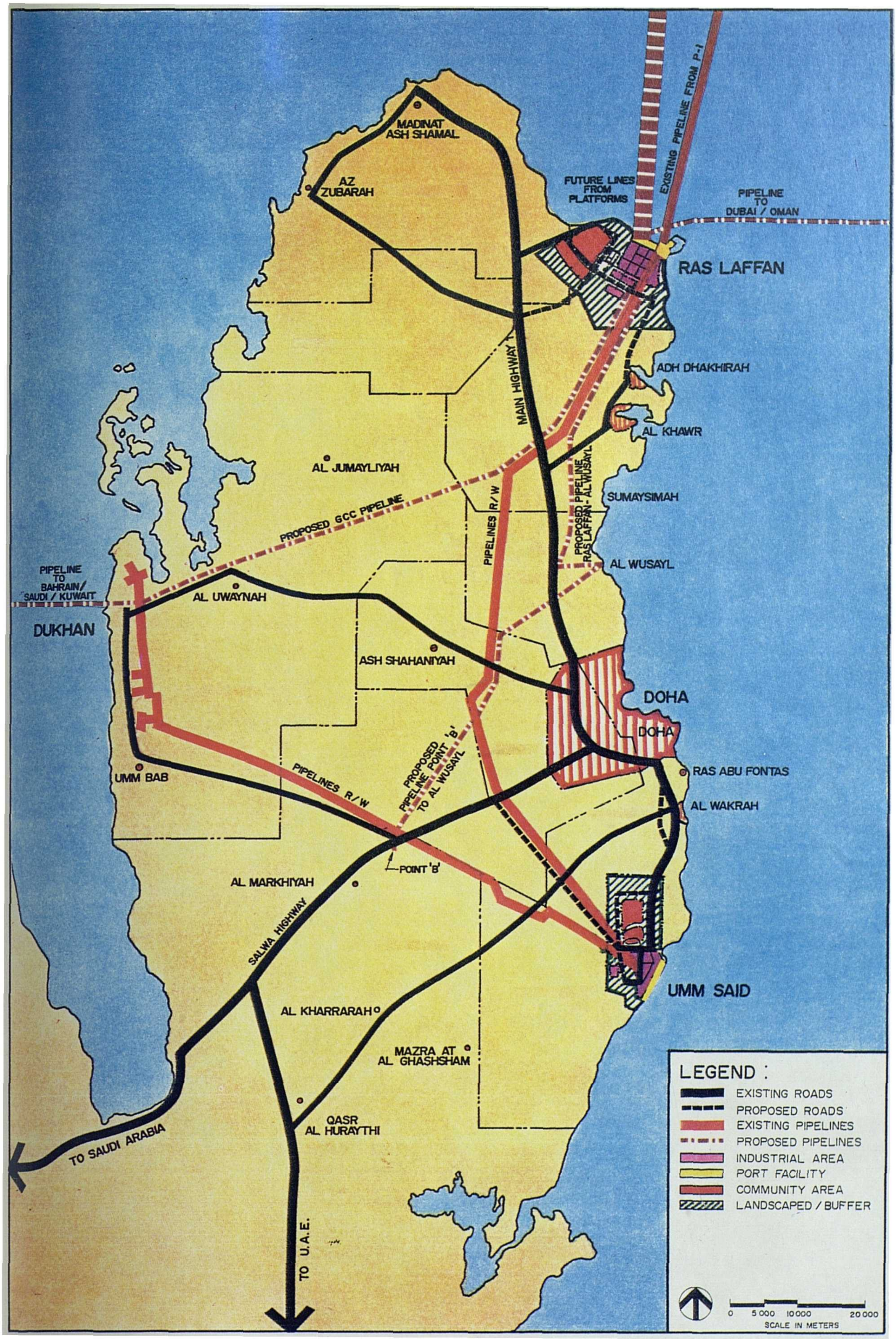
The exploitation of the North Gas Field has required a large gas collection network offshore as well as extensive onshore expansion of pipeline networks onshore and these are considered in Chapter 6.2.

3.2 Capital and Liquidity

Economists agree that ensuring the availability of capital represents one of the most important problems which developing countries confront when trying to direct investment towards economic development, particularly when adopting a developing policy based on rapid industrialization. As for capital liquidity and its availability, we can say that Qatar has passed through several stages during the last fifty years:

- the pre-oil stage, before 1949,
- the early oil period, before political independence in 1971 and economic, independence in 1973,

FIG 12


MADINAT ASH SHAMAL
AZ ZUBARAH
FUTURE LINES FROM PLATFORMS
EXISTING PIPELINE FROM P-1
PIPELINE TO DUBAI / OMAN
RAS LAFFAN
ADH DHAKHIRAH
MAIN HIGHWAY
AL KHAWR
AL JUMAYLIYAH
PROPOSED PIPELINE RAS LAFFAN - AL WUSAYL
SUMAYSIMAH
PIPELINES R/W
PROPOSED GCC PIPELINE
AL WUSAYL
PIPELINE TO BAHRAIN/ SAUDI / KUWAIT
AL UWAYNAH
DUKHAN
ASH SHAHANIYAH
DOHA
PROPOSED PIPELINE POINT 'B' TO AL WUSAYL
RAS ABU FONTAS
UMM BAB
AL WAKRAH
POINT 'B'
AL MARKHIYAH
SALWA HIGHWAY
UMM SAID
AL KHARRARAH
MAZRA AT AL GHASHSHAM
QASR AL HURAYTHI
TO SAUDI ARABIA
TO U.A.E.
LEGEND :
EXISTING ROADS
PROPOSED ROADS
EXISTING PIPELINES
PROPOSED PIPELINES
INDUSTRIAL AREA
PORT FACILITY
COMMUNITY AREA
LANDSCAPED / BUFFER
0 5000 10000 20000
SCALE IN METERS

- the oil asset ownership stage and oil boom, 1973 - 1981,
- the post oil-boom and the early gas era, the 1980s and 1990s.

During the pre-oil stage, Qatar's economy, as described earlier depended on low-technology fishing, very limited agriculture and small-scale traditional trade. These activities could lead to only small-scale capital formation which was sufficient for current low levels of demand.

With the advent of the oil era the flow of oil revenue to Qatar transformed the situation. During the 1950s, as the oil revenue from royalties flowed in it was handled as income and expenditure by the Ruler and the British Adviser (see Introduction I.2.2). In the early 1950s the proportion allocated to the Ruler was about 25% the remainder going to the slowly evolving Governmental administration headed by British Advisers. Liquid assets built up rapidly as the growth in oil revenue exceeded the Government's capacity to spend. (Cummins 1955)

During the 1960s, under the new positive approach to development introduced by the Prime Minister, Sheikh Khalifa, Government revenue became more systematically directed towards expenditure on physical and social infrastructure and to investment in Qatari and regional industrialisation. This became even more prominent during the 1970s and the post-independence period, but especially after the ascension of Sheikh Khalifa Bin Hamad Al-Thani to the throne in 1972.

In spite of this, budgetary surplus appeared to grow steadily up to the late seventies according to IMF Statistics (1977) and IMF Surveys (1977). However, as El Mallakh (1979) has pointed out, from 1974 to 1977 at least the Government's surpluses also included the item "net landing and equity participation". This item represents participation of the Qatari Government in business ventures on a large scale, so that an apparent budget surplus of QR 1,629 mn in 1977 was converted into a deficit of QR 44.2 mn. after this outflow into capital investment is taken into account. The detailed breakdown of Government supply of capital into business and industrial ventures is not available. However, the scale of capital investment supply from Government from 1973 to today is enormous, although fluctuating with changes in Government revenue - especially from oil. (see Chapter 2.2.9.1).

The other important aspect of this is the very large power possessed by the Government to control the scale and the type of industrial and other investment not only in the public sector but across a wide field, although Government holdings are not all published. The Qatar Investment Board established during the 1970s, handles a range of Government investment portfolios, largely foreign, and Government decisions as to the allocation of surpluses to these as against direct and indirect investment and expenditure in Qatar.

Supplying capital to industrial investment is one of the largest items in the capital allocations in the annual budgets (see Chapter 2.2.9.3), particularly if infrastructural expenditure is taken into account.

Industrial development of the kind described in Chapter 5.2 to 5.4 required capital investment not only into plant and equipment but also into physical infrastructure on a massive scale. The Umm Said industrial area required almost everything from a seaport to workers accommodation (see Chapter 5.2.1 - 5.2.5) and the Ras Lafan industrial development now proceeding is a "greenfield" location (see Chapter 6.2.4). Industrialisation on this scale is possible by the use of capital by a revenue rich government. There is therefore the paradox that in a free-market economy the dominant force in deciding investment policy is the central government.

The build-up of capital in the private sector is mainly determined by the benefits derived by the business community from the final consumption effects of rising government expenditure.

" the businessmen, both psychologically and economically, have been geared towards trade and service activities where the profits are easy and returns substantial and quick" (Mohyddin 1984).

These profits in aggregate are insufficient to provide the capital necessary for investment in large-scale industry. Most Qatari entrepreneurs, also retaining their involvement with commerce (including importation), therefore "for the most part undertake small-scale light industries oriented towards the internal consumer markets. On the other hand, the public sector undertakes large-scale, capital-intensive, export-oriented industrial schemes". (Mohyddin 1984, p. 13).

This contrast has not changed very much during the last decade. There are several reasons for this but the factor of capital remains extremely important because of:

(a) the scale of capital expenditure required for physical infrastructural projects,
(b) the scale of capital investment required in the dominant oil and gas based large industrial processing plants so far installed,
(c) the freedom enjoyed by private sector capital to move to any attractive opportunity in Qatar or abroad.

3.2.1 Banking

Government actions to encourage owners of private capital to find investment in industry attractive are examined in Chapter 4.4.2. The banking institutions necessary for the handling of financial capital are already in existence. The first domestic bank was established in the State of Qatar in 1964. At present, there are six local banks. Before the establishment of local banks there were several foreign banks which started operating in the following years:

Standard Chartered Bank	1950
The British Bank of the Middle East	1954
Grindlays Bank	1956
Al-Mashrek Bank	1960
United Bank Ltd	1970
Bank Saderat Iran	1970
Bank of Oman	1970
Banque Paribas	1973
Arab Bank Ltd	1975

The first commercial bank in the State of Qatar was established in 1950 when oil exports started but ten out of fifteen banks currently operating were established during the 1970's and 1980's.

Qatar National Bank is still of major importance because, although it is essentially a commercial bank, it is 50% owned by the State and handled more Government funds than any other agency. The list of banks operating in 1991 is given in Table 37. The build up of financial assets during the 1970s was so considerable that they outstripped opportunities for domestic lending and investment. In 1975, when there were 2 Qatari and 10 foreign banks, private sector deposits totalled 3,062.3 mn QR and the Ministry of Economy and Trade estimated the capital investment of Qatari individuals in all businesses at 330 mn QR. By 1981 QMA put private bank deposits at 6,483.6 mn QR and all local business investment (excluding Government) at over 5,000 mn QR.

Even so, limited domestic investment meant that Qatar's banks turned to foreign assets. The IMF estimated that in 1975 the commercial banks' foreign assets totalled $ 277 mn, rising to $ 1,184 mn in 1981 with a ratio of Foreign Assets to Foreign Liabilities of 7 or 8 to 1.

TABLE - 37

COMMERCIAL BANKS OPERATING IN QATAR
1991

(Unit : Million QR)

Particulars Name of the Bank	Head Office & Branches	Capital	Year of Established
QATARI BANKS			
Qatar National Bank	22	189.000	1965
Doha Bank Ltd	7	52.500	1979
Commercial Bank of Qatar	5	56.250	1975
Qatar Islamic Bank	4	100.000	1983
Al-Ahli Bank of Qatar	3	45.000	1984
Qatar International Islamic Bank	1	100.000	1990
ARAB BANKS			
Arab Bank Ltd	2	5.000	1958
Bank of Oman Ltd.	1	5.000	1971
FOREIGN BANKS			
Banque Paribas	1	5.000	1973
British Bank of M.E.	2	5.000	1954
Standard Charted Bank	1	5.000	1950
A.N.Z. Grindlays Bank	1	5.000	1956
United Bank Ltd	1	5.000	1970
Bank Saderat Iran	1	5.225	1970
TOTAL	52	582.975	-

Source : Qatar Monetary Agency

The collapse of oil revenues, the Souk-el-Manakh financial collapse in Kuwait, and the Gulf war led to a slow down in banking activities and by 1985 some liquidity problems (Moore 1984 & 1985). Recovery in commercial bank deposits was slow and only made possible at all by the injection of government funds, as shown in Table 38 and Fig. 13 for the period 1987 - 1990. As indicated in Table 39 the same is true of commercial bank credit activity.

TABLE - 38

DEPOSITS[1] AT COMMERCIAL BANKS
1987 - 1991

(Unit : Million QR)

Particulars / Year	Government	Q.M.A	Total	Private & Mixed Sector				Grand Total
				Savings & Time	Demand	Foreign Currency	Total	
1987	331.0	-	331.0	5131.7	3529.7	3740.4	12401.8	12732.8
1988	1003.4	23.0	1026.4	5108.6	2220.8	4000.4	11329.8	12356.2
1989	282.0	1.5	283.5	4604.0	2157.6	6243.2	13004.8	13288.3
1990	817.3	-	817.3	3192.9	2705.2	6350.7	12248.8	13066.1
1991	2424.6	-	2424.6	5525.9	2353.5	4763.9	12643.3	15067.9

Source : Qatar Monetary Agency

(1) At the end of year

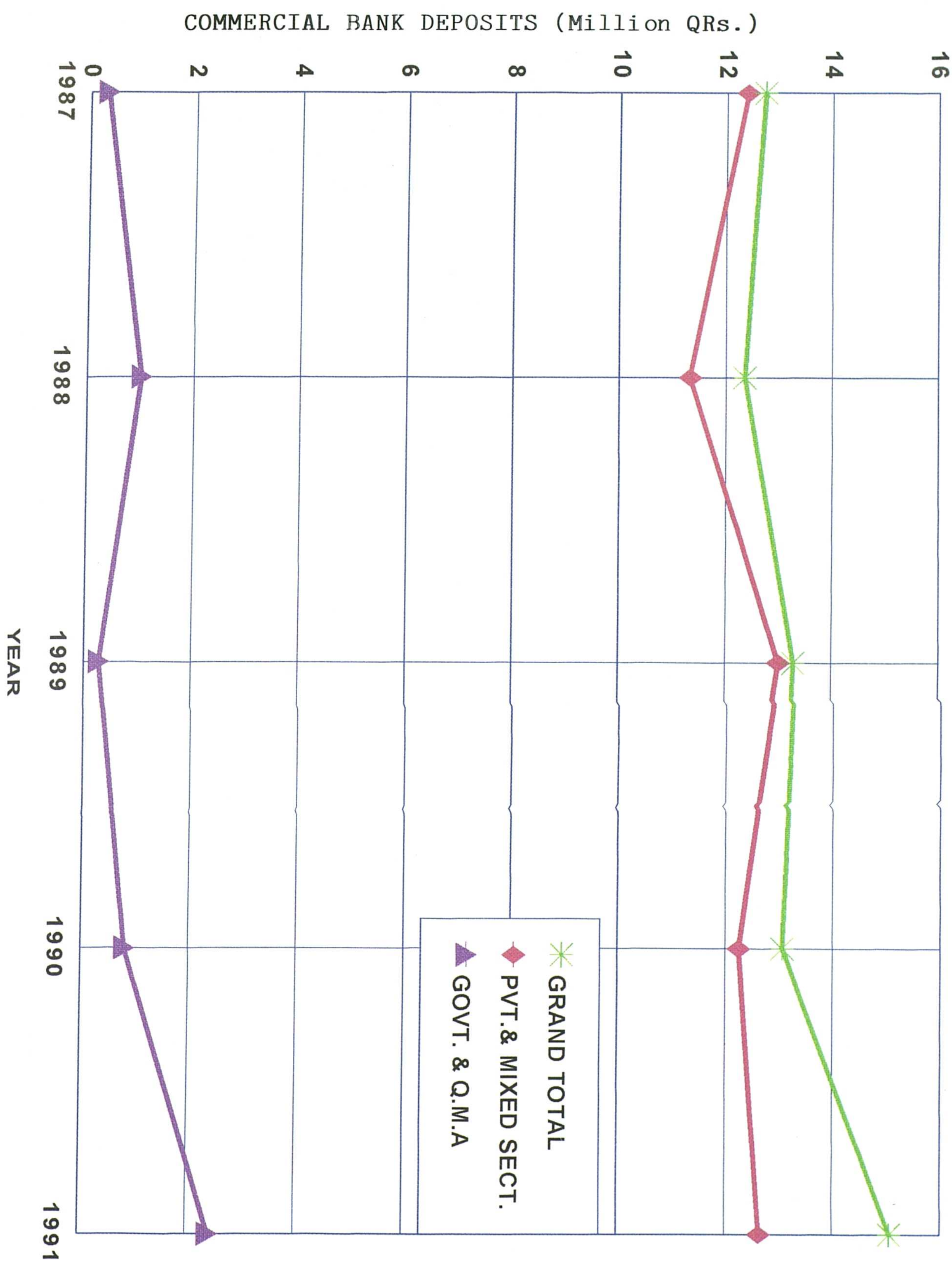

COMMERCIAL BANK DEPOSITS (Million QRs.)
0
2
4
6
8
10
12
14
16
1987
1988
1989
1990
1991
YEAR
GRAND TOTAL
PVT.& MIXED SECT.
GOVT. & Q.M.A

TABLE - 39

COMMERCIAL BANKS CREDIT[1] BY ECONOMIC ACTIVITY 1987 - 1991

(Unit : Million QR)

Economic Activity / Year	1987	1988	1989	1990	1991
Trade	2531.6	3047.5	2796.4	1769.3	3039.8
Industry	202.1	168.4	105.6	64.3	160.7
Agriculture	0.5	1.2	67.0	7.9	62.9
Transportation	106.5	93.7	76.0	34.9	185.5
Land & Construction	975.1	789.9	703.3	544.0	580.8
Govt Establishments	293.1	3114.4	4448.0	1849.2	6803.4
Banks and Finance	47.1	47.5	25.7	9.3	16.4
Individuals and Professionals	4264.9	1807.5	2005.2	666.5	2266.7
Other	322.4	194.9	326.0	120.9	227.4
Total Credit	**8743.3**	**9265.0**	**10553.2**	**5066.3**	**13343.6**

Source : Qatar Monetary Agency

(1) At the end of the Year

3.2.2 Capital and Investment

Throughout the whole period capital availability and liquidity in the private sector in gross terms has always been plentiful, but local investment in industry has been determined by three main factors, (a) the actual number of opportunities present, (b) the relative attractiveness of industrial investment as compared to investment in property, trade or foreign ventures, and (c) confidence in regional and national security. The first two factors are the reason for the incentives and encouragements dealt with in Chapter 4.4. The last is not wholly in Qatar's control.

The Government has adopted a variety of approaches to the question of capital investment in industry. First, it has invested directly as sole owner, secondly it has invested in mixed sector industries with local private investment, thirdly it has tempted private sector investment into industry with incentives of various kinds, and lastly, and in the case of most of the major industrial projects, entered into major joint venture projects with foreign partners. One reason for this last practice is that it has brought in non-Qatari capital and another is that it has made it easier for the Government to borrow abroad for its share of investment. Examples of all these appear in Chapter 6.

3.3 Markets and Marketing

3.3.1 General

In spite of the very long established trading tradition in the Gulf it is generally agreed that "Marketing" as it is understood in the industrially developed world has not been given much attention until very recently by Arab firms. In Qatar, when the oil companies owned the production concessions and everything downstream, marketing of crude oil and oil products was handled by the international majors. When after the early and mid 1970s the host countries finalised their ownership takeover then oil became a "sellers' market" - the accent was on apparently unlimited demand for oil at almost any price. Since the early 1980s, however, and the effect of market forces during the previous decade in bringing new crude suppliers into production, Arab Gulf governments have been forced to recognize that even at this basic level, marketing has to be regarded as an integral part of economic activity.

3.3.2 Marketing of Industrial Products

Ever since Qatar began to adopt a policy of developing the manufacturing sector it has had to recognize that certain general marketing activities and functions have to be appreciated. There can be a tendency, specially found in "centrally planned economies", for marketing in the modern "western" sense to be ignored, but Qatar is part of the long-established free-market attitude found in the Gulf. Qatar is not a "command economy" even though major economic decisions are very centralized.

It is therefore essential that the relatively new types of industrial enterprises in Qatar appreciate the logic built in to the whole marketing system so far as it affects their success or failure. These are the elements of that system:

3.3.2.1 Market Research

This is a matter of building up an information database on particular potential or existing markets. All advanced industrial countries have, for example, overseas commercial intelligence systems which assist exporters to identify market niches. In addition, individual concerns in such countries carry out extensive and detailed market research for individual products in domestic and external markets. Although GOIC (see GOIC 1981) is rapidly building up an information system and database relating to industrialization, there is still a long way to go in market research. A typical assessment as made by Van de Putte (1985, p.22) eight years ago in a study of "Marketing Opportunities for Downstream Products", is still valid:

"The simple fact is that the plastics market is in a state of crisis. It is therefore highly sensitive, and it could be destroyed in the space of a few months by quite a small percentage of the products" and "considerable disorder could occur in this particular market if the Gulf countries, perhaps badly advised by people without specialist knowledge, fail to appreciate the condition of the market at global and other levels".

In 1993 the forced contraction of the European petrochemical industry could give rise to general protectionist measures against imports of downstream products from the Gulf even though only a very small number of such products - e.g. special types of low-density polyethylene - may actually upset particular European markets. Markets have to be understood in detail.

Petrochemicals have become a very sensitive issue in international trade as shown by the actions taken by the European Community in June 1984 and later, to impose extra high tariffs on imports of some Saudi-Arabian petrochemical products. The detailed issues summarized in studies by the British Committee for Middle East Trade (COMET 1986 and other years) and the Arab-British Chamber of Commerce (A-B, C.C. 1985), cannot be examined here but some major issues are important. First, it is obvious that all the

Gulf countries, and the Gulf Emirates in particular, will naturally turn to petrochemical manufacturing based on their only major natural resource - hydrocarbons. Secondly, this activity until the late 1970s was only carried out in the technologically advanced industrialized countries and generally but not always by privately owned firms. However, in Europe in particular, as the European Community has developed as an economic bloc, the matter of protecting established industrial activities has become of political importance. Thirdly, the historical changes in ownership of oil and gas production noted in the Introduction 3.2 have led to national governments in the Gulf becoming dominant in the hydro-carbon sector. The scale of investment needed (see Chapter 3.2) for main-stream petrochemical production has reinforced government public-sector dominance. The dangers of major political as well as economic confrontation between producer-groups is clear (and see Chapter 8).

On a smaller scale, it is doubtful whether any of the 220 private sector industrial establishments licenced and registered between 1980 and 1990 for production in Qatar carried out any systematic research into the domestic market for their products (see Chapter 6.09), except when they were assisted by the IDTC or DID (see Chapter 5.0).

3.3.2.2 Production Planning

The aim here is to design and operate production plant which will actually produce items which the markets identified in 3.3.2.1 will buy in preference to other products.

3.3.2.3 Pricing and Costing

These will be determined by the market and production costs. The relative attractiveness of product pricing is a matter of market research whilst production costs will be affected by many other factor costs - labour, free-market or subsidised input prices etc.

3.3.2.4 Advertising, Distribution and Sales/After Sales Service.

All these are familiar elements of successful free-market industrialised economies and are integrated with the other elements of the whole system. These are all at an under-developed level in most Qatari industries.

Successful marketing also implies that the producer/supplier is also satisfied with the end-result. In normal free-market conditions this means the whole of the process is profitable to the producer/supplier. This raises a number of associated issues relevant to Qatar including for example, infant-industry protection, production subsidies for social as well as economic reasons etc; these will be considered later in the context of actual and projected industrial development (and see Chapter 6.07 & 6.0.8).

3.4 The Domestic Market in Qatar for Industrial Products

For all practical purposes Qatar can be considered to have a free trade policy. Commodities and products produced in GCC member states enter freely and this, given the considerable volume of entrepot trade in the Gulf i.e. import and re-export especially by the UAE, makes control of other trade less than total. Apart from some commodity types, e.g. alcoholic drinks, which are culturally unacceptable, imports of consumer goods carry minimal customs tariffs between 2.5% and 4% by value. High tariff protection is given to some industrial supplies such as steel and cement and other types of support and incentives to local production are dealt with in Chapters 4.4 and 4.5 and 6.0.7 to 6.0.9.

The general situation however is such that the best guide to the domestic Qatari market is an analysis of imports, and this has been used later in this study for the identification of potential market niches for local industry - see Chapter 9.

3.4.1 The Domestic Market for Manufactured Consumer Goods as Indicated by Imports

The first point is that because Qatar is a small but rich country, in world terms the total domestic market is small but per capita imports very large. The estimated per capita value of imports in 1986, the year of the last population census, was 10,800 QR. Population estimates for 1991 indicate a sizeable increase from the census figures of 369,000 to 504,000 and on that basis preliminary estimates of average imports per capita in 1991 rise to over 12,400 QR. However, the population of Qatar is not homogeneous and analysis of the pattern of consumption is both difficult and complex. A few general points can be made here but in the absence of detailed market research other than the sample Household Expenditure Surveys periodically carried out by the CSO, conclusions must be treated with care.

First, the Qatari population generally has a very high disposable income for expenditure on high-class, high-value housing, consumer durables, semi-durables and non-durables. The expatriate population for analytical purposes can be divided into two parts, the skilled professional and the less-skilled workers. In addition there is a threefold distinction to be made between expatriates of different regional origin i.e. Arab - generally skilled, Asian -

skilled to some extent, but mainly unskilled, Western - almost entirely technical and professional skilled.

These and consequent cultural distinations are associated with sometimes broad and sometimes specific types of consumption and market demand. The pattern of imports, particularly for manufactured goods reflects this economic and cultural diversity of what is essentially a mini-state economy with a minimal level of tariffs or other trade controls.

Secondly, partly as a result of the situation outlined above, the demand for some manufactures is abnormally high for population size, and for others very restricted. Given the low level of Qatar's industrial production of most goods other than heavy chemicals, steel, cement and flour, the detailed breakdown of imported commodities gives the best guide to market demand (and therefore also opportunities for further local industrial response - see Chapter 9).

Thirdly, the market for consumer goods of high added value and relatively technically advanced and luxury goods, in total absolute terms is limited and trading competition fiercest. This part of the market is mainly made up of Qatari nationals. The CSO Household Expenditure Survey of 1982/83, at the time of the peak of total imports in 1982, indicated that the ratio of Qatari to non-Qatari household expenditure on semi-durable goods was 1.6: 1.0 and for durables the ratio difference increased to 1.99 : 1.0.

The implications of these facts for the assessment of domestic market opportunities for local manufacturers are considered further in Chapter 9 in terms of import substitution.

3.5 The Domestic Market for Capital and Intermediate Industrial Goods - Imports

This internal market is the product of the requirements of local manufacturing, construction and public utility industries. The most obvious and largest items are industrial machinery, constructional steel, cement etc. As noted in Chapter 6.18.6 and 6.18.7, government initiatives to meet some of these demands by local manufacturing have resulted in domestic cement and steel production. The private sector responded rapidly to expanding demand for cement products and the simpler forms of metal fabrication (see Chapter 6).

According to the broad economic classification employed in Qatar's Foreign Trade Statistics, by 1990 28.5% of the value of total imports was of Machinery and Capital Equipment excluding Transport. Transport Equipment and Accessories made up another

14.7%, a half of this represented by passenger cars. External trade in the class of Processed Industrial Supplies made up another 23.3%.

Whilst it is clear that for many reasons, including economies of scale and other factors considered in Chapters 7 and 8. Qatar will have to continue to rely on imports for most of these products, there are many imported items for which local manufactures could be substituted. Import substitution already achieved and feasible for the future are dealt with in later Chapters.

3.5 Export Markets

The existence of a limited local market has led to the setting up of industries mainly for export and which mainly depend on foreign markets. The most important exports of Qatar today are chemical fertilizers, iron and steel, petrochemicals, natural gas liquids and petroleum products.

3.5.1 Gulf Cooperation

One important aspect of export markets for Qatari manufactures is the move towards creating a united economic bloc in the Arab Gulf. Much of the work of GCC committees and of GOIC has been aimed at producing a larger market for industrial products in the AGS region than exists in any one single country, as well as looking at export markets. The other side of the coin is that the achievement of consensus among the six member states of the seven who originally agreed the charter for GOIC (Iraq is no longer a member), has to mean the loss of a certain amount of individual independence. In fact Article 11 of the Charter of 1976 states that "nothing may restrict the freedom of member states to retain their industrial development organizations or restrict the freedom of member states to receive technical assistance on the national level from Arab, international and regional organizations".

The real problem confronting Qatar's drive to export manufactured products is that until the unassociated gas of the North Field comes on stream the country has no competitive advantage over its GCC neighbours all of whom are producing virtually the same range of products viz. crude oil and its derivatives plus products made from associated gas. An analysis of Qatar's 1990 industrial exports by commodity groups, relative importance by value and destinations in ranking order follows below (and see Table 19).

3.5.2 Exports by Commodity Group

		mn. QR.		% age
A	Total	12,846.87		100
B	Crude oil	10,129.41		79
C	Total non-crude-oils	2,717.47		21
D	Processed petroleum products	217.74		
E	Gas, natural & manufactured (Liquid Propane & Butane)	354.55		
F	Other products manufactured from hydro-carbons	1,334.73		10.4

Breakdown of F:

(i)	Organic chemicals	196.68	Ethylene	99.8%
(ii)	Inorganic chemicals	84.85	Ammonia	99.9%
(iii)	Inorganic fertilizers	322.26	Urea	100%
(iv)	SITC 893000 Div. 58 - Plastics, Esters, Ethers etc. Polyethylene	714.26		79.9%
(v)	Sulphur			16.68

G	Total of all non-crude-oil hydro-carbon products = D + E + F	1,907.02	
H	G as a percentage of C		72.9%
J	Residual exports, i.e. all exports not of crude oil nor of hydro-carbon products: C minus G	710.45	
	H as a proportion of total exports		0.06%
K	Iron & steel exports - 99.9% rods and bars	649.57	
	K as a proportion of all non-hydrocarbon exports		91%.

This analysis illustrates the following facts. The first is that directly or indirectly Qatar's exports are almost entirely based on oil, associated gas and a small range of hydro-carbon products. Even the steel sector only exists because of relatively cheap domestic energy supplies. It is clear that although very considerable efforts have been made to broaden the export base, there is a long way to go and the question has to be asked whether it is in fact logical to attempt to creat a large, export-oriented non-hydrocarbon industrial sector. During the 1990s the availability of the new vast resource of North Field unassociated gas implies that the answer must be negative. What then becomes important is the extent to which hydro-carbons are used in technologically more complex and also more valuable ways in the future - see Chapter 9.

The second fact to emerge from this analysis is that the hydro-carbon products now manufactured in Qatar are those in which all the GCC countries have existing interests, in which all the existing industrialised countries have even larger established interests and, lastly, in which all the other oil and gas producers in the world including newcomers such as Malaysia are staking claims. These basic petrochemical products are now entering rapidly changing, extremely competitive markets in which a very large number of governments involved are likely to adopt protective tariff and other measures. The European petrochemical industry is having to almost completely restructure itself. The Financial Times reported on 17 December 1993 that for example West European ethylene cracker capacity of 18.4 mn tonnes per annum was almost 3 mn larger than demand, and that ethylene cracker profitability had been negative since February 1991. Qatar needs to find less turbulent world markets for its hydro-carbon products.

3.5.8 Destinations of Exports by Value, 1990

If we analyse the destinations of Qatar's main exports of processed and manufactured hydro-carbon commodities i.e. products of refinery and separation plants as well as of manufactured petrochemicals a clear pattern appears.

Japan was by far the largest market, taking 32% of 3.5.2 G above and two-thirds of 3.5.2 E (liquid propane and butane). China took 10% of this whole group and 34% of urea exports. South Korea and Taiwan, the next in order, each imported more than 100 mn QR of these products. Far Eastern and South East Asian countries as a whole took 74% of Qatar's non-crude oil hydrocarbon exports[FN]. The countries of the sub-continent, Bangladesh, India, Pakistan and Sri Lanka as a group received 10% of these imports.

Qatar's exported hydro-carbon products are obviously extremely dependent on these Asian, and in particular Far Eastern markets. However, most of these commodities are imported as intermediate products for later industrial conversion into higher added value finished goods. Of Qatar's imports of finished products 21% come from Japan, 28% from all Asian countries. One question for Qatar is whether alone or in collaboration with other GCC countries it can reduce its dependence on the production for export of

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Foot Note: China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand intermediate hydro-carbon based products i.e. having to some extent lessend its dependence on crude oil exports can it take a next step in export industry sophistication? A second question is to what extent is this dependence on the markets of one region dangerous ? As a group the Far Eastern countries all have very fast growing economies but the present Japanese recession, the uncertainty over the political stability of China and Hong Kong, and the growing regional rivalry over the oil and gas potential of the South China Sea, together with other facts suggests that some caution is necessary. It may be specially necessary in North Field Development for Qatar not to be too reliant on Far Eastern markets.

3.5.4 Gulf Markets

Of the non-hydrocarbon products exported, iron and steel rods and bars for construction use are the only manufactures of any significance. About 50% by value goes to the United Arab Emirates, with the GCC countries as a whole absorbing about 80% of Qatar's exports of steel (with slight annual fluctuations). With other manufactures Qatar faces strong internal GCC competition especially from the long established Saudi Arabian Basic Industry Corporation (SABIC) plants and the often linked great range of light industries.

As early as 1984 GOIC identified a list of 50 non-resource based industrial investments that appeared worthy of study (see Appendix 1), based on a regional market apraisal. A short-list of 25 possible Gulf Joint Projects was drawn up, again on a regional market approach, including consumer goods e.g. detergents and soaps, as well as some intermediate and capital goods, for example some smaller machine tools. (Mohie El-Din 84). The general conclusion was that all 25 could be viable at a regional market level, for some even the regional market was too small for efficient production runs, whilst very few if any were justifiable solely in terms of national markets.

What has actually happened is that GOIC appraisals have also been fed into the IDTC and the DID in Qatar and, in turn, some individual projects have been taken up by the private sector. At the same time, in Qatar IDTC initiatives, such as the reports produced along with French consultants SERETE, out of a short list of 18 possible projects found 7 which either had low risk and medium/high profitability forecasts, low risk with low profitability, or high/medium profitability and high risk. As the cumulative list of industrial company registrations indicates (Appendix 5) some enterprises have been established in almost all the fields identified by IDTC/Serete in Qatar. (and see Chapter 6.13). The free trade agreement between country members of GOIC at least ensures that

Gulf markets are open to their products. Increasingly, more attention will have to be paid to marketing in the terms described in Chapter 3.3.1 and 3.3.2.

3.6 Human Resources for Industrial Development

Human resources, and here in the context of industrial development, are the most difficult of all resources to evaluate and measure. For example, the human resources which are actually involved extend well beyond the numbers of people specifically registered as employed in manufacturing activities. As described in Chapters 5 and 6, industrial development involves at least planners, the skilled technologists and organizational experts in Government agencies and the public sector, the private sector owner/entrepreneurs, as well as those who can be described as shop-floor workers. An industrial labour force, quantitatively, extends vertically from ultimate decision makers through production operatives to infrastructure service workers.

Qualitatively, it must contain all the skills necessary to perform all these tasks satisfactorily. For industrial development two other requirements have to be added, effective technical planning capabllities in addition to those needed by individual business, and secondly, a positive will to innovate, change and develop.

This is why, in the words of Kusnets (1955): "The major capital stock of an industrially advanced country is not its physical equipment; it is the body of knowledge amassed from the tested findings and the training of the population to use this knowledge".

3.6.1 Human Resources - the Quantitative Factor

The basic fact is that the total number of Qatari citizens is small and the potential number who can contribute to industrial development for the foreseeable future is even smaller. This is the result not only of demographic processes but also of cultural forces, all of which have changed in the past and may change in the future.

Detailed figures for the national status and demographic details for all residents are not published but the situation in Qatar, in terms of scale is so extreme that for present analytical purposes some approximations, based on CSO data and projections can be made.

The potentially economically active population in the case of Qatar has to be calculated on some assumption regarding age and sex. At present the CSO assumes that the economically active population is aged 15 years or over and calculated that of the Qatari sector in 1986 14.3% were females (see Table 6). If we assume that cultural change was to enlarge this proportion to some 20%, then of a 1996 Qatari population of approximately 130,000 about 52,000 would be disqualified from full time economic occupations by reason of gender. If we also take into account the large proportion of Qataris who remain in full-time education between the ages of 15 and 25 (with strong official encouragement), the large and increasing number who are enabled by generous social welfare provision and personal affluence to retire in 50 year age-groups and beyond, and the infirm, a realistic projection of potentially economically active Qatari citizens in 1996 would be no higher than 50,000. In 1986 the proportion of the total Qatari population which was economically active was about 25%: the same ratio in 1996 would yield a total of about 32,500. Whatever variables are introduced into these estimations it appears highly probable that by the time the new industrial take-off based on North Field gas is starting, the total Qatari "manpower" available for ALL economically active purposes will be somewhere between 32,000 and 50,000. This is approximately the total number now employed in the construction industry alone.

Quantitatively, it is quite clear that not only is the State of Qatar inescapably dependent on expatriate labour but that there are other important consequences for industrial development. In 3.4 above, the market demands for industrial products of the expatriate population are noted. The ethnic and economic status composition of this group has changed in the past and could change again in the future, for social, political and technical reasons which are not wholly under the control of State of Qatar. In some ways this is a sensitive issue but in domestic market terms alone it will require careful examination. Quantitatively and qualitatively, it affects almost all the other factors with which we are concerned, for example: capital and recurrent work on physical infrastructure requires a large number of relatively low-skilled workers whilst managing and operating a petro-chemical plant needs a much higher proportion of highly skilled staff. This, over-simplified, distinction has other consequences, for example, on the length of contracts, the degree to which a major part of the population is transient, the range, quality and quantity of infrastructure in housing, health, water supplies, on the size of homeward remittances and the demand for imports. All these and other factors are closely interwoven with the other determinants of industrial development policy.

3.6.2 Human Resources - the Qualitative Factor

As noted elsewhere, the policy of industrialization in Qatar is based on the need to move away from economic dependence on the export of crude oil. Given Qatar's resource wealth and limitations the most obvious way forward is through the processing and utilization of natural gas. This, in short, means moving up-market in industrial technolgy and in international marketing sophistication. This, in summary provides the reason why Qatar needs to use its quantitatively limited domestic manpower to the best advantage and that means training a highly skilled and highly motivated labour force.

This statement is a platitude in many ways because it could be applied to any country. However, in Qatar as in the other GCC countries it is of critical importance. First, in terms of total numbers Qatar will have to rely to a very large extent on expatriate labour in industry. It is important nevertheless that at the most senior levels of each part of the structure of each industry, management and technical operations, as well as at the national development level in planning and financial controls for example, trained Qataris should be the decision makers. Until this is achieved Qatar will not truly be in charge of its industrial and economic affairs.

The opposite approach which has to be considered in Government planning of industrial growth is the selection of projects most suitable for and most attractive to what might be described as the elite of the growing but still small pool of trained Qatari manpower. This theme is taken up in Chapter 9.

The training process has so far proceeded rapidly when one remembers that a modern system of universal education was not introduced until 1956. In 1958 special training centres were introduced and in 1977 the University of Qatar was inaugurated. By 1993 the cumulative total of Qatari graduates from the University of Qatar reached over 7.600, with 980 graduating in that year including the first cadre from the Faculty of Technology. There is in addition a sizeable pool of foreign trained graduates and post-graduates. The results in industrial manpower terms are not easy to measure directly because details of employment and educational status are not completely available, the deficiencies in data being greatest in the private sector. Some examples illustrate the current and recent position.

The Ministry of Public Works, which runs several material processing plants and laboratories, by 1985 employed almost equal numbers of Qatari and expatriate engineers - 45 : 48 - as compared with 23 : 68 in 1980. By 1992 Qatari engineers formed the majority. By 1992 the number of Qataris working in the Government sector and having first degree or better qualifications (excluding QGPC) as a proportion of the total equivalent made up 43% as compared with 36% in 1987 and 30% in 1985. In the case of Qatar Steel Company, a joint venture established with Kobe Steel of Japan in 1978, Qatari management took over full control in 1989 and in 1992 marketing was also taken over by Qataris - inboth cases with successful results (see Chapter 7 for fuller consideration of QASCO as a case-study).

It would seen that within the severe quantitative limits noted earlier qualitative objectives are achievable. This is especially noteworthy in the context of two studies by Melikean and Al-Easa (1981 & 1982). In 1981 they made the point which is still valid that: "every literate and educated Qatari can readily find employment and at relatively high wages".

The background survey of work motivation among university students gave the top emphasis to: (1) "I work to make my way in life" and (2) "I work so that Qatar will prosper". The bottom two responses were: (9) " I work for the money" and (10) "I work because there is no alternative". All these propositions are compatible with the basic traditional cultural attitude among all Gulf Arabs that manual work is for menials.

From the point of industrial development one important challenge is how best to satisfy people's aspirations, and encourage motivations in developing high added-value manufacturing enterprises.

CHAPTER 4

GOALS AND POLICIES

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4.1 The Goal of Socio-Economic Development

The goal of socio-economic development of countries and their people is now generally acceptable as a desirable objective. However, as Al-Kuwari (1978) indicated in his study of oil revenues and their impact on development in the Arab Gulf Emirates mainly up to 1970, growing oil derived State revenues were directed first to a range of expenditure activities which though mostly socially desirable were not co-ordinated in any planned development programme. In the case of Qatar, oil revenues only reached a significant level in 1952. In the next decade, expenditure on physical and social infrastructure in the form of water and electricity supplies, transport and communications, education and health soared (and see Chapter 3.1). Attention here is concentrated on those goals and policies relevant to industrialization in Qatar as part of the development process mainly after 1960.

4.1.1 Early Commitment to Development by the State

The first point to be made is that the Provisional Constitution of the State of Qatar, drawn up during the late 1960s and promulgated in 1970, laid down the economic principles governing the soon to be independent State. Article 6, Clause (c) stated that the State's functions should include economic advancement "through scientific planning and international cooperation". At the same time Article 6, Clause (b) stated that the system of free enterprise was guaranteed, based on the rights of private ownership of property and capital and individual labour freedom. Article 16 allows the public interest in some circumstances to remove rights of private ownership. Of indirect economic relevance are the basic constitutional undertakings to maintain Islamic principles in society and the promise to plan social security, health and educational provisions for its citizens. (Liebesny 1973).

The positive attitude to the goal of socio-economic development stated in the 1970 constitution was already being transformed into policies during the 1960s by the then Deputy Ruler, now H.H. The Emir, Sheikh Khalifa Bin Hamad Al-Thani. The process speeded up after his accession in 1972, the declaration of political independence in 1971, the taking over by the State of all national oil interests between 1970 and 1976, and the great surge of oil revenues after 1973.

The early 1970s therefore were a critical period of change during which independent political and economic initiatives for development became possible and the will to develop was present. At the same time it must be remembered that traditional social attitudes could not suddenly change within a few years and central government had to proceed with some caution with its development policies.

4.1.2 First Appreciations of the Situation

The first preparatory steps towards development planning involved the commissioning of an Economic Survey of Qatar by the international consultants Arthur D. Little who carried out research inthe country in 1962-63. This pre-dated the known discovery of the great North Field resources of unassociated natural gas. The consultant's report (Little 1966 & 1968) and recommendations in the industrial field were cautious, pointing out in particular that Qatar lacked "the substantial natural resources of Iraq and Saudi Arabia, the great petroleum reserves of Kuwait and the established trading position of Bahrain."

Whilst the North Field gas discoveries have since changed the scale of Qatar's resource inventory, much of the Little Report's conclusions remain valid, e.g. the superiority of hydro-carbon based industries for Qatar as opposed to industries based on apparently cheaply generated electric power (see Chapter 9), e.g. the significant lowering of costs in several production fields if these can be made mutually supportive i.e. each member of a group of integrated industries can be more profitable than individual free-standing independent industries (see Chapter 9).

4.1.3 Emergence of a Qatari Approach to Development

The 1970s saw the emergence of a State development policy which, based on the factors noted earlier as they were perceived at the time, can be described as cautious and pragmatic. No central planning institution existed then or has been established since only the Council of Ministers assisting the Emir are involved in drawing up a list of development projects. A tentative program was designed for 1974-78 but never published, and the only published signs of what development strategy evolves in the office of H.H. the Emir are the items listed in the government's annual budgets. Nevertheless, as noted below, some general principles are observed.

The most important economic principle observed, as noted by El Mallakh (1979) and corroborated by later events, has been the balancing of the rate of government expenditure on development including infrastructure against price stability. Qatar, unlike Saudi Arabia has always avoided high inflation even though it has no institutionaliized body for comprehensive planning. This maintenance of balanced monetary and fiscal policies by using a series of checks on the economy may become more difficult if the scale of projects increases very greatly, for instance the Ras Lafan and North Field gas complex (see Chapter 1.6.2.2 and Chapter 5.5).

The second principle which seems to have been observed is that development is a continuous process resulting not only in increasing the national wealth but also increasing the share received by individuals hand in hand with the increase in society's general standard of living. The United Nations defined development as the process according to which efforts are directed to both citizens and Governments to improve socio-economic circumstances in local communities. This is to help citizens to get adapted to changes and participate in the development process as much as possible; whilst in some ways this can be termed as an emphasis on material consumerism, fundamentally it means minimising cultural breakdown and instability.

4.1.4 General Principles and Policies

The end result is that Qatar does not publish five-year or other development plans or economic targets, neither has it got a centrally planned economy or very much constraint on individual economic freedom through taxation or control of capital movement. More positively, the State of Qatar has approved in principle the public policies and objectives of socio-economic development and acts according to them in planning for development in different fields. Such planning takes into consideration the following factors:

a. Full Governmental control over the State's natural resources and utilizing these for the benefit of the State and its people.
b. A reasonably balanced comprehensive development of various economic sectors, but concentrating on the industrial sector as the leading economic sector in development.
c. Activating and developing the commercial sector.
d. Lessening dependency on food imports.
e. Providing and subsidizing where necessary the basic inputs for development and the satisfaction of society's expectations, such as transport, communications, water, energy and housing.
f. Concentrating on local human resources development both qualitatively and quantitatively.
g. Promoting social welfare through creating opportunities for employment and careers and utilizing labour productively for the country's requirements.
h. Providing national defence integrated with Gulf security.
i. Controlling Government expenditure so as to achieve the best use of financial resources in each of the above fields.

In practice this has meant a sectoral planning approach. So far, this has also meant that much development implementation has been on a project basis within each sector. To move towards a comprehensive planning of all sectors, the country needs sufficient time to put into force regulations and measures that are required to collect data and information necessary for planning, together with actual organizational capability for planning as well as establishing linkages of the several projects of various sectors so as to form an integrated plan. Within sectors, a greater degree of planned integration is certainly desirable (see Chapter 9). The industrial sector with which this study is concerned is a case in point.

4.1.5 Supra-national Development

On a large international scale, comprehensive development planning and integration have been seen as beneficial. The United Nations Economic Commission for Western Asia already listed in 1985 eighty four regional and sub-regional ortganisations involved in economic activities and development in the Arab world excluding the Maghreb (ECWA 1985). Other studies have attempted to identify a specifically Arab approach to development (Abdalla et al 1983). In the sector of industrial development the range extends from Arab Industrial Integration (Ghantus 1982) to the more limited Industrial Development in the Arab Gulf Region (Dabdab & Mohyddin 1982).

It is perhaps significant that a very large number of studies were produced in the boom years for oil producers, the late 1970s and early 1980s and before the Iran-Iraq war and Iraq's invasion of Kuwait. Qatar has consistently taken an active part in GCC cooperative activities and in this context specially the Gulf Organization for Industrial Consulting (see below 4).

4.2 Policies and Goals of Industrial Development in Qatar

The industrial development process is defined by planners as a process for extending and controlling the growth of modern fabrication industries. Industrial development requires more than just setting up industrial projects and their production. It requires continuous development of these industries through increasing their capacity to absorb emerging technology, improving administrative systems, raising productive efficiency, extending the range of products types and improving their quality, as well as raising the capacity of these products to serve different purposes, and a dynamic approach to marketing. For Qatar's industrial planners as well as industrialists it means continuously raising their capability to compete with other industrial countries, and acquiring the flexibility in the long run to develop the different branches of manufacturing industries according to the changing requirements of markets. Thus Qatar's industrial development, as an essential part of national economic development, could be regarded in some ways as beginning only now, and that almost everything that has happened before about 1990 has been preparatory. In other words, the dynamic process of "self-improvement", of rapid response to changing possibilities, all of this not only in technological but in motivation terms, is on the whole just beginning in the 1990s, see for example QASCO (Chapter 6.3.6 and Chapter 7).

Much of what is needed for a successful ongoing process of industrial development cannot be directly carried out by development planners and Government organisations. What can be done however, as described in Chapter 5, is to establish the best possible organization's support systems for all industries, to ensure the best possible working practices in public sector industries, and to identify priorities for future developments. The general goals and policies can be summarised as follows:

a. Reducing the State's dependence on oil, which is presently the main source of wealth and developing other sources of income and energy.
b. Widening the base for industrialization through setting up or encouraging the growth of basic and essential industries and the production of intermediate and final commodities, i.e. upstream and downstream industrial diversification.
c. Achieving a high degree of integrated cross-linkages between particular industries, and between manufacturing and other sectors.
d. Providing the physical, social and financial infrastructure needs of industry.
e. Achieving the development of those industries which have competitive capability in local and world markets.

It is no accident that these general objectives of industrial development coincide with those of many neighbouring Gulf countries. For Qatar we can therefore add a further policy:

f. Developing mutually advantageous industrial collaboration within the GCC circle.

4.3 Policies and Goals for Industrial Development in the Gulf Region

As noted in the Introduction I.2.3.3, regional cooperation in the Gulf region became formalised by the establishment of the GCC in 1981. A number of security and political factors as well as economics lay behind this but, together with all the other larger associations of Middle East and/or Arab countries, a more general realisation lay behind such collaborative movements. These movements occurred in many parts of the world in the Post-World War II period and still continue, in Europe, Latin America, the Far East and most recently North America. The basic economic reason is that:

"Economic interdependence among nations has became today more pronounced than in the past. One implication of the interdependence phenomenon is that the results of economic policies - fiscal and monetary - of a country cannot be contained within its own area of jurisdiction." (Hashim 1981, p. 11).

In the field of industrial development in particular, the GCC countries realising that their industrialization is economically beneficial not only for diversifying the source of income but also for constructing an advanced technological and industrial society, have declared a strategy for industrial development. Its objectives are summed up as follows:

- Motivating the development of industry in any of the GCC countries on a balanced and integrated basis to suit its potentialities according to the circumstances of each country.
- Increasing the share of the manufacturing industries to maximum possible extent.
- Increasing the proportion of the domestic labour force engaged in the industrial sector.
- Bridging the gaps in the industrial development in the GCC countries.
- Creating a suitable degree of self sufficiency in manufactured commodities in the GCC countries.
- Creating an original base for research and technology development in applied science.
- Develop the integration between the oil/gas sector and other economic sectors particularly the industrial sector.
- Creating opportunities for investing financial surpluses and savings of the Council countries in the development of industrial projects.
- Exploiting more fully the natural resources found in the GCC region, in particular for manufacturing industries.
- Encouraging the growth of suitable industries in rural under-developed parts of the regions.

4.3.1 Gulf Organization for Industrial Consulting (GOIC)

Even before the GCC was formally set up a regional organization was established in 1976 under the name of the Gulf Organization for Industrial Consulting (GOIC) with its headquarters at Doha, Qatar. The objective of the organization is to achieve industrial cooperation through coordination of industrial development activities among the member states. Toward this end, the organization undertakes the following activities with member states:

- Collection and publication of information about industrial development projects and policies.
- Development of proposals for the establishment of common industrial projects in the member states.
- Recommending ways and means of coordination among the industrial development projects.
- Coordination and development of technical and economic cooperation among existing or planned industrial organizations and establishments.
- Providing technical assistance to prepare and evaluate industrial projects.
- Preparation of information and studies concerning industry.

Since its establishment GOIC has worked to make itself an integral part of industrial progress in the Arab Gulf. It provides access to a complete net work of inter related multi-disciplinary specialists. GOIC contributes to shaping the regional industrial strategy. It has prepared policy-aids for guiding investments in priority areas, and has also prepared several feasibility studies for industrial projects vital for the GCC area. The organizational frame work of GOIC has been structured to effectively serve regional industry and assist in its development, integration and coordination (and see Appendix 1 for a 1984 list of industries considered by GOIC for development).

4.4 Incentives for Industrial Development in Qatar

Incentives are defined as effective methods used for creating suitable conditions for the success of industrial development projects, not only encouraging private sector investors to direct their investments towards industrial development. Qatar, as well as the other Arab Gulf and developing countries, offers many incentives to the national and foreign investors to encourage establishment of industrial projects from the pre-investment stage through the execution and operation of the industrial units.

4.4.1 Technical Assistance : Examples

Pre-investment efforts and studies are very important to decide on the direction and identification of suitable opportunities. As early as 1979 the Industrial Development Technical Centre (IDTC) carried out through a French consultant 18 opportunity studies prepared for light and medium industries. Based on these several food, paper, chemical, detergent, plastic, building materials, metals and machinery industries were established by 1983 by the private sector. Their products in local and the GCC markets are now well established.

The successors to IDTC viz. the Department of Industrial Development (DID) and the Department of Industrial Licensing and Control continuously provide advice and assistance to prospective investors and industrialists in identification of new opportunities, guiding them in applying for industrial licences, and evaluating feasibility studies and proposals which the private and public sectors often submit to them. The DID constantly carries on its policy to find out more opportunities for investment in the fabrication industries and either preparing the necessary market studies of the market or making preliminary feasibility or detailed studies - project profiles. In 1991 DID released 22 completed project profiles to the private sector as a promotional effort. Similarly, DID in cooperation with GOIC released 14 further project profiles in 1992 based on market research and technical studies done by GOIC.

4.4.2 Financial Incentives

Ever since the Government of Qatar began to encourage industrialisation during the 1960s it has offered a range of financial, fiscal and other inducements to private investment in manufacturing. They were collated, added to and give full legal status in the Industrial Organization Law No.11 of 1980 (generally referred to as Law No.11). Further relevant laws were promulgated in 1985 - Law No.3, and 1990 - Law No. 25. The main relevant clauses of this legislation are given in Appendix 2, but the development of the main provisions is summarised here.

First, incentives granted before 1980:

- State of Qatar provided land necessary for industrial projects at suitable rents not exceeding 25 QR a year for a site of up to 1500 m^2, and 50 QR a year for a site up to 3000 m^2 at Salwa Industrial Estate located at Doha industrial region. At Umm Said Heavy Industrial Area the rent for land was 1 QR per square meter.

- Establishment of the necessary industrial areas and providing services necessary for industrial projects such as roads, water, electricity, worker dormitories... etc. (see Chapter 5.2, 5.3 and 5.4).

- No corporate taxes for an initial period of five years and no customs duty on equipment, materials, and services which are imported or exported by industrial firms.

- Providing industrial projects with electricity and water at subsidized prices, fixed at QR. 0.06 per KWH of electricity and QR. 4.4 per cubic meter of desalinated water.

- Providing necessary guarantees for foreign loans needed for industrial projects.

- Facilitating disbursement of necessary loans from local banks and at favourable terms.

- Easy repatriation of profits from joint venture organizations, involving foreign participants.

- Easy procedures for employing foreign workers necessary for the industrial projects.

- Facilitating loading and unloading facilities by building harbours for ships of 100,000 tons or more supplying existing industries and others at Umm Said.

- Facilitating the procurement of living accommodation and housing which some industrial projects require.

- Protecting local products selectively by imposing custom duties on imported articles which are similar to locally made goods.

And of long term significance: The promotion of local skills and talent through encouraging high standards of education and training, whether technical or administrative.

Additional incentives added in 1980 and later include:

- Possible contributions by Government to the cost of private project research and feasibility studies.
- Exemption from corporation tax.
- Exemption from customs duties on imports of:
  Equipment, machinery and the spare parts which are needed by industrial establishments.

Raw materials, semi-finished products, packing requirements such as sacks, boxes and cylinders needed for production.

- Exemption from export taxes, if any, on local products.
- Protection from manufactured imports through higher tariffs on such products if local goods of equivalent quality are available.
- The availability of industrial loans for approved projects at annual interest of 3% (well below market rates) along with a repayment of loan over seven years. The first two years are treated as grace period, provided that the invested capital of the establishment should not exceed 20 mn QR, and should be owned by the citizens of Qatar. The loan should not exceed 40% ofthe total capital that is invested.

4.5 Other Relevant Industrial Legislation and Controls

In order to promote industrial development efficiently various measures, in addition to providing financial incentives and some "infant industry" protection, have had to be taken by Government.

First, all the Arab Gulf countries have found it necessary to adopt regulatory measures in the form of laws, systems or codes for industrial development to stimulate investments in domestic industries. These laws include detailed rules to enable relevant Government bodies to support and direct, industrially and technically, the industrial activities in the country. The importance of this legislation is due to the especial characteristics of their resource bases. In some respects they are resource rich in that their hydro-carbon wealth is enormous in terms of their population sizes, in other respects resource poor because their range of resource types is very limited - in the case of Qatar extremely so. What resources they have, however, up to recently have been readily convertible into the single resource type of money and it is achieving the best use of this for the great benefit - in this context through industry - which requires careful regulation.

The easy way forward in this situation, the establishment of new industries or expanding existing plants haphazardly and without planning or detailed comprehensive study, will result in prolonged project execution, production of commodities not in demand, plants operating well below expected capacity, and other adverse consequences to the national economy. To avoid these, Qatar has progressively refined a series of legal enactments and executive codes, starting in 1980 to act as safeguards of the national interest as well as effective stimulants for Qatar's modernisation of industry. The laws contain comprehensive and yet flexible rules according to which no adverse effect should occur to the public interest as a result of (a) giving freedom to investors to invest their capital in the industries they want to promote, or (b) in deciding the type and volume of production, or (c) from problems that may arise due to strict Government control. There is also some protection for the national stock of wealth by irresponsible or rash and unprofitable investment. It has been realized in countries which have appeared to invest heavily and progressed well in the industrial sector that in many cases freedom has led to projects which the national economy either does not need, or, if needed, not actually on the basis they were carried out for. Products from such industries may not be sold locally or abroad, or they may be expensive or badly manufactured. Some unplanned and unforeseen consequences for the balance of payments are examined in Chapter 6.4.

4.5.1 Industrial Organization Laws

The Industrial Organization Law as it has evolved consists of eight sections as follows:

- Section One Definitions
- Section Two Industrial Development Committee
- Section Three Licences
- Section Four Industrial Register
- Section Five Incentives
- Section Six Light Industry Loans
- Section Seven Industrial Superintendance
- Section Eight Desertification and Public Laws.

The Industrial Development Committee has issued several regulations which ensure proper applications of the law so that the public interest for which they were designed is properly safeguarded. These include application and procedures for industrial licenses, registration in the industrial register, protection, custom dues exemptions as well as industrial loans. All these affairs have now been completely streamlined as evidenced by the functioning of the organization and performance of the department.

In addition to the basic Industrial Organization Law, other legislation relevant to the industrial sector, has been issued all for the same purpose. The most important clauses are in Law No.11, 1980 concerning trading companies and in Law No.3, 1985 concerning the contribution of non-Qatari capital to economic activities.

As the State needed information about the existing projects to plan its industrial policy effectively and to give relevant licences, and also needs various data about the industrial projects in general, all the industrial establishments, existing before 1980 were to be registered in the industrial register of the Dept. of Industrial Licensing & Control within six months of the publication of the law.

4.5.2 Industrial Licencing

The basic principle behind this system is that no industrial enterprise can take advantage of any of the incentives and concessions offered to new industrial development as described in Sections 4.4, 4.5 and 4.5.1 unless they are licenced and registered by the Department of Industrial Licencing and Control as it is now termed. Without this Department's licence, manufacturing business should not carry out new industrial projects, enlarge the size or type of operation or change the product range. The Licencing Department has to take into consideration the economic needs of the State of Qatar primarily, as well as the needs to GCC countries which constitute a unitary market with State of Qatar.

The system superficially seems rigidly bureaucratic but in fact is run very flexibly as proved by the growing number of licenced and registered enterprises (see Chapter 6.4 and Appendix 5).

In Appendix 3 are reproduced the application forms which have to be submitted for new industrial projects.

4.5.3 Present Situation

A committee chaired by the Minister of Industry and Public Works reviewed all the existing laws with special reference to industrial promotion and incentives during 1990/91. Comprehensive proposals to stimulate private sector investments were sent to the Government for approval and issue of necessary decrees. If these proposals are approved, it is expected that the investments in industrial projects by local as well as foreign entrepreneurs will be stimulated. It is however not possible to discuss these proposals here.

CHAPTER 5

ORGANIZATIONS FOR PLANNING AND IMPLEMENTING INDUSTRIALIZATION POLICIES

5.0 Present Organizational Arrangements

5.1 Historical Perspective of Industrial Development in State of Qatar

5.1.1 Industrial Development Technical Centre (IDTC)

5.1.2 Qatar General Petroleum Corporation (QGPC)

5.1.3 The Industrial Development Committee

5.2 The establishment of Industrial Areas

5.2.1 The Umm Said Industrial Area

5.2.1.1 Heavy and Basic Industrial Area

5.2.1.2 Light and Medium Industrial Area

5.2.1.3 The Industrial services area and Workshops

5.2.1.4 The Residential Town of Umm Said

5.3 Salwa Industrial Area

5.4 Other Industrial Locations

5.4.1 Dukhan Onshore Oil Processing Area

5.4.2 The Cement Industry Location at Umm Bab

5.4.3 The Sand Washing Plant and Laboratory at Al-Karaana

5.4.4 The Quarries at Umm Al-Afae

5.4.5 The Organic Fertilizers Factory at Al-Neiga

CHAPTER 5

ORGANIZATIONS FOR PLANNING AND IMPLEMENTATION OF INDUSTRIALIZATION POLICIES

5.0 Present Organizational Arrangements

On August 30, 1992 an Emiri Decree was issued reconstituting several Ministries and establishing a new Ministry, the Ministry of Energy and Industry, thus abolishing the earlier linkages of Ministry of Finance and Petroleum and Ministry of Industry and Public Works. Before that date for almost two decades, the chief organizations together with various independent or autonomous organizations all involved in Industrial development were:

- Ministry of Industry & Agriculture
- Ministry of Finance & Petroleum
- Ministry of Economy & Commerce
- Industrial Development Technical Centre
- Industrial Development Committee
- Qatar General Petrolum Corporation.

The newly formed Ministry of Energy and Industry now has 3 relevant Departments and components with responsibilities for industrialization:

a. Department of Industrial Development
b. Department of Industrial Licencing & Control
c. Qatar General Petrolum Corporation (QGPC).

The erstwhile Industrial Development Technical Centre (IDTC) and the Industrial Development Committee are now parts of departments a & b under a single Director. QGPC is responsible for all hydro-carbon activites including QAPCO, NODCO, QAFCO, NGL and the Steering Committee for North Field Gas.

5.1 Historical Perspective of Industrial Development in State of Qatar

The proclamation of political independence in 1971, the accession of His Highness Sheikh Khalifa in 1972 and the first step taken in 1973 to take national control of Qatar's oil and gas wealth, all signified a period of major change in the development of Qatar. The State undertook systematic development efforts in the production and diversification of the economy with great emphasis on industrialization and established organizations with particular responsibilities in this field.

5.1.1 Industrial Development Technical Centre (IDTC)

In 1973 the IDTC was made directly responsible to the Emir to carry out the industrial plans and projects for exploiting the natural resources of the country. The Centre was to lay down industrial development plans for the State and to supervise their execution after being ratified.

The Emiri Decree (Law No. 3) issued on 24th March 1973 stated the following objectives for the Centre:

- Preparing industrial plans and projects to exploit the country's natural wealth in such a way to suit the country's resources and its needs togther with carrying out economic and technical feasibility studies for these projects.
- Proposing how the private sector can contribute to industrial projects, jointly with the public sector.
- Dealing with anything that H.H. The Emir sends to the Centre concerning matters connected with realizing the Centre's objectives.
- Collaborating with relevent Government Departments in planning to provide a suitable labour force, training centres, services and public utilities necessary for industrial development.
- Preparing data and technical specifications for commercial bids for industrial projects, studying such bids, and working with Government Departments in preparing and negotiating contracts.
- Following up the execution of industrial plans or projects, collaborating with the concerned departments and supervising the handling of projects by the departments responsible for carrying them out.
- Preparing detailed analytical reports and evaluations of domestic industries in which the Government is involved.
- Systematizing collaboration with local and international organizations, and taking part in international conferences connected with industrial development, and followed up decisions and agreements taken in this respect.
- Collecting technical statistical and economic data that are relevent to industrial development in Qatar, studying data, reports, and projects produced by Ministries and Government Departments, also any other studies, reports or projects in the Industrial Development field.

- Following up international, economic and technological activities in the industrial field.

5.1.2 Qatar General Petroleum Corporation (QGPC)

QGPC was established in 1974 by Law No. 10 which stated its responsibilities as follows:

The carrying out the affairs of the oil industry throughout all stages including excavating and drilling for oil and natural gas, the production, refining, transportation, storing, selling, distributing, and exporting it. A state-owned corporation with capital of 3 bn QR. the law has enabled QGPC to possess the State's dividends from some foreign companies such as Shell Company in Qatar and Qatar Oil Company Limited.

QGPC holds the national shareholding in:

A. Companies whose capital (all or most of it) is owned by QGPC, and which work within Qatar:
   - QGPC Onshore Operations (the former Qatar Petroleum Company Limited)
   - QGPC Offshore Operations (the former Qatar Shell Company Limited)
   - National Oil Distribution Company (NODCO)
   - Qatar Petrochemical Company (QAPCO)
   - Qatar Fertilizer Company (QAFCO)
   - Qatar Gas Company Limited
   - Qatar Liquefied Gas Company

B. Companies in which the Corporation possesses a minor part of the capital and which work abroad:
   - The Arab company for Ship Building and Repairs (ASR) in Bahrain.
   - The Arab Company for Oil Transportation in Kuwait.
   - The Arab company for Oil Pipes in Egypt.

5.1.3 The Industrial Development Committee

This was established as an inter-ministry committee with representatives from all organizations concerned with industrial development viz: the Ministries of Agriculture & Industry, Finance and Petroleum, Economy and Trade, Justice, Electricity and Water, and the Interior, together with the IDTC, the office of the Emir and the Qatar Chamber of Commerce.

Members of the Committee were appointed by the Council of Ministers and, under the Chairmanship of the Minister of Agriculture and Industry, met regularly to discuss how best to develop and encourage national industries.

It was responsible for:
studying proposals and systems which aim at systematizing, protecting and encouraging national industries, and proposing public policy for distinctions, exemptions, facilities and bonuses accorded to the industrial projects, priorities in promoting them and the priorities given to each of these projects according to the economic needs of the country and the circumstances of local consumptions and exports.

The recommendations of the Committee concerning these matters were presented to the Minister of Agriculture and Industry. These recommendations were carried out after the concerned authority had agreed, according to the industrial organization law and its executive regulations.

5.2 The Establishment of Industrial Areas

Many countries have adopted policies of establishing industrial estates or areas for various reasons. In the 1930's Britain was one of the first to use industrial estates to encourage growth in regions affected by economic recession and unemployment. Developing countries have adopted the same policies to encourage the early first stage of industrialization. The basic principle is the same in all cases, that government should provide land, infrastructure and usually factory buildings at low rent. This means that new enterprises' requirements for initial capital expenditure are lower than otherwise. There may also be subsidies for recurrent expenditure on inputs such as electricity, water supplies etc. as well as free or cheap maintenance of site facilities.

In the case of Qatar all these and other elements are present in the moves to create industrial areas. During the early 1970's IDTC carried out surveys of Qatar to choose the most suitable location for establishing different types of industrial projects. Two industrial areas were finally chosen, one for basic and heavy industries at Umm Said, and the other one for light and service industries at Salwa Industrial Estate near Doha. In addition to these two locations some sites have been developed close to the centres of raw materials and minerals which are available in the country, such as Dukhan for on-shore oil operations and Umm Bab, where the necessary limestone for making cement is found.

Because of the distance of these locations from Doha their operations had to be self sufficient in many respects.

- Umm Said's location 40 km. south of the capital, Doha was seen to be an advantage if it was to be developed as the Centre for strategic and basic industries which were also port-oriented.
- This relative remoteness also made it possible to plan Umm Said as a wholly independent centre of socio-economic activity, regarded as desirable planning (see 5.2.1.4 below).
- Distance from Doha and general wind patterns minimize the effect on the capital city of air pollution from heavy idnsutries.

All the factors were taken into account by IDTC in the early 1970's in making detailed studies for developing the industrial area and Umm Said as part of the development programmes and plans for industrial development. All later technical and economic studies have proved the feasibility and viability of this choice.

These studies also resulted in dividing the industrial area into several elements with specific functions to suit the industrial activities of established and future enterprises together with services and other establishments necessary for successful development. These are considered below.

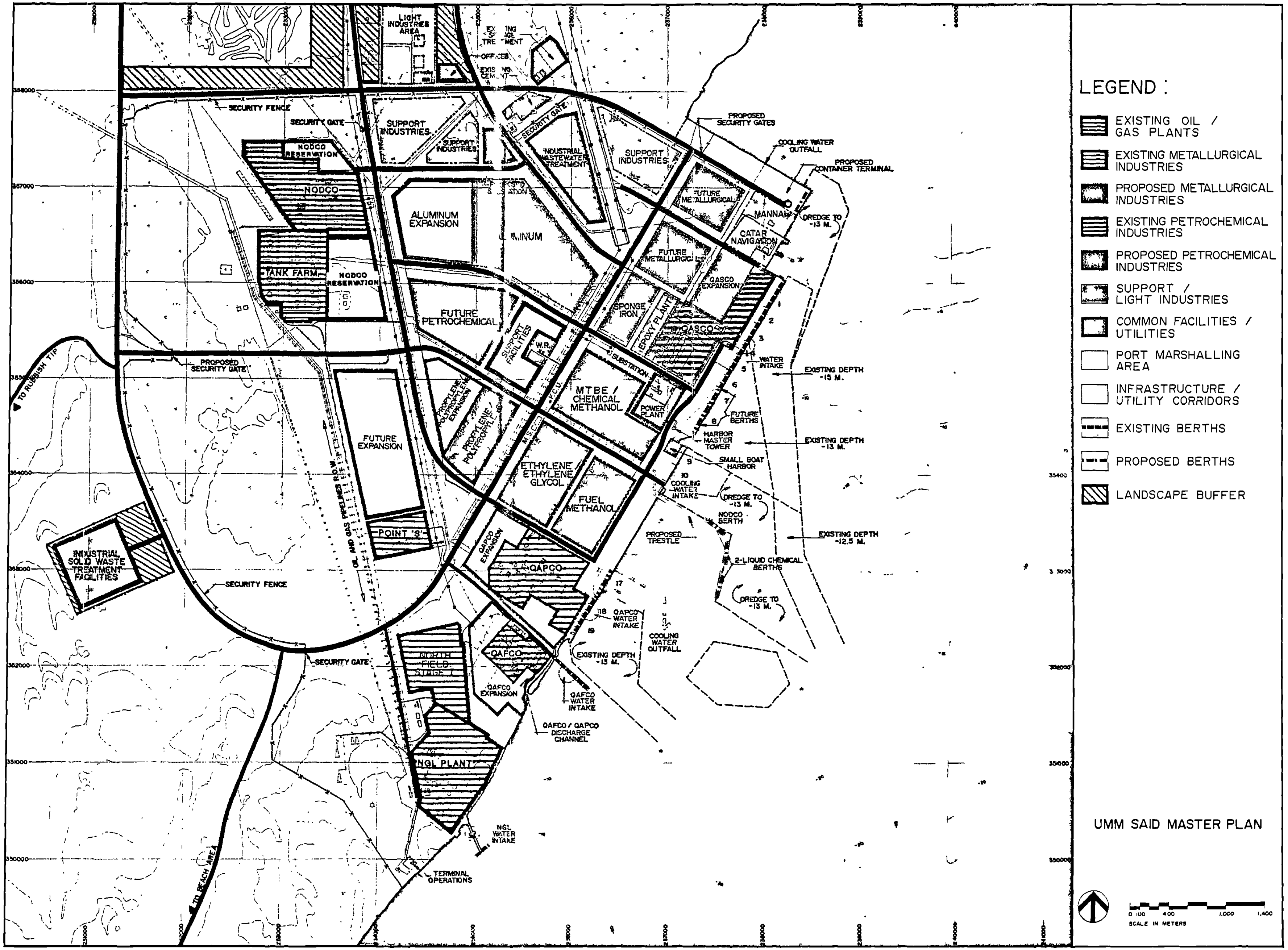
5.2.1 The Umm Said Industrial Area (see Fig. 14)

Choosing the area of Umm Said for concentrating basic and heavy industries in the country was the end result of several studies and surveys. Umm Said started with many advantages, some of which had been appreciated in the 1960's.

- Umm Said port was first created in the late 1940's by what became QPC as the export point for crude oil brought by pipeline from the Dukhan onshore field. The first very small refinery plant was built here in 1953 by QGPC and this was followed by great expansion after NODCO (National Oil Disribution Company) was formed in 1968. By 1964 three offshore oilfields were brought into production and while their crude was exported from Halul island an oil and gas pipeline was built to Umm Said. (see Chapter 1.6). Umm Said therefore become the natural location for Qatar Fertilizer Company, the first true petrochemical enterprise, established in 1969, to locate its plant. Even before the 1971/73 critical period mentioned earlier, Umm Said was already the site for industrial activity, but it also had other factors in its favour:

A - INDUSTRIAL LAND USE PLAN

FIG 14



- Its deep water site with navigable Channels close inshore and the local engineering geology made it possible to plan considerable port expansion.

- The whole area was owned by the State, and this facilitated planning and developing it, and offering land for industrial establishments at fairly low cost. Its total area is about 200 square km. including industrial and residential areas, energy paths and security and safety areas.

5.2.2 Heavy and Basic Industrial Area

This area is for heavy and basic industries which include, chemical fertilizers, petrochemicals, iron and steel, oil refining, extracting natural gas liquids and their export, together with the infrastructural requirement of these industries such as industrial harbours and some general cargo harbours. This area also includes the industries which have to be on the sea shore such as the sea arsenal, the floating basin and the marine workshops.

IDTC carried out the following work on the area of heavy and basic industries:

- Surveys and detailed studies of the coastal area, particularly sea currents and the offshore sea-bed being investigated in order to decide which parts are suitable for wharves, and the alignment of and need for deepening the navigation channels leading to the harbour. The sand and other material resulting from deepening these paths could be used in land fill and preparing the area for the proposed factories.
- Engineering geology studies in preparation for the construction of very large and tall industrial plant structures.
- Studies for and pre-provision of the technical and other services and inputs e.g. roads, water, gas and electricity supplies, needed by each enterprise, including the relevent administrative services.
- Deciding general and specific layouts of and for factories according to individual needs and security requirements.
- Establishing all external transport and communications systems, i.e. airport and seaport facilities, warehousing etc. and the management and maintenance of all these.
- Establishing internal and external road networks for all needs including security and emergencies, together with maintenance.
- Direct supervision of all development work and planning for a continuously evolving Industrial Area.

The scale of IDTC operations becomes clear when, as in Chapter 6.15 to 6.18, the heavy industries which have grown up in less than twenty years are considered.

Future developments at Umm Said are dependent mainly on how the Strategic Plan for natural gas utilization in Qatar considered in Chapter 6.2.1.1 proceeds.

5.2.3 Light and Medium Industrial Area in Umm Said

This area, planned and provided with services, lies next to the heavy industries area. It is designed for the growing number of light and medium industries which take their input supplies from the basic industries and which also can meet the demand for some products by the heavy industry enterprises and the industrial area as a whole. For example some industries such as readymix concrete factories, clinker grinding mills for producing cement, help in providing building materials necessary for the development of the area. Other industrial linkages are polyethylene and polypropylene product manufacturing and the basic petro-chemical plants and refinery in the heavy indsutry sector. In still other cases, industrialists with projects licenced under Law 11 of 1980 by the Industrial Development Committee have taken up factory sites mainly to make use of the extensive infrastructural provisions, e.g. artificial cork products, packaged animal feed and concentrated and packaged salt manufacture.

5.2.4 The Industrial Services Area and Workshops

This is a mixed commercial service area for which the IDTC drew up plans as part of a fully integrated Umm Said Industrial Area. It included in its plans, mechanical and carpentry workshops, car service stations and other facilities which would serve the two factory areas and also the new residential town.

5.2.5 The Residential Town of Umm Said

In the Long Term Structure Plan for the Umm Said region, the consultants William Pereira included plans for a complete new town, about 2 Km distant from the Heavy Industry Area. This was planned to accommodate and serve a population projected at 29, 300 by 1995.

First projections suggested that over 4000 residential units would be needed by 1982 and a network of principal services and an internal road system were constructed in the early 1980's. Umm Said town was designed to cater for administrative and technical staff needed for the management and running of the Industrial area itself, staff of the public and mixed sector major industrial groups, and for private company employees. IDTC was responsible for the building and allocation of housing in collaboration with other Government agencies. Some residential accommodation has been built by private industrial companies operating in Umm Said.

During the last five years in particular, however, there has been a tendency for senior staff and Qataris in particular to prefer to live in what may be called "Greater Doha" and to commute to work in Umm Said. As a result the residential population, mainly of lower - income industrial and administative employees, is only a few thousand and the full development of services has not occured. The potential for future growth remains.

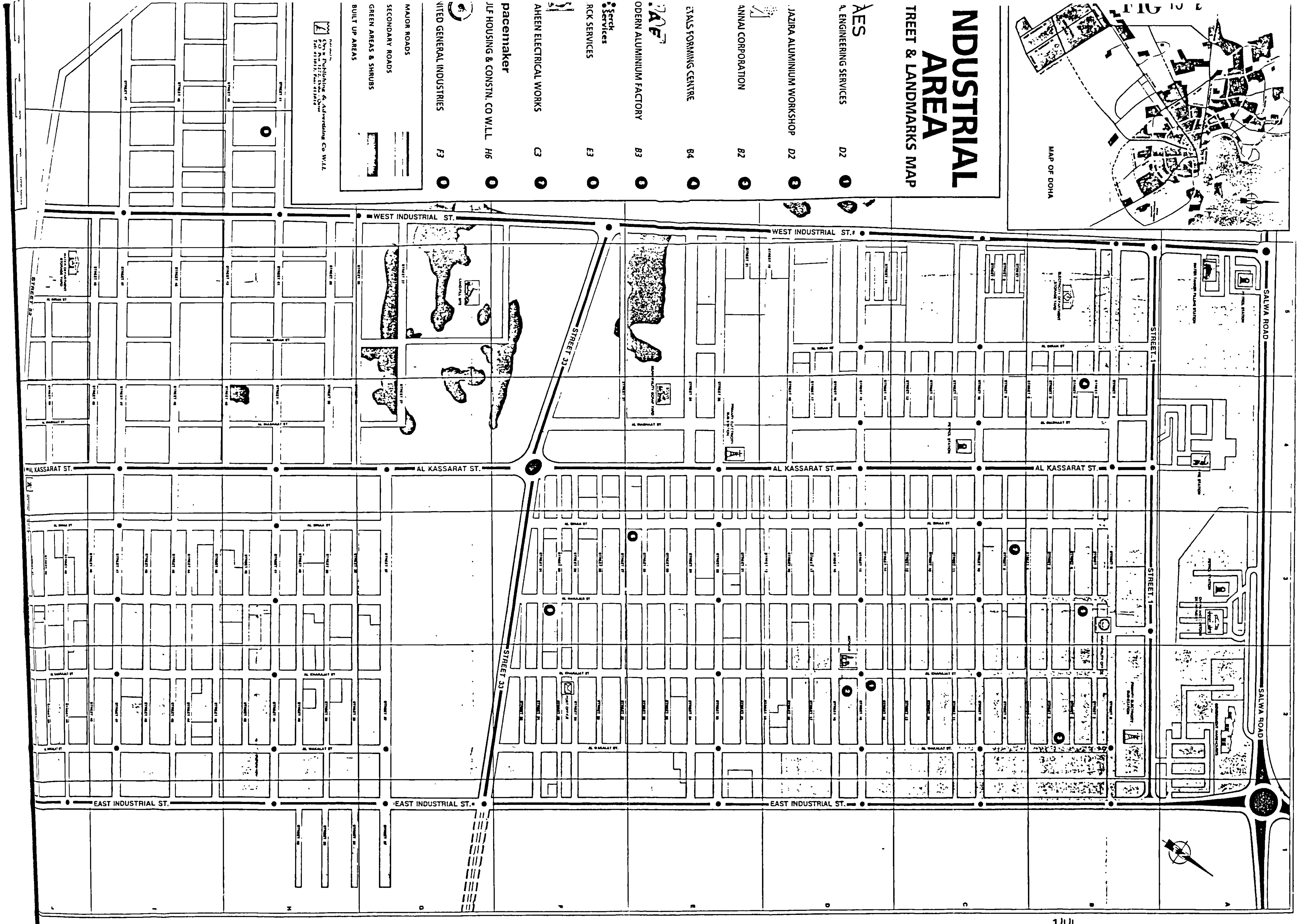
5.2.6 Development Potential at Umm Said

The IDTC in its comprehensive planning of the industrial areas allowed for the future systematic growth of new industries. The industrial linkage with North Field gas exploitation provides for future industrial growth of the kind covered in Chapter 9.3 onward. Aerial surveys, mapping and land surveys and a comprehensive plan of the zones's potential were carried out in 1987. One unfortunate consequence, however, of national worries over security as a result of political and military events in the gulf during the 1980's is that much recent information concerning Umm Said as also Ras Lafan may not be published.

5.3 Salwa Industrial Area (see Fig. 15)

The first private sector industries which were established in the 1950's and 1960's were small workshops of a great variety of types from metal working to cement products. These grew up behind the waterfront of old Doha and were mixed in with housing and offices in the city centre. The Salwa Industrial Area, south west of and outside the main limit up area was designed to enable these small industries to be relocated so as to reduce pollution, disturbance and traffic congestion in the developing capital city of Doha.

Salwa sites have been distributed to various companies, entrepreneurs and industrial ventures since 1972. Since then, an Industrial Area Administration has been established under the Ministry of Municipal Affairs for fulfilling regulations and supervising the availability of the required services for the area, guarding against breaches of law and supervising shifting of industrial units which were located in the capital to the industrial area.


NDUSTRIAL AREA
TREET & LANDMARKS MAP
AES
A. ENGINEERING SERVICES D2
JAZIRA ALUMINIUM WORKSHOP D2
ANNAI CORPORATION B2
ETALS FORMING CENTRE B4
ODERN ALUMINIUM FACTORY B3
RCK SERVICES E3
AHEEN ELECTRICAL WORKS G3
pacemaker
JLF HOUSING & CONSTN. CO W.L.L. H6
NITED GENERAL INDUSTRIES F3
MAJOR ROADS
SECONDARY ROADS
GREEN AREAS & SHRUBS
BUILT UP AREAS
MAP OF DOHA
WEST INDUSTRIAL ST.
AL KASSARAT ST.
EAST INDUSTRIAL ST.
STREET 33
STREET 1
SALWA ROAD

The Salwa industrial area extends over 25 square kilometers, and is divided into ten sections officially described as holding:

1. Garages and Metal Working
2. Trading Shops and Aluminium Works
3. Factories for Glass, Tiles and similar products
4. Prefabricated Asphalt Mixers
5. Car Agencies, Garages and Al-Tabouk (Bricks) Factories
6. Office Equipment and Paper Products Factories
7. Cooling Systems, Refreshments and Foodstuff Industries
8. Gas Stores and Diverse Professions
9. Industrial Equipment, Pre-fabricated Houses and Warehouses
10. Company Equipment and Warehouses.

Since its first development the designated Salwa Industrial Area, named after the trunk road running south-west and of Doha, has began to be absorbed by the growth outwards of low density housing from the urban centre, and effectively is now within Greater Doha.

5.4 Other Industrial Locations

Other industries have been located near the sources of raw materials on which they depend, and their development, in part Government planned, has required infrastructural provision by the State. They have all grown rapidly, at various scales as complete manufacturing service and residential units.

5.4.1 Dukhan Onshore Oil Processing Area

About 90 Km west of Doha is located Dukhan where the first onshore oil was discovered and exploited. This area has developed into a self sufficient industrial area with the production units, purification and oil transport pipelines, associated gas pipelines etc. A self sufficient colony for workers, staff and services has been developed in an area which is totally controlled by QGPC.

5.4.2 The Cement Industry at Umm Bab

Because of the availability of the necessary raw materials for cement which include limestone and gypsum and the nearness of ample energy supplies at neighbouring Dukhan , a factory was established in this area for producing two kinds of cement;

ordinary and salt resisting cement. In addition, a unit to produce lime to satisfy the requirements and the consumption of the iron and steel factory was also established. A residential area for workers and staff was set up in this area including essential services such as a clinic, a club and roads network, at the only non-oil industrial location on the west coast.

5.4.3 The Sand Washing Plant and Laboratory at Al-Karaana

This plant was established after the discovery of large reserves of good quality sand at Karaana. The sand is treated to meet the specifications and requirements of the building sector. The production capacity of this plant is about 600 tonnes per hour. A residential area has been built near this location for workers of the plant and laboratory, supplied with essential services and facilities.

5.4.4 The Quarries at Umm Al -Afae

Production started in 1975 at the large and well equipped quarry established by the Government at one of the few locations of good quality stone suitable for building purposes. Reaching maximum production of 1 mn. tonnes of prepared stone during the month of March 1977, it is equipped to supply stone to exact building specifications. Here also the complex includes residential, administrative and service units for the workers, including mosques and restaurants.

5.4.5 The Organic Fertilizers Factory at Al-Neiga

Prosperity has brought a major problem of waste disposal to Qatar and a factory has been constructed at Al-Neiga for treating waste matter and changing it into well-composted organic fertilizer to satisfy local requirements. The factory's capacity is 150 tonnes a day of waste matter and garbage, of which 100 tonnes are converted into organic fertilizers, the rest either treated, or used as land fill. Another unit has been established for the same purpose to treat the sewage output of Doha. These factories have been constructed close to the purifying sewage units to make use both of water and waste matter. They are managed by Al-Doha Municipality and the final safe products used on municipal land and gardens.

5.4.6 The Mechanical Slaughterhouse at the Central Market Area along Salwa Road

As the urban population and its consumption both grew, so did the need for securing sanitary conditions of meat slaughtering. A mechanical slaughterhouse was established near the cattle markets and central markets. This project includes sheds for sheep and cattle, halls for slaughtering cows, camels and sheep, departments for the sanitary supervision of jointing meat and refrigerators for preserving meat for a week. There are also units for treating blood, and other organic refuse and waste water. This slaughterhouse is equipped with the most up-to-date equipment operating according to scientific methods in this field, constructed on a site of about 4 ha.

5.5 Ras Lafan - The New Industrial Area (see Fig. 16)

The developments at Ras Lafan, 70 Km north of Doha, represent a new era in Qatar's economic and industrial history. Based on the exploitation of the offshore North Field Gasfield (see Chapter 5) what is planned at Ras Lafan is a major part of a comprehensive Strategic Plan for the utilization of Natural Gas in Qatar (see Chapter 6.2.1).

QGPC has submitted a Master Plan for the development of Ras Lafan as a future heavy industrial area. The salient features of the plan, the early stages of which are now being implemented are as follows:

5.5.1 QGPC is the major shareholder in Qatargas (77.5%) which has been established to produce and export liquefied Natural Gas (see Chapter 1.6.2.2). The production of LNG itself from natural gas piped from the offshore wells to Ras Lafan, liquefied in an onshore plant and transported via specialized port facilities and LNG tankers is a very major industrial undertaking, applying state of the art technology.

5.5.2 Of greater industrial importance to Qatar is the use and processing in the country of this vast resource of natural gas. The industrial area is planned in four main industrial zones: Qatargas and LNG production, gas processing, petrochemical manufacturing, and refinery processing. In each zone, land plots have been allocated to a number of potential industries, with the flexibility of accommodating different industries, as market conditions change. Provision has been made for future light industries. Each activity is to some extent interlocked with others, as for example:

a. Ras Lafan development as a whole is based on the demand for liquefied natural gas (LNG) and the demand for lean gas, the balance largely dependent on the export of gas by pipeline(s). Offshore facilities will be built as and when LNG and gas processing facilities are finalized.

b. Gas processing will be developed as the need for lean gas builds up.

c. Condensate from LNG and gas processing will provide feedstock to the refinery.

d. Lean gas, ethylene, propane and butane will be converted to petrochemicals: fertilizers, polymers and bulk chemicals which will be mostly exported. These in turn will also provide raw materials for light industries in the future.

5.5.3 The industrial program is divided into six development phases, which would take place over the next thirty years, and may well extend over a longer period. The projected/potential industrial scenario is dependent on the implementation of phased investment and actual manufacturing policies, which depend on the continuing assessment of maket possibilities. The scenario in summary is as follows:

(a) The optimum production capacity of the offshore production complex (800 MMSCFD of wellhead fluid).

(b) Each development phase will have a single gas processing train of 800 MMSCFD capacity. LNG trains (400 MMSCFD capacity) will be included according to the relative timing of demand for LNG versus demand for lean gas. The net result will be a total of six development phases; the first four of which will have a single gas processing train and three LNG trains and the final two, a single gas processing train only. These configurations establish the availability of feedstock for downstream refining and petrochemical processing.

(c) Refineries will be included in each phase for the upgrading of condensate to high value-added products.

(d) The recovered natural gas liquids (ethane, propane and butanes) will be converted in petrochemical plants to higher value-added products. These are phased as follows:

Phase	Industry	Capacity (KTPA)
1	Ammonia	495
	Urea	660
	Ethylene	270
	Polyethylene	200
	Linear Olefins	100
	Aromatics	207
II	Ammonia	495
	Ethylene (Expansion)	540
	Polyethylene	200
	Polystyrene	80
	Methanol	825
	Polypropylene	200
	MTBE	500

III	Ammonia	495
	Urea	660
	Ethylene	270
	Ethylene Glycols	300
	Polystyrene (Expansion)	160
	Aromatics	207
IV	Ammonia	495
	Ethylene (Expansion)	540
	Linear Olefins	100
	Methanol	825
	Polypropylene	200
	MTBE	500
	Ethylene Glycol (Expansion)	520

This industrial program, currently phased over thiry years, is based on a maximum scenario involving the eventual production of 24 million TPA of LNG (delivered) and the export of 2,600 MMSCFD of gas via pipelines.

5.5.4 Ras Lafan Community

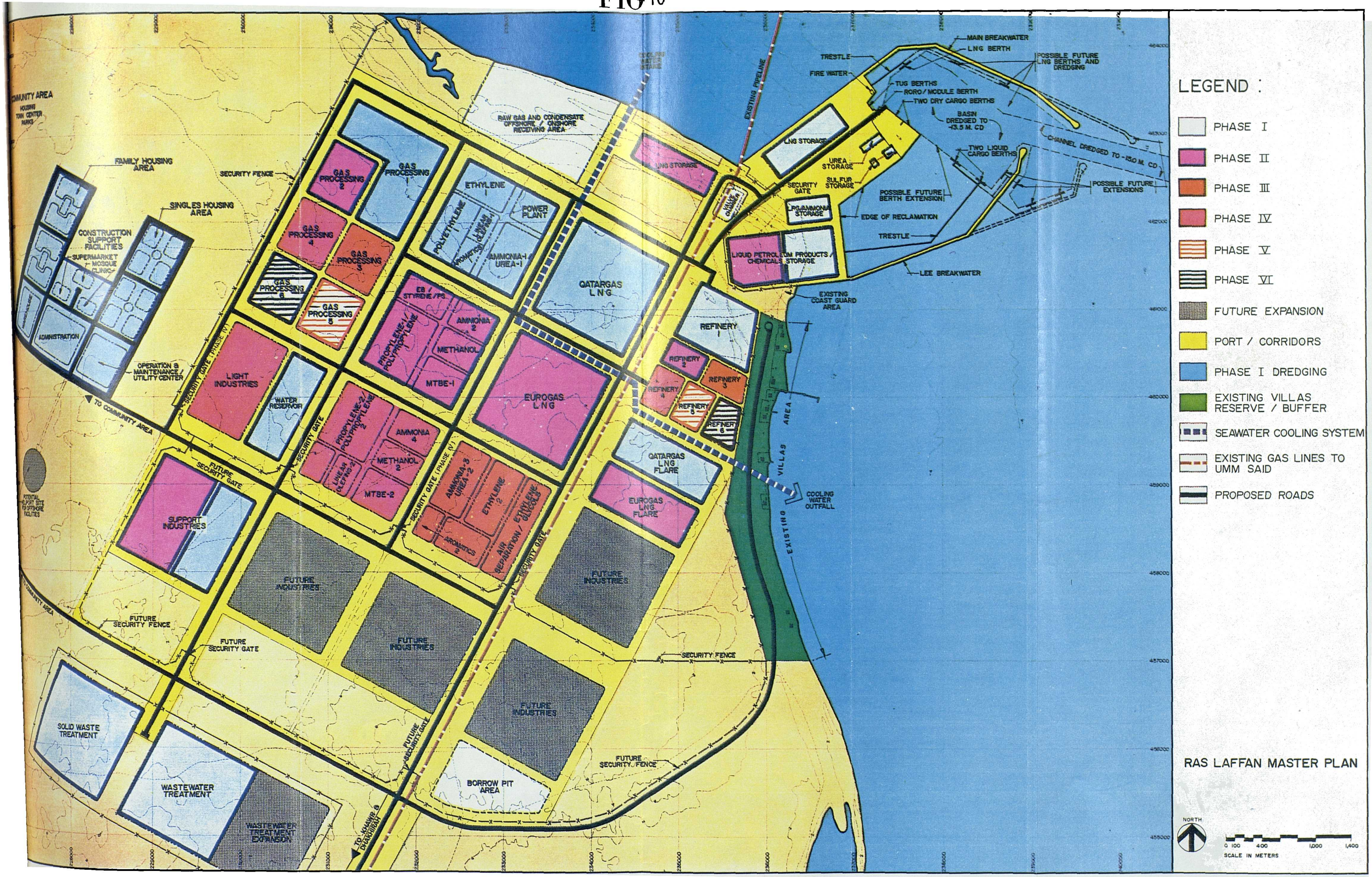
The objective of the Community land use plan is to create an attractive and balanced community from the very start, to make Ras Lafan a desirable area in which to live for Qatari and non-Qatari employees (see Fig. 16)

A number of possible locations of the new town were considered and the selected location was chosen to take advantage of the nearness of the site to the coast, the high ground, the avoidance of sabkha depressions, and the proximity to the industrial area for the provision of power and water as well as employment. The ultimate population is projected to be 74,000 by the completion of Phase VI of the industrial development.

This community will be divided into nine clearly identifiable neighbourhoods containing mixes of housing types served with shops, mosques, schools and recreational facilities. The community centre will have a full urban-level complement of facilities for civic and commercial leisure activities. High quality housing will be provided together with a full range of social and public services. A number of reserve sites are defined at strategic locations to be used for activities that may be identified in the future. Near to the coast line, sites are designated for the headquarters of the Development Organization, a hotel, a beach club and a marina.

A - INDUSTRIAL LAND USE PLAN

FIG 16



The allocation of land uses and services are planned to accommodate the rapid growth induced by the ambitious industrial programme, within a long-term strategy for the development of the town.

5.5.5 Seaport

On the basis of the 6-phase development programme proposed port traffic analysis projects the movement of 13 million commodity tonnes per year in the first phase of development increasing to a maximum of 54 million tonnes at the end of Phase VI. This implies an average of 360 ships calling per year in the first phase, reaching a maximum of about 1,300 ships per year. Based on this port traffic analysis, it was concluded that the following number of types of berths will be required at the port facility:

	Phase I	End of Phase VI
LNG	1	3
Condensate/Refined Products	1	3
LPG/Ammonia	1	2
Liquid Chemicals	1	2
Container Cargo and Dry Bulk	2	3

One of the considerations in the selection of Ras Lafan as a location for development was the relative closeness of deep water offshore for export shipping. However, a water depth of some 15 meters, suitable for the expected export shipping, is about eight kilometers from the coast and there is no natural shelter from waves. As ships of 135,000 cubic meters capacity are planned for the export of LNG, any berth used by such ships would require a very high level of availability to ensure a regular and economic service. From wave records made in recent surveys it was concluded that a protected harbour basin will be needed for the safe operation of LNG vessels involving large-scale dredging of navigation channels. There will be a common product storage area adjacent to the port which will be available to the industries to supply and maintain their own tankage requirements to permit the rapid loading of the shipping tankers. Taken as a whole, the seaport with all its special handling facilities becomes an enormous capital project in its own right. Yet, without the export by sea of LNG the economics of the whole Ras Lafan project would be called into question (see Chapter 9.8 and 9.9).

5.5.6 Infrastructure

The infrastructural requirements for not merely a coastal terminal for offshore gas production but for a high technology heavy industry area and a large new town; all on a "greenfield" site are enormous. Excluding the seaport dealt with in 5.5.5 above and the pipeline linkages to Umm Said (see Chapter 6.25), the main elements planned are as follows:

a. High standard arterial road linkages to the rest of the country and two internal road systems for the industrial area and the community.

b. Power may initially come from the National Grid from Dept. of Electricity and Water. Provision has been made for a power and desalination plant at Ras Lafan connected to the National Grid via a 220 KV transmission system.

c. Seawater cooling is provided by a seawater cooling canal, capable of providing up to 550,000 cubic meters per hour of cooling water for the industries and the power plant.

d. Municipal water will be initially obtained from Electricity and Water Department, but will be supplemented from supplies produced at Ras Lafan.

e. Electrical power distribution from a 220 KV supply provided in the first phase by the Ministry of Electricity and Water but later from generating plant in the industrial area.

f. Digital telecommunication system in cooperation with the Qatar Public Telecommunications Corporation.

g. Various support facilities such as an Administration Building, Operations and Maintenance Center,Civil Security Complex and a Fire Station.

h. Interplant piping to carry gas and liquid feedstocks and products between industries, the main supply headers and the loading facilities at the port will be the responsibility of and supplied by the individual industries.

i. Water and waste systems which include water, sewage and industrial waste collection systems and liquids and solids waste treatment facilities with the treated effluent water available for irrigation.

An additional factor to be taken into account is that the provision of these extensive physical infrastructural facilities will itself be a long-term process phased in with industrial development. The area as whole will be undergoing detailed site survey and preparation, construction, extension and maintenance for decades. This adds yet another dimension to the problems dealt with in 5.5.7 and 5.6 below.

5.5.7 Environmental Considerations

The impact of this industrial program on the environment has also been carefully considered. Appropriate standards for air quality emission and water effluent before discharging to the Gulf have been determined. The required water treatment and solid disposal facilities will be included in the infrastructure program. To ensure the maintenance of such standards, the concept of "permit program" has been applied that will require potential polluters to install adequate pollution controls. The concept is based on placing a provision in the facility lease that requires specific plants to comply with the permit program and achieve certain minimum environmental standards.

5.6 Conclusion

It is clear from Chapter 4 and Chapter 5 above that Qatar has committed itself on a large scale to government involvement in and encouragement of industrialization. This has meant adopting some elements of a command economy i.e. the State reserves the right to own and control the assets of oil and gas, the only rich natural resources available to the country. However, it is also clear that this approach has not been based on any ideological philosophy concerning the superiority of state as opposed to private ownership. In fact the only ideological input is that noted in Chapter 4.1.1, i.e. the constitutional duty of government to uphold Islamic principles in society and preserve the rights of private ownership and capital.

The centralist approach to industrialization and the setting up of organizations and systems by the State to promote development is rooted in two simple facts. First, one consequence of the discovery and exploitation of a globally desired commodity, petroleum during this period of the history of Qatar and the Gulf was that external revenue in vast quantities flowed rapidly in to Government/State hands. It was the government/State which determined how this wealth should then be disbursed. Spending and development agencies grew from the top down and policy is inevitably determined ultimately at the centre - by the State. Because this has happened in an Islamic Arab society with strong tribal and trading traditions the result has been not a mechanistic totalitarian system but a pragmatic, cautious and socio-politically sensitive system.

The second fact is functionally resource-determined. Any industrial project which is really concerned with the transformation rather than the assembly of materials tends to be capital intensive. Heavy industry is very much affected by economies of scale. In the case of Qatar the combination of scale of effort and the technological needs of the industries considered in Chapter 6.18 made it inevitable that their establishment could not have taken place without direct State investment and promotion - hence the public sector. The exploitation and utilization of the North Field gas resources are even more dependent on very large scale State investment both of cash and international credit. At the same time such growths required infrastructural expenditure, in what up until 1950 was a poorly developed country, on a scale which only the State could satisfy. Therefore the State's plans and policies mainly determine the whole physical fabric of the country.

One quite different element in the process must also be noted. Private capital, considerable in total and private enterprise has freedom of action of investment, locally or abroad. There is no central government direction and very little control through taxation. The private sector has to be induced and attracted to industrial projects and the planning and development organizations have to deal with this complicated field in the private sector, the mixed sector, i.e. private and public investment and management, and the public sector. Behind all this is the permanent problem of the smallness of the domestic human resource base.

CHAPTER 6

STAGES OF INDUSTRIAL DEVELOPMENT IN QATAR

6.0 The Sequence of Development upto 1991

6.0.1 Stage 1 : The Pre-Oil Stage

6.0.2 Stage 2 : 1949 - 1973

6.0.3 Stage 3 : 1974 - 1983

6.0.4 Stage 4 : 1984 - 1991

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6.1.3 Infrastructure

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6.3.10 Other Industries with Government Participation

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6.7.0 Future Development of Umm Said Industrial Area

6.8.0 Conclusion

CHAPTER 6

STAGES OF INDUSTRIAL DEVELOPMENT IN QATAR

6.0 The Sequence of Development upto 1991

In previous chapters the resource and other factors involved in the process of industrial development, the goals and policies adopted by the State, and the organization and institutions set up in order to achieve the success of industrialization policies, have all been surveyed. The industrial age which can be said to have started with the discovery of oil in 1949 has obviously been a period of changes - internal and external, social, economic and political. Some of these have been summarized in the introduction in which the point is made that the equivalent changes during the pre-oil, pre-industrial age, although apparently much smaller, were importantly responsible for influencing what came later i.e.. what gave Qatar its individual character distinct from other Gulf and/or oil states.

The period since 1949 of course has its own internal dynamic progression of events, and industry in Qatar has developed through successive stages, each characterized by certain political, economic and social traits. Hence the period as a whole is divided into four successive time stages, which can also be correlated with the changing events analyzed in the Introduction.

Stage 1	:	Pre-oil
Stage 2	:	1949 - 1973 Oil production and first industries
Stage 3	:	1974 - 1983 Rapid industrial and economic development
Stage 4	:	1983 - 1991 Consolidation of earlier basic development efforts, development of small/medium scale industries, first phase of gas age

6.0.1 Stage I : Pre-Oil Stage

As noted earlier, during the period upto 1949 economic activity involved fishing, pearling and basic agriculture, all supplied with the products of crafts such as carpentry and iron smith work to build boats, tools etc. Consumer goods were simple textiles, construction materials of local stone, lime cement and either date palm timber or imported wood. Pearling was vital before 1930 in supporting a structured economic activity including pearl-divers, ships crews, ships captains - the marine leaders of ventures, the "Nowkath", the merchant backers and financiers. Even after the virtual collapse of Gulf pearling after 1930, the legacy of traditional trading and maritime ventures remained.

Another legacy of the traditional past was that of a large resident non-Qatari-Arab population, made up of many people of other ethnic background, Persians, ex-slave Negroes, Indians and a few Europeans.

6.0.2 **Stage 2 : 1949 - 1973**

Discovery of oil at Dukhan in 1949 brought in the oil based economy which although at low levels of production of 2000 barrels per day at first and which was mostly exported, provided the take off for industrial growth. The following may be considered as the major events in industrial development between 1949-74:

- 1963 saw the establishment of a small local refinery with a capacity of 6000 barrels per day to produce kerosene, motor gasoline and diesel and the first use of associated natural gas for electricity generation at Ras Abou Aboud.

- 1965 may be considered as a turning point in the history of the Qatar oil industry with the start of off-shore oil production. 1965 also saw the establishment of the first cement manufacturing facility with capacity of 100,000 tons/year.

- Between 1965-73 oil production took a sharp jump from 1.7 mn. tons in 1965 to 20 mn. tons in 1973. Increased production and a modest rise in the price of crude oil from US$ 1.5 to UA$ 3.0 per barrel by 1973 provided the required funds to sow the seeds for this phase of industrial development.

- Political will and an appreciation by the government of the developmental possibilities offered by rising revenue, expanding national resources and local needs led to a series of government backed ventures.

- 1968 - Establishment of NODCO and the expansion of refining capacity to 12,000 BPD by 1974.

- 1969 - Launching of Qatar Fertilizer Company, production starting in 1973 with 594,000 tonnes /year of ammonia and 660,000 tonnes/year of urea.

- 1974 - Establishment of Qatar Steel company, which went into production in 1978 with a capacity of 330,000 tonnes/year.

Initial activities of private sector also took place during this period to establish consumer industries such as bakeries, building materials and other consumer industries to satisfy in part local consumption.

6.0.3 Stage 3 : 1974 - 1983

This period saw a big increase in the price of oil, from US$ 3 in 1973 to US$ 35 per barrel in 1981/82. Availability of funds in plenty gave a fantastic boost to the economy in general with booms in industrial activity, construction, trading and contracting. Demand grew in response to the rapid increase in the expatriate labour force and higher living standards.

The period of industrialisation up to 1980 was studied by Al-Kubaisi (1984) who drew particular attention to (a) the relocation of early small-scale industries in Salwa Industrial Area (see Chapter 5.3 above) and (b) the major heavy industrial development at Umm Said (see Chapter 5.2.1 above). He also noted the deliberate emphasis on industrial development in the increasingly centralised planning for development decisions taken after 1961 and in the 1970s.

The first planned industrial development programme was implemented during this period with the following developments based on government initiatives:

- 1975 - NGL-1 plant was commissioned.
- 1976 - Expansion of cement plant capacity to 330,000 tonnes/year.
- 1977 - Launching of compost plant.
- 1979 - Commissioning of 30,000 tonnes/year burnt lime unit.
- 1979 - Expansion of fertilizer production capacity with Ammonia-II and Urea-II
- 1980 - Launching of NGL-II to produce more propane, butane, methane and ethane rich gas and rebuilding NGL-I.
- 1980 - Launching of Qatar petrochemical company to produce 280,000 tonnes/year of ethylene and 140,000 tonnes/year of polyethylene.
- 1983 - Expansion of NODCO refinery output capacity from 12,000 bpd to 62,000 bpd.

It can be seen that there was extensive activity and a horizontal expansion of the industrial base, with greatly improved utilization of associated gas and some vertical integration through the prodution of petrochemicals.

The government recognized the need for the involvement of the private sector in further industrialization and to develop an outlet for growing private sector funds. To facilitate such development Law No. 11, 1980 was proclaimed spelling out incentives for the private sector (see 6.1.2 below and Chapter 4.4).

During 1977 the Industrial Development Technical Centre (IDTC) conducted several studies through a French consultant, SERETE, to identify small/medium scale industries out of which some projects like detergents, paint and building materials etc. were developed.

This period also saw one major indirect development. The ruler H.H. Sheikh Khalifa, gave top priority to education and advanced training of Qataris. Even before his accession, in 1971 he commissioned two reports on the feasibility of establishing a University (Bowen-Jones 1971) (UNESCO 1971), the nucleus of which was created 1973 followed by the full establishment in 1977. At the same time Qataris were sent for training overseas. There are many Qataris at different levels of industrial development and management to-day due to the importance given to higher education by the Government during this period.

6.0.4 Stage - 4 : 1983 - 1991

Even though this was a period of economic and political upheaval in the Gulf region it saw the consolidation of gains of earlier industrial development that took place before 1983. Notable achievements were in absorption of new technology, increasing efficiency of operations and producing outstanding results in the technical operations of various industries such as:

QASCO	:	Production exceeded design capacity by 70%
QAFCO	:	Production exceeded design capacity in urea plant by 88% and ammonia by 22%
QAPCO	:	Production exceeded design capacity by 22%.

However, the sharp decline in oil revenues in the early 1980s and the slow revival in constant value terms in the late 1980s did not favour heavy industrial investment either by the government or the private sector until the end of the decade. The next major step forward in industrial development was taken in September 1991 when H.H. the Emir inaugurated Phase 1 of the North Field natural gas exploitation programme.

During this period government measures to encourage private sector participation in industrial development were extended in type and scope. Greater use was made of incentive schemes launched in the 1970's and incorporated with several significant additions in law 11 of 1980 (see Chapter 4.4.5 and Appendix 2). Further encouragement were added in Law No. 3 of 1985 (see chapter 4.5 and Appendix 2) whilst through Law No. 6 of 1987 private sector industrial products were given a 10% price preference advantage over imported products when tendered for public sector contracts.

One administrative measure taken to improve industrial planning efficiency was the reorganization in 1989 of the Ministry of Industry and Public Works, creating two departments, for Industrial Development and for Industrial Licensing and Control.

Direct financial backing of private sector industry came with the flotation in 1989 of the Qatar Industrial and Manufacturing company. Of its authorized capital of 400 mn. QR the Government of Qatar is responsible for 20%; by the end of 1992 subscribed capital totalled 100 mn. QR. During the first three years of its existence the QIMC promoted 7 industrial projects some of which have entered the production phase (2 launched in 1992): about 20 projects are under study by the company. The intention was to target private capital into industrial investment by providing initial capital and a degree of guarantee against risk through direct government investment.

Other initiatives taken included the evaluation of possibilities for private sector manufacturing carried out by the new Department of Industrial Development (DID). In May 1991 the Ministry of Industry and Public Works released 22 "profiles" of projects studied in this programme, since when many different organizations and QIMC have taken an active interest in these possibilities.

6.1.0 The Industrial Situation at the end of Stage 4, 1991

6.1.1 Major Industrial Projects: A Summary of Achievements

Table 40 summarizes the production achievements by 1991 of the major industrial projects. The data is collected from the various industrial sources, the CSO and from publications of the QMA. In gross production terms the results are impressive.

6.1.2 Private Sector Industry: A Summary of Achievements

The private economic sector in Qatar was extremely active in some economic fields such as wholesale and retail trade, the supply of building and construction materials, contracting, transport, financing, insurance, real estate, furniture making, food and beverages, recreational, repair and maintenance services.

The private sector's earliest response to increased national and personal wealth and consumption, as noted in the Introduction 1.3.3.2, Chapter 3.2. and 3.4.1 was to invest in trade and property.

TABLE - 40

PRODUCTION OF MAJOR INDUSTRIAL COMPANIES 1983 - 1991

Products / Years	Qty. Unit	Design Capacity	1983	1984	1985	1986	1987	1988	1989	1990	1991
Qatar Fertilizer Company											
Ammonia	000. MT	594	586.3	631.8	743.8	658.3	682.3	724.9	714.3	708.0	691.2
Urea	"	660	685.3	734.0	639.6	746.9	733.9	779.6	780.4	761.1	798.7
Organic Fertilizer Factory											
Organic Fertilizer	"	150	16.0	15.2	22.4	21.3	27.7	26.7	33.2	37.0	31.6
Qatar National Cement Co.											
Ordin. Cement(Portland)	"	330	119.8	243.5	227.7	197.3	189.2	178.8	174.6	183.0	266.4
Sulphate Resis. Cement	"		42.3	69.8	107.5	126.3	103.8	112.3	120.5	84.1	100.2
Quick Lime	"	30	18.4	19.1	18.6	15.8	13.5	14.3	15.2	16.3	16.0
Hydrated Lime	"		-	-	0.9	0.1	1.0	-	-	-	1.0
Qatar Steel Company											
RC Steel Bars	"	332	467.5	475.4	503.7	493.1	503.4	533.0	556.5	593.3	560.5
Oxide Iron Ore Fines	"		65.0	13.5	10.0	-	6.0	-	-	-	-
Qatar Flour Mills Company											
Flour No. (A)	"		17.6	17.8	17.9	21.8	22.6	24.5	26.4	-	24.6
Flour No. (B)	"	1000	7.1	5.7	2.1	3.3	3.6	4.2	3.8	28.4	4.0
Bran	"		5.4	5.7	5.7	6.2	6.6	8.0	8.1	3.3	7.4

Products / Years	Qty. Unit	Design Capacity	1983	1984	1985	1986	1987	1988	1989	1990	1991
Qatar Petrochemical Co.											
Ethylene	"	280	163.5	204.6	184.9	258.3	262.7	256.5	295.1	293.9	234.7
Low Density Polyethylene	"	140	144.0	149.3	152.9	176.2	173.9	170.7	181.4	185.5	161.6
Sulphur	"	46	19.0	33.2	27.6	44.7	48.2	37.0	51.9	53.9	39.2
Natural Gas Liquids											
Propane	"		314.7	423.6	310.9	382.7	662.1	304.1	348.4	412.6	419.1
Butane	"		202.9	321.2	228.3	268.8	223.7	204.8	231.5	307.5	302.8
Condensate	000 Barrel		1670.4	2578.6	1370.2	1635.4	1825.9	1569.1	1827.2	1798.2	2062.3
Refinery	:					:					
Liquified Petroleum Gas	"		82.2	424.3	458.3	55.5	58.0	75.0	83.7	93.5	-
Super Petrol	"		3.2	664.5	758.6	824.8	115.3	226.5	309.9	148.7	137.5
Premium Petrol	"		1093.6	1342.4	1344.2	1293.7	157.1	112.7	146.1	320.8	275.6
Jet Fuel	"		573.2	859.4	573.3	662.3	97.5	403.9	352.9	387.4	360.3
Kerosene	"		68.9	2.8	9.8	27.5	-	-	51.1	95.5	-
Diesel Oil	"		1359.4	1333.8	1625.5	3050.4	601.1	1062.0	647.5	701.2	661.8
Fuel Oil	"		-	1008.7	3646.2	4140.5	565.3	854.6	825.7	968.2	923.8

The rapid growth of non-productive sectors of private enterprises resulted in some early overheating of the economy, but in the 1960's the private sector started to take a more active role in industrial development especially in the following sectors:

- Food and beverages
- Wood products including furniture
- Paper products, printing and publishing
- *Simple chemicals* and plastic products, fiber glass containers
- Building materials, bricks, blocks, sand, aggregates, etc.
- Fabricated metal products.
- Insulating materials.

With accelerated economic development and the priming of the Qatar economy by increased general Government expenditure various investment opportunities were created in the industrial sector to supply other economic activities. New industrial activity in turn opened up various other investment opportunities related to that industry and ultimately activity in any sector boosted opportunities in the industrial sector.

For example, the building and construction sector created various investment opportunities in the field of building materials manufacture such as cement, bricks, prefabricated building blocks, fiber glass water tanks, window frames, doors whether in metal or wood, etc. A good number of these opportunities were of a size which was within the capacity of the private sector investor.

In most cases when the rate of Government expenditure fell in the early 1980's the private sector suffered in the mid 1980's from the indirect and direct effects of the slowing down of the main engine for economic activity. Recovery in the late 1980's was encouraged by the incentives outlined earlier although private industrial activity tended to remain in the same sectors as earlier. Table 41 & 42 give a statistical summary of the number of registered industrial enterprises. A more exact analysis is made in Chapter 6.4.3

TABLE - 41

DISTRIBUTION OF REGISTERED INDUSTRIAL ENTERPRISES ACCORDING TO INDUSTRIAL ACTIVITIES IN 1980

No.	Industrial Activity	No. of Enterprises
1	Food and Beverages	13
2	Textile and Leather	1
3	Wood and Wood Products	2
4	Paper, Printing and Publishing	5
5	Chemical, Rubber and Plastics	19
6	Non-Metalic Mineral Products	12
7	Basic Metal Industries	2
8	Fabricated Metal Products, Machinery and Equipment	6
	Total	60

Source : Personal research and CSO publications

TABLE - 42

ENTERPRISES REGISTERED IN 1991

I.S.I.C. Division	Industrial Activity	No. of Est.
31	Manufacture of Food, Beverages and Tobacco	32
32	Textiles, Wearing Apparel and Leather Industries	13
33	Manufacture of Wood and Wood Products including Furniture	29
34	Manufacture of Paper, Paper Products, Printing and Publishing	15
35	Manufacture of Chemicals, and of Chemicals, Petroleum, Coal, Rubber and Plastic Products	27
36	Manufacture of Non-Metallic Mineral Products except Products of Petroleum and Coal	47
37	Basic Metal Industries	1
38	Manufacture of Fabricated Metal Products, Machinery and Equipment	39
39	Other Manufacturing Industries	1
	Total	204

Source : CSO

Note : See also Chapter 6.4.3 and Appendix 5

6.1.3 Infrastructure

During all these stages of industrial development government expenditure on physical infrastructure was large and continuously growing. It is not possible to separate infrastructural works specifically for industrial purposes as opposed to those for general socio-economic benefit. Budgetary statements do not allow this even within the stated allocations for capital expenditure to particular ministries, and the mounting costs of maintaining the growing infrastructural stock out of current expenditure are equally difficult to identify.

The dangers of extravagant expenditure on physical infrastructure are well-known and Qatar has succeeded in avoiding most of them (Bowen-Jones, 1984). Nevertheless, as stated in Chapter 2.2.9.3, a large proportion of the capital spending proposed for 1993/94, with an increase of 25% over the previous year compared with only 5.4% increase in general expenditure, goes on infrastructure, a large part of this attributable to the needs of industry. The results of past expenditure appear not only in the communications and utilities itemized in Chapter 3.1 but also in the industrial areas and estates described in Chapter 5.2, 5.3 and 5.5. In the future, Ras Lafan will make even greater demands and if Umm Said makes a second take-off, Qatar will have two major new towns, as well as two major industrial areas, in addition to the Dukhan oil complex and the capital city Doha, to support.

6.2 Growth and Development of Industrial Planning

Economists usually differentiate between growth and development. Growth represents unrelated efforts depending on private and Government induced activity, whereas development represents a deliberate control and allocation of available resources for specific structural changes in the economic structure, based on sectoral inputs to realize previously stated objectives according to some master plan to realize growth among the different economic sectors, balanced or unbalanced according to circumstances.

Thus, the year 1974 is a turning point in the history of industrial development of Qatar when the State started to carry out a new central role in organizing, directing and planning the industrialization process. The essential features of a first five-year plan for industrial development, prepared by the Industrial Development Technical Centre, for the period 1974 to 1978 were implemented. The integrated plan included new projects for basic industries, and for expansion of existing industries. Some of the basic industries which were established, Iron and Steel, Petrochemicals, Chemical Fertilizers, Cement, Oil Refining, Natural Gas Liquids, Lime, Organic Fertilizers and Mechanical

Slaughterhouse, have been described in sequence in Chapter 5 as well as in the beginning of this Chapter.

The first plan also gave emphasis to light and medium industries when designing an effective structure for industrialization. It was realized in Qatar, unlike in many developing countries, that light and medium industries are an essential part of a well-integrated society and economy and that the promotion of investments in these was essential to a healthy overall economy. It was also accepted that due care for developing them according to a well structured plan gave better results than allowing them to grow haphazardly. As this sector was considered very important, the IDTC undertook studies to promote investments projects suitable for light and medium industries. Based on these studies IDTC chose some projects for implementation where techno-economic feasibility studies appeared attractive. Further, several studies were prepared as preliminary market studies through which the private sector could benefit. The Centre undertook policies to provide these opportunities for investment in the private sector or as joint sector companies where the State shares equity with the private sector but with majority holdings. The essential aim was to stimulate private sector investments in industrial development. The cumulative results are indicated in 6.4 below.

6.3.0 The Development of the Public, Private and Mixed Sectors

The State was quite aware that the industrial development must be pursued as a two pronged approach, each supporting the other and working together, to realize development effectively both in the public sector and in the private sector. There is no rigid view by the State of Qatar to determine what should be done by the public sector, and what should be left for the private sector (and see Chapter 5.6). However the balance should be dynamic and not static, that is to say the balance between these sectors depends greatly on the stage of development within a country, the development policies adopted by a country and the resources available to a country. At initial stages of development the greatest role is played by the public sector. This can pay dividends during subsequent stages as the growth process naturally leads to creating new fields and areas of opportunities for investment in the fields of industrialization.

The experience of several industrialized and developing countries has proved that the basic industries established by the public sector in the developing countries may provide attractive opportunities for establishing many other ancillary and subsidiary indsutries. Some of them depend on the basic industry products as their raw material, other provide inputs to the basic industries in the form of materials, equipment or spare parts. The private sector usually has the greatest role in establishing industries which complement the basic industries, and the experience in Qatar lends to support this (see Chapter 3.5).

The State also has had a role to play in inducing private capital to invest in industry as a profitable venture. Financial incentives are not enough in themselves; technical assistance in making the right choices by private investors is also a necessary part of industrial planning (see Chapter 4.4.1).

An additional reason for all State support for light and medium industries is that sound enterprises can reduce dependence not only on imports of intermediate and light capital goods but also of consumer goods (Chapter 3.4).

As for the role of the private and public sectors in industrial development at the present stage, it has been accepted that the State should supervise the growth of basic industries as they are closely related to the hydrocarbon based projects, which require long term policies and huge financial resources. Further, such projects also need long periods of gestation, starting from the stages of project identification to the stages of profitable operation. On the other hand, light and medium industries require fewer financial inputs and shorter gestation periods and may therefore be left for the private sector.

6.3 The Background of Development and Current Situation of the Major Public and Mixed Sector Industries

6.3.1 Qatar General Petroleum corporation (QGPC)

QGPC, the single largest industrial organization in Qatar, was originally established in 1974 by Emiri decree as a profit-seeking enterprise "to work for the development of the oil industry in all its aspects including exploration and prospecting for oil and natural gas and the production, refining, transport, trading, distribution, sale and export of these substances". QGPC was authorized by law to acquire Qatar State's share in Shell Company of Qatar (off shore) and QPC (onshore). In 1977 QGPC under the Minister of Petroleum took over all rights in Qatar's hydro-carbon resources with a capital base of QR 3 bn.

QGPC supervises a number of local industries based on the utilization of oil and gas in addition to a number of investments abroad. With a capital of QR. 5 bn (approx. US$ 1.37 bn), QGPC is also involved in the various oil industry operations, including prospecting and drilling for oil, natural gas and other hydrocarbons; production, refining, storage and transport of hydrocarbon products and derivatives; and trading distribution, sale and export of such products. It is a majority share holder in national subsidiaries engaged in oil refining and production of petrochemcials and fertilizers, viz: NODCO, QAPCO, QAFCO AND QATARGAS (See below).

Overseas investments have included a number of joint Arab and foreign ventures, ranging from dry docks, ownership of oil tankers, installation cum operation of pipelines, petrochemical projects and engineering consulting companies.

QGPC maintains oil and natural gas production at levels compatible with state policy and market conditions. Thus, in keeping with the government's plan and commitment to the Organization of Petroleum Exporting Countries (OPEC) crude oil production was maintained in 1991 at the level of about 400,000 barrels per day. During the year 1992 the quota for Qatar remained around 370,000 barrels per day.

QGPC has a programme of in-service training for Qatari employees who receive practical and theoretical courses locally and abroad. A special training and development department has been created for this purpose. QGPC with a workforce of over 4,000, almost 2,000 of these being Qataris, is by far the largest industrial employer.

While running its onshore and offshore operations, QGPC continues to carry out technical and prospecting activities with a view to preserve the fields' productive capabilities and boost their potentials. Early in 1990, QGPC signed an oil and gas exploration agreement, based on production-sharing with French Elf-Aquitain, covering a virgin offshore area. In addition, QGPC is currently undertaking contacts with a number of international companies for prospecting operations in other offshore areas.

In the domain of oil refining, oil product distribution installations at Abu Hamour were commissioned early in 1989 to enhance the integration of the refining industry. The two refineries of Umm Said were also operated at full capacity, 62,000 bpd, raising total output of refined oil products to 2.4 million tonnes, an increase of 31.1% against the previous year.

6.3.2 National Oil Distribution Co. (NODCO)

The refining industry was launched in Qatar in 1953 when Qatar Oil Company set up a small unit with a production capacity of 680 b/d to produce kerosene and diesel oil. The first fully-fledged refinery was commissioned in September 1974. The initial capacity of 6,200 b/d was later doubled, but a third expansion scheme, commissioning a second refinery in 1983, raised combined design capacity to 62,000 b/d of refined oil products, of which a portion is exported to neighbouring markets. Table-43 shows the production of NODCO for the year 1986-90.

TABLE 43

QATAR NATIONAL OIL DISTRIBUTION COMPANY PRODUCTION DEVELOPMENT 1986-90 IN KILO (000) TONS OIL EQUIVALENT (KTOE)

Year	LPG	Gasoline KTOE	Jet Fuel KTOE	Diesel	Fuel Oil Reidual KTOE	Total Crude Feed KTOE
1986	54.8	273.4	92.5	411.7	598.3	1,461
1987	57.7	286.5	101.7	617.1	562.1	1,688
1988	74.9	352.4	224.0	645.3	562.7	1,989
1989	81.4	482.6	365.6	658.4	823.2	2,593
1990	93.5	490.8	401.3	714.1	978.8	2,918

Sources : NODCO/QGPC

6.3.3 Natural Gas Liquids (NGL 1 and NGL 2)

The utilization of natural gas associated with crude oil production started on a small scale in Qatar in 1963 as an energy source for power stations. However, even in 1974 less than 31% of onshore associated gas was used and the rest flared off. In 1979 only 3% of offshore associated gas was used. The value as feedstock of associated gas once processed and separated into natural gas liquids (NGL) such as butane and propane and other components was first appreciated by QPC at Umm Said using Dukhan gas. In 1980 under QGPC two new plants were built to handle onshore and offshore gas - NGL 1 and NGL 2 plants. Beginning commercial production late in 1980, these plants are equipped to produce exportable natural gas liquids at a maximum combined daily capacity of 1,700 t. of propane, 1,240 t. of butane and 1,075 t. of natural gasoline. They also produce ethane rich gas used as feedstock by QAPCO, and methane rich gas used as feedstock by QAFCO, and fuel for several heavy industries as well as power-cum-water-desalination stations.

TABLE 44

NATURAL GAS LIQUID PLANTS
PRODUCTION DEVELOPMENT 1986-91 (METRIC TONNES)

Year	Propane	Butane	Gasoline
1986	347925	242792	192415
1987	315724	223383	182592
1988	353205	263862	516910
1989	396773	297188	182779
1990	412675	307561	169820
1991	423479	233903	176408

Source : Ministry of Industry & Public Works Reports

The future for the NGL plants and other uses of associated gas became uncertain during the 1980s, partly because the Khuff formation gas reserves in the Dukhan area were being drawn down, particularly because of the rising demands by the desalination and power generating plants. Associated gas has the additional disadvantage is that its extraction rate is directly linked to crude oil production rates, and these have been subject to OPEC quota limits as well as affected by crude oil export price fluctuations.

The non-associated gas of the North Field is about to transform the situation - see 6.6 below.

6.3.4 Qatar Fertilizer Company (QAFCO)

QAFCO, the first of the true hydro-carbon processing plants, was also the first very large joint venture between the State of Qatar and foreign industrial and financial interests when it was established in 1969. QGPC holds the State's majority interest with 25% shareholding by Norsk Hydro. Feedstock and energy from Dukhan associated gas supports two plants QAFCO 1 and QAFCO 2. Each of these comprises a unit for the production of ammonia at a design capacity of 900 tonnes per day (t/d) or a combined annual design capacity of 594,000 tonnes/year, and a unit for the production of urea of a daily design capacity of 1000 tonnes (or 600,000 tonnes as total design capacity). QAFCO has maintained the record production rates it had achieved in 1988 with annual output hitting the marke of 714,400 m.t. of ammonia and 780,300 m.t. of urea. Table-45 shows the steady output increase QAFCO has achieved in recent years.

TABLE 45

QATAR FERTILIZERS COMPANY PRODUCTION DEVELOPMENT 1986-91 (METRIC TONNES)

Year	QAFCO 1		QAFCO 2		Total	
	Ammonia	Urea	Ammonia	Urea	Ammonia	Urea
1986	308000	332000	351000	415000	659000	747000
1987	350400	332900	331900	401000	682300	733800
1988	334300	338200	380600	441400	724900	779700
1989	NA	NA	NA	NA	714400	780300
1990					708000	761000
1991					692000	798000
Design Capacity					594000	660000

Source : Ministry of Industry and Public Works, Reports

6.3.5 Qatar Petrochemical Company (QAPCO)

The Company was formed in 1974 for the purpose of investigating the use of ethane-rich gas as part of the process of converting the NGL from associated gas. A joint venture by the Qatar Government (through QGPC) as 84% shareholder and the French Company CdF chimie was launched in 1977.

Commissioned late 1980, QAPCO began commercial production following a brief period of experimental operation. The complex comprises three production units:

- The first unit has a design capacity of 280,000 t/y of 99.95% purity ethylene, 5,000 t/y of propylene and 46,000 t/y of sulphur produced as a by-product.

- The second unit produces 140,000 t/y of low density polyethylene at nominated capacity, using 150,000 t/y of ethylene, or 52% of the first units's output of this material.

- The third unit was commissioned late in 1986 to produce feedstock for the first unit through the processing of 150,000 cu ft daily of ethane-rich gases from the gas liquids plants. Table-46 shows QAPCO's production 1986-91.

TABLE 46
QATAR PETROCHEMICAL COMPANY PRODUCTION DEVELOPMENT 1986-91 (METRIC TONNNES)

Year	Ethylene	Polyethylene	Sulphur
1986	258348	176282	44734
1987	262687	173891	48211
1988	256625	170774	36951
1989	255129	181407	51958
1990	293917	185508	53890
1991	234722	161600	39172

Source : Ministry of Industry and Public Works' Reports

6.3.6 Qatar Steel Company (QASCO) (and see Chapter 7)

The Qatar Steel Company was first formed in 1974 by Emiri decree as a joint venture between Qatar Government as 70% shareholder, and two Japanese companies who would be responsible for construction, operating and marketing. Although all raw materials would have to be imported the plant which came on steam in 1978 would rely on the local physical inputs of local gas-generated power and natural gas for the direct reduction process.

The special attraction was the booming demand for reinforcing steel in Qatar and the Gulf region. QASCO is examined in some detail in Chapter 7 and here attention is confined to a brief summary.

QASCO plant has fully integrated production facilities manufacturing different types of iron and steel products.

Concrete reinforcing bars of 10-32 mm are preduced in the third and last production unit which has an annual design capacity of 330,000 tonnes. Table-47 gives recent production figures.

TABLE 47
QATAR IRON AND STEEL COMPANY PRODUCTION DEVELOPMENT 1986-91 (TONNES)

Products / Year	Direct Reduction Sponge Iron	Casting Steel	Rolling Reinforced Bars
1986	487217	498694	493120
1987	482270	483833	503431
1988	495158	519732	533010
1989	531001	554762	556538
1990	573376	563794	564422
1991	566159	564324	560481
Design Capacity	**400000**	**400000**	**330000**

Source : Ministry of Industry & Public Works Reports

6.3.7 Qatar National Cement Company (QNCC)

The first national industry to be estabilished in Qatar in 1965 was, strictly, the first "mixed sector" venture being jointly funded by the Government and the private sector. Based on growing demand for construction materials and on low-priced energy, production has gone some way to substitute for imports. QNCC operations are located at Umm Bab, the only heavy industry not to be in the Umm Said area (see Chapter 5.4.2).

The first cement plant was commissioned in 1969 with an annual production capacity of 100,000 t/y. An increase in demand promoted the execution of a first expansion phase which when completed in 1974, raised output to 215,000 t/y. Two years later, a second expansion phase brought production up to 330,000 t/y.

A special kiln with an annual design capacity of 30,000 t/y was set up to produce unslaked lime covering all the needs of Qatar Steel Company. In 1985 work started to build a plant for production of two types of slaked lime, one for chemical uses and the other for construction.

Table-48 shows the development of cement and unslaked lime production in the past six years.

TABLE 48

QATAR NATIONAL CEMENT COMPANY PRODUCTION DEVELOPMENT 1986-91 (TONNES)

Year	Cement	Unslaked Lime
1986	165895	15849
1987	126512	13542
1988	161717	13695
1989	248228	15547
1990	267092	16695
1991	366567	18114

Source : Ministry of Industry and Public Works, Reports.

6.3.8 Qatar Flour Mills Company

The Flour mills is legally a private sector enterprise incorporateed in Qatar in 1969 and beginning operation in 1973. Because it supplies a basic foodstuff, flour, which until 1981/82 was a State-subsidized commodity, the Flour Mills occupy a "grey area" between the mixed and private sectors and receive favourable treatment for most of their production input, including fuel and energy. Production figures are shown in Table-49.

TABLE 49

QATAR FLOUR MILL COMPANY PRODUCTION DEVELOPMENT 1986-91 (METRIC TONNES)

Year	Flour 1	Flour 2	Bran	Total
1986	21850	3299	6200	31349
1987	22598	3751	6633	32982
1988	24489	4225	7960	36674
1989	26486	3788	8170	38444
1990	28370	3384	7990	39744
1991	24569	4952	7377	36898

Source : Ministry of Industry and Public Works, Reports.

6.3.9 General Note

Five of the industries very briefly outlined above are mainly resource-based enterprises i.e. using oil and gas as energy and raw material inputs. Cement, Steel and Flour production on the other hand were mainly demand based, although the availability of low-priced energy was an important factor in each case. A certain amount of inter - industry linkage between the major industrial units has already taken place, as planned in the first development design. For example, QASCO and QNCC are mutually associated in construction whilst QAPCO, NODCO and QAFCO are all closely tied in with NGL processing. The next stage of "integration" on this scale depends on the downstream development of North Field Gas - see 6.6. below.

6.3.10 Other Industries with Government Participation

Many of these are noted in Chapter 5.4.3 to 5.4.6 and range from projects managed and administered by the Ministry of Municipal Affairs to others including the National Fishing Company and the large-scale engineering workshops owned and/or operated by quasi-governmental bodies such as the Public Works Department, Doha International Airport etc. Not strictly in the private sector and not strictly State-owned manufacturing enterprises, nevertheless their total industrial output is considerable although impossible to isolate and quantify.

6.4.0 The Development of and the Current Situation in the Private Sector

6.4.1 The Growth of Private Sector Industries

Table 41 and 42 contained in 6.1.2 above summarised the growth in number by general type of industrial units between 1980 and 1991, the period during which licencing and registration became necessary (see Chapter 4.5.2) . These figures, as will become apparent, represent the best available for industrial enterprises each with 10 or more "persons engaged" and with a stated capital based of more than QR 250,000. A more detailed and exact breakdown is given below but the statistics have to be analysed with caution because (a) some enterprises which grew up before the 1980 legislation was passed either did not register or delayed registration, (b) the timelag between applying for a licence from the relevant department and actual operation may be considerable and (c) during the mid 1980's it became necessary to modify the data-base used by the licencing department.

Nevertheless a more detailed breakdown of Licencing Department data, particularly since 1984, is possible and is presented in Appendix 5. and 6.4.3 below.

The scale of industrial investment, excluding all infrastructural provision in this group of industrial units, is remarkable considering the low base from which Qatar's industrialization programme started. By 1991, 7.4 bn QR had been invested in the 204 registered and functioning industrial units. An additional 116 establishments, licenced but not fully operating, had total investment capital of 1.9 bn QR. Some of this was public sector investment, but in 6.4.2 amd 6.4.3 below the structure and characteristics of private sector industry is investigated, backed up by personal field research.

6.4.2 Trends in Industrial Establishments by ISIC Code type and Number of Employees 1984-1990

6.4.2.1 Table 50 presents related data from CSO Annual Industrial Surveys. For fuller data see Appendix 4. The CSO collects information from a variety of sources relating to all industrial units of all sizes. The analysis which follows is also based on personal research of samples of different types of establishment.

The major industrial units discussed in 6.3.1 to 6.3.8 above are included within the CSO and DIL figures. These can with care be illustrated to give a picture of the private sector. Even during the relatively short period 1984 to 1990 both the structural characteristics of Qatar's industry and trends within industry are apparent. First, as is to be expected even forty years after industrial activity started and some twenty years or less since industrial development was launched, the largest number of industrial establishments are small units catering for consumer demands for foodstuffs and clothing and for the growing demands for all building materials even the simplest. So we find bakeries each employing on average less than 7 people in 1984 and less than 6 in 1990, clothing industries with 4 or less in 1984 and in 1990, while the production of most fabricated metal products - ISIC Code 38 - was carried in enterprises in 1984 and 1990 with an average of less than 10 employees.

6.4.2.2 Secondly, if we abstract from the total figures for the number of establishments and the number of employees those which are clearly in the category of major Public Sector Industries (i.e. Qatar Flour Mills, Code 3116, QGPC & NODCO Code 3511 & 3530, QAPCO Code 3511, QAFCO Code 3512, QASCO Code 3710 and QNCC Code 3692) we find that the number of industrial establishments grew by about 650 between 1984 and 1990; a 55% increase. The number of employees rose by some 2000, an 18% increase. Closer examination reveals the complexity of the situation.

TABLE 50

QATAR : MANUFACTURING ESTABLISHMENTS : NUMBERS & NUMBER EMPLOYED

ISIC CODE	INDUSRY	1984		1986		1988		1990	
		Estab.	Emp.	Estab.	Emp.	Estab.	Emp.	Estab.	Emp.
3	All Manufacturers	1203	16230	1879	16852	1850	16256	1855	17163
31	F.D.T	103	1563	175	1760	172	1865	1795	1982
3112	Dairy products	4	294	5	297	5	296	5	312
3117	Bakery products	88	595	158	856	156	870	161	922
3134	Soft Drinks etc	3	320	4	259	4	306	5	338
32	Textiles, clothing etc.	536	1865	1054	3541	1053	3541	1052	4284
3220	Clothing only	536	1865	1040	3457	1039	3460	1037	4155
33	Wood & products	239	1827	243	1970	240	1963	240	2046
3320	Furniture	74	581	78	668	68	246	66	246
34	Paper, Printing & Publishing	18	1226	19	884	18	1014	20	1076
3411	Paper & Card prods	1	37	1	17	1	43	3	66
35	Chemicals & prods incl. Rubber & Plastic	22	2800	35	3034	29	2765	30	2696
3511	Basic Chemicals	5	843	5	1255	4	702	5	726
3530	Oil Refinery Prod.	1	499	2	564	1	594	1	619
3560	Unclassed Plastic Prods.	8	317	18	347	16	345	15	307

ISIC CODE	INDUSRY	1984		1986		1988		1990	
		Estab.	Emp.	Estab.	Emp.	Estab.	Emp.	Estab.	Emp.
3512	Fertilizers	1	911	1	698	1	772	1	756
3521	Paints & Assoc. Prods	-	-	1	32	1	32	2	72
3523	Soap, cleaning agents toiletries etc.	1	54	1	48	1	68	1	98
36	Non-metallic mineral prods. excl. oil	116	4144	132	2483	130	2294	128	2263
3692	Cement & Plaster Prods	1	505	7	653	5	628	4	578
37/3710	Basic Metals Iron & Steel	2	1223	1	1166	1	1060	1	1074
38	Fabricated Metal prods. & Machinery	152	1508	205	1931	194	1669	192	1643
3811	Hand tools & Hardware	46	303	68	587	62	592	60	540
3812	Furniture & Fixtures - Mainly metal	2	38	2	51	2	78	3	86
3813	Structural Products	100	982	81	538	77	408	78	460
3841	Ships & Ship Repair	1	152	4	11	3	8	3	8

Source : Industrial Survey of Qatar, CSO.
Note : List contains all industrial establishments of all sizes as notified to CSO surveys.

What is apparent from the trend in number of establishments and of employees is that 1986 was the high water mark of expansion followed by a down turn and then a recovery. This would seem to indicate a timelag between the collapse of government revenue in 1981/82; reaching its lowest level in 1986 and then later recovering with a response in industrial growth which was delayed by 4-5 years, similarly with recovery.

6.4.2.3 Thirdly, we have to look at particular sectors within a private investment area. Clothing industrial establishments almost doubled in number and their employees increased by nearly 2300, a growth of 123%. This expansion of what are really small craft workshops although clearly reflecting consumer demand (which in the Arab Gulf is overwhelmingly for custom-made clothing) does not fit with policies of up-market advanced technological development, although certainly reflecting a private sector growth.

On the other hand, in spite of the effects of recession and apart from the performance of the major industries, increasing investment was also being expressed in rather more advanced products than tailor-made clothing between 1984 and 1990. New establishments started up by 1990 in the production of paints and associated products, glass and glass products and metal furniture and fixtures. Numerical increases are small but especially during a period of recession of some significance. Changes in classification obscure the detailed picture in the group of industries under ISIC codes 3819 to 3829, viz: Unclassified fabricated metal products; manufacture, repair and maintenance (including making spare parts) of machinery and equipment. This group includes technical servicing and manufacturing plants linked to the heavier industries and the scale of jump from 3 establishments in 1984 with 33 workers to 48 and 550 suggests that private sector investors were recognising new technical opportunities. Such recognition is better identified by examining the large establishments.

6.4.3 Trends in larger Industrial Establishments by Registration & Licencing, and Size of Capital and Labour Force

Appendix 5 shows a detailed breakdown of the data available at the Department of Industrial Licencing and Control at the end of 1991. Current and very recent information which indicates the intentions of identifiable investors is confidential. A Summary abstract follows of the salient facts concerning industrial establishment each with a minimum authorized capital of QR 250,000 and an actual or projected number of persons engaged of 10 or more.

It is noted in Chapter 4.5 the statutory necessity for companies to be licenced to start production, and then registered as producing in compliance with licencing controls, after which they are able to obtain the various benefits described in Chapter 4.4, was not introduced before 1980. Retrospective registration was carried out for these establishments already in production and of sufficient size. It is possible that where the benefits of registration were marginal the controls were evaded by some small entrepreneurs but personal field research suggests that this was relatively rare.

At the other end of the sequence thare are industrial enterprises which have been licenced but which either are still under construction or have not been registered since starting production. In order to maximize accuracy the data used are those finalized for the end of 1991 in the records of the DIL. Within each ISIC main Code it is possible to identify the major public sector industries and whenever possible and useful they are eliminated from analysis to allow concentration on the private sector.

A. The total number of establishments registered, licenced and either in production or under construction at the end of 1991 was 306 of which 8 were clearly major public sector companies, leaving 298 in the private sector, at least 5 of which were joint ventures between public and private sector companies. Before 1980 the number of establishments registered and in production is recorded as 105, of which 7 were major public sector plants.

Even assuming some under-recording of the pre-1980 establishments and accepting some errors and omissions in the data, even an approximate increase of 200 in the number of private sector ventures, a growth by 200% by the end of 1991, represents a very large flow of private investment.

If the data for industrial projects licenced and in production but not registered by the end of '91, i.e. recent ventures,are considered then 56 new industrial developments had matured during the few years previous. In addition, when the 20 enterprises licenced and under construction at the end of 1991 are taken into account then it appears that the recovery at the end of the 1980's indicated in 6.4.2 above was in train.

In absolute terms the smallness of numbers involved whether of establishments or persons engaged make it dangerous to read too much into the statistics. However some interesting changes are indicated. In 6.4.2.3 above, the clothing industry was identified as having a large number of small workshops. But the DIL figures show that the clothing establishments registered since 1980 and in production by end 1991, 12 in number, employed almost 3000 people backed by investment capital of over 47 mn. QR.

An equal number of establishments have been licenced since 1980 with a projected work force of 2000 and nominal capital of over 40 mn. QR. These are clothing factories, large and medium in size and investment in them is still considered profitable. They are all located in the Salwa Industrial Area.

Of the other primary stage, consumer led industries, continuing investment flows into bakeries which become individually larger as measured by work-force and by capitalisation. The Food, Drink, Tobacco group (ISIC Code 31) as a whole (excluding the special case of Qatar Flour Mills) has continued to thrive although only one sub-group, producing Dairy Products, uses any significant proportion of local commodities (in this case milk) in processing. FDT industries are mainly scattered throughout Doha.

New investment, after 1980 and recently, has been made in the Paper and Card products group but this is mainly a matter of assembly of imported paper and card rather than a full transformation process. There is of course a market linkage to other industries and final consumers.

In Code 38, the Metal Fabrication industries which have increased in numbers from 19 in 1980 to 40 in operation by end 1991 there is some structural change. Table 50 in 6.4.2 above indicates that there are a much larger number of small and very small workshops but at the 10+ employee level and above there are some industries of rather more advanced technology e.g. one factory making structural products employing 122 people and with 100 mn QR capitalization, and this progress appears to be continuing. However, most activities in this area are still relatively simple processes changing the form of intermediate products into similar grade products -eg. imported pre-formed aluminium shapes into door-frames for the construction industry. In all the cases considered so far, the technical skills required range from craft level to low and in a few cases medium level.

There is little design skill, little innovation and no technical research required. The only appeal to the limited size cadre of educated and trained Qataris lies in the management of input purchasing, finance and sales. The same would be true of the growing number of producers of plastic products although the most recent ventures are licenced and more highly capitalized for the production of more technically demanding products.

B. An analysis of the full list of these private sector industries suggests that downstream linkages with the major basic industries is still rather undeveloped. In some ways this is not wholly surprising;. QGPC and NODCO refinery and NGL products are designed for export and/or local final use e.g. refined petroleum products, propane, butane etc., or as intermediate products for QAFCO and QAPCO. In the case of QAFCO the fertilizers produced as such are final use products whilst the QAPCO products of ethylene and LDPE (Low Density Poly ethylene) are marketed abroad as low-cost intermediates by the CdF Chimie partners. Exceptional is the case of QASCO which has itself developed downstream and joint venture enterprises linked to its own basic products ie. Qatar Metal Coating Co. for the epoxy coating in the first instance of a special line of concrete reinforcing bars. Other analogous new developments around the steel-making core have been 3 proposals involving foreign investment and new technology viz, Qatar Sponge Iron Co. with German participation, Qatar Zinc Co. and a Silicon and Ferro silicon enterprise both with Indian involvement. It is yet to be seen whether these proposals will eventually take shape.

6.4.4 Preliminary Conclusions

The main conclusions which can be drawn at this stage from this brief survey of the development of private sector industries are as follows:

6.4.4.1 In 6.3.0 above it was pointed out that the role of the basic industries in providing opportunities both in supplying inputs to and markets for successful investment in light and medium industries, can be important. To some limited extent this inter-linkage growth has begun to happen but various other factors have to be borne in mind. First there is the matter of lead-time in general and specific real timing to be considered. Not until 1980 do the government inducement to private industrial investment appear and only during the 1980s do those products of the basic industries which are of intermediate value to the private sector start flowing (except for cement), e.g. NGL and QAPCO materials. The response time by private investors to any general industrial growth would have in any case meant a period of delay. This was aggravated, as noted in 6.4.2.2. above by the economic recession of the early 1980's. Qatar does not have a command economy and private investment cannot be directed into ventures which are not perceived to be as profitable as others. Secondly, the basic industries were not designed to create opportunities for private sector "downstream" industries and QGPC perhaps became too complex an organization to rectify this situation, particularly given the attention which had to be given to North Field Development.

6.4.4.2 It is clear that the most attractive industrial investment opportunities were and are seen by most potential industrialists to lie in supplying of consumer goods to the domestic market. The main characteristics of the domestic market for manufactured goods were described in Chapter 3.4. Given that up to 70% of Qatar's residents at any one time are transient expatriates, the majority with relatively low incomes and given that imported products are freely available, then it is not surprising that largest volume growth is at the small-scale, low to medium technology end of the industrial spectrum. Bakeries, clothing workshops and small factories, furniture and hardware manufacturing have all been and still are attractive to private investors. Again it is not surprising that the manufacture of high value, technologically advanced consumer products has not taken off. Competing with imports from very big foreign production lines in the small high-income market which Qatar offers is always difficult and in most cases impossible.

6.4.4.3 All industries and especially the non-basic, non-public sector enterprises have to compete with all other demands for the very limited skilled human resources available. In private sector industries when ownership and financial control have to be in Qatari hands and in advanced technology fields which offer the best motivations for skilled Qataris, the difficulties of attracting career as well as capital investment are great. This aspect will be considered further in Chapter 7 and 8, but at this point it can be suggested that private sector industries may be starved of the technologically and managerially most capable Qataris and have to rely to an unacceptable extent on expatriate staff.

6.4.5 Import Substitution

At this stage one last brief question can be raised on the effectiveness of local manufacturing in reducing dependence on inports, i.e. industrialization for purposes of import substitution, so far as the evidence presented in this section allows. Part of the answer as it is related to consumer products has already been given in 6.4.2.2 above and in Chapter 3.4.1, ie. that purely in terms of the local market the national industries find it difficult to compete with imports on price, product range, quality etc. This is also true of the local market for intermediate and capital goods.

Even in some specific areas where question of local taste, perishability of product etc. might be expected to give local manufacturers a great advantage, for example bakery products, there appears so far to be not much challenge to imports from local producers. Through out the 1980's the number of establishments of all sizes and of the 10+ worker group continued to grow as did the number of employees. However, at the same time the value of imports of bakery products rarely fell below QR 10 mn annually and were generally on a rising trend.

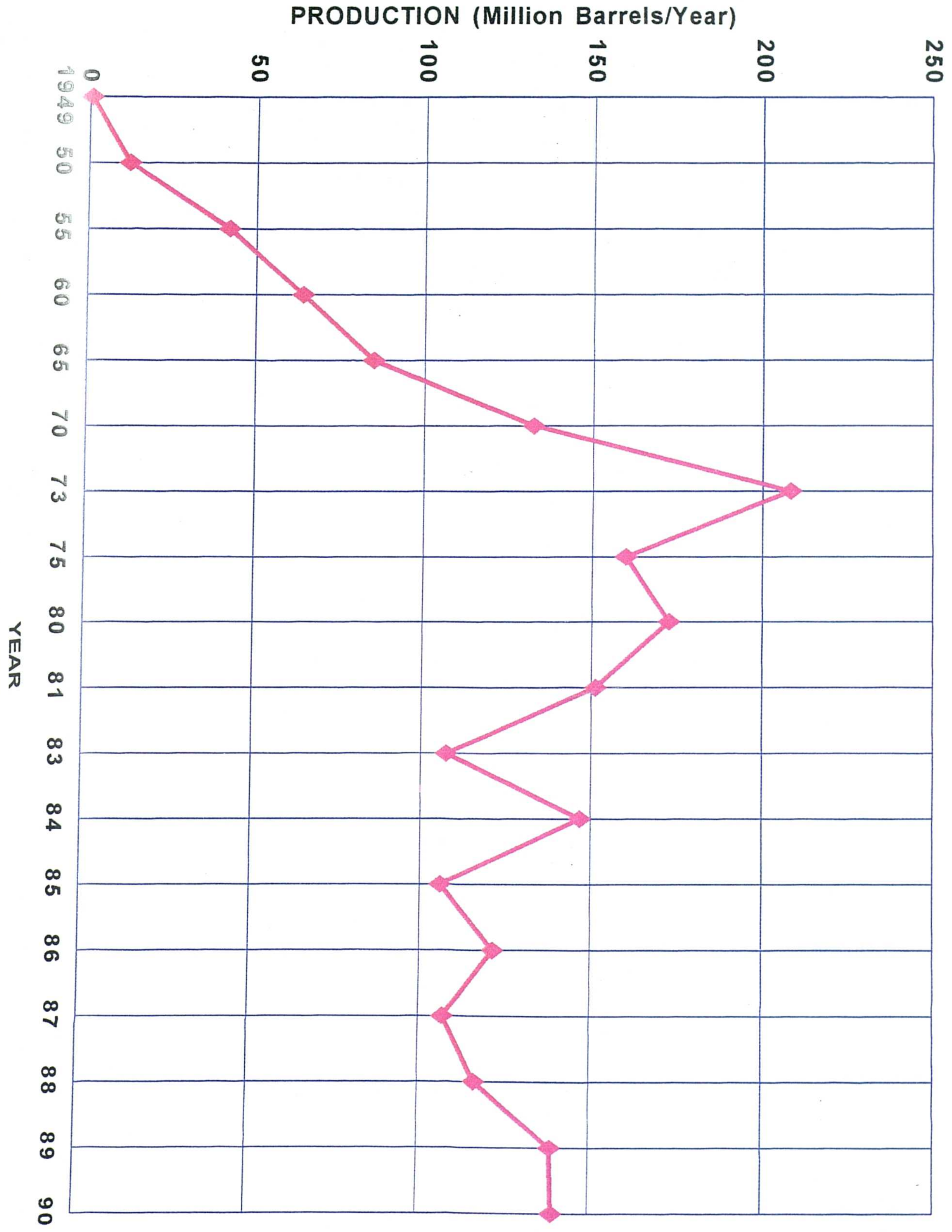
To some extent the explanation lies in the fact that local manufacturers make up both the staple fresh items and the speciality fresh items and the question of competition between these and imported items does not arise, but this may only be true if particular culturally desired items of consumption retain their present level of demand. Medium and long term social change may alter this pattern, not only in aspects of food consumption but also in clothing, furniture etc. There is evidence, for example, that in Saudi Arabia (Bowen-Jones 1986), changes in living patterns include higher proportional consumption of prepared and processed foodstuff. In Qatar this is reflected in the proportionately faster growth in imports of edible products and preparations.

In reality, because there are no detailed statistics for the volume and value of production by industrial enterprises other than the major, almost entirely public sector plants, it is not possible to measure accurately the contribution of the private sector to import substitution. Further, because practically all raw material inputs into industry other than oil, gas, limestone and a few other non-metallic minerals, and a very small contribution by agriculture, have to be imported, the beneficial effects on the balance of trade from manufacturing so far are limited. Thus CSO data show that during the 1980's the value of raw material imports as a proportion of total imports rose from 6% to almost 11%.

It is too early in the industrialization process to measure the balance of material economic advantage to the State from the developments so far, particularly in the industrial private sector. Overall, it can be claimed that any local production of locally marketable products is on the whole advantageous, partly in social value. It is, however, much clearer that the "downstream" industries which have grown around and out of basic crude oil production, refining and gas separation, although still dependent on Qatar's hydrocarbon resources make proportionately a far greater contribution to the State through their dynamic innovative and technologial potential (Stournaras, 1985). This theme is examined further in Chapters 7 and 8.

6.5 The Historical Background of Fluctuating Oil Income (see Fig. 17)

The years between 1980 and 1991, covering stage 4 of industrial development in Qatar, saw wide fluctuations in world oil prices, which compared with the 1970's were very detrimental to oil exporters. After reaching a peak in 1981/82 of upto US$35 a barrel a decline started from 1982.83. By 1986 the prices went down as low as US$10, slowly recovering to about US$ 18/barrel by 1991. There was however a sharp but temporary rise upto US$35 during the Gulf Crisis due to the occupation of Kuwait by Iraq. As noted later oil prices have fallen still further upto 1993. The general relationships between the oil revenues earned by Qatar by changing volumes of prodution - see Fig. 17 -, and fluctuating world prices and the Qatari economy have been considered in Chapter 2.2.3 - GDP, and 2.2.8 - Balance of payments, and touched on elsewhere. The effects also show through in import statistics; Table 16 shows very clearly how the


PRODUCTION (Million Barrels/Year)
0
50
100
150
200
250
1949
50
55
60
65
70
73
75
80
81
83
84
85
86
87
88
89
90
YEAR

fall in spending power, public and private, produced a continuous decline in the import bill from 1981 to 1986 and then, as shown in Table 17 a recovery upto 1991/92.

It is to be expected that such fluctuations would also be reflected in industrial development. In 6.4.2.3 and Appendix 4, data on the numerical trends of establishments and employees from 1984 onward a much more subdued and delayed reflection of the fluctuation does appear.

However, the output of the manufacturing sector as a whole as valued in measurements of GDP show a more encouraging picture. Table 51 shows estimates of GDP for the period 1980-87 at constant 1981 prices in which it appears that the value of manufacturing output is the only sector to grow without interruption between 1980 and 1986. A similar series shown in Table 52 for the period 1986-1990 at constant 1988 prices shows manufacturing holding up well, the only decline being a small fall between 1987 and 1988 and subsequent recovery.

GDP contributions by economic activity measured in current prices were earlier illustrated in Table 12 for the period 1987 to 1991. In this case a decline in the value of manufacturing output between 1990 to 1991 is noted but it is not possible to break these figures down into more detail. This fall of just over 9% is the same rate as shown by the economy as a whole. Table 53 covering the earlier period, 1980-88, at current prices confirms the trend illustrated by Table 51.

At the lowest GDP at constant prices which happened to be in 1986 the contribution of manufacturing was QRs.3198 out of a total GDP of QRs 20808, constituting 15%.

It may thus be seen that during the years of fluctuating oil prices and revenues the contribution of the manufacturing sector went on increasing, not only proportionally to lower GDP in some years but also in absolute terms. This indicates the value of industrial diversification and of the further promotion of industrial sectoral activity in Qatar.

TABLE - 51

GROSS DOMESTIC PRODUCT ESTIMATES AT CONSTANT PRICES (1981) 1980-1987 Mn QR

Economic Activity / Years	1980	1981	1982	1983	1984	1985	1986	1987
Agriculture and Fishing	148	172	189	184	192	193	218	203
Mining and Quarrying	23524	20175	16342	14647	16071	15252	16685	14607
Manufacturing	1470	1491	1622	1792	2141	2219	2438	2406
Electricity and Water	61	83	105	143	173	201	216	216
Building and Construction	1600	1632	1795	1369	1481	1406	1128	1084
Trade, Restaurants and Hotels	1272	1858	1702	1428	1362	1017	1010	1120
Transport and Communications	409	409	428	436	446	408	369	432
Finance, Insurance, Real Estate and Business Services	1839	2022	2197	2052	2122	2108	2201	2162
Social Services	139	176	228	209	202	180	189	182
Imputed Bank Service Charges	-441	-561	-537	-453	-495	-432	-486	-452
Total Industries	30021	27457	24071	21807	23695	22552	23968	21960
Government Services	3436	4089	4089	4422	4434	4476	4480	4553
Household Services	143	148	148	155	160	167	174	181
Import Duties	89	103	103	81	81	65	52	55
Grand Total	33689	28411	28411	26465	28370	27260	28674	26749

Source : Annual Abstract of Statistics, 1989, CSO

TABLE - 52

ESTIMATES OF GROSS DOMESTIC PRODUCT BY ECONOMIC ACTIVITY AT CONSTANT PRICES (1988) 1986-1990 Mn. QR

Year / Economic Activity	1986	1987	1988	1989	1990
1. Agriculture and Fishing	214	228	232	206	200
2. Mining and Quarrying	5490	4808	5591	6234	6628
3. Manufacturing	2658	3198	3138	3163	3295
4. Electricity and Water	351	350	365	353	375
5. Building and Construction	1033	1013	1030	972	1137
6. Trade, Restaurants and Hotels	1234	1380	1338	1566	1391
7. Transport and Communications	440	531	659	648	642
8. Finance, Insurance, Real Estate and Business services	2242	2197	2236	2379	2441
9. social Services	230	224	233	215	236
10. Imputed bank Service Charges	-594	-558	-540	-553	-592
Total Industries	13298	13371	14282	15183	15753
11. Government Services	7167	7272	7321	7555	7614
12. Household Services	213	223	233	251	252
13. Import duties	130	130	143	145	132
Grand Total	20808	20996	21979	23134	23751

Source : Annual Abstract of Statistics, 1992, CSO

TABLE - 53

GROSS DOMESTIC PRODUCT ESTIMATES AT CURRENT PRICES

1980-1988 Mn. QR

Years / Economic Activity	1980	1981	1982	1983	1984	1985	1986	1987	1988
1. Agriculture and Fishing	150	172	190	195	206	13	237	237	243
2. Mining and Quarrying	19245	20175	15001	10790	11330	95925	5395	5869	5644
3. Manufacture	943	1491	1391	1464	1829	1770	1777	2100	2462
4. Electricity & Water	64	83	89	133	165	191	363	362	366
4.1 Electricity	40	53	41	56	39	91	71	73	75
4.2 Water	24	30	48	77	126	100	292	289	291
5. Building & Construction	1556	1632	1829	1395	1411	1313	1054	993	1015
6. Trade, Restaurants & Hotels	1293	1858	1775	1587	1506	1186	1149	1319	1374
6.1 Trade	1150	1667	1510	1311	1251	999	986	1128	1184
6.2 Restaurants	119	124	167	171	169	106	94	90	88
6.3 Hotels	24	67	98	105	86	81	69	101	102
7. Transport & Communications	399	409	458	450	480	450	410	508	518
7.1 Sea Transport	105	22	16	15	53	31	31	38	41
7.2 Air Transport	43	61	77	94	86	83	77	73	76
7.3 Land Transport	189	257	278	244	228	225	188	193	195
7.4 Communication	62	69	87	9	113	111	114	204	206

Source : Annual Abstract of Statistics, 1989, CSO

TABLE-53 (CONTD)

Years / Economic Activity	1980	1981	1982	1983	1984	1985	1986	1987	1988
8. Finance, Insurance, Real Estate and Business Services	1705	2022	2308	2301	1919	1899	1972	1988	2239
8.1 Banks	452	602	635	554	605	563	646	640	673
8.2 Insurance	68	70	94	66	78	76	71	48	70
8.3 Exchange Agencies	15	19	35	50	42	37	30	28	27
8.4 Real Estate	1117	1241	1420	1235	1076	1111	1081	1143	1342
8.5 Business Services	53	90	124	126	118	112	144	129	127
9. Social Services	128	176	242	227	222	201	214	214	217
10. Imputed Bank Service Charge	-406	-561	-569	-492	-543	-484	-553	-533	-540
Total industries	25077	27457	22714	17780	18525	16334	12018	13057	13538
11. Government Services	3367	3865	4727	5553	6189	5748	6047	6425	6900
12. Household Services	132	143	157	168	176	187	198	213	233
13. Import duties	87	103	107	104	118	129	130	130	139
Grant Total	28663	31568	27705	23605	25008	22398	18393	19825	20810

Source : Annual Abstract of Statistics, 1989, CSO

6.6 The North field Gas Project

During most of stage 4, contemporary developments and discussion about the future developments of industry in Qatar essentially centred around development of North field gas project. Exploitation of North field Gas is considered the biggest industrial project not only in the history of the State of Qatar but also in the entire region. The North Field is one of the biggest, if not the biggest gas field in the world. Considering only the proven reserves of the field which were upgraded recently to 250 trillion cubic feet, the challenges it offers to develop rationally a new era in the national economy are formidable. This could involve exploitation and development not only through the export of liquefied natural gas LNG but also supplying various other by-products based industries which will include condensate recovery and processing, petrochemicals, fertilizers, fuel, methanol and fuel additives etc.

Exploiting associated natural gas with crude oil in Qatar dates back to more than twenty years ago, when natural gas was first used in generating electricity at Ras abou Aboud station in 1963. Ever since that time efforts in improving gas recovery have led to realizing almost complete utilization. In addition to the growth of gas consumption in the generating electricity sector and water desalination, many other industrial projects have been carried out, based on utilizing gas both as fuel and raw material. The cement industry established in 1969, the chemical fertilizer industries in 1973, iron and steel in 1978, and petrochemicals in 1980, all to a considerable extent own their existence to the availability of natural gas. Separation of the associated gas chemical components and the use of condensate for sale or refining has been in practice since 1974.

In future, the Qatar economy will depend increasingly on the basis of the exploitation of non-associated North Field Gas. The location and reserves have been described in Chapter 1.6.2.2, but the timing of their discovery as well as their scale has been and is of considerable significance.

According to the Oil and Gas Journal in 1971, the world's natural gas reserves were then estimated at 45,000 billion cubic metres, of which the USSR was estimated to have some 27%, the USA 17%, and the Gulf region and Iran with 13%. Not until 1971 in fact did large-scale international trade in natural gas begin although small-scale movement such as the annual Algerian shipments of about 100 mn cu.ft to the United Kingdom and 50 mn cu.ft to France were under way. The key to large scale development lay in the price ratio of natural gas delivered at the market to other energy sources. As long as oil remained cheap, natural gas was at a disadvantage away from the point of production because the only feasible way to transport it is and was in liquefied form and/or under pressure.

Liquefaction plant is expensive to construct, maintain and run and so is LNG tanker transport. Natural gas pipelines which are pressurized pose many more problems than do those for oil.

However as the world demand for oil increased and oil prices rose so the exploitation of unassociated gas became more attractive and international trade rocketed. During the 1980s in particular natural gas became favoured in industrialized countries for electricity generation because of its relatively low air polluting qualities - for the equivalent amount of energy gas power stations produce half of the carbon dioxide emissions given off by coal-fired and two-thirds of that produced by oil. Modern gas generating plants are also the most efficient in energy conversion.

The world's largest gas consumer, the USA, has been self sufficient for decades and US Department of Energy calculated in 1990 that it had another 50 years supplies at current rates of extraction. The main international markets dependent on imported gas are Western Europe and Japan and whilst their main demand is gas for energy then gas for feedstock is also important. Leaving the United Kingdom which is at the moment self-sufficient, the natural gas consumption of the European Community (EC) countries rose from 55 mm tones oil equivalent in 1970 to a peak of over 200mm ton in 1988. A 1990 projection of total European demand including the UK for gas (Stern 1990) pointed to a rise from 370 bn cu.metres in 1989 to 650 bn cu.m. in 2009 by which time more than half of the demand would have to be met from outside Europe. Equivalent figures for Japan are not available but with Japan dependent on oil imports for 60% of its energy requirements then it is obvious why Japan is interested in Gulf gas as well as oil.

Nearer to Qatar, is Saudi Arabia which is almost completely dependent on associated gas with all the limitations this implies, and other markets, all of which could be supplied by a regional pipeline network.

All these are indications of the complex and continuously changing world scene in which Qatar had to take the decision of how, when and for what purposes the North Field gas be exploited.

Qatar General Petroleum Corporation made detailed and careful studies of appropriate measures to exploit the North Field by producing gas to meet the local energy and industrial raw materials requirements of the State as well as to export the gas to neighbouring countries through pipelines and to the world markets as liquefied natural gas (LNG).

To realize this aim QGPC entered into collaboration with foreign oil companies with equity participation in a Liquefied Natural Gas Company. Six western companies responded to this offer by QGPC. After detailed discussions with them, QGPC declared in February 1983 that it had chosen the British Petroleum and the French Company ELF Total as partners in the joint venture project. The agreement was signed to this effect with the British Petroleum Company and ELF Aquitaine on June 25th 1984. On November 1st, 1984 a new company was established in Qatar called Qatar Liquefied Natural Gas Company Limited for carrying out the liquefied natural gas project according to the Ministerial Decree No. 33, 1984 as a joint venture company capitalised at 500 mn. QR. Originally QGPC owned 77.5% of the Company's share capital, whereas British Petroleum and ELF had 7.5% each and MITSUI Company of Japan 7.5%. In 1991 British Petroleum relinquished its share which was taken up by MOBIL of U.S.A. in 1992.

6.6.1 Future Growth Potential of North Field Gas to 2000 A.D.

North Field Gas Development Plan to exploit some of its massive wealth of natural gas resources offers promising opportunities on a vast scale. The gas reserves will not only readily meet projected local consumption for many future decades but will also enable the realization of staged industrial development based on gas and natural gas liquids aimed at regional and international markets in the energy, petrochemicals, fertilizers, minerals and metal sectors.

6.6.2 The Comprehensive Strategic Plan (and see Chapter 5.5)

Based on total estimated Gas Initially In Place (GIIP) of 380 trillion cubic ft. (TCF) with 250 TCF recoverable proven reserves, the State of Qatar initiated the development of a Srategic Plan for utilization of Natural Gas in Qatar. The objectives of the Strategic Plan are :

- To rationalize the utilization of natural gas resources.
- To generate revenues by the export of natural gas in the form of LNG or by pipeline
- To develop appropriate industries that result in higher value aded to the natural gas
- To expand the Umm Said Industrial Area to its full capacity.
- To start the long-term development of Ras Lafan as a new Industrial Area.

6.6.2.1 Stage 1 of development was briefly described in Chapter 1.6.2.2 The industrial implications can be summarized as follows. Stage 1 design capacity is 800 million

SCF/d of wellhead gas to produce about 750 million SCF/d of lean gas (mainly methane) and about 48,000 b/d of LPG/Naphthas. The lean gas will be used for:

- Meeting the requirement of Qatar's power generation and water desalination.
- Supplying existing industries and their expansion in Umm Said.
- Feedstock for new industries in Umm Said.

Surplus gas will be reinjected into Dukhan Khuff reservoir. The naphtha fractions will be processed into higher value petroleum products.

6.6.2.2 Future Stages of North Field Development

Though the development of future industries will be varied according to ongoing forecasts, potential profitability and market requirements, the Strategic Development Master Plan has identified the following potential industries to be developed in Ras Lafan:

- Liquefied Natural Gas for export
- Direct Export of gas to Neighbouring countries.
- Refining of Condensate

The timing of the various development stages will depend on market outlets but balanced development would be based on the following linkages:

	{	Ammonia/Urea
Lean Gas	{	Methanol
	{	Minerals/Metals
	{	Power/Power intensive indsutries
Ethane/Propane	-	Ethylene & derivatives
Propane	-	Propylene/Polypropylene
Butanes	-	MTBE/Lead. Free gasoline
Naphthas	{	Gasoline/kerosene
	{	Petrochemicals/Aromatics

The Maximum Programme Scenario is as follows

° QATAR GAS	1 X 6 LNG TRAINS	(12 MILLION TPA LNG)
° EUROGAS	1 X 6 LNG TRAINS	(12 MILLION TPA LNG)
° GAS PROCESSING	6 TRAINS	(=4800 MMSCFD WELLHEAD GAS)
° REFINERY	6 TRAINS	(420000 BPSD)
° PETROCHEMICALS	= 4 TRAINS OF GAS PROCESSING	

Petrochemical Plant Capacities

	Capacity (Tpa)	Number Of Plants
Ammonia	495,000	4
Urea	660,000	2
Methanol	825,000	2
Ethylene	540,000	2
Polyethylene	200,000	2
Polystyrene	160,000	1
Ethylene Glycols	520,000	1
Linear Olefins	100,000	2
Polypropylene	200,000	2
Aromatics	340,000	2
MTBE	500,000	2

6.6.3 Status of Implementation - 1993

Ras Lafan Port

To achieve these objectives and goals, the State of Qatar awarded the Ras Lafan port contract on 7 September 1991 to Condotte Joint Venture for engineering and construction. The work on permanent structures, main breakwater and reclaimed area is under progress. Preliminary design of ports is complete and the basic design of civil works for port is in final stage.

The Scope of 'Condotte' work includes the following elements:

- Port layout to accommodate Four (4) LNG beths, Six (6) Liquid/Chemicals products berths, Two (2) Dry Carbo/Bulk Solid berths, One (1) Ro-Ro/Lo-Lo (for Modules and Heavy Equipment) and Tugs and Launches berth.
- Design and Construction of 5 KM long Navigation Approach Channel, Harbour Entrance and Basin.
- Main and Lee Breakwaters, Trestle with Roadway and pipetracks to two (2) LNG and two (2) Liquid product berths and one (1) solid cargo berth.
- Land Reclamation of pipeways and storage area and port operations facilities.
- Design and preparation of tender documents for all the port Administration and Operations (Customs, Immigration, Administration, Harbour Masters, etc.) building and structures.

- Design and preparation of tender documents for all the utility systems from shore to offshore facilities for Port Operations.

Preliminary Engineering of the port is complete and the basic and detailed engineering of various elements of Port Design is underway. The approach channel and port basin are now being dredged (to -15m and -13.5 CD respectively). The construction of Main Breakwater is proceeding and core material from dredging and quarry is being laid. The contractor has completed the batching plant, labour camps, temporary desalination and power generation plant. The trial precasting and testing of Antifer blocks has been started and importation of Armour rocks for slope protection is progressing.

The implementation plan for Ras Lafan Port and Infrastructure is tied to the dates defined by Qatargas LNG project schedule and monthly meetings are being held with Qatargas Task Force and its Consultant to coordinate the design and interfaces. The division of responsibility between QGPC and Qatargas has been agreed upon and interface points have been finalized.

The infrastructural needs for Ras Lafan Industrial area have been briefly summarized in Chapter 5.5 and work in progress is on schedule.

6.7 Future Development of Umm Said Industrial Area

The Umm Said Industrial Area, as described in Chapter 5.2.1 has spare potential capacity for further industrial development and has some industrial plants that could be linked to North Field gas developments. As a result, one objective of the Master Plan is to expand Umm Said Industrial area to its full capacity by utilizing all the lean gas and gas liquids derived from Stage 1 of North Field Development as completed in September, 1991.

An expansion programme for existing plants is proceeding to utilize the gas, and contracts for two new joint ventures, Methanol (QACENCO) and Chemical Methanol/MTBE (QAFAC) have been signed and designed projects have completion scheduled for the end of 1994. Other industries being considered are Aluminium Smelting, and additional Petrochemical plants.

To support this new industrial growth and facilitate the shipment of liquid products, the construction of a new jetty with two berths was completed by the end of 1993. Other infrastructure facilities (Power, Potable Water, Cooling Water, etc.) are designed on completion to support the industrial plants when they come on stream.

6.8.0. Conclusion

At the beginning of this chapter, four stages of industrial development in Qatar were identified. If one correlates these with other changes outlined in the introduction and later Chapters it becomes clear that Stage 2 was an important preparatory stage during which even before Qatar was wholly politically independent (i.e. before 1971) or in economic control of its own resources, (i.e. before 1974), the State had taken the first steps towards planned industrialization.

Stage 3 was essentially a period of inital take-of, during which major industrial projects were commissioned, the basic physical infrastructure was laid down by the State and oil was in a seller's market. It is only during the 1980's that some degree of maturity starts to appear. In the heavy industry sector for the first time petrochemical processing plants on any scale moved into high levels of production and steel making became more sophisticated in its products. In the 1980's the effects of new State encouragement of private industrial ventures start appearing. Also in the 1980's came the depressing effects of collapsing oil revenue, the lingering dislocation of the Iraq-Iran war which only ended in 1988, and ending the decade, the second Gulf war of 1990/91.

What is notable is that the slowly accelerating process of industrialization, in the public and the private sector, was slowed down rather than halted during this period of great economic and political instability. In addition, the central drive by the State to pursue the goal of industrialiation was maintained and the planning of the next major phase based on North Field gas continued.

The results of the policy of industrialization have only become really measurable, in terms of industrial integration, of developing technology and demands on human resources, during the last few years. Qatar is still at a youthful stage of industrial development.

CHAPTER 7

ROLE OF TRANSFER OF TECHNOLOGY IN THE DEVELOPMENT PROCESS & INDUSTRIALIZATION IN QATAR

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7.0 Introduction

As noted below, the subject of the Transfer of Technology is in itself extensive and here attention is confined only to those aspects which concern industrial development in Qatar, although some wider issues have to be touched on.

The starting point now universally accepted is that technological capability is directly linked to living standards, the larger the capability, the higher the living standards. As soon as the State of Qatar adopted a policy of improving the living standards of its people it was committed to raising the level of technological capability available.

"Technology itself is a method for doing something. Using a method requires three elements: information about the method, the means of carrying it out, and some understanding of it" (Dahlman & Estphal 1983, p. 6). A UNIDO statement put the same essential idea in different words "technology is a system of knowledge, skills, experience and organization that is used to produce and utilize goods and services" (UNIDO1986).

If these general principles are applied to the case of Qatar before 1949, the situation can be described as one of low technology in all respects but in which all components - information, means of implementation and comprehension - were all in balance, in what is often described as a traditional, tribally organized, socio-economic culture (see Introduction and Chapter 1). Material consumption levels and expectations were low.

Any general economic development which was to occur or be planned in Qatar started not only from this low base but in the context of particular factors of resources endowment, scale and size of the country, and what UNIDO terms "Factor Proportions". The technologies appropriate to Qatar would be similarly determined.

In earlier Chapters the analysis of the resource endowment factor made it clear that any technological progress or introduction could effectively only be in the field of oil and gas extraction and utilization; no other significant resource factor exists independently of oil and gas.

Scale and size are relevant in two particular ways. First, the period between 1949 and 1990 was one in which Qatar was an important oil producer but in international terms at a third order level, on its own it was a price-taker and not a price-maker. On the other hand, in per capita terms it was wealthy and nationally the State had sizeable capital assets and revenue. As noted in Introduction I.3.3.1 and I.3.3.2 Qatar was and is a very distinct form of mini-state, a rich developing economy and care must be taken in applying general axioms to this specific situation. The same applies to what UNIDO terms Factor Proportions: "The predominant part of technologies available .... come from advanced economies and are .... predominantly capital-intensive and labour-saving". This proposition is in fact highly appropriate for Qatar even though inappropriate for most developing countries.

The first technological revolution in Qatar was brought about by foreign oil companies which for legitimate profit motives introduced oil industry technologies which had no roots in Qatar. This was not strictly a transfer of technology in intention, but merely the location in Qatar of primary industrial plant. The revenue earned by the State from its portion of oil-sales revenue made it possible for the State to choose, during the 1960s, a national development policy. This choice implied the taking over control and ownership of the resources of oil and, given the resource-limitations of the State except for this particular asset, directing effort further along the path of hydrocarbon exploitation and utilisation. Because this policy emphasised the growth of industry in general and manufacturing based on hydrocarbons in particular, Qatar committed itself to importing all the necessary technologies. Thus the transfer of technology, with an emphasis on some particular technical features, became an imperative.

7.1 What is Transfer of Technology?

Transfer of technology means, in the most general terms, the transmission of technology produced and/or used in one place for a given purpose and its application in another place and/or purpose as a technological innovation. Hence, international technology transfer consists in the transmission of technology from one country (technology supplier) to another (technology recipient).

Technology transfer may be either horizontal or vertical in character, or both:

- vertical transfer takes place between different stages of research and development activities (R&D), implementation and exploitation of an innovation,

- horizontal transfer involves the transmission of technology from one place (purpose) to another.

International technology transfer, especially towards developing countries as recipients, predominantly encompasses horizontal flows.

Transfer of technology may also take commercial or non-commercial forms. The latter covers all channels through which the freely available technological knowledge is disseminated all over the world (e,g,, international conferences and publications). Commercial forms involve so-called proprietary technology, access to which or whose use is somehow restricted (through industrial property rights or non-institutionalized methods of keeping it confidential).

7.2 Industrial Technology in Qatar

As appears from the description and analyses of the industrial enterprises in Qatar, manufacturing is carried out at very large number of technological levels in which the following can be distinguished.

(a) Hand-craft industries with some machine assistance. These are low-technology, labour-intensive, low capital requirement, small enterprises, typified by most clothing firms, bakeries etc.

(b) At a slightly higher level of technology (including all the elements earlier mentioned - information, processing plant, skills, organization etc.), but still essentially assembly plants, are clothing factories, simple forming of metal goods, box-making from imported card etc.

(c) More complicated processing industries, in which the material input is itself physically and sometimes chemically changed, for example, on a large scale flour milling, and cement making, on a small scale the making of extruded plastic goods. These conversion process industries require low to middle level skills to operate, and higher technological skills only at large scale management levels, and in design and equipment modification level.

(d) Multi-stage process manufacturing can include a range of technologies from medium to very high, as in, for example steel production and intermediate product petrochemicals. Variations in process complexity; value-added ratios; organizational and technical skills and experience; marketing skills etc. are considerable, depending on the scale of operation, product specification and many other factors. In terms of skills and experience, however - the human ingredient - all the industries here demand at least some input of very high skills, particularly in areas such as quality control, even for intermediate products. In Qatar this bracket will include the production of high quality rebars (QASCO) and HDP and LDP, High Density and Low Density Polyethylene, (QAPCO).

(e) At the highest technological level industries may produce both intermediate and end products, all of high added value and made to exact and demanding specifications. There will be a strong element of technical and product innovation based on skilled research on all aspects of the processes and in marketing. So far Qatar has no representative among such industries.

7.3 Qatar's Industrial Needs for Technology Transfer

7.3.1 Determining Factors

As already noted in Chapter 6 the private sector of industry is mainly responsive to the local national market and predominantly this means making and selling (a) consumer goods (b) simpler forms of construction materials and hardware. Technological advances here can only be in the fields of mass-production and larger production lines, not really feasible because *of the smallness of the home market and competition from already cheap* imports.

The public sector major industries on the other hand are all in categories (c) and (d) of 7.3 above and only exist at the moment as the result of some degree of technology transfer. Future planned industrial growth in the hydrocarbon sector, as indicated in Chapter 6.6.0 - 6.6.3 and Chapter 9.9 raises still further the reliance on the extensive use of advanced technologies. The time-scale, the narrowness of the present industrial base and the limited human resources available, together ensure that Qatar will remain dependent on industrial technology transfers on a large scale and for a long time.

The choices which Qatar makes in its planning for future industrial development will both determine the kinds of technological transfer which are considered most appropriate and be determined by an appreciation of the benefits and difficulties associated with such transfers (and see Chapter 9.14).

7.3.2 Technology Transfers, Inward Investment and Joint Ventures

In Chapter 9.5 and following sections the point is made that the technological requirements of the planned downstream industries based on North Field Gas are of very high cost and the lead-time between investment and returns very long. As a result, even more than in the past Qatar will seek inward investment in industrial joint ventures not only to obtain imports of technology (one type of technology transfer) but also to meet demands for capital investment which it may not have sufficient domestic capital to meet. To some extent, such problems could, theoretically at least be solved, by GCC members themselves combining their resources in fewer, larger operations. In practice, as indicated in Chapter 4.3.1 and Chapter 9.12 the reality is much more complicated. The result is that, as has already happened with QAFCO, QAPCO and QASCO and now in QATARGAS, Qatar will have to turn to joint ventures which not only transfer technologies in the processing, distributing and marketing sectors of industry but also supply capital on an equity-sharing basis.

7.3.3 Negative Aspects of Technology Transfer

As Derakhshani (1986, p. 42 & 43) stated: "Well designed transfer agreements benefit both parties and thus negotiations should not be conducted as if the relationship between supplier and recipient were a zero-sum game". The larger point being made is that there are costs as well as benefits in any technology transfer agreement, especially if the agreement is a commercial deal as is and will be the case in Qatar, and not an aid package.

Without over-stressing the negative aspects, therefore, as has been pointed out in various UNIDO documents and in its Manual on Technology Transfer (1986) in particular, recipient countries should take heed in their planning choices of some of these negative aspects.

As far as costs of technology transfer are concerned, direct and indirect costs should be distinguished. Direct costs of technology, partly borne in foreign exchange and partly in local currency, cover first of all the price for the elements of technical knowledge charged explicitly by the supplier. Due to many imperfections on the technology market, the monopolistic position of the seller, the relative ignorance of buyers from developing countries and generally lower efficiency of projects based on imported technology (e.g., royalties based on value added of output), the price paid for foreign knowledge tends to be higher than its "normal" market value.

The best-studied kind of indirect costs associated with technology transfer towards developing countries are overpricing (price mark-ups) of raw materials, intermediate products and machinery accompanying the inflow of technology. Such practices are facilitated by the so called tie-in clauses inserted into technology transfer agreements. Tie-in provisions oblige the technology buyer to purchase simultaneously productive inputs from a source indicated by the supplier.

Hidden costs of technology transferred to developing countries may also be ascribed to different forms and mechanisms under which foreign technology flows into the host country. Some of them can be expressed in financial terms while others have a non-tangible nature. The former include, for instance, the capitalization of know-how, i.e., conversion of a part of payments due for technology into the equity share in the recipient's company. In addition to direct payments for technology (e.g., royalties), the seller gains dividends on his shares in the equity capital.

An additional burden to be borne by technology recipients may be caused by unfavourable contract provisions imposed by the supplier in technology transfer agreements. These provisions, referred to as restrictive business practices, have frequently had negative monetary and non monetary implications for the developing countries. The following restrictive contract clauses have been the most widespread in technology transfer towards the developing countries:

- export restrictions (total or selective ban on exports, both in terms of commodities and markets, export quotas, the demand of prior supplier's consent for exports, export pricing controls, ban on export of substitutes, etc.);

- ban or restrictions on the use of the supplier's trade mark, in particular when undertaking exports;

- restrictions on the volume of output or sales;

- the possibility of the supplier's interference in production structure, types of goods manufactured, etc.;

- provisions allowing the supplier to fix prices for the domestic market;

- obligatory employment of foreign personnel;

- the supplier's intervention or participation in the recipient company's management;

- tie-in provisions;
- tie-out clauses (obligation to sell goods produced on the basis of imported technology to its supplier or to firms indicated by him);
- grant-back provisions (obligation to provide the technology supplier free of charge with all improvements, patents, trade marks, etc., introduced by the recipient);
- restrictions on recipient's R&D activities;
- ban to sub-licence and/or disseminate technology to other local companies; and
- post-expiry commitments.

All these practices negatively affect, in one way or another, the economic development of the recipient country.

Gunnar Myrdal (1968) once described a "technological trap" in which, in the production sphere, technology transfer, while providing capital-intensive innovations which create few job opportunities and absorb large quantities of capital and foreign exchange, pumps them into the modern sector and increases the incomes of small, privileged social groups. This, in turn, leads to the copying of consumption patterns prevailing in the developed economies, as well as to a fall in the propensity to save. In the case of limited possibilities for export expansion, the modern sector brings about the ruin of the traditional one, further increasing the unemployment level. Strengthening of technological dependence abroad negatively affects the national innovation activity, contributing to growing frustration and unemployment of highly skilled personnel, xenophobia and a brain drain.

Clearly this scenario is not one in which Qatar totally fits but as UNIDO points out, the elaboration and implementation of a well tailored technology transfer and scientific policy in developing countries is of key importance in attempting to make the technology transfer as beneficial as possible for the recipients and to avoid most of the associated shortcomings. In other words development planning must be very capable of taking all these factors into account. Qatar cannot develop without technology transfer but has to be extremely selective.

7.4 Qatar and the Absorption of Transferred Technologies

Up to this point in discussion it has been assumed that once the technical requirements of economic development in general and industrial development in particular have been identified, that relevant transfers of technology can be made and new technologies absorbed and used. There are, however, some aspects of this assumption which need further examination with reference to Qatar.

Zahlan (1986) examining what he termed "The Science and Technology Syndrome in the Arab World" started with the following propositions:

Two of the traditional "explanations" for the conditions of S&T in developing countries revolve around the shortage of technical manpower and the absence of a national market for science and technology. Inputs of manpower and resources, however, are not transmitted spontaneously into technological capabilities to meet demand. A complex system of institutions is essential to mediate this process.

In 1981 Zahlan demonstrated that the manpower, resources, and markets for technologies existed in the Arab world:

"When the Arab states are viewed in toto there is convincing evidence that the necessary pre-conditions for technological development exist on the supply and demand sides, but the absence of effective interaction between these two sides of the supply/demand relationship has resulted in the independent development of the educational systems, of methods for planning and executing projects and of the expansion of isolated technology enclaves." (Zahlan 1981).

This was consistent with his earlier analysis of "Constraints on the Acquisition of Technology" (1980) in which he identified:

"four major constraints these Gulf countries face are internal : public policy towards the planning and execution of projects; the age and size of the national market; manpower and education; and, finally, the institutions concerned with the acquisition of technology."

Many others as well as Zahlan have responded to the constraint of size of market and of manpower resources by pleading for more integration among the Gulf States so as to pool markets and manpower. As far as Qatar is concerned, however, local human resources, for the foreseeable future will remain small. In Chapter 3.6 the quantitative and qualitative aspects of Qatar's human resources were noted and it is clear that the transfer of the technologies required for the present development programmes will necessitate an associated importation of skilled expatriates. Once this is accepted as inevitable, the advanced nature of the technologies associated with downstream hydrocarbon industries appreciated, together with a need for inward capital investment, then it becomes logical for Qatar to look not so much to the Arab world but to the most and richest technologically advanced countries for technological supply - i.e. joint ventures as in 7.3.2 above.

What then becomes important are Zahlan's other two constraints - public policy towards planning, and the improvement of the relevant institutions. In Chapter 9.14 the need for improving the comprehensiveness of project and industrial planning is noted and clearly even more emphasis in any plan or proposal for projects must be given to the acquisition and effective transfer of technology.

As far as institutional developments are concerned, the young University of Qatar has already extended its interests from science to applied science to technology. It may be necessary to review the whole question of skilled manpower and the most satisfactory way of mobilizing Qatar's most scarce and valuable resource.

One hundred and fifty years ago a pioneer agricultural scientist Justus Von Liebig stated in the context of agricultural fertilisers his famous Law of the Minimum:

"By the deficiency or absence of one necessary constituent, all others being present, the soil is rendered barren for all those crops to the life of which that one constituent is indispensible."

In the present context the indispensible minimum is that of a trained, skilled and motivated people.

In the sections which follow, this theme is followed up in two short case-studies, the first referring to the place given to Science and Technology (S&T) in Jordan's programme of national and industrial development, the second relating to Qatar's experience with QASCO.

7.5 The Role of Science and Technology in Development - The Case of Jordan

In common with many developing countries, Jordan has always recognized the role of scientific and technological activities in economic and social development. All Jordanian successive national plans included what can be called as "strategies" and "policies" for the promotion of scientific and technological activities.

In making scientific and technological policies, two issues are of major concern, the first deals with strengthening the national scientific and technological base while the second considers the utilization of this base. The promotion of Research and Development (R&D), the linkages between S&T institutions and the production sector, and the utilization of financial and human resources can be considered as the basic elements in these issues.

The Ministry of Planning of Kingdom of Jordan has always included in its plan, strategies and policies for the promotion of S&T as a tool for economic and social development, made financial contributions to promote S&T activities, and allocated part of external technical assistance to support S&T infrastructure in Jordan. The task for providing R&D funds was transferred from the Ministry to the Higher Council for Science and Technology in 1988.

7.5.1 Three Year Development Plan 1973-1975

During this first plan, the National Planning Council allocated some JD 350,000 on an annual basis to support R&D activities at the University of Jordan and the Royal Scientific Society in addition to part of foreign technical assistance.

Although the plan called for allocating 1% of Jordan's GNP for R&D activities, the actual expenditure during this period did not exceed one seventh of that amount, illustrating the fact that actual expenditure in this field is difficult to achieve during early stages of planned development.

7.5.2 Five Year Development Plan 1976-1980

This plan repeated the previous call for the allocation of 1% of Jordan's GNP for R&D activities, but actual expenditure on R&D by the Ministry of Planning during this period reached some JD 350,000 per year, only about 0.2%. Nevertheless, this was an improvement on the previous plan. The Ministry continued to provide external technical assistance to R&D activities at the University of Jordan, Yarmouk University, and the Royal Scientific Society.

7.5.3 Five Year Plan for Economic and Social Development 1981-1985

For the first time, this plan addressed directly the issue of science and technology in a separate chapter implying the awareness of the government of the vital role of S&T in economic and social development. Development strategies dealt clearly with science and technology, calling for funding S&T activities with particular emphasis on the establishment of laboratories and support of research which serves development.

The plan also dealt with S&T characteristics and problems, goals, and organizational measures aimed at strengthening the national S&T base, and promoting research and development activities by increasing expenditure on S&T to between 3% and 5% of Jordan's GNP. It was suggested that this could be achieved through allocations inthe general budget as well as through public and private sector organizations, with the requirement that in each case no less than 30% of such expenditure be marked for Research and Development. The Ministry of Planning continued to provide technical assistance and financial support to S&T activities funds ranging between JD 300,000 and JD 350,000 per year.

To further promote S&T activities in the industrial sector, the Ministry of Industry and Trade included in the Law for the Encouragement of Investment an Article that allows tax deductions, for economic projects and approved economic projects, if part of their expenditure is allocated to R&D or training of their workers. Industrial firms, however, did not take advantage of this incentive in an effective way.

Expenditure on S&T activities increased in comparison to those during the previous plan, due partly to the establishment of Muata University in 1982. In addition, minor R&D activities started increasing in public sector organizations as more industrial firms recognized the role of S&T in increasing production.

7.5.4 Five Year Plan for Economic and Social Development 1986-1990

The plan called for enhancing and improving the quality of production and reducing production costs. The plan also emphasized the need for mobilizing and supporting R&D efforts and stressed the need for providing funds for that R&D geared toward solving problems facing Jordan's growing industrial sector. The main organizational measures included:

1) Enacting special legislation to levy a scientific research tax at one fil per consumed liter of petroleum products.
2) Requesting the universities to increase their annual current expenditures on R&D to 5% of their annual budget.
3) Establishing a national institution for S&T.

The second half of the 1980s decade, however, proved to be for Jordan and other Middle East countries a period of restraint rather than expansion in expenditure. For example the oil product tax rose by between 10 and 50 fils but the revenue remained in the treasury.

In 1987, the government established the Higher Council for Science and Technology. The responsibilities of this council include the formulation of the national S&T policies, plans, and programs and the provision of financial support to Research and Development.

These plans in themselves could create a proper investment climate that encourages savings and investment in industrial projects that could benefit from S&T capabilities in Jordan. Creating a suitable investment climate is one of the main factors that usually improve S&T services. In fact an economic Adjustment Programme had to be adopted in 1988 as the result of economic deterioration.

The position was made far worse by the Gulf crisis of 1991 and extra burdens were put on Jordan's internal economy by the return of seventy thousand Jordanian and Palestinian workers with their families from Kuwait and other Gulf countries. The crisis also caused a halt to external financial assistance.

Along with a new Economic Adjustment Programme negotiated with the IMF for the period 1992-1998, the government prepared a fresh social and economic Five Year Plan for the period 1993-1997.

7.5.5 Economic and Social Plan 1993-1997

This plan aims at increasing the proportion of GNP expenditure on R&D from 0.5% to 1.5%, and on S&T from 4% to 7% over the plan period. More important, the plan aims at increasing the industrial sector contribution in R&D from 8% in 1991 to 12% in 1997.

In this plan, more elaborated policies concerning S&T are set up including:

1) Formulation of a national basic and applied research plan that determines the capabilities and requirements of S&T as well as R&D projects and their priorities according to socioeconomic needs.
2) Encouraging the private sector to utilize the specialized S&T institutions through proper financial and monetary incentives.
3) Applying proper criteria to technology transfer and adaptation and developing these criteria through adopting and updating appropriate regulations.
4) Updating the regulations that are related to patents, copyrights, and publications.
5) Developing information systems in both private and public sectors and interconnecting them with international information networks.
6) Increasing the utilization of domestic resources in productive sectors by S&T inputs.

7.5.6 Conclusions

The main conclusions reached at the ESCWA Workshop which reviewed the situation in Jordan in September 1993 were as follows:

The most important issue that affects S&T activities in Jordan, and in most developing countries, is the amount of actual expenditure for these activities. As seen above, all successive national economic and social plans advocated that the percentage of expenditure on R&D to GNP should reach at least 1%. Toward the end of the eighties, actual expenditure reached about 0.3%. While this ratio is low, it is not lower than similar ratios in most developing countries. for instance, R&D expenditure in ESCWA Islamic countries is also around 0.3% of the GNP. On the other hand, this ratio reaches around 2.6% for industrial countries.

There are no equivalent figures for Qatar, mainly because there is no central institution charged with S&T development. This may be the time for formally establishing such an organization. The ESCWA study also concluded that while the role of S&T activities in improving industrial performance in Jordan has been considerable, government policies for S&T activities had been far from the real needs of the Jordanian industry. Indeed, many scientists and engineers were in the dark over real S&T priorities.

As Table-54 shows, domestic expenditure for the performance of R&D increased from around JD 2.2 mn in 1980 to JD 4.8 mn in 1985 and reached about JD 10 mn in 1990. This expenditure increased dramatically in 1992 to reach about JD 15 mn., but a large part of this nominal increase is attributed to the establishment of new and private universities. In 1993, there were fifteeen universities in Jordan. Hence the actual expenditure on Research and Development for economic development purposes is only a fraction of the nominal total.

Of relevance to Qatar are the following main points:

Jordan with far fewer resources to call on than Qatar has at least found it possible to build into its planning intentions an appreciation of the need for work in Science and Technology and to apply this through Research and Development. As stressed in Chapter 9 Qatar needs to make a similar appreciation. The autonomy of each ministry in planning its projects; the absence of a science and technology content in any national development plan; and the vertical integration of each sector of the economy with few lateral spin-offs to others, will no longer be sufficient for successful industrial development in Qatar.

Secondly, although Qatar may be less vulnerable than Jordan to economic and political external events, past history shows that it is not invulnerable. It is therefore increasingly important, as Qatar becomes more and more dependent on complex technologies and international links, in supply and market terms, that Qatar diminishes its dependence on R & D and S & T imported in individual joint ventures.

TABLE 54

JORDAN
ESTIMATED DOMESTIC EXPENDITURE FOR THE PERFORMANCE OF R&D AND GNP, 1980-1992

Reference Year	R&D Expenditure (Million JD)	GNP (Million JD)	Estimated R&D Expenditure to GNP (%)
1980	2.241	1184	0.189
1981	2.449	1484	0.165
1982	3.179	1703	0.187
1983	3.857	1815	0.213
1984	4.190	1905	0.220
1985	4.813	1965	0.245
1986	5.587	2097	0.266
1987	5.981	2113	0.283
1988	6.200	2130	0.291
1989	6.728	2206	0.305
1990	10.003	2376	0.421
1991	11.797	2559	0.461
1992	14.910	3159	0.472

Notes:

1) *GNP figures are taken from: Jordan, Central Bank of Jordan, 1993, Monthly Statistical Bulletin, Vol. 29, No. 5, pp. 6-7.*

2) *For R&D expenditure in 1986, see: Daghestani, F.A. and Shahateet, M. (1988c).*

3) *For R&D expenditure for the years 1980-1985 and 1987, see: Daghestani, F.A. (1989), p. 73.*

4) *R & D expenditure figures for the years 1988-1992 are estimates.*

7.6 Qatar's Experience in Technology Transfer and Industrial Development

7.6.1 The Industrialization of Qatar

The basic aim behind industrialization is diversifying the sources of national income and the promotion overall of human development in Qatar. The various stages of industrialization and future plans have been discussed in Chapter-5.

Industrial development started in Qatar on a limited scale, during the sixties on the basis of individual projects mainly for utilization of the associated gas which otherwise was flared and wasted. During this a stage few basic industries were developed such as cement, oil refining and chemical fertilizers. These industries mainly were of the energy intensive type and chiefly directed to home consumption except for the petrochemical manufacturing of fertilizers for export.

The pattern and plans for industrial development were under the responsibility of Industrial Development Technical Centre (IDTC) which was created by Law No.3 of 1973, with the vital task of laying down industrial development plans for the State and to supervise their implementation after being ratified. The year 1973 may, therefore, be considered as a turning point in the history of industrial development of the State of Qatar. In that year IDTC began to promote plans for the diversification of the sources of income through the creation of various industries were which aimed at diversifying the sources of income. This year may also be considered as the beginning of technology transfer.

The stages of evolution of an industrial development plan promoted by IDTC may be summarized as follows:

7.6.1.1 Data Collection

A successful industrial development plan cannot be laid down without detailed information from other economic sectors such as interactive industry (oil and gas), agriculture, electricity and water, transport, communication etc., and the social sectors such as education, training, health etc. IDTC collected the necessary information from the State Ministries, Organizations, and the Industrial Enterprises, whether public, private or mixed sector, on their future development plans and their needs during the specified period of planning for industrial development. Special formats were designed for collecting such information.

7.6.1.2 Preparation of the Proposed Industrial Development Plan

After careful consideration and analysis of the collected data by IDTC staff, specialists and consultants, the following steps were taken.

a) Identification of Investment Opportunities by analysis of the following factors:

- Availability of natural resources such as oil, gas, metallic and non-metallic minerals.
- Import analysis to identify import-substitution industry.
- Identification of manufacturing sectors successful in other countries at the same level of development and under similar socio-economic conditions.
- Exploration of possible linkages with other industries, up stream and down stream, to existing and future industries.
- Exploration of possible integration of existing lines of manufacture such as the petrochemical industry with oil and gas processing industries such as the refinery and natural gas liquids plants.
- Studies of possible diversification into other process industries such as paints, building materials, detergents, pharmaceuticals etc.
- Expansion or modernization of existing facilities to cover emerging markets.
- Promotion of Government industrial policies to suit future industrialization.

b) Preparation of Pre-feasibility and Feasibility Studies

After identifying investment opportunities, several project ideas were selected according to certain criteria and priorities to convert them into pre-feasibility studies (and see Behrens et al 1991). The structure of the pre-feasibility studies was suitable to enable investment decisions to be taken. The pre-feasibility studies were usually sufficient to design a draft industrial development plan. Following the draft of an industrial development plan and before an investment decision was made a detailed feasibility study was undertaken, the feasibility study not being an end in itself, and the investment decision possibly differing from the study.

7.6.1.3 Scope of Technology Transfer During the Preparation and Execution of Industrial Development Plans

The preparation and execution of Industrial Development Plans themselves involve a great deal of technology transfer during the different stages of development of the plan and until the different projects planned are commissioned.

The different technological services and transfer of technology may be described as follows:

- Conceptualization and preparation of Industrial Development Plans.
- Preparation of investment opportunity studies, cost-benefit studies, pre-feasibility studies and feasibility studies.
- Engineering services including technology evaluation and selection, basic and detailed engineering drawings and specifications, selection of equipment, design of civil works and other infrastructure, erection and pre-commissioning activities.

7.6.1.4 **The most obvious phase of technology transfer comes with:**

- Commissioning and commercial operations.
- Absorption of technology through organized training.
- Getting to "know-why" from the acquired "know-how" training and operations.

7.7 Channels of Technology Transfer for Industrial Development

Technology transfer at present level can be attained through four main channels (excluding aid packages which are not relevant to the Qatar case).

1) Joint ventures
2) Licences and know-how agreements
3) Turn-key projects
4) Technical assistance agreements.

The problems of technology transfer have been discussed earlier. It may be noted that the channel most commonly used in the Arab Gulf States is the formation of Joint Venture between a local party and one or more foreign partners followed by a turn-key agreement. By the very nature of the mechanism of technology transfer these two channels of technology transfer do not provide enough opportunities to acquire know-how and especially know-why as these two alone involve the minimum participation of local engineers and technologists, and nothing else. However, where the local engineers and management take suitable steps for technology transfer in the real sense of the word the know-how and know-why could also be achieved. Qatar Steel Company may be taken as a typical example of successful technology transfer at fairly early stages[FN]

Foot Note : The specialised references and diagrams are referred to separately in this section.

7.8 QASCO, an Integrated Steel Manufacturing Unit

Steel can be produced in integrated or non-integrated plants as indicated by the simplified flow diagrams in Fig. A. For steelmaking in integrated plants iron ore in the form of lumps, pellets, sinter or their mixtures is used, whereas non-integrated plants produce steel from scrap.

There are two main routes for integrated steel production:

a) The conventional Blast Furnace/Basic Oxygen Converter combination in which liquid hot metal (pig iron) is produced in the blast furnace and refined to steel in the converter.

b) The modern Direct Reduction/Electric Arc Furnace combination where the product of direct reduction, a solid generally known as direct reduced iron (DRI) or sponge iron, is melted together with scrap to produce high quality steel in the electric arc furnace.

Blast furnace technology is mainly dependent on the availability of high quality metallurgical coking coal which must be coked in special ovens before being charged with iron ore into the furnance. This type of coal is not available in Qatar nor does it occur in sufficient quantities in other Arab countries. Furthermore, the establishment of a steel industry on the basis of blast furnaces and basic oxygen converters requires large investments and is only economical for large production capacities.

In the case of direct reduction technology, on the other hand, coke is not needed and can be replaced by other fossil fuels, such as natural gas. This gas, however, should be converted into the reducing components, viz. hydrogen and carbon monoxide popularly known as synthesis gas. This can be done by alternate processes viz. steam reforming or partial oxidation in special equipment known as Reformers. The capital required to build an integrated steel plant based on direct reduction and electric arc furnace is relatively not so big and the plant is economical for small capacities. In addition to this, the direct reduction process is environmentally much more acceptable as compared to blast furnance process.

7.8.1 The Qatar Steel Company (QASCO) and Technology Transfer

In the process of development planning Qatar finally decided to set up an integrated steel industry based on direct reduction in order to economically utilize the abundant natural gas reserves in the country. For this purpose, QASCO was established as a joint venture with Government of Qatar holding 70% equity and Kobe Steel 20% and Tokyo-Boeki of

Japan 10% and was inaugurated in 1978. The Qatar steel works comprises the following main production units:

- A direct reduction plant using Midrex technology, 400 Module.
- A melting shop containing two 70 ton ultra high power electric arc furnaces producing together 416,000 tons/year.
- Two continuous casting machines each having an annual capacity of 527,000 tons.
- A rolling mill with a rated capacity of 330,000 tons/year of reinforcing bars ranging from 10 to 32 mm diameter.

In addition to these, there are utilities and off-site facilities such as electrical sub-station, oxygen/nitrogen generator, quality control centre, machine shop, utilities and material handling systems.

The following tables give a brief summary of technology transfer channels in their scope and origin for QASCO.

CHANNELS OF TECHNOLOGY TRANSFER

Channel	QASCO
1. Joint Venture	Yes
2. Licences & Know-how Agreements	Yes
3. Turn-key Proejcts	Yes
4. Technical Assistance	Yes
5. Embodied Technology	Yes

SCOPE OF TECHNOLOGY TRANSFER AND ITS ORIGIN

Scope	QASCO
1. Planning Services	IDTC (Qatar) Kobe Steel (Japan) Tokyo-Boeki (Japan) B.S.C. (England)
2. Technical and Economic Services	Kobe Steel (Japan) Midrex (USA)
3. Engineering Services	Kobe Steel (Japan) Midrex (USA) Sir Alexander Gibb & Partners (England)
4. Managerial Services & Marketing	Kobe Steel (Japan) Tokyo Boeki (Japan)

7.8.1.1 Technology Transfer in the Pre-investment and Investment Phases

The transfer of technology in these phases of the project development cycle (shown in Fig. B) was very efficient. As a result of absorption of the transferred technology by local organizations and personnel, it took only about 3 years from the date of starting the preparation of the industrial site (March 1975) until the date of plant commissioning (April 1978). This period was considered to be one of the shortest necessary for the construction of such a plant. During this period local contracting firms and local manpower gained experience in land reclamation, civil work, equipment handling, erection of machinery and preparation for the start up.

7.8.1.2 Technology Transfer in the Operation and Production Phase

According to a management service agreement with Kobe Steel, the latter provided a technical and management team to supervise the plant activities. Another agreement with Tokyo-Boeki was entered into for the marketing of QASCO's products. The following shows the effectiveness and results of technology transfer in the above mentioned fields:

7.8.1.3 Plant Operational and Technological Improvements

The progress in the production of reinforcing bars in QASCO is shown in Fig. C. The production increased from about 379,000 tons in 1979 (the first full year of production) to 588,000 tons in 1992. Fig. D illustrates the development of QASCO's efficiency defined here as the annual production expressed in percentage of the design capacity of the rolling mill. The efficiency of the plant exceeded 100% in the first full year of operation and reached over 178% in 1992. The change of the cumulative production of the rolling mill with time is given in Fig. E. The smoothness of the curve indicates the smooth performance of the plant, since rolling is the last step in production at QASCO and the effect of any intermediate stoppage will be reflected in it.

It may be seen from Figs. C, D and E that QASCO had consolidated technological know-how and mastered the operation of the plant.

Due to joint efforts between IDTC and QASCO, the following main improvements and modifications were achieved and implemented in the plant directly due to the absorption of technological skills both at operational and planning levels.

7.8.1.4 **Materials Handling System**

By using the results of time and motion studies the operation was optimized. The unloader in QASCO (design capacity = 15000 ton/day) is designed to unload iron ore pellets from a 65,000 tons vessel in 4.333 days. After optimization of the operations the same vessel was unloaded in only 3.5 to 4.0 days. This means saving of money, time, manpower, etc. and avoiding any penalty due to longer unloading time. Another item of material handling which was improved in QASCO is the screening of ore pellets. Originally, these pellets were screened at 6.3 mm, resulting in big losses of fines (<6.3 mm). Experience gained by QASCO showed that it is possible to screen the pellets at 3.2 mm and charge the fraction over 3.2 mm in the direct reduction shaft without producing any operational trouble. In this way the losses of ore pellets are minimized.

7.8.1.5 **Direct Reduction Plant**

As a result of the improved blending of feed pellets, the reduction temperature could be raised in QASCO from the projected temperature of 740^{o}C to about 850^{o}C which resulted in a production increase of about 30% from the rated capacity of the plant. At the same time the gas consumption was decreased from 14.64 to 10.88 GJ/ton and the electric power from 150 to 120 kWh/ton.

Local research and development results helped also in the prevention of fires in the dust collection cyclones and on the conveyor belts of the direct reduction plant. This dangerous problem was solved by simple modifications of the conveyor belt used for the transport of sponge iron.

Another important problem related to the water system, corrosion of the water pumps, was solved by using the results of local research and development work. Due to the presence of relatively high concentrations of nitrogen in the natural gas used in QASCO, ammonia was suspected to form in the cooling zone of the direct reduction shaft. Thermodynamic and kinetic calculations showed the possibility of ammonia formation in this zone. Chemical analyses have confirmed this theoretical findings. This phenomenon was not known before and was firstly observed in QASCO.

The manufacturer recognized and accepted the proposals made by QASCO to solve the problem by changing the material of the impellers of the pumps from bronze to cast iron.

7.8.1.6 Steelmaking Shop

Three major improvements were achieved in the steelmaking as a result of local experiments:

- Increase in the blending ratio of sponge iron, i.e. the ratio between the weight of sponge iron and the total weight of sponge iron plus scrap in the charge to over 90% (Fig. F)compared with 80% in the project design. The proportion of 90% was found to be most economical for QASCO and all troubles due to this high percentage of sponge iron in the charge were solved. Figure F is based on data partly published in the literature[4)] and partly supplied by QASCO.

- Decrease of electrode consumption from 5 kg/ton of liquid steel in 1979 to 3 kg/ton in 1992 (Fig. G). This means a decrease of the production cost of steel at QASCO.

- Decrease of electric power consumption from 672 kWh/ton of liquid steel in 1979 to 630 kWh/ton in 1986 (Fig. H) which means a further decrease of the production cost of the steel.

- Decrease of the average tap-to-tap time from 150 minutes to an average of about 140 minutes. This means an increase in the annual steel production capacity.

- Fine sponge iron (-3.2 mm) was charged in the electric arc furnaces without deterioration in the operation. This lead to a minimization of material losses.

- Thermodynamics and kinetics of steelmaking from sponge iron and scrap in QASCO's electric arc furnace were studied in order to optimize the plant performance[5-10)].

7.8.1.7 Continuous Casting (C.C) Shop

Instead of preparing the continuous casting machine for each heat, trials carried out at QASCO showed that it is possible to cast several heats with a single preparation of the machine. This method is known as the continuous continuous casting (C.C.C). Its application leads to an increase of productivity, more yield, saving of man-power, less cost and better quality.

7.8.1.8 Rolling Mill

Due to various modifications introduced locally, the production of the rolling mill was increased in 1992 by about 78% of design capacity.

7.8.1.9 Manpower, Training and Organization

The employment policy of QASCO for non-Qataris is based on recruiting highly skilled and experienced engineers and technicians capable of contributing to the operations and at the same time transferring their experience and skill to the nationals by direct contact. For further improving the standard of its working staff, QASCO sent many of its engineers and technicians for training abroad. A special emphasis was put on the training of Qataris. In this respect an agreement was made with Kobe Steel Company for the training of Qataris in different technical and managerial fields of the steel industry. According to this agreement about 20 young Qataris were sent to Japan for 11/2 years (from November 1975 to May 1977) before the start up of the plant. Other groups were sent for different periods in 1977, 1982 and 1983. In 1990 only one person was sent to Japan for technical training.

Now QASCO has its own on-job training facilities for young Qataris who join the plant after successfully completing their training courses. Technical and managerial personnel from other Arab countries, mainly the Gulf States, and Iran are being trained in the various production shops and management sections of QASCO. Figure I shows the development of productivity of manpower in QASCO. It can be seen that productivity increased by 57.6% from 330 tons/man year in 1979 to 520 tons/man year in 1992, one of the highest productivities recorded for such steel making technology in the world.

Qataris working in the plant have absorbed the modern technology of steelmaking to a satisfactory degree, have terminated the management agreement with Kobe Steel Ltd. and they have been successfully operating and managing the plant since the 1st of January 1989.

The number of Qataris, non-Qatari Arabs and the Japanese working in QASCO is shown in Fig. J. It can be seen that the numbers of Qataris and that of other Arabs have increased from 38 and 92 in 1978 to 160 and 247 in 1992 respectively, while the number of Japanese decreased from 128 to only one person.

The enormous increase of the manpower productivity in addition to the decrease of production cost and the parallel increase of Qataris and decrease of Japanese is an index for the successful accumulation and absorption of steelmaking technology by Qataris.

7.9 QASCO and Innovation

One of the most satisfactory aspects of the way in which technological transfer has worked in QASCO is that in some ways it has reached the ideal level where the indigenous work force is now designing and producing in innovative ways and moving into "second-generation" joint ventures. For example, early in 1992, on the initiative of Qatari management QASCO established a subsidiary, Qatar Metals Coating Company (QMCCO). Because QASCO is able to produce steel reinforcing bars (rebars) of very high quality and specification it can supply QMCCO with materials for expoxy coating. This gives extra protection against corrosion and is in demand particularly for superior quality buildings in the salty, humid and high temperature conditions. Through to 1993 demand for epoxy-coated and standard rebars for export markets has exceeded supply even though production has been at record high levels.

7.10 QASCO & Marketing

The production of QASCO is mainly export-oriented. About 10% of the production is sold in the local market while 90% is exported mainly to the Arab Gulf States. As mentioned earlier a marketing agreement was concluded with a highly experienced and efficient marketing firm - Tokyo-Boeki. QASCO's aim was to take over this responsibility after building up its own Qatari staffed marketing organization for this very important task. This was achieved in 1992 with the termination of the marketing agreement with Tokyo-Boeki and taking over entirely by Qataris. This has helped in fact to boost the sales of QASCO's products to the highest levels since start-up.

Due to severe market competition all over the world, the Arab Gulf States are co-ordinating marketing of the steel products to avoid harmful competition among themselves and to protect their market from the dumping policy of foreign producers.

Even so the main factors which have helped QASCO to market its full production are attributed to its efficient and alert marketing organization, prompt fulfilment of the sales contracts and its vicinity to neighbouring Gulf markets as well as the high quality of its products.

7.11 Conclusions

It may be seen from the Case Study of Qatar Steel Company that State of Qatar has achieved successful technology transfer in the science and technology of steel manufacture through a modern and sophisticated process. This is no mean achievement considering that State of Qatar has embarked upon industrialization seriously only about 20 years ago. The example of the State of Qatar proves that given suitable opportunities and challenges it is possible to receive and absorb technology successfully. Qatar now also has to demonstrate that this can be done in other industries and on other scales.

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List of Figures for QASCO Case Study

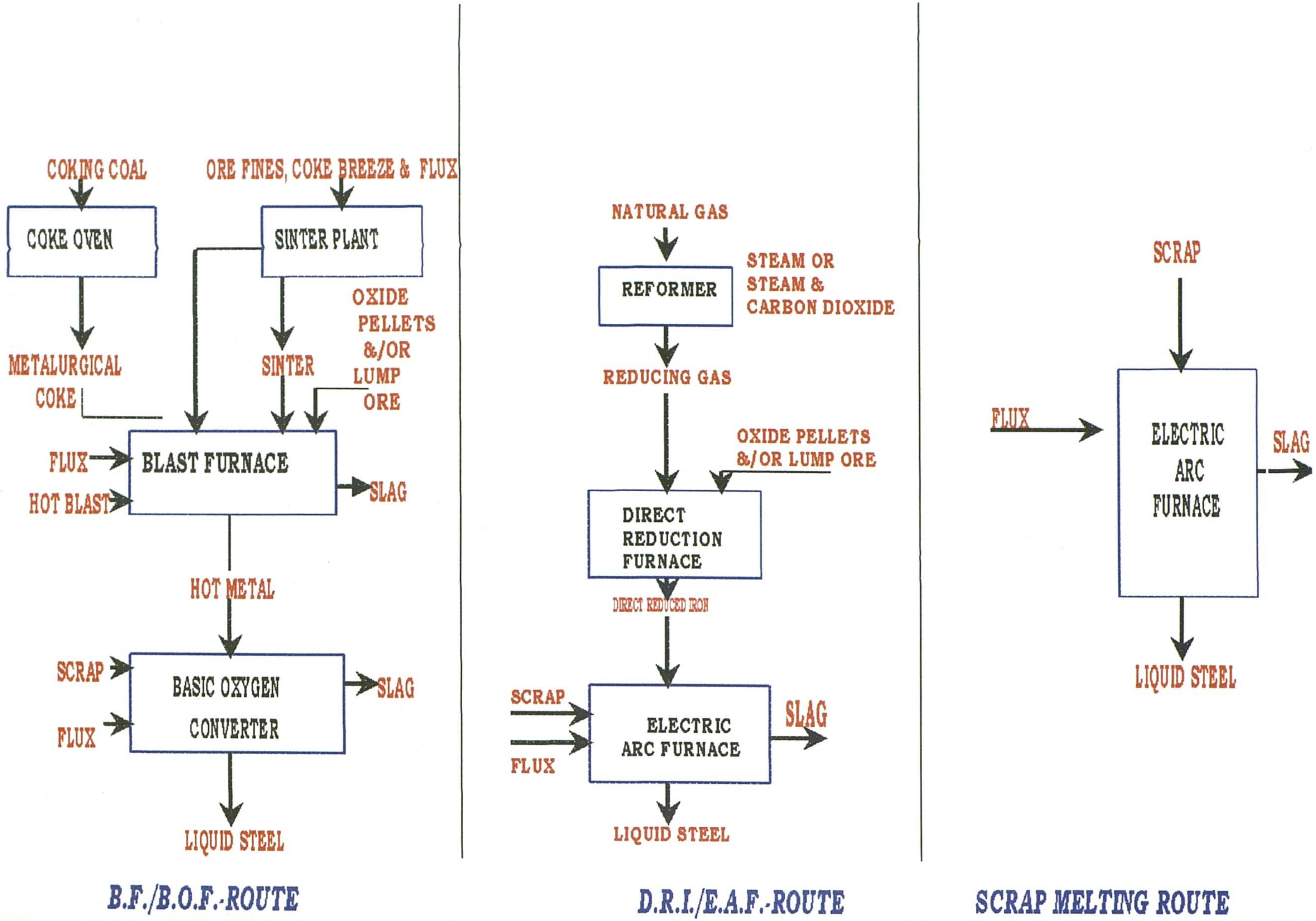


Fig. A :*Simplified Flow Diagrams of the Tow Main Routes for Integrated & the Route for Non-Integrated Steel Making*

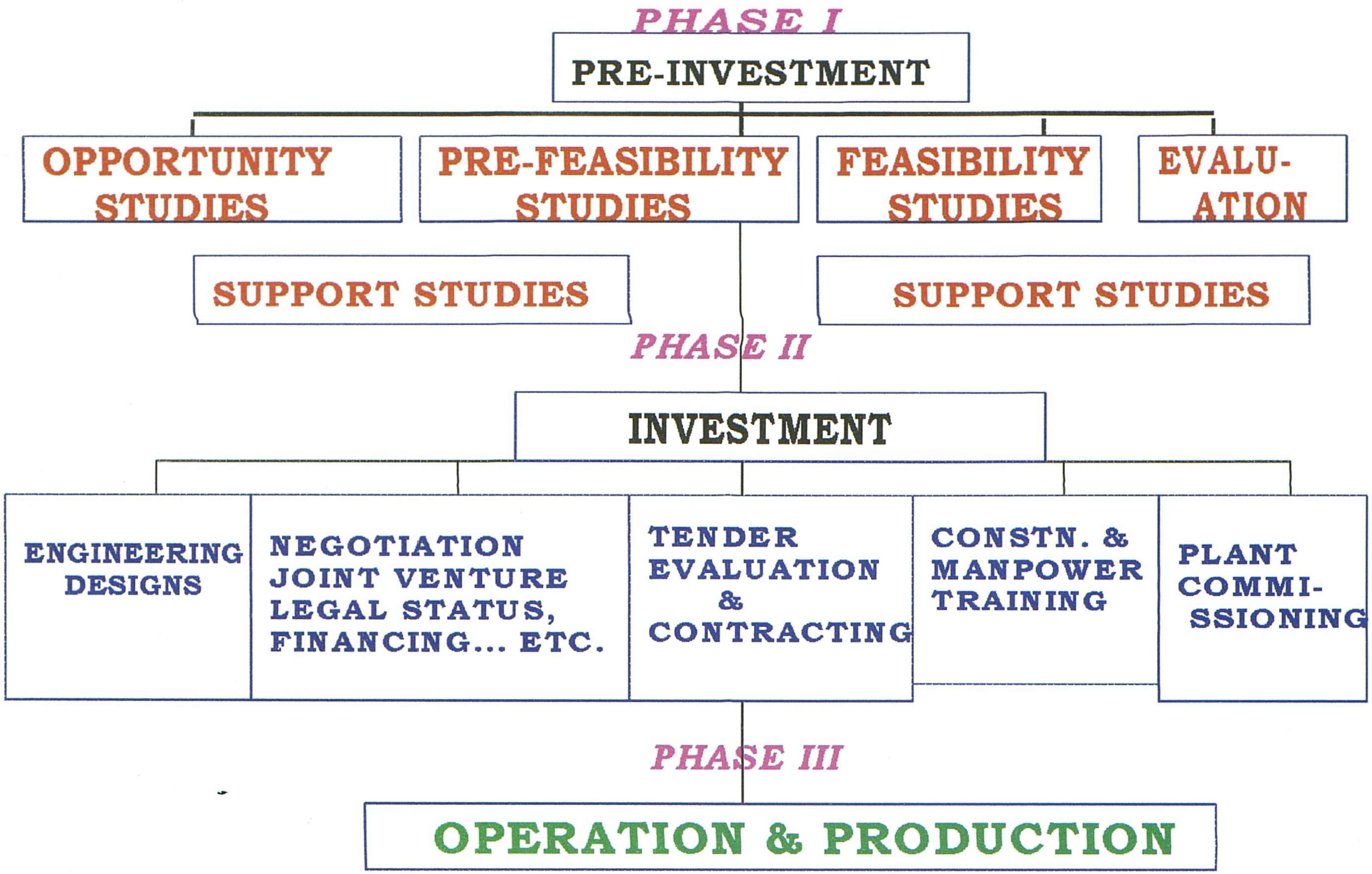
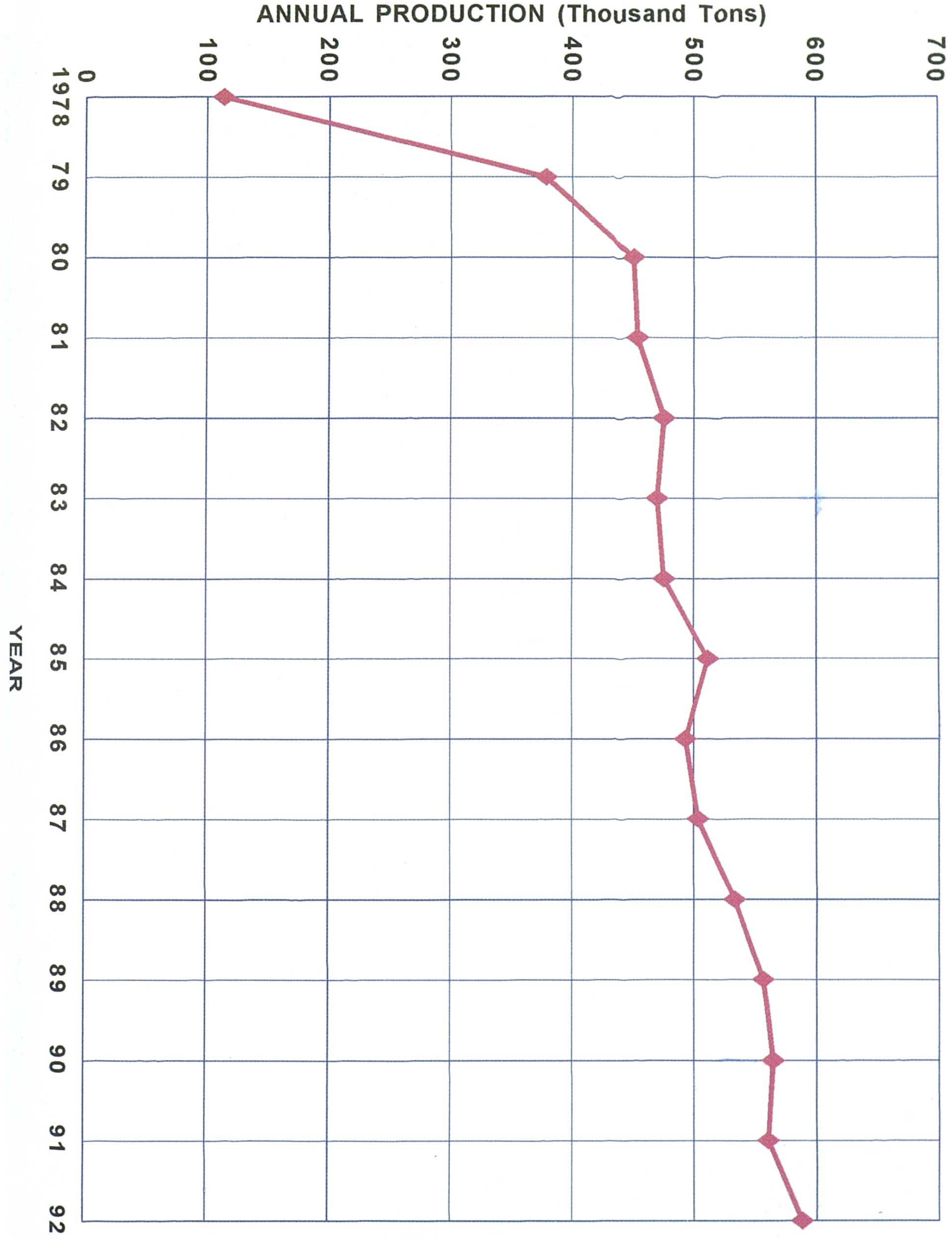
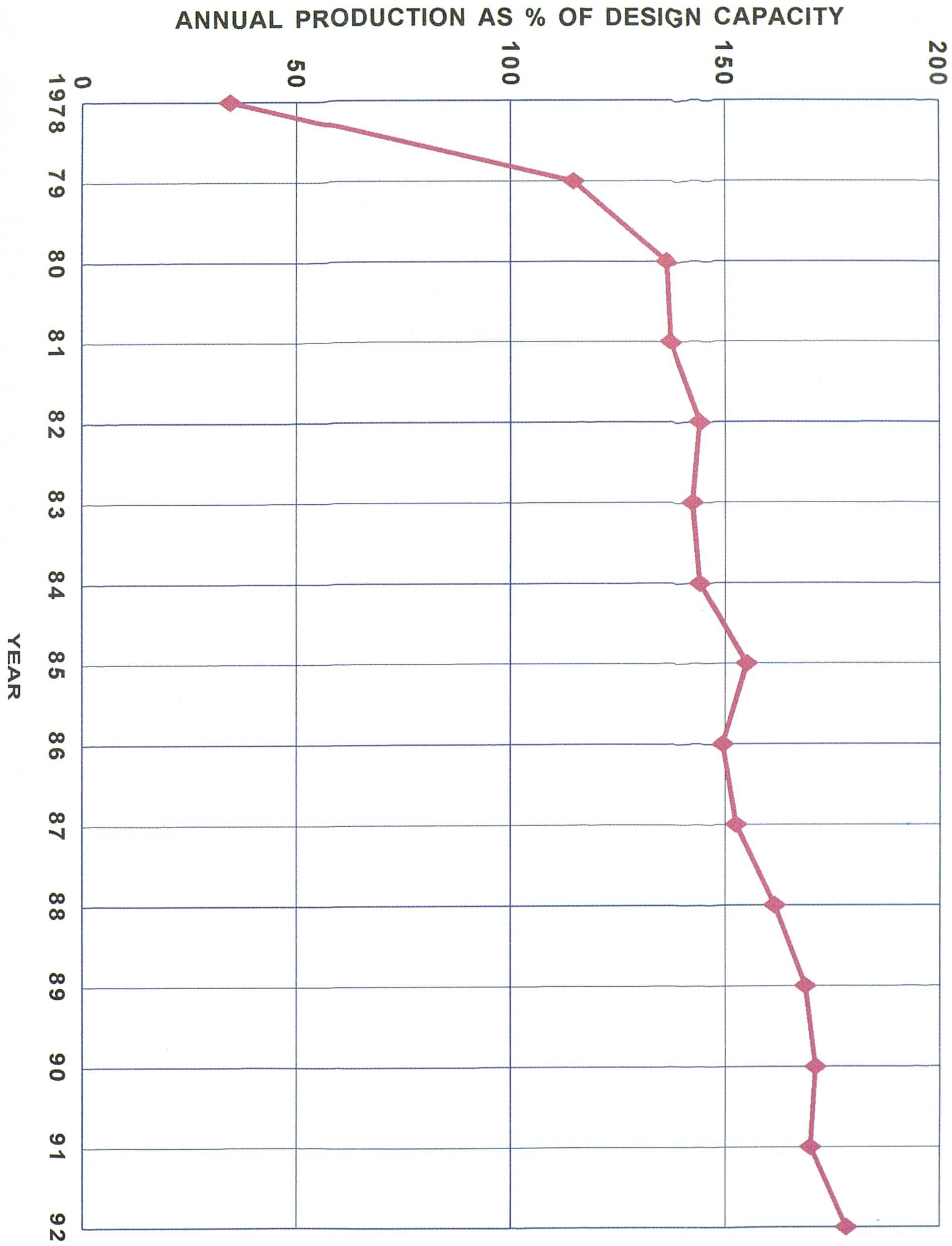
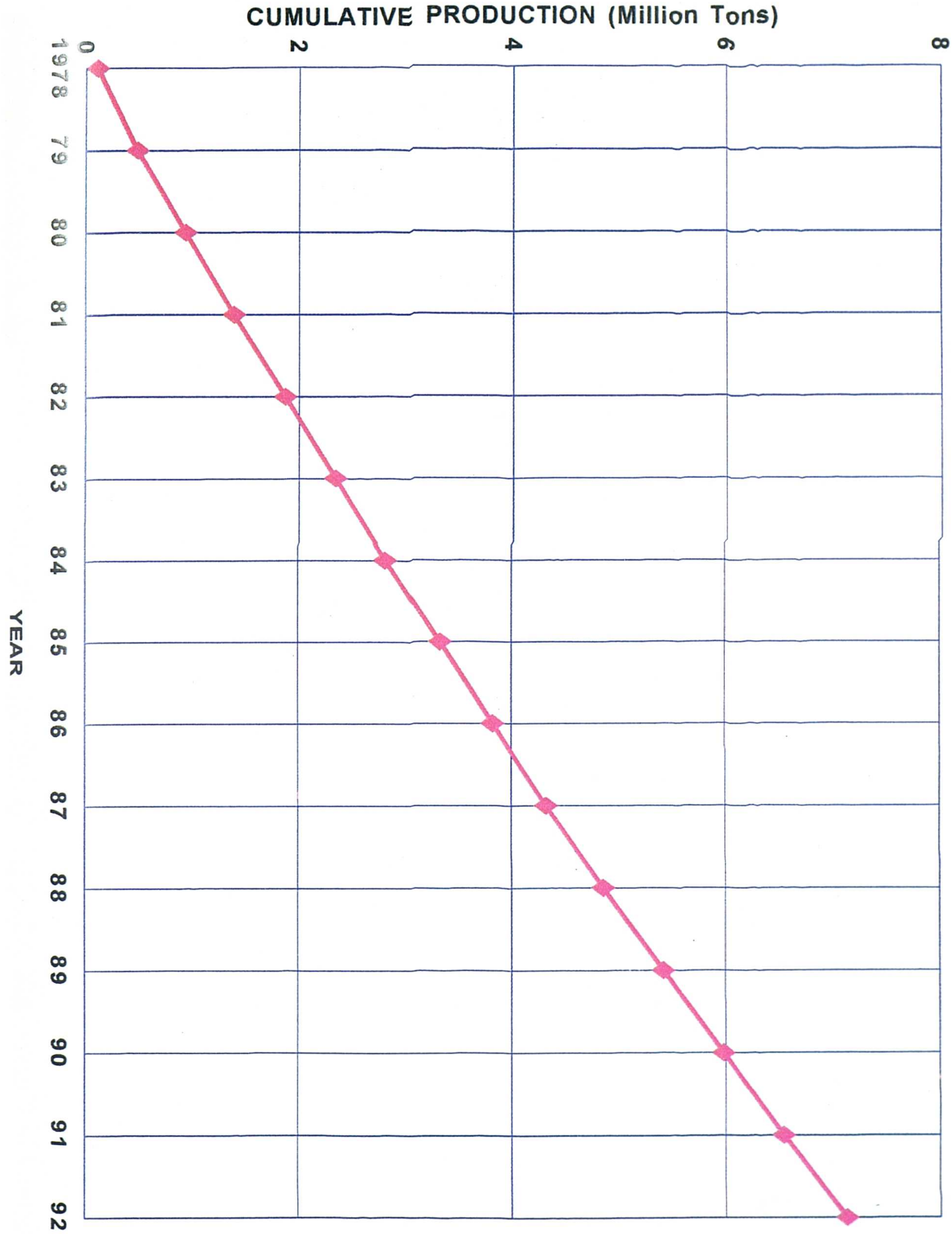
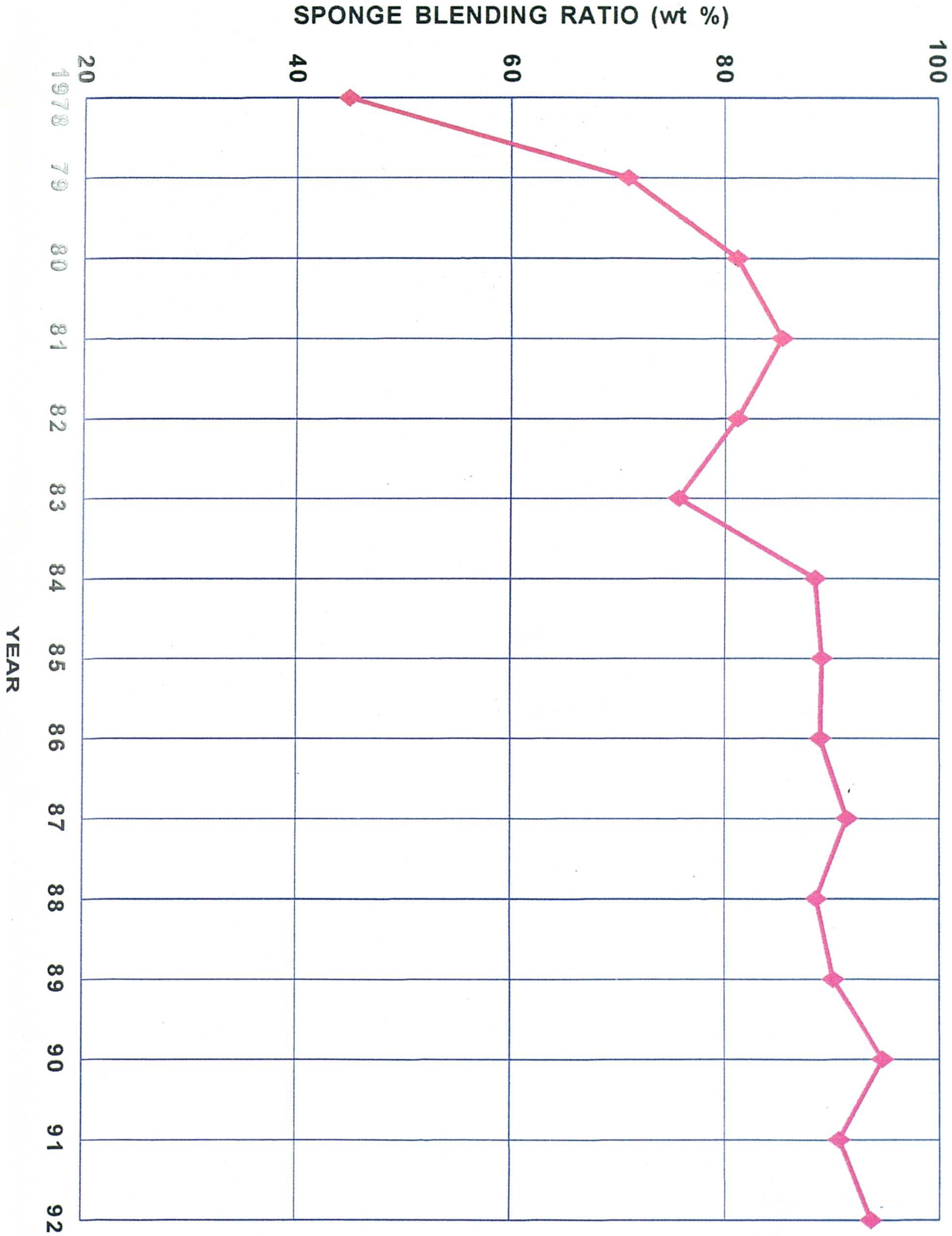


Fig. 8 : Project Development Cycle.

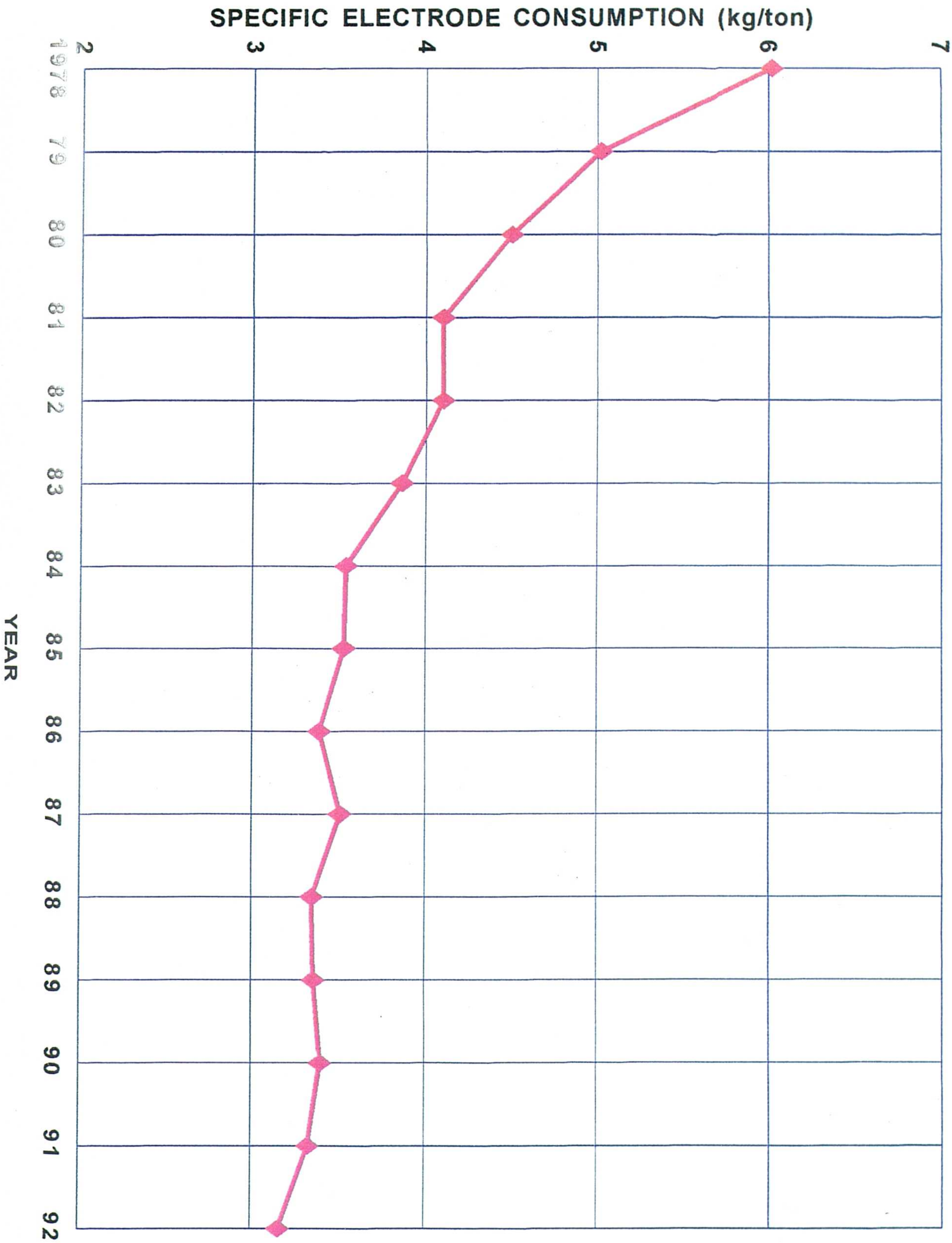

ANNUAL PRODUCTION (Thousand Tons)
0
100
200
300
400
500
600
700
1978
79
80
81
82
83
84
85
86
87
88
89
90
91
92
YEAR

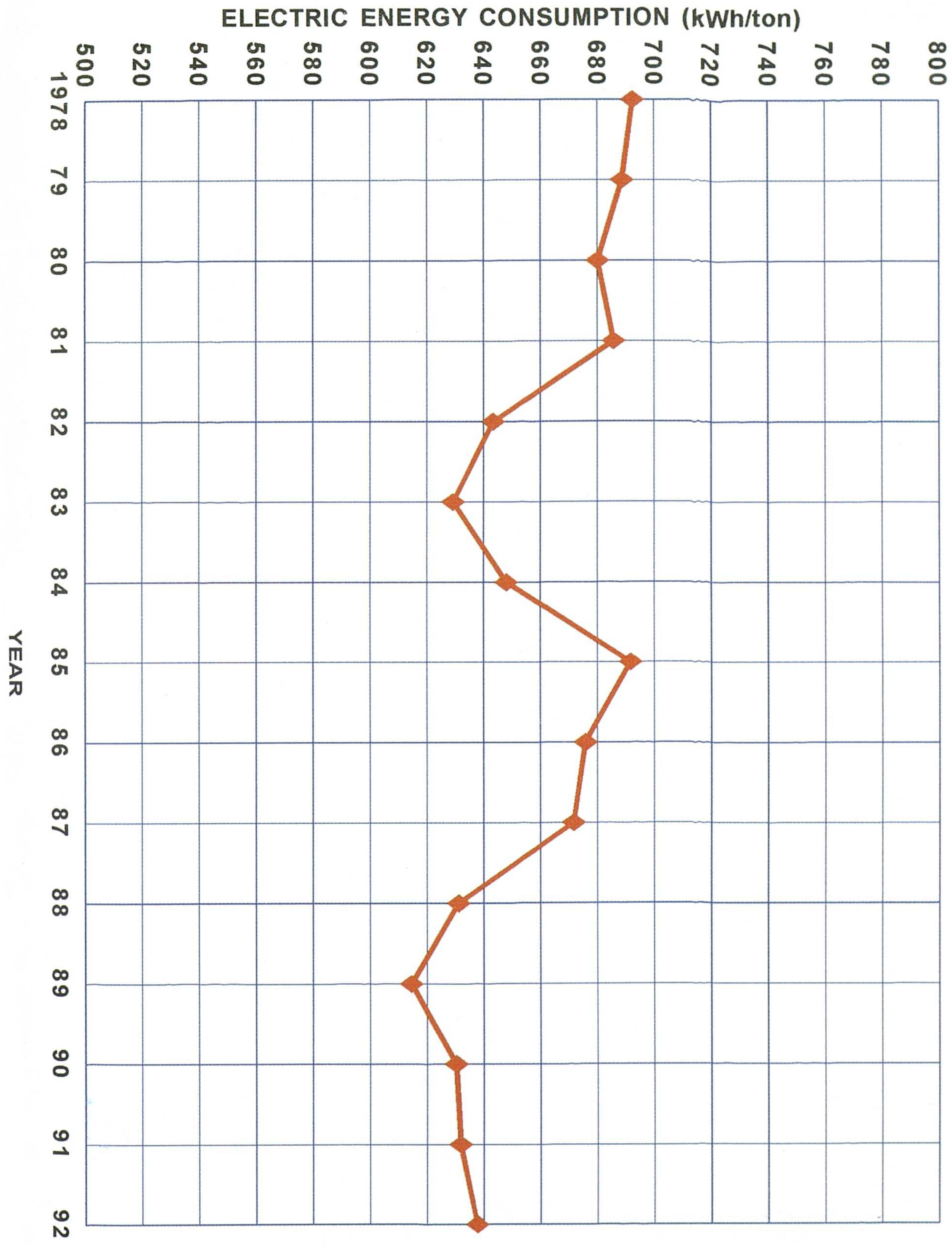

ANNUAL PRODUCTION AS % OF DESIGN CAPACITY
0
50
100
150
200
1978
79
80
81
82
83
84
85
86
87
88
89
90
91
92
YEAR

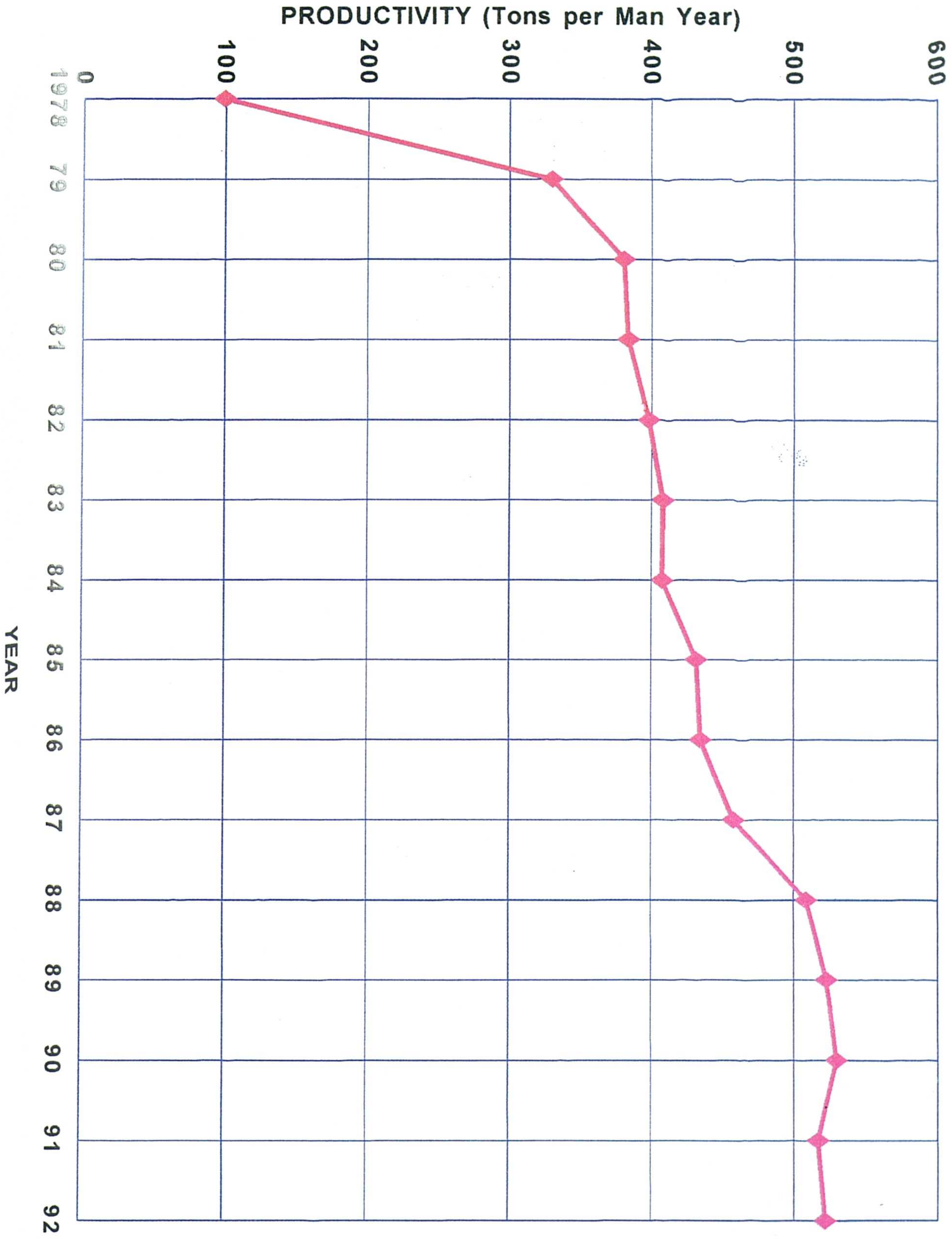

CUMULATIVE PRODUCTION (Million Tons)
0
2
4
6
8
YEAR
1978
79
80
81
82
83
84
85
86
87
88
89
90
91
92

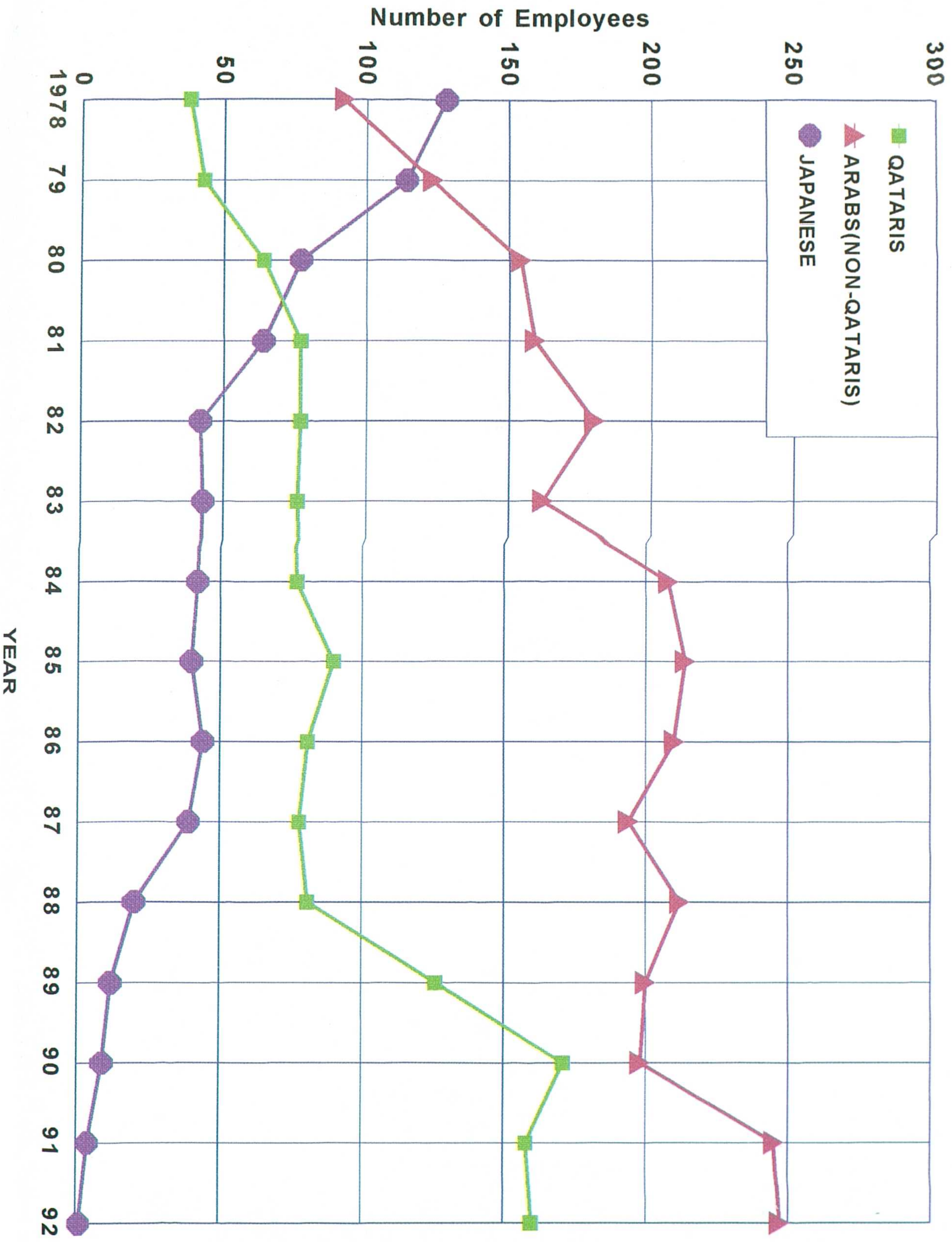


SPONGE BLENDING RATIO (wt %)
20
40
60
80
100
1978
79
80
81
82
83
84
85
86
87
88
89
90
91
92
YEAR


SPECIFIC ELECTRODE CONSUMPTION (kg/ton)
2
3
4
5
6
7
YEAR
1978
79
80
81
82
83
84
85
86
87
88
89
90
91
92


ELECTRIC ENERGY CONSUMPTION (kWh/ton)
500
520
540
560
580
600
620
640
660
680
700
720
740
760
780
800
YEAR
1978
79
80
81
82
83
84
85
86
87
88
89
90
91
92


PRODUCTIVITY (Tons per Man Year)
0
100
200
300
400
500
600
YEAR
1978
79
80
81
82
83
84
85
86
87
88
89
90
91
92


Number of Employees
0
50
100
150
200
250
300
QATARIS
ARABS(NON-QATARIS)
JAPANESE
1978
79
80
81
82
83
84
85
86
87
88
89
90
91
92
YEAR

CHAPTER 8

QATAR - A NEWLY INDUSTRIALIZING COUNTRY (NIC) ?

CHAPTER 8

QATAR - AS A NEWLY INDUSTRIALIZING COUNTRY (NIC) ?

8.1 Qatar - Emergence as a Newly Industrializing Country (NIC) ?

In order to examine whether Qatar could now be classified as Newly Industrializing Country (NIC), three particular economic aspects are considered.

- Sectoral Composition of GDP
- Composition of Exports
- Economic Characteristics and Performance.

8.1.1 Sectoral Composition of GDP

Qatar's Gross Domestic Product (GDP) increased at an average by 6.04% between 1987 and 1991 (QMA, 1991) as shown in Table-55. After a positive growth for the years 1987 to 1990 the GDP showed a negative growth of -9.3% during 1991 mostly due to the Gulf crisis and the resultant decline in major sectors viz: oil, manufacturing and building and construction.

The average growth of manufacturing industries for the years 1987-91 showed a growth of 13.54% during this period. The share of manufacturing industries in GDP varied from 10.6% to 14.3%.

The oil sector still contributed the greatest proportion of GDP ranging from 25.4% to 34.0% and with a average of 31.8% as against 13.0% for the manufacturing sector. It may thus be seen that the oil sector still dominates the economy of State of Qatar. The economy is closely tied to the world economy. Major developments elsewhere are reflected immediately as petroleum products exports constitute a major portion of national income. The downward trend in oil prices coupled with global inflation will continue to exert pressure on Qatar's total revenues.

8.1.2 Focus on Diversification

The economy of Qatar fell in 1991 from abnormally high 1990 levels as oil prices

TABLE - 55

GROSS DOMESTIC PRODUCT BY ECONOMIC SECTORS
1987 - 1991

(Value in Millions of QR)

Economic Sectors	1987			1988			1989			1990			1991*			Average 1987-91	
	Amount	Proportion %	Change %	Amount	Proportion %	Change %	Amount	Proportion %	Change %	Amount	Proportion %	Change %	Amount	Proportion %	Change %	Proportion %	Change %
1. Oil Sector	5869	29.6	8.8	5591	25.4	-4.7	7103	30.1	27.0	10187	38.0	43.4	8250	34.0	-19.0	31.8	11.10
2. Non-Oil Sectors	13956	70.4	7.4	16388	74.6	17.4	16513	69.9	0.8	16605	62.0	0.6	16039	66.0	-3.4	68.2	4.56
Agriculture & fishing	237	1.2	0.0	232	1.0	-2.1	214	0.9	-7.8	210	0.8	-1.9	215	0.9	2.4	1.0	-1.88
Manufact. Industries	2100	10.6	18.2	3138	14.3	49.4	3333	14.1	6.2	3451	12.9	3.5	3120	12.8	-9.6	13.0	13.54
Electricity & Water	362	1.8	-0.3	365	1.7	0.8	349	1.5	-4.4	411	1.5	17.8	415	1.7	1.0	1.6	2.98
Building & Constru.	993	5.0	-5.8	1030	4.7	3.7	972	4.1	-5.6	1130	4.2	16.3	950	3.9	-15.9	4.3	-1.46
Trade, Rest. & Hotels	1319	6.7	14.8	1338	6.1	1.4	1618	6.9	20.9	1480	5.5	-8.5	1528	6.3	3.2	6.2	6.36
Transport & Commu.	508	2.6	23.9	659	3.0	29.7	669	2.8	1.5	683	2.6	2.1	697	2.9	2.1	2.8	11.86
Finance, Insurance & Real Estate Services	1988	10.0	0.8	2236	10.2	12.5	2455	10.4	9.8	2553	9.5	4.0	2610	10.7	2.2	10.2	5.86
Other Services	6449	32.5	6.8	7390	33.6	14.6	6903	29.2	-6.6	6687	25.0	-3.1	6504	26.8	-2.7	29.1	1.80
Total	19825	100	7.8	21979	100	10.9	23616	100	7.4	26792	100	13.4	24289	100	-9.3	100	6.04

* Preliminary Figures

Source : Central Statistical Organization dropped after the Gulf war, according to the Qatar Monetary Agency sources. Oil prices shot up with the August 1990 invasion of Kuwait and all countries with spare capacity boosted their output to fill the gap left by Iraq and Kuwait. Prices, however subsided later. The GDP fell by 9.3% in 1991 to 24.3 billion riyals from 26.8 billion a year earlier. The biggest drop was in the oil sector, which accounted for 8.2 billion riyals in 1991, a fall of 19 percent from 10.2 billion in 1990. The economy and its oil sector were still more active than in the late 1980s even so.

Despite these problems, the Government has pursued its sound long-range financial and social programmes. These programmes are aimed at increasing the general standard of living for all its nationals, diversify sources of income and encourage private sector participation.

Despite its hydrocarbon wealth, Qatar since its independence has undertaken some diversification as described in previous Chapters. After the Gulf crisis, the Government has acted to rebuild confidence by approving several schemes and announcing a new law aimed at encouraging foreign investment. Income from overseas investment has helped to cushion the country's declining earnings from crude hydrocarbons.

According to a recent statement by the Minister of Energy & Industry (Al Attiyah - 1993), oil prices could gradually increase by $2 a barrel if OPEC members abide by their new production agreement. The estimated demand for OPEC crude oil in the first quarter of 1994 is 25.3 million bpd. OPEC has set an aggregate production ceiling of 24.9 mn. bpd. Over production by OPEC member States has led to a glut on the world oil market that sent prices sliding in recent months after they had almost hit the $21 per barrel mark that OPEC seeks. Meanwhile, Qatar pledged support for OPEC efforts to lower the oil production ceiling of members. The emerging consensus at the OPEC meeting held in January 1993 in Qatar, was to try to cut one million bpd supply from the present OPEC ceiling of 24.6 million or 1.5 million from actual volume. In fact the average price per barrel fell to $ 14 by the end of 1993.

8.1.3 Composition of Exports

It is well known that the level of economic activity in developed economies has a major impact on growth prospects in developing countries, particularly through changes in import/export demand. Developing country exports of manufactured goods, for example while expanding strongly in the 1960s and 1970s, have been stagnant in real terms since 1982. The decline in oil prices affected oil based economies strongly since 1982 and touched a low ebb by 1986.

Qatar's Balance of Payments posted in 1991 a monetary deficit compared with a monetary surplus of QRs. 973 million in 1990 (QMA - 1991). The deficit was basically an outcome of a surplus on the trade balance but a larger deficit on the capital account following settlement of loans falling due in 1991 - see Table-56.

TABLE - 56

QATAR'S BALANCE OF PAYMENTS

(In Millions of QR)

Particulars	1987	1988	1989	1990	1991*
1. Trade Balance	3307	3432	5140	7992	5206
Exports (F.O.B)	7435	8045	9967	14161	11467
Imports (C.I.F)	-4128	-4613	-4827	-6169	-6261
2. Services and Private Transfers (Net)	-3923	-4382	-5153	-6877	-5729
3. Current Account (1 + 2)	-616	-950	-13	1115	-523
4. Net Capital Transfer (Private and Official)	-1031	-1286	-92	-142	-879
5. Surplus or Deficit in Balance of Payment (3 + 4)	-1647	-2236	-105	973	-1402
6. Change in Reserves (Increase -)	-1647	2236	105	-973	1402

Source : QMA

* *Estimates*

The surplus in Qatar's trade balance dwindled by QRs.2786 million or 34.9% to QRs. 5206 million in 1991 from the 1990 level, when the surplus rose against the 1989 level by QRs.2652 million or 55.5%.

The decline during 1990/91 was attributed to the downward trend of total exports during the Gulf war, especially oil, petrochemical exports and reexported commodities on the one hand and to a slight increase in imports against the preceding year level. The ratio of total exports to total imports sank to 183.1% compared with 229.6% in 1990.

TABLE - 57

SECTORAL COMPOSITION OF GDP (1975 PRICES) IN DEVELOPING COUNTRIES

% Developed Market Economies[a]														
	All		Low-Income		Lower Middle-Income		Upper Middle-Income		High-Income		Large Countries[d]		Smaller Countries[e]	
	1963	1980	1963	1980	1963	1980	1963	1980	1963	1980	1963	1980	1963	1980
Agriculture	28.4	17.4	47.4	38.0	40.4	27.4	16.2	9.5	9.2	5.1	9.4	6.4	6.5	4.3
Mining	11.6	10.9	1.2	1.4	6.1	8.7	11.2	6.9	32.0	28.1	3.1	2.6	2.7	2.1
Manufacturing	15.2	19.2	12.5	15.1	12.0	15.9	19.6	24.6	16.7	18.6	25.5	26.5	26.6	27.5
Services[b]	39.3	44.3	32.9	39.4	36.4	41.1	46.2	50.5	37.3	39.8	52.6	55.7	54.0	56.9
Others[c]	5.7	8.2	5.9	6.0	5.1	7.0	6.8	8.6	4.8	8.4	9.4	8.8	10.2	9.2

a For definitions of countries covered see the original source.

b Includes Government services.

c Covers construction and public utilities.

d Developing countries with a population above 20 million in 1970. The figures for different income groups include large countries.

e Smaller countries with population below 20 million in 1970

Source : UNIDO (1983), Table IV.1, p. 83.

It may thus be seen that the State of Qatar's development is still dependent on oil exports and this situation has to change to make the development more balanced. This requires a structural change in future industrialization programmes.

8.2 Composition of Manufacturing Output in Developing Countries - A General Overview

Structural change in industrial output cannot be viewed simply in terms of the share of manufacturing or industry in total output or employment. It is important to know whether the composition of the output produced within manufacturing is associated with a diversified industrial structure which is capable of a self-sustaining programme for long-run growth.

The group of developing countries is very heterogeneous. The main characteristic shared within this group is that per capita income is low, but if we examine the structure of their economies we find significant inequality between developing countries in terms of both income and manufacturing output. The evidence presented by John-Weiss (1988) suggests that the poorer developing countries have experienced lower growth in both income and manufacturing. Table-58 shows that when developing countries are grouped by per capita income criteria the poorest group, which comprises over 50 percent of the population of developing countries, had the lowest rate of growth of manufacturing value-added. Table-57 above showed the mining sector - chiefly petroleum based - to have a key role in the high-income developing countries. Many oil rich countries like Qatar used oil income to push industrialization forward. Thus for this group manufacturing still grew more rapidly than in the low-income countries.

In general, the additional manufacturing output and exports produced by developing countries since 1960 has been highly concentrated in a relatively small number of countries. For example, of the increase in manufacturing value-added in the developing country group 1973-80 over 70 percent was provided by ten countries, with around 55 percent of the population of the group. However of these ten, four, Brazil, Mexico, South Korea and India provided over 50 percent of the additional manufacturing value-added.

Although, many developing countries expanded their exports of manufactured goods over this period, again the bulk of the increase was concentrated in a few countries. Data for the mid-1970s, for example, indicate that the ten chief developing country exporters were responsible for over 75 percent of all manufactured exports from the group. The four major South East Asian exporters, Taiwan, South Korea, Hong Kong and Singapore accounted for over 45 percent.

An important question is the cause of this uneven expansion of manufacturing. Naturally one should not expect all countries to grow at equal rates, since factors like natural resource endowments, current output levels, social systems, political and economic external links, and economic policies, will all influence the growth that can be achieved in a specific period. The explanation of this range of performance is clearly complex and cannot form part of this thesis. However, the characteristics of mini-state economies, as relevant to Qatar and noted in Introduction I.3.3 have to be borne in mind.

TABLE - 58

AVERAGE ANNUAL GROWTH OF MANUFACTURING VALUE-ADDED FOR GROUPS OF DEVELOPING COUNTRIES (1963-80)

Income Group[a]	Annual Growth of Manufacturing value-added (%)	Group Share in Population of Developing Countries in 1980 (%)	Number of Countries in Group
Low	4.9	50.7	28
Lower Middle	7.3	18.2	21
Intermediate	8.6	15.7	24
Upper Middle	8.5	12.3	11
High	5.8	3.1	11

Source : John-Weiss, 1988

[a] *For details of the income range in each group see the original source.*

8.3 Qatar - Transformation into a Newly Industrializing Country (NIC)

8.3.1 Newly Industrializing Countries

The uneven spread of manufacturing and export growth within the developing countries has led to efforts to reclassify countries into the more dynamic and the rest. One approach is to define NICs as those countries with an export-oriented strategy for manufacturing; another includes as NICs those countries where manufacturing has reached some threshold share of GDP - either 20 percent or 25 percent. The countries most frequently included in lists of NICs are probably Hong Kong, Singapore, South Korea, Taiwan, Brazil, Mexico, Argentina, India, Egypt, Turkey, Malaysia, the Philippines and Yugoslavia - Table-59.

Data on some of the structural characteristics and economic performance of these countries, with the exception of Taiwan, is given in Table-58. Together they have around one-third of the population of all developing countries, including China.

From Table-59 it is difficult to identify common characteristics shared by the countries most commonly cited as NICs. With the exception of Argentina all had a growth rate of manufacturing in the 1970s in excess of both developed and the lower-income developing economies.

The role of manufacturing in the economies of the Table-59 NICs varies markedly. In terms of its share in GDP all countries in the table have a share above 15 percent, which Table-57 shows was the average for low and lower middle-income developing countries. In a majority of cases the share of manufacturing in the NICs is close to that in developed economies, and in three countries, Yugoslavia, South Korea and Hong Kong exceeds the average for developed economies. For exports, manufactures exceed 40 percent of total export in all cases except Mexico, where oil distorts the comparison. In all but three countries manufactures are more than 50 percent of total exports, which as we have seen was approximately the average share of manufactures in non-oil exports from developing countries in the early 1980s. Manufacturing value-added per capita varies substantially between countries from US$1,144 in Singapore to US$27 in India. In all cases the per capita figures are low in comparison with developed economies, but none the less are generally high by the standards of most other developing countries.

TABLE - 59

ECONOMIC CHARACTERISTICS AND PERFORMANCE[a] : NICs

NICs	Share of Manufacturing in National Income (%)	Manufacturing Value-added per Head of Population (US$ 1975 Prices)	Share of Capital Goods in Total Manufacturing[b] (%)	Share of Manufacturing in Total Exports (%)	Annual Growth of Manufacturing (%) 1975 Prices	
					1963-73	1973-81
Argentina	25.8	394.0	33.6	57.8	6.5	-0.8
Brazil	28.2	403.0	32.9	70.9	9.7	6.2
Egypt	17.3	87.0	21.7	44.1	3.3	8.2
Hong Kong	30.8	966.0	33.8	97.0	12.3	12.3
India	17.2	27.0	27.4	65.3	3.7	5.1
Malaysia	18.4	189.0	26.0	47.4	9.1	9.2
Mexico	23.5	430.0	33.5	32.2	8.9	6.9
Philippines	25.7	115.0	16.4	55.0	6.5	6.6
Singapore	27.6	1144.0	63.6	79.9	18.0	10.0
South Korea	33.8	276.0	25.3	93.2	20.4	13.4
Turkey	18.6	177.0	22.6	55.7	9.9	3.4
Yugoslavia	36.1	621.0	34.4	92.0	6.7	6.2
Developed Economies[c]	27.3	1925.0	43.8	84.7	6.1	1.6

[a] All percentage shares refer to early 1980s.
[b] Capital goods are defined here as ISIC branches 381, 382, 383 and 385.
[c] Simple average for Canada, Federal Republic of Germany, Japan, UK and USA.

Source: UNIDO (1985b), various tables, quoted in John Weiss 1988.

The trade pattern of the NICs also illustrates the extent to which their development since 1960 has differentiated them from other developing countries. On the import side, their increasing domestic production of capital goods has meant that several NICs have been able to reduce their dependence on capital goods imports. As a specific example of this pattern one can note that by 1980 imports of machine tools provided only around one-third of domestic use in India, Brazil and Taiwan, which is roughly the same proportion as in France and the UK. However, in other countries, such as Mexico, South Korea and Argentina this import-substitution in machine tools has been carried much less far.

8.4 An Industrial Economy : Concepts and Definitions

According to one large scale analysis (John-Weiss 1989) an industrial economy is defined by reference to the share of manufacturing in total commodity production, where the latter can be seen as GDP net of services. Using this approach an industrialised economy is one where the share of manufacturing in commodity production is above 65 percent. Other criteria suggested include this group:

- a minimum of 25 percent of GDP originating in the industrial sector;
- at least 60 percent of industrial output in the form of manufactures;
- at least 10 percent of the total population employed in the industrial sector.

For the mid-1960s the only industrial developing countries found in this group were Argentina, and Hong Kong, with a few others, Chile, Uruguay, Israel, Portugal and Yugoslavia being borderline cases. There were 15 other countries with relatively large industrial sectors, dominated by manufacturing, but where industrial employment had not spread widely enough for them to be classified as industrialized.

Data from the early 1980s do not show a dramatically different picture using the same criteria.

Despite the structural change that has taken place much of the industrialisation in developing countries is 'premature', in the sense that, as we have seen, the value of manufacturing output per head of population is still very far below that in the developed economies. Therefore, whilst the share of manufacturing in national income in the NICs, for example, may be close to that in developed economies, sectoral productivity remains much lower. In addition, a growth in the GDP share contributed by manufacturing may only reflect a decline in other sectors. This is why absolute as well as relative values have to be used. In this case, as shown in Chapter 6 Tables 51 and 52, for the period

1980 to 1990 inclusive, in Qatar the contribution of Manufacturing to GDP showed an increase in absolute value at constant prices over each the previous year of all but 2 of the 11 years. As a proportion of GDP the annual increase in the contribution by manufacturing rose every year (year-on-year) at an accelerating rate from 1980 with 4.4% to 1987 with 15.2% and even the fall in 1990 was only to 13.9%. If one sets this against World Bank figures for commodity prices then the constancy of total manufacturing growth in Qatar can be appreciated (World Bank 1992). In real terms the price of petroleum fell annually by 10.1%, in 1989 and 1990 rose by 20.6% and 23.8% respectively, falling again in 1991 by 20.3%.

It is equally true of Balance of Trade matters as it is of GDP in total and in composition. The IMF pointed out the nature of the contrast found between different parts of the developing world in these terms (World Economic Outlook 1988, p.12):
"A tendency for the industrial countries to lose export market shares reflects the buoyancy of exports from developing countries. This is mainly attributable to exporters of manufacturers - notably Korea and Taiwan."
"For the majority of these countries (primary product exporters) the growth of exports is expected to remain unsatisfactory because of deeply entrenched problems relating to these countries narrow export bases."

A different approach was adopted by Auty (1988) in a study of the economic stimulus derived from resource-based industries (RBI) in developing countries, and in particular Saudi Arabia and Bahrain.

The key criteria adopted whether the RBI are successful in this model are (a) the efficiency of industrial investment, (b) the degree of progress to economic diversification. The accuracy of this approach depends on the precision with which investment efficiency in RBI can be measured, and the value of the approach depends on the assumptions made concerning the relationship between the choice of investment and the range of options open to the developing country.

In the first case, the range and quality of data available may seriously inhibit the depth and precision of the type of comparison of industrial costs of similar manufacturers attempted in Table 5, p. 219 in Auty's study as between Saudi Arabia and EEC countries. For example, the true input costs in any industry in the "oil-economies" - the Arab Gulf States in particular are almost impossible to isolate, quite apart from overt subsidies. Oil and gas provide energy and materials in many forms to the infrastructure and utilities (i.e. electricity and water) as well as to the industries which also require much of the infrastructure and utilities utilized by non-industrial activities.

Separating social from economic costs in this area or isolating transfer prices between different economic or industrial processes cannot be carried out precisely, as noted by Al-Kubaisi (1984) and in II.1.2 above.

For this and many other reasons, e.g. the different possible assumptions which can be made of the lead-time for expected return on investment, or e.g. the differing perceptions of risks especially given different ranges of investment opportunities open to, for instance Western private sector multinationals as opposed to a consortium of States (see Chapter 10.5 for a brief comment on aluminium industries in the Arab Gulf and the West), the meaningful measurement of RBI investment efficiency is extraordinarily difficult.

The answer to the second question - how wide is the range of choice of investment actually available to any State at any one time - can be exemplified in essence as follows.

Saudi Arabia with enormous oil reserves in a very large country with a considerable variety of physical resources has had a different set of options to that of Bahrain, mini-State with small and declining oil reserves and millennia of experience as a Gulf trading centre. Saudi Arabia not only through SABIC and its basic industries (see p. 274 below) but through other agencies such as SIDF, could develop many market-led consumer goods industries. Bahrain however has been able to develop only one significant RBI, the aluminium smelter first established as a joint venture with North American interests and now part of an AGS consortium GARMCO. The smelter operated at a loss up to 1979 according to Auty and again in the late 1980's and 90's. (see Chapter 9.10.5).

Investment efficiency in Bahrain RBI has to be measured in terms of the unquantifiable effect of Bahrain's industrial pioneering venture as part of a move away from primary production of oil into maritime, trade and above all banking service activities - true diversification.

In the case of Qatar, all the foregoing chapters demonstrate that Qatar was and is faced with either being totally a rentier State relying on exports first of crude oil and now of its immense reserves of natural gas, or positively investing in the local industrial utilization of its only significant resource - hydrocarbon. The decision to invest in RBI could not be and was not taken on financial grounds that this would guarantee high income returns. As noted in the Introduction and in Chapter 4.2 - Policies and Goals of Industrial Development, the decisions were as much social, cultural and political as economic and takne in a particular time context, the 1960's. The development stimulus effect has to be assessed similarly.

Diversification for Qatar, as Beseisu indicated in 1982, given that Kuwait had early claimed the chief regional financial role, Bahrain banking, and Dubai in the UAE entrepot commerce, could only be within the range of hydro-carbon RBIs. Chapter 9 examines further the nature of these available investment options.

CHAPTER 9

THE FUTURE PROSPECTS FOR THE STATE OF QATAR AS AN INDUSTRIALIZED COUNTRY

9.1 Economic Review of the Recent Past

9.2 Oil Price Scenario

9.3 The Impact of North Field Gas Project - Phase 1 - on the Economy

9.4 Future Projects : Current Status of Proposals

9.4.1 LNG Projects

9.4.2 QAPCO

9.4.3 QASCO

9.4.4 QAFCO

9.4.5 QNCC

9.5 The Investment crunch - The Need for Integrated Industrial Planning

9.5.1 The Need for Reviewing and Revaluation of Selected Key Areas

9.6 Fresh Review of Hydrocarbon Resources - Scenario Plan

9.7 The Enhancement of the Value of and Conservation of Oil Reserves.

9.8 The Exploitation and Utilization of Natural Gas Resources

9.9 Review of the Present Situation and Proposals of the Organizations Utilizing North Field Gas

9.9.1 Factors in Selecting Best Options

9.10 Development and Expansion of Existing Major Industries

9.10.1 NODCO Refinery Operations

9.10.2 Refining Outside Qatar

9.10.3 Fertilizer Production

CHAPTER 9

THE FUTURE PROSPECTS FOR THE STATE OF QATAR TO EMERGE AS AN INDUSTRIALIZED COUNTRY & CONCLUSIONS

9.1 Economic Review of the Recent Past

Ever since 1982 and even more so since 1986 when oil prices crashed temporarily to below $10 a barrel level, the economy of State of Qatar has been under severe financial strains. Despite austerity measures the balance of payments were negative for the years 1987 to 1991 except where there was a surplus, a surplus which was the accidental result of short-lived higher oil prices due to the Gulf war. Budget deficits also were experienced from 1986/87 till 1991/92 except for 1990/91 when there was a surplus of 560 million (QMA - 1991), see Table-60.

The decrease in export receipts continued after 1986, falling to QR 9638 mn, in 1991, a drop of 17.7% against 1990. The fall in earnings was not only due to a decrease in oil revenues but also in non-oil exports especially petrochemicals which fell by 29% in 1991 to reach 1453 mn. QR. Crude oil's relative share of exports rose to 84% of total exports from 82.7% in 1990.

The projected deficits are getting to be more and more difficult to bridge, considering that whatever reserves are available need to be utilized for development activities especially for the ambitious North field development projects including LNG project. Continued budgetary deficencies may stall further development programmes unless there is more careful and judicious use of resources as well as selective external borrowings and local fund mobilization.

9.2 Oil Price Scenario

Export earnings are still closely interlinked with oil prices and forecasts of oil prices do not appear encouraging. On the one hand it is argued that war and a desire to rebuild shattered economies will result in a push by countries such as Kuwait to raise exports thus adding to the world oil glut and causing a further drop in prices. On the other hand some argue that prices will actually increase provided OPEC quotas are respected. The actual effect so far of disagreements among OPEC members and the continued rise of production by non-OPEC oil producers has been to keep prices depressed in 1993.

TABLE - 60

ESTIMATED AND ACTUAL STATE BUDGETS FOR 1989/1990 - 1991/92**

(In Millions of QR)

Particulars	Estimates			Actual Figures		
	1989/90	1990/91	1991/92	1989/90	1990/91 *	1991/92 **
Total Revenues	5835	7786	8428	9300	11948	9170
Total Expenditure	11482	11709	11706	10525	11388	10600
Recurrent Expenditures	9969	9920	9811	9511	10323	9199
First Chapter	(4621)	(4420)	(4302)	(4556)	(4575)	(3864)
Second Chapter	(4376)	(4622)	(4537)	(4398)	(5059)	(4600)
Third Chapter	(972)	(878)	(972)	(557)	(689)	(735)
Capital Expenditures	1513	1789	1895	1014	1065	1401
Fourth Chapter	(1513)	(1789)	(1895)	(1014)	(1065)	(1401)
Deficit	**-5647**	**-3923**	**-3278**	**-1225**	**560**	**-1430**

Source : QMA

* *State budget made on Gregorian calender year, starts April 1st and ends March 31st.*

** *Preliminary Figures.*

(and see Chapter 2.2.9.3 & Table 28)

For the future, in addition to Kuwait, U.A.E. and possibly Iraq will be considering pumping out more oil. The list of potential new producers as well as non-OPEC producers wishing to expand production, keeps growing. The Caspian Sea region, now divided between Kazakhstan, Turkmenistan and Azerbaijan, is already expected to yield as much oil as Saudi Arabia according to early estimates by Western oil companies, who are bidding for development contracts. The Tarim basin in north-west China has potentially vast oil production potential and foreign bids were invited before October 1993. The South China Sea potential and the Malaysian - Indonesian - Brunei oil and gas fields already in production make it unlikely that ever again will OPEC countries determine the level of oil prices. Norway has announced plans to increase oil and gas production by 30% by the end of the century.

It appears that oil prices will not rise to much above the present level for many years. Even if they reached $21 bbl which is the bench mark of OPEC hopes, the real value of this level is estimated to be about $ 6.0 in terms of 1973 dollar value. Further, the decline in the value of the U.S. dollar against major currencies has also an effect on Qatar's balance of payment as almost half its imports are from Europe which has experienced widely fluctuating currency values. Japan accounts for second place with 17% of Qatar's imports and the Japanese Yen has appreciated strongly against the U.S. dollar. Qatar is trying to boost imports from U.S.A to off-set this effect to some extent. It is clear that Qatar's economy is still not only at the mercy of external forces beyond its control but fragile due to its predominent dependence on the sale of crude oil.

9.3 The Impact of North Field Gas Project - Phase 1 - On the Economy

The Phase-1 of North Field gas project which went on stream in September 1991 was launched mainly to cater for the domestic needs of electricity, water and industry and to substitute for the on-shore gas Khuff Field which has become depleted. The capital cost of the project originally estimated at US $ 950 mn. has ended up at about US $ 1,300 mn.

The economic returns on Phase-1 of North Field Gas were based on the sale of condensates viz: Propane, Butane, Naphtha and Heavy residues. The financial consultants of the project in the 1980's assumed cash flows based on a crude oil price of US $ 18 bbl and prices of LPG (Propane, Butane) Heavy Naphtha at 135.5/ton and Light Naphtha at $155.6/ton as of 1988. These were assumed to rise to $ 185 both for LPG and heavy naphtha by 1993.

The international energy scenario does not appear to support the prices considered by the consultants. Present (end 1993) LPG prices are about US $ 140 and crude prices show no sign of rising. If the present trend continues there is no way by which the positive cash flows predicted could be achieved. Part of the lean gas which is surplus after catering for power generation was to be used for promoting industries such as Fertilizer plant expansion, an Aluminium smelter, Methanol production etc. However none of these projects have yet taken shape. It is also unlikely that the lean gas utilizing industrial projects will go on stream till 1997. The excess lean gas is therefore reinjected back to Dukhan fields at great cost with no apparent or immediate returns. At the present assessment it appears that North Field Project Phase-1 will not achieve profits until profitable utilization of lean gas and condensates is in hand.

One basic problem which has raised difficulties throughout the period of North field planning is the way in which the scale and complexity of a huge co-ordinated scheme affect adversely the accuracy of any forecast of projection of actual costs and real obtainable prices. This is almost unavoidable and is the price a small State such as Qatar has to pay for exploiting a world-scale asset resource.

9.4 Future Projects : Current Status of Proposals

9.4.1 LNG Projects

Chubu Electric Power, Japan, signed a letter of intent with Qatar Gas in 1991 to buy liquefied natural gas from Qatar for 20 years; this is not strictly a contract. Further, American oil and gas giant Mobil Corporation has taken the major share in Qatar's ambitious plan to exploit its offshore North Field Gas Field, the world's largest proven non-associated gas field. It signed a joint venture agreement with Qatar General Petroleum Corporation to produce 10 mn. tonnes of liquefied natural gas from the North Field, Mobil taking a 30 percent stake in the venture to be called Ras Lafan LNG Ltd. and QGPC remaining 70 percent. Mobil already has a 10 per cent share in another Qatar LNG project to produce six mn. tonnes a year from the same North Field reserves. Other shareholders in the Qatar Liquefied Gas Company (QATARGAS) are Total (France) and Mitsui and Marubeni (Japan). Qatar thus has established several joint ventures with foreign companies to develop and distribute liquefied natural gas from the North Field reserve to overseas markets. The forecast demand from the main Far East markets is likely to rise by 50 percent by 2000 AD from the current 40 million per annum output now. This assumes in particular that Japan recovers quickly from its current industrial recession.

From Qatar's point of view it is important to capture as large a proportion of the Far Eastern and South East Asian market and as quickly as possible before other so-far unproven but estimated large resources become available. At the end of 1993 Iran announced the discovery of a new gasfield of North Field scale some 200 km to the north-east in Iranian waters and almost every month brings information of new exploration in Asia. The Sultanate of Oman has signed a memorandum of understanding to supply natural gas through a pipeline to India. A prefeasibility report said to have been prepared by a consortium of French Consultants appears to have endorsed the techno-economic viability of this proposal. It is also important therefore that Qatar successfully exports by pipeline (much cheaper than tanker) to her Arab neighbours and further west. Large LNG sales would provide Qatar with the early cash-flow needed for future domestic industrial developments and, of immediate importance, bridge the lead-time gap between investments and returns.

9.4.2 Qatar Petrochemcial Company Ltd. (QAPCO)

QAPCO has plans to double the production of ethylene to 525,000 tons and polyethylene to 360,000 metric tonnes per annum by adding new units. Agreements have been signed with Enichem of Italy for basic engineering and Technip of France, Snam Progetti of Italy and Technologie Progetti Laveri of Italy. QAPCO is a joint venture between Qatar General Petroleum Corporation (QGPC) which holds an 80 percent stake and now the remainder by Elf Aquitaine (France) and Enichem S.P.A.

9.4.3 Qatar Steel Company Ltd. (QASCO) (and see Chapter 7)

QASCO has an integrated steel plant, which produces sponge iron, converts it into billets and finally reinforcing steel bars. The company has exported its products to Algeria, Egypt, Iran, Yemen and Hong Kong besides GCC countries. It has plans even to sell its products to China and Japan. It also plans to double its production of steel bars to over a million tonnes annually, spending about QR 1 billion on the expansion project. Two consulting organizations viz. Mitsui of Japan and Dastur Engineering of India have been appointed as consultants for market and feasibility studies. According to official statements by QASCO, setting up a totally new plant as envisaged by U.A.E and other Gulf States is a more expensive proposition than QASCO's expansion. QASCO's capacity is also currently being expanded by about 140,000 tonnes by carrying out internal modifications of the production lines which would be completed by December 1995. After the major expansion for which feasibility studies are under preparation, total capacity will be about 1.2 million tonnes which may be achieved by 1997.

9.4.4 Qatar Fertilizer Company (QAFCO)

QAFCO has plans to build two new plants to produce ammonia and urea at Umm Said. The plants will use lean gas from Qatar's natural gas processing plants based on the offshore North Field reservoir as feedstock. QAFCO is also likely to seek loans from foreign banks to finance part of the cost, estimated at $400 million, for expansion. According to a QAFCO source a 1,500 metric tonnes per day ammonia plant and the

2,000 metric tonnes per day urea plant are expected to come on stream at the end of 1995. Urea and ammonia markets are attractive to Qatar compared with European producers because of low production costs (see 9.13.1 below).

9.4.5 Qatar National Cement Company (QNCC)

QNCC has also announced its plans for expansion of present capacity from 600,000 Tons/year to 1.2 Million Tons/Year at an estimated cost of about US $ 200 million, this based on the continued buoyancy of national and regional demand.

9.5 The Investment Crunch - The Need for Integrated Industrial Planning

As noted earlier in this study, Qatar's financial resources and the internally owned capital on which it can call are large by historical standards but modest when compared with the investment requirements needed for the effective exploitation and utilization of the North Field. This is partly a matter of a long lead-time between expenditure on basic production - offshore gas-wells, gas gathering and distribution systems and in the case of LNG expensive liquefaction process, storage and marine transport and the returns on sales of gas or gas products. The phase-1 stage described in 9.3 was crucial for obtaining the first returns on sales and required international financing on a shared equity basis which eventually was avoided with QGPC bearing the entire investment due to difficulties in raising international loans to some extent - nothing else was possible, the forecast sales revenue as noted in 9.3 above turning out to be too optimistic.

Unfortunately, also, the complex integrated development scheme described in Chapter 6.6.2 has not in fact turned out to be an integrated plan for industry. The proposed expansion schemes noted in 9.4.2 to 9.4.4 above are all independent projects with the only common link between them and any other industries is that they all rely on North Field gas for energy and some feedstock. To deal with industrial development and the appropriate investment on a national basis then medium and long term objectives have to be realistically identified, on a variety of scales and in both public and private sectors. It is in the light of real and profitable inter-related industrial ventures, all of which in the end have to rely on established and innovative uses of hydro-carbons, that the following most urgent steps need to be taken if successful industrial development is to proceed.

- A fresh review of hydrocarbon resources to evaluate proven and field reserves and future possibilities and an evaluation of various exploitation systems.

- A detailed review of the present and future national and specific demands for electricity and water and the consequential demands for energy.

- A review of present and projected company plans of all the major public and mixed sector organizations and in particular of QGPC, NODCO, QAFCO, QAPCO and QASCO.

- Setting up a system for the monitoring of operations of QATARGAS and the enterprises in the Ras Lafan Industrial Area.

- Review the present and projected financial resources of the State of Qatar, in particular in relation to existing current and developmental commitments and the proposed/projected future developments.

- Prepare prospective plans for the economic and industrial sectors in relation to the short (1995-2000) and long term (1995-2015) needs of State of Qatar.

- Develop scenarios for financial resource mobilization and allocation to meet the requirements of envisaged projects in the prospective plans.

The plans should necessarily aim at (1) reducing the dependence on energy exports in the form of oil, (2) boost the contribution of manufacturing sector from the present 14% of GDP to 25% by 2005 A.D., (3) achieving this whilst at same time keeping a favourable Balance of Trade, and (4) involving selective growth in the industrial sectors at a variety of scales.

9.6 Review of Hydrocarbon Resources

Qatar has estimated recoverable reserves of about 3200 million barrels of crude oil which is equivalent to about 30 years output at current levels. QGPC's plans for future production will depend on OPEC quotas and also the state of the international market. The associated gas which so far has been essential for national demands for energy and feedstock has an even more limited future.

Exploration and development of new fields both on-shore and off-shore will be countinued but development costs have to be commensurate to the returns on oil sales. There have been mixed results so far from on-shore oil exploration.

Hydrocarbon exploitation levels, other things being equal, should be viewed under the following criteria:

(1) Limited reserves of oil which at the present level of extraction may not last beyond 2020 A.D.

(2) The logical development and utilization of North Field Gas as the dynamo of the future economy. This decisive first step already has been taken although utilization of condensates and lean gas from Phase-1 has not developed according to plan. The successful launching of the LNG project is the most promising and needed next development.

The approach should be one of strategic scenario planning - see 9.13.

9.7 The Enhancement of the Value and Conservation of Oil Reserves

Oil unlike gas is relatively easily saleable whatever may be prevailing prices though the over-optimism of the late 70s must not return. Natural gas in its various forms is not as easily saleable, requires long term planning and huge financial resources to exploit, and still will make Qatar export-dependent even if high-value added manufacturing based on gas does develop in Qatar.

For these reasons Qatar should adopt a policy to upgrade the proven oil reserves by (a) exploration and development of new fields (b) implement enhanced recovery of oil up to the point beyond which it is economically not viable, and (c) generally regard oil as a resource to be conserved rather than be rapidly exploited to meet high cash flow requirements of the State for major developments. It is the considered opinion of several experts that Qatar should endeavour to reduce the proportion of export earnings by the sale of crude oil from the present 85% to say 75% by the year 1997 and to 50% by the year 2005. Oil is a valuable and in the case of Qatar limited asset partly because it can always be sold at short notice at spot prices or short term contracts to tide over immediate/short term cash requirements which will always be felt by any economy.

Thus Qatar would be well advised therefore to exploit the limited oil resources judiciously, conservatively and sparingly rather than exploit them at high rates and deplete them even before the year 2020. Posterity will need this oil reserve as an assured, but easily negotiated asset much like a gold reserve.

9.8 The Optimal Exploitation and Utilization of Natural Gas Resources

Any modern and long term plan would, with due regard to over-commitment of investment expenditure, aim at exploiting the natural gas resources to the fullest extent so that as indicated earlier the proportion of earnings due to natural gas based products, by-products and industries would go up substantially and bring down the contribution of the oil exports to say 75% by 1997 and 50% by 2005 A.D. These targets could be debated with regards to their achievability and the necessity to achieve.

The first requirement is scenario economic planning (see below) incorporating realistic research based projections of:

(a) financial requirements of the economy at selected growth rates envisaged for the years 1995, 2000 A.D. and beyond,
(b) possible earnings from oil exports and non-oil exports to meet the above requirements.
(c) the export of natural gas regionally by pipeline with minimal processing and the industrial processing of LNG for export by tanker.
(d) the development of natural gas based petrochemical and energy intensive metallurgical industries to meet the above requirements and targets.

9.9 Review of the Present Working and Future Plans of Organizations Utilizing North Field Gas

All present operating large industrial organizations like QGPC, QAFCO, QAPCO, QASCO and future organizations are interlinked due to the share holding and management structure but the vertical integration in their operations could be greatly expanded. Closer interaction is to be expected in the planning and development of the above organizations, an interaction which alone can bring about comprehensive planning and development as well as efficient operations to give the best to the economy.

On the North Field project the State of Qatar has apparently taken a more limited view of the scope of the whole project than the theoretical framework described in Chapter 6.6.2 would suggest. If natural gas has to be the work horse of Qatar's future economy it is necessary that natural gas potential is exploited to its full extent locally. Liquefied natural gas (LNG) production and marketing has been and is vital in order to obtain overseas capital and technological inputs as well as to assure reasonably rapid financial returns through long term sales contracts.

However, the best way of realising enhanced economic returns in a natural gas based economy is to convert natural gas, and its by-products to higher value added products, in the first instance in Qatar itself, and then consider other options as secondary and tertiary options. This would mean that conversion of condensates and lean gas to petrochemcials should be given the highest consideration as petrochemcials offer the best value-added option on low value starting materials such as lean gas and condensates.

The other possibilities are the utilization of natural gas (a) to generate electricity which in turn is utilized to develop high energy intensive industries such as aluminium, magnesium, ferro alloys, etc. (b) to utilize lean gas as heating medium in various industries such as alumina, calcined petroleum coke, refractories etc. (c) to utilize lean gas as compressed natural gas.

Several project ideas have been considered but it is necessary to cover all possibilities in order to identify the best options possible. For example on value added criteria natural gas and condensates when converted to petrochemical yield the best value added options. Thus, if natural gas is converted to methanol the value added is about 1000%. Similaly when the condensate propane is converted to poly-propylene through propylene the value goes up from US \$ 130/ton to US \$ 1200 - 1300 per ton. Besides the manufacture of petrochemicals would not involve import of any other raw materials with almost the entire quantity manufactured available for export. What would have to be bought in are capital equipment and human expertise (see Chapter 7).

The possibilities in a technical sense, for petro-chemical and cheap energy based manufacturing are vast as indicated by the following options and alternatives:

(1) <u>Power Intensive Industry Options</u>

Aluminium Smelter, Magnesium Metal, Ferro Alloys, Calcium Carbide, Electrolytic Manganese Di-oxide, Ceramic Industrial Materials.

(2) <u>Ammonia and Related Products</u>

Urea
Ammonium Nitrate, Calcium Ammonium Nitrate
Complex Fertilizers (DAP, NPK)

(3) <u>Methanol and Related Products</u>

Fuel Methanol
Acetic Acid, Vinyl Acetate, Polyvinyl Acetate
Formaldehyde, Phenol formaldehyde, Urea and Melamine Formaldehyde Resins
MTBE (Methyl Tertiary Butylether)
Ethylene Glycol

(4) Ethylene Related Products

Feedstock Options:

Ethane Rich Gas
Liquefied Petroleum Gas (LPG)
Naphtha {yields Propylene, Butadine, Benzene, Toluene, Xylenes (BTX)}

Product Options:

Merchant Ethylene
Low Density Polyethylene, High Density Polyethylene
Vinyl Chloride Monomer, PVC Styrene/Poly Styrene
Ethylene Glycol, Ethylene Oxide
Alpha Olefins

(5) Propylene and Related Products

Feedstock Options:

Propane Dehydrogenation
LPG/Naphtha Cracking

Product Options:

Merchant Propylene
Poly Propylene
2-Ethyl Hexanol
Acrylonitrile
Propylene Oxide/Polyols

(6) Butane and Related Products

Butadiene/Poly Butadiene Rubber (PBR)
Butenes (MTBE, Butyl Rubber, Methyl Ethyl Ketone)
Maleic anhydride/fumaric Acid
Methyl Ethyl Ketone

(7) Naphtha Cracker to produce Ethylene, Propylene, Butadiene and Aromatics unit to produce Benzene, Toluene, Xylenes (BTX)

(8) Refinery Based Operations

Hydro Cracker vs Fluid Catalytic Cracker (FCC) to produce middle distillates. If FCC to recover Propylene and Butenes.

9.10 It is clear that selectivity is necessary and that once that fact is accepted then the serious business begins of research into best combination of options for Qatar. From the evidence of what has happened so far it appears that there is considerable danger that the Strategic Plan prepared by Bechtel Consultants for QGPC including the components of a multi-phase thirty year programme summarily listed in chapter 6.6.2.1. will degenerate into a sequence of individual projects each justified by separate particularities at any one time. An associated difficulty is that in any or all of the technically feasible production projects is that because equity financing from abroad would be crucial and joint venture collaboration necessary to supply technological and skilled staff inputs, the interests of Qatar's economy and society might take secondary place to the external interests. As noted in Chapter-7, technological transfer is never easy and given the smallness of future cadres of skilled Qataris, the more numerous and technologically more complex are future industrial plants the more difficult it will be to maintain Qatari control policy let alone operational management.

Two other problem areas become evident once the number and scale of the technical possibilities become evident. The first is marketing. In Chapter-3.3 some aspects of this were examined. In Qatar's second industrial age marketing becomes even more critical. Even for a relatively restricted range of refinery products world markets are complex and ever-changing. In the field of petro-chemical products, which if only on grounds of economies of scale of prodution and the size limitation of the domestic market would have to be expanded, international markets are even more complicated and sensitive to deal in. As a result, once again collaboration with major overseas interests - which are usually producers themselves - to undertake marketing on behalf of Qatar enterprises becomes a necessary but a dangerous dependence.

The second problem area is the general limitation on the size of Qatari human resources available for industrial development. Aspects of this were considered in Chapter 3.6 and any projection of future demand/supply equation for labour, together with any projections of future demands for basic supplies such as housing, public utilities, water and electricity etc. social provisions, education, health, point to the need for future industrial planning to take into account the repercussion in these areas. For example, if one isolates the factor of water and electricity supplies, it is already the case that present and steady-state future demands have put so much pressure on natural gas resources as to increase pressure for the development of unassociated North Sea gas. However, the higher demand for labour - mostly expatriate - created by North Field Gas based industries will in turn raise further demands , for water and electricity, plant replacement, and infrastructure maintenance and so on.

Here is yet one more variable that has to be taken into account in selecting the most advantageous and beneficial projects from the long list of technically feasible possibilities.

9.10 Development and Expansion of Existing Major Industries

In the case of established major enterprises each should be considered for further investment if production is profitable and the output marketable and especially if their operation can be integrated with North Field Development. At Umm Said, for example, the basic physical infrastructural capital costs have already been written off and facilities including a deepwater port have spare capacity.

9.10.1 NODCO Refinery Operations

NODCO refinery has now a total capacity of 62,000 barrels per day. New downstream projects such as an isomerization unit as well as revamping of existing units are already being implemented. NODCO refinery also proposes to upgrade part of the condensates production line viz: full range naphtha and heavy distillates, a proposal which should be pursued seriously as the refined products will yield better returns. A recent survey by GOIC (GOIC - 1993) has also indicated the necessity to augment the supply of refined products which will apparently fall short by the end of the century for Qatar's own requirements.

NODCO's future further expansion programmes should be directed towards (a) the manufacture and export of petroleum products that are likely to be in demand in the near future by known specific markets (b) select such processes for expansion that will give a suitable product mix as well as by-products which could be further utilized to manufacture petrochemicals. It is reported that a detailed study of the world markets for refined products has already been prepared by NODCO through the services of Arthur D. Little. Early decisions should be taken on alternatives such as hydro cracker vs fluid catalytic cracker, asphalt unit, lube oil refinery etc.

9.10.2 Refining Outside Qatar

While the NODCO refinery operations and expansions are being considered on the one hand it may also be advisable to consider other possibilities to manufacture higher value added products at suitable locations say in Europe, Far East, India or Australia where exports of crude can find markets. Under this option Qatar could hire refineries on a lease basis where Qatari crude would be refined and distributed. This could have some advantages over the manufacture of refined products in the NODCO refinery and exporting them to distant destinations especially from the point of on the spot availability, supply flexibility, freight charges etc. Depending very much on financial factors such as the avoidance of high capitalization costs of new plant in Qatar, differential labour as well as distribution costs etc., this could be a way of maximizing returns on Qatar's remaining surplus crude. Kuwait and Saudi Arabia, it is known, are becoming involved in such projects.

Thus the manufacture and export of refined products from Qatar as against the export of crude and products refined elsewhere under Qatar ownership should be examined from all angles. Needless to say that sale of more refined products would be beneficial to the economy of Qatar.

9.10.3 Fertilizer Production - Qatar Fertilizer Company (QAFCO)

9.10.3.1 Expansion Plans

QAFCO's future expansion plans have been discussed on several occasions and it appears that a decision to install third ammonia and urea lines has been taken although details about the target markets, collaborations, mode of financing etc. are not yet known. It appears that the recent sluggish prices of ammonia and urea has dampened immediate prospects.

QAFCO's continued dependence on the sale of ammonia and urea could be risky since additional production capacities are being installed in the consuming countries. Besides both ammonia and urea are subject to price squeeze as has happened recently and it would be advisable to spread the product range. For the period 1989 - 1992 the average proportion of exports of ammonia by main desination and value were India 32%, S. Korea 22%, Taiwan 13%, whilst of urea exports China took 34%, Japan 20%, Thailand 12% and Philippines 10%. All these countries are themselves rapidly industrializing and their access to hydro-carbon feedstocks is improving as exploration and exploitation of oil and gas proceeds rapidly in S.E. Asia. The financial prospects for future growth in Qatar's fertilizer production could be improved if it were in joint ventures with export market countries such as India.

Other more profitable lines of expansion in Qatar could be:

- Dual purpose ammonia/methanol plants
- Manufacture of ammonium nitrate and calcium ammonium nitrate.
- Manufacture of phosphoric acid and complex fertilizers (DAP, NPK).
- Barge mounted ammonia plants to utilize the offshore gas "on site".
- Manufacture of melamine, formic acid, dicyandiamide etc.

A proposal to manufacture Melamine appears to be currently under consideration as a joint venture between QAFCO and Qatar Industrial Manufacturing Company (QIMCO).

9.10.3.2 Efficiency Improvements

The manufacture of ammonia has undergone significant changes during the past 15 years with respect to consumption of feed stock.

According to a recent report by GOIC (GOIC - 1993), QAFCO now consumes almost twice the amount of gas needed by newer and improved processes. QAFCO must consider how best to improve efficiency either by revamping existing equipment or by the installation of improved process equipment. Qatar should also review the pricing of methane rich gas to the existing units which should be brought to more realistic levels, for example profitability should be examined at various price levels e.g. US $ 0.50, 0.70 and 1.00 per MMBTU rather than the present level which is believed to be $ 0.20 to 0.30 per million BTU.

9.11 The Petrochemical industry

There appear to be specific plans by QAPCO to expand ethylene and polyethylene capacity to 360,000 tons/year but details are extremely confidential. Due to the recent slump in the prices of petrochemicals, Qatar's operations have come under pressure and there is an urgent need to look to other products. In order to have continued expansion in petrochemicals, Qatar should, for example, examine and implement production of ethylene oxide/glycol, alpha olefins, propylene by propane dehydrogenation and propylene based chemicals and polymers.

In the long run it may be advisable to consider setting up a multifeed cracker which can use feedstocks such as ethane rich gas, light naphtha or LPG. Such a cracker has already started operation in Saudi Arabia. The merit of such a cracker is that the products generated will include ethylene, propylene, butanes and aromatics, such a diversified product mix giving better market option and can withstand market price fluctuations better. Even so, world conditions are such that many actual and potential joint venture companies are more concerned with their home-base industry.

9.12 Steel, Metallurgical and analogous Industries

In these cases the comparative advantage of locating in Qatar is obtained from cheap and plentiful energy.

Qatar Steel Company (QASCO) has been one of the most successful joint ventures of State of Qatar in cooperation with Kobe Steel and Tokyo Boeki of Japan. During the last 3 years the operational as well as marketing management of QASCO was taken over completely by Qatari management. QASCO is systematically proceeding with expansion plans. With internal modifications plant capacity would be raised to 700,000 tons/year of reinforced bars by end of 1995. Consultants have been appointed to prepare feasibility studies and market surveys to expand the capacity further. The results of the study available by end of 1993, will determine the actual capacity and product mix. QASCO is already involved in Qatar Metals Coating company to manufacture epoxy coated reinforcement bars and is considering participation in other joint ventures in Qatar or other GCC countries (see Chapter 7).

Due to the successful management of QASCO it is suggested that they should also be involved in promoting metallurgical and other industries, such as aluminium, magnesium etc. which have high energy consumption and therefore rely on low energy prices.

The most obvious candidate is aluminium smelting and possibilities here have been considered for some years only to be shelved. A brief examination of the aluminium industry illustrates the fact that the process of industrialization is by no means straight forward even in a country such as Qatar with plentiful and cheap energy resources.

In the first place the aluminium industry is a series of processes not a single operation. The ore, bauxite, is first converted into alumina, aluminium oxide, which is then smelted into the pure metal. This in turn is used alone or in alloys in many different forms. In recent decades between 80 and 100 national and multi-national companies have dominated the world scene, the most important names such as Alcan, Alcoa, Reynolds, Alsuisse etc. being multi-national groupings with extensive interests upstream and downstream of the smelters. The Arab Gulf Industries, in Bahrain and the UAE although associated with other interests are essentially smelters of imported alumina and exporters of aluminium metal although Bahrain has ventured into downstream units such as rolling mills viz: Gulf Aluminium Rolling Mills (GARMCO) and is considering other ventures to produce cast aluminium wheels for automobiles.

The possession of cheap energy is important because each 1 lb of aluminium requires between 7 and 12 Kwh of electricity for smelting depending on plant design and efficiency. Japanese smelters have been paying 5-8 US cents per Kwh to produce aluminium metal which for the last ten years has been selling for 47 - 55 cents a lb. Since the early 1977's the demand/supply ratio for aluminium metal has moved between shortage and surplus and only a few giant multi-nationals fully vertically integrated, from bauxite to automative parts for example, have avoided crippling losses.

One of the most striking examples comes from Venezuela where a government controlled complex includes Bauxiven bauxite mine, Interalumina producing alumina in association with Alsuisse, Venalum which in 1993 was the worlds largest capacity smelter 20% Japanese, and Alcasa smelting, rolling and laminating plants. HEP and relatively cheap labour made this group one of the world's lowest cost producers but it lost money continuously from 1990 to 1993 and now seeks for foreign private assistance (Financial Times, 25 August 1993).

In 1991, '92 and '93 Western producers shut down smelter capacity at an average rate of 800,000 tonnes per annum but at the same time achieved record high production in 1992. Dubal and Alba in the Gulf, as with other metal producers keep finding export markets but at prices which yield nothing but employment for expatriates; but it was reported at the end of 1993 that ALBA was also prepared to make production cuts. As was pointed out in 1985 (Anthony Bird 1985) that there were many different reasons why the average aluminium smelter with production costs of about 65 cents a lb. remained in production with metal prices at about 47 cents a lb. The only financially valid reasons could be found in the very large global integrated concerns such as Alcan which could profit from e.g. aluminium can-making and foil production on a large scale and even profitably sell alumina from some of its plants to other smelters. However, in order to achieve this position which enabled it to make a positive net income in all but one of the six years 1984-1989, Alcan had to spend capital at a rate rising from US $ mn. 427 in 1984 to $ mn. 1,455 in 1989. Alcan's gross revenue of over US $ 9 bn in the one year 1989 was almost twice the total investment costs of Qatar's North Field LNG project, and 50% larger than Qatar's total GDP!

This brief note on the aluminium industry is not to dismiss it as a possible future development for Qatar but does indicate the risks involved with cash-flow returns in a volatile industry to which the price of admission in terms of capital is high. The only way of reducing the risks is to move towards a very large integrated group complex with upstream and downstream varied production lines all of which would depend on export markets and demand extremely high international capital investment.

It may be that more studies need to be made of much smaller scale, more technologically advanced and more higher value added production lines based on energy utilization. Almost ten years have passed since a report highlighted Japanese development of so-called new materials (IBI 1985) including fine ceramics, high polymers (engineering plastics), impregnated metals etc. Investment in Japan and the USA in the making of plastics with strengths and heat resistances superior to metals has gone on for years and the use of heat moulded ceramics instead of machined metals has been known in the UK since the early 1980's.

9.11 Review of Water and Electricity Demand/supply Scenario

Fundamental not only to industrial development but to the whole socio-economic development of Qatar is the appropriate availability of water and electricity. Because of the work commissioned by the Government of Qatar in the 1970's the factual situation relating to Qatar's natural water resources is known and needs no further study. However, what is open to review are the way in which these very limited natural resources and the "manufactured" water from desalination is utilized and priced. Today and in the future all domestic and industrial demands for water have to be met by various desalination process and in Qatar this is carried out in dual-purpose electricity generating and desalination plants which consume increasingly large quantities of gas (see Chapter 3.13 & 3.14). Since the late 1980's the gap between peak demand and supply for electricity has become dangerously small. The safety factor can only efficiently be increased by the installation of a major new capacity or a reduction in demand. Domestic demand varies with total population the rise of which depends very largely on the size of the transitory expatriate labour force desired by Qatar and this very much depends on the scale of industrial and infrastructural growth. Industrial demand is obviously directly related to the scale and type of industries. Much the some is true of water. A variety of socio-economic demand/supply scenarios with rigorous evaluation of all the factors involved is now necessary because of the sensitive nature of the financial, social and technical issues involved. The Government appears to be undecided whether the future expansion of electricity and water should be promoted through the newly formed private sector organization viz: Qatar Electricity and Water Company, or through the Ministry of Electricity & Water. In the meanwhile future expansion plans to enhance the capacity of Ras Abu Fontas power station by 600 MW and desalination capacity by 33 MGD appear to be taking shape.

9.12 Change and the Uncertainty Factor

All that has been considered so far has to be evaluated in the context of a rapidly changing world, changing in often unforeseen ways which are relevent to Qatar's economic and specifically industrial development. Who in 1971 would have forecast that the North Sea region including UK, Norwegian and Danish sectors would in 1981 be the world's second biggest oil producer? Or in 1981 that in 1992 Norway alone would become the fourth largest exporter of oil in the world? (Data from Petroleum Economist and EIV Energy Review, various issues). In 1977 three expert reports including a CIA assessment, an OECD report on World Energy, and a WAES study of Alternative Energy Strategies, all predicted that non-OPEC non-communist oil production would peak sometime between 1985 and 1990 depending on world economic growth rates. In fact it has risen continuously and shows signs of continuing to do so for the next thirty years at least.

Mabro (1982, pp. 8-10) over a decade ago identified four main features of change on the supply side of the world oil market which were and are far-reaching. For Qatar, an important but minor producer these changes were beyond control and little appreciated in their effects, in fact, grossly under estimated in importance almost everywhere. "First is the emergence of oil producing agents as sovereign agents .... crude oil upstream is no longer integrated to oil downstream in the markets" This made it possible to miscalculate the effects of the 1973/74 price hike and the use of the oil weapon in encouraging the exploitation of previously more expensive energy sources, i.e. non-OPEC sources. "Secondly, the market facing oil producer countries has become much more diverse .... Hence the shift towards very short-term contracts and the large increase in the number of spot transactions" This of course has meant greater volatility -and greater risk - particularly for the smaller producers. The third change Mabro identified was the de-regulation of the US oil market; technically this resulted in the removal from the world market of one reasonably predictable market player which as the world's largest oil consumer was also becoming a major importer. A decade after Mabro's statement the breakup of the USSR has also resulted in greater uncertainty with the disappearance of a once monolithic economy and for many years the world's largest producer.

The last change noted by Mabro was the emergence of new oil producers; this has already been noted. One additional point can be added in this context. When oil production was determined almost entirely by its profitability to international commercial companies, Qatar as with all Gulf producers benefited from the low real costs of exploration and extraction. Once this differential was removed by changed pricing policies then there was a fundamental re-appraisal of technically higher cost production possibilities and associated revolutionary changes in production and utilization technology. The world could not stand still for OPEC.

The point of relevance here, is that in the world of oil supply structural change has always been normal. Secondly, when this world is widened to embrace energy supply then here too structural change is normal. This is outside the scope of this thesis, but as long as industrial development in Qatar is at least closely linked to its natural gas resources, and natural gas is a commodity mainly traded as an energy source, so also is Qatar affected by changes in alternative energy demand and supplies. Thirdly, Qatar's location in a region of political instability, which also has been and is a focus of changing interest to external powers, adds a factor of insecurity to an already complex situation. When the authors of the 1992 Annual Report of the World Bank (World Bank 1992) could state: "In 1991 economic developments in the countries of the region were largely shaped by the Gulf Crisis" one appreciates the degree of insecurity and uncertainty in which Qatar and other Arabian Gulf States have lived.

It is also a world of change in other respects. For example, Japan is not only a market for LNG but Japanese companies are involved in Qatargas, this in addition to some remaining interests in QASCO. However, considerable restructuring of Japanese industry is underway. The fall in Japanese iron and steel production from a peak rate of 110 mn. t. in early 1991 to 83 mn. t. at the end of 1993 is an indicator of the depth of Japan's current recession. Japan's next industrial revolution supported by the Ministry of International Trade and Industry (Miti) also can have unpredictable consequences for Japan's trading partners and completition. Relatively minor changes for Japan would be greatly magnified in their effects on Qatar, if Qatar becomes too reliant on the Japanese market for LNG and gas products.

One last important area of uncertainty of importance here is the balance between collaboration and competition between the Arab Gulf States (AGS). It should be remembers throughout that GOIC, the Gulf Organization for Industrial Consulting and referred to frequently in this thesis is what its name implies, an organization for consultation in every sense of the word and no more. GOIC has done and is doing a great deal of work in studying, evaluating and recommending fields in which member states can collaborate, and its work on regional industrial co-ordination has been considerable. In the end however decisions are taken by national governments independently and in, varying degrees together. Thus, on the one hand Bahrain's aluminium smelting company ALBA had an independent origin in 1970 but later expansion in 1981/82 was backed by Saudi Arabia as a GCC act of collaboration. On the other hand the Dubal aluminium venture in Dubai opened at the end of 1979 is a totally independent venture virtually without reference to other members of the UAE and AGS.

The Gulf Cooperation Council Economic Agreement drawn up in 1982 (Arab Economist 1982), did in fact seek in Article 12 to:

"Co-ordinate industrial activity and formulate policies and methods conducive to industrial development and diversification of their respective productive bases on principles of integration ...."

Whilst at the same time in Article 24 accepted that:

"Differences in the levels of development of the member states and local development priorities shall be taken into account in the implementation of this agreement........."

A great deal of cooperation and collaboration in the field of industrial development is actually achieved among GCC countries. The degree of consensus is probably at least as great as between members of the E.E.C. The fact however remains that as between GCC members the levels of industrial development, the scale of industrial enterprises, the range of internal involvement in joint ventures, the size of the resource - banks, to name only a few, are all extremely diverse. For example, by 1981, just before the GCC Economic Agreement was signed, the Saudi Industrial Development Fund had approved loans of Saudi Riyals 1,155 million (approx. QR 1,200 mn.) to light and medium chemical industries alone, in addition to SABIC investment. Qatar was the first GCC country to embark on the production of basic chemical products - urea in 1974 at Umm Said, but SABIC (Saudi Arabian Basic Industries Corporation) by 1989 had in operation or under construction large scale plants with between 50% and 60% of GCC basic petrochemical capacity, between 45% and 85% of intermediates, between 60% and 100% of thermoplastics and almost all of the fine chemical capacity. Thirteen giant petrochemical plants in joint ventures with 10 different companies from 6 different countries are part of SABIC.

One important aspect of these and other differences is that at this level of interest in petrochemcials as also in other industrial sectors such as energy-intensive metallurgy, is that the number of organizations in the industrialized world capable and suitable of being joint venture partners is finite and small. These foreign partners are necessary because of their input of essential plant and human technology, organizational and management skills and capital. In this area GCC countries are fiercely competiive.

A further problem arises as between the GCC and the larger group of Arab Gulf States and to extend further, the Gulf States, including Iran. Within the GCC circle, Kuwait's plans of how to replace or substitute its petroleum and petrochemical industries destroyed in 1990/91 are not yet clear but have to be taken to account. In the AGS circle, at some point in time Iraq will reappear not as a military enemy but as a giant industrial competitor. Within the region, Iran's industrial plans although partly shrouded in secrecy appear formidable, and cetainly include expansion in oil and gas downstream manufacturing and export on a large scale.

It is therefore even more important that Qatar should examine even more closely and more comprehensively its short-term and long-term industrial policies given this environment of change and uncertainty. One approach which could be adopted at many planning levels from national to project, was developed precisely for the situation in which Qatar now finds itself - scenario planning.

9.13 Scenario Planning (and see Galer 1984)

This concept was developed during the 1970's and early 1980's and utilized extensively by Shell during and because of the turbulent events then occuring in the oil world. As a very large and complex organization involved in all stages of hydro-carbon exploitation and utilization Shell found that most methods of strategic planning used by large companies, government and government agencies were based on the use of linear forecasts in decision making, and that such forecasts "could not only be misleading but dangerously expensive".

"An environment, where as far as the oil and gas industries, are concerned, investment lead times are long and tens or even hundreds of million of dollars may be associated with a single decision" is a precise description of Qatar's position. Shell's response was to replace "forecasts" with "scenarios", an important characteristic of which is to increase the understanding of uncertainty. Given the position in which Qatar finds itself, wishing to pursue the constant objective of industrialization in a world which continues to change in a great variety of ways as much as it has in the past - the uncertainty principle -, the principles of scenario planning could usefully be applied.

As Galer points out, scenarios are sets of credible internally consistent but fundamentally different alternative "pictures" of future business or economic environments. The first basic step is to identify these aspects of the future which are in reality highly uncertain and separate them from those which are already largely predetermined. Depending on the planning timescale, the predetermined events, those which have already taken place or are "in the pipeline", can be carefully isolated as those whose consequences in that timescale will turn up in almost any future scenario.

Uncertainties - technological innovations, changes of life-style and consumption, political instabilities in producing or market regions etc. - can with care also be identified.

Careful analysis in exploring the various interactions of predetermined elements and uncertainties can then help focus attention on major uncertainties which could seriously affect current decisions. Linear forecasting points from a present position along a path of the most likely review of the future. Scenario planning offers probable future scenarios each with its logically inter-related sets of opportunities and threats. One over-simple example of the difference as applied to Qatar arises in Chapter 9.3 above. On the face of it a forecast was made of what the market prices of condensates would be when production of North Field Phase-1 got under way. On the basis of projected cash-flow investment decisions were taken. The forecast was incorrect and therefore the investment decisions were invalidated.

Scenario planning would have presented different scenarios including among other factors various levels of demand and prices for condensates along with other variables and pre-determined factors, for example, the imperative domestic need for gas-energy for different expedient levels of water and electricity demand. There would then have been a statement of choice of investment decisions possible rather than an acceptance of a forecast but over - optimistic simple projection.

Scenario planning is a complex and rigorous process and all that can be said here is that it would be particularly appropriate to Qatar at this time, for the same reasons that Shell International and its various component companies found it appropriate in the late 1970's - uncertainty and volatility in the demand and supply sides, the escalation in scale of investment demands, and a climate of change in all areas from technological to political.

In 9.14 below some other conclusions are drawn regarding the need for improved planning approaches to Qatar's indsutrial development.

9.14 Conclusions

It is not the purpose of this thesis to lay down plans for Qatar's industrial future, but on the basis of the research carried out, the data collected and analysed there seem to be some firm conclusions which can be drawn concerning Qatar's future industrial progression.

It was pointed out earlier that S.G. Warburg were quoted in the Financial Times of 17/12/93 that West European ethylene crackers had been losing money since February 1993. The slump in HDP (High Density Polyethylene) prices had been equally bad. In German marks/kg, prices betwen June 1989 and June 1991 peaked at 2.3 with a low of 1.8; between July 1991 and September 1993 peaked at 1.8 with a low of 0.9

The Association of Petrochemical Producers in Europe ended 1993 by nearing agreement on major cuts in production and also by merging into longer lower cost groups, Trichem, a major consultant group in the field reported in December 1993 that the polypropylene average annual price had fallen every year for the previous five years.

Qatar therefore has to face two unpleasant facts. The first is that world competition in most petrochemical fields is extremely fierce and, secondly, most of the industrial companies who could be involved in joint ventures with Qatar - both in production and in marketing - also have to think of their own core operations in Europe and the USA.

9.14.1 Qatar at a Critical Period of Industrial Development

The first conclusion is that Qatar is at a special critical period in its development as a whole and in its industrial development in particular. The scale of development potential offered by North Field gas is enormous and the consequences of any miscalculations in the financial, organizational and technological forecasts on which a giant complex of operations is based, would be extremely serious.

9.14.2 Need for More Comprehensive Planning

The second is that at no time has the need for comprehensive economic planning with a main emphasis on industrial development been more relevant to Qatar. The factors involved are extremely complex and inter related. North Field's financial commitments in capital and recurrent costs and cash-flow - investment capital of US $ 5-6 bn. for the LNG project alone - require that North Field development be brought into a more comprehensive planning system.

9.14.3 New Co-ordinating and Planning Industrial Agency

The third conclusion is that within a national planning system there should be an independent body which can not only develop integrated perspective plans for the smooth development of industrial activity but also coordinate and monitor the various operational plans to yield the highest economic returns. Such a role could be effectively played by a separate corporation, perhaps called "Qatar General Industrial Corporation", (QGIC). Under this organization all industrial activities in the public sector including those of existing units such as QAFCO, QAPCO, QASCO and QNCC should be integrated. This would mean delinking hydrocarbons exploration from production and sale which should be the main concern of QGPC, the utilization of hydrocarbons.

The remaining QGPC operations on the other hand would still have to be overseen and controlled by a revamped development committee of the Council of Ministers because of the linkages between hydro-carbon production and hydro-carbon utilization whether in downstream manufacturing, as energy for domestic utilities etc. The proposed QGIC would essentially be a planning and regulatory body concerned with overall national industrial policy with special co-ordinating responsibility for major public sector enterprises.

9.14.4 Innovative Science Park Industries

On the evidence collected so far it would seem dangerous for Qatar to concentrate its major industrial efforts only in large-scale petro-chemical enterprises which could be new to Qatar but are well established in internationally highly competitive markets which are resistant to newcomers. On a world scale Qatar might best deploy some of its limited financial capital and even more limited human resources in innovative and specialized "niche" industrial developments. Small could be beautiful in terms of cost-effectiveness and optimal returns, and the period during which NGL and gas exports take the place of crude oil exports could be used to explore the less conventional industrial possibilities. In many industrialized countries a great deal of attention is being paid to such very high value-added "science park" industries, collaborations between research teams and manufacturers, many of which such as high technology work on polymers, resins etc. could be based on the hydro-carbon wealth possessed by Qatar. Industries of this kind would not develop or multiply quickly but all the conventional industries have a long gestation period and put far more capital at risk. This is an area in which exploration is necessary and potentials encouraged under the patronage of the Ministry of Energy and Industry, where developments should be under autonomous management but with risks under written by the State. A QGIC planning involvement would also be implied.

9.14.5 The Private Industrial Sector

The private sector in Qatar is still in its infancy. The launching of Qatar Industrial Manufacturing Company (QIMCO) has given some stimulus to the active participation of private sector. However, much more encouragement, direction and Government support is needed to promote private sector industries. This is relevant to the procedures of two existing departments - Licencing and Control and Industrial Development. At some planning level, the technical assistance described in Qatar 4.4.1 should point private investors towards enterprises which are as far as possible compatible with developments in the other sectors and not incompatible with the general industrial plans formulated by a new QGIC. The licensing and registration system should be developed to allow more positive discrimination to assist private ventures which are truly manufacturing and not mainly assembly operations. On the same basis the financial and other incentives to private investment in industry should be positively geared to help high-value, low import input, capital rather than labour intensive industries. Other incentives could be used even more for selective encouragement of the private sector, all co-ordinated within an overall industrial strategy, include several measures the most important being:

- Further development of industrial estates with full infrastructure and ready to occupy workshops.
- Promotion of an industrial development bank to offer soft loans.
- Promotion of "off-set" programmes as practised by Saudi Arabia and UAE to encourage foreign participation in industrial projects.
- Development of tax and duty free zones.
- Relaxation of sponsorship regulations for foreign workers entry and residence as well as foreign equity participation.
- Promotion of a small/medium scale industries services institute under the patronage of Ministry of Energy and Industry.

These are only indicative of the efforts which Qatar needs to make in order to maximize the considerable private funds for domestic productive industrial investment.

9.14.6 Human Resources

Lastly, there is one other field in which effort is required at the planning and development level and requiring collaboration and coordination between several different agencies, a field often referred to as manpower planning. National human resources have been considered at several places earlier in this study and clearly this is a highly complex and sensitive area in which the needs of industry and the potential effects of industrial development are not necessarily the most important to Qatari society. All that can be said here is that at a high planning level, due attention must be paid to these needs and effects of industrialization if the policies of many government agencies are to make sense in terms of national well-being. The fundamental question which has to be answered satisfactorily is what part in the whole process of the country's development are Qatari citizens going to play; providing answers has to be left outside the scope of this study.

9.15 Final Summing-up

Qatar has committed itself to becoming virtually a single sector economy - an industrial economy. During the 1960's, even before political independence was achieved, the first industrial operations began, and in the 1970's a general policy of investment in industrialization was adopted. Unlike its two neighbouring Arab mini-state economies which also first prospered on oil, Bahrain and Kuwait, Qatar did not develop either as a banking or a financial centre, but concentrated on what has been its first industrial revolution. This was based on Qatar's virtually only significant resource, onshore and off shore oil and associated gas. The State has played the dominant role in creating a public sector complex of basic industries, a complex which relative to the size of Qatar is very large. This, together with heavy expenditure on physical and social infrastructure, which raised Qatari living standards and consumption to some of the highest levels in the world, was made possible by crude oil export revenue.

Halfway through this first period of industrialization came the first indications of vast new hydro-carbon resources - unassociated natural gas offshore - at Qatar's command but only at a price. The price has been investment in extracting and the first stages of utilizing this new resource, investment, which together with that logically required for downstream industrial processing, is on a scale which strains Qatar's current finances. The goal is a second industrial era.

The constant pattern of industrial investment by the State and of high levels of other expenditure obscures the great volatility and violently changing events which have affected the State's main income - oil export revenue. This dependence and the uncertainties which result from it have been key factors in encouraging industrialization for the sake of diversification, of import-substitution , of creating higher added-value commodities and other benefits.

However, ultimately the entire structure of past and future industrial developments has its foundations in Qatar's only significant physical resource, hydro-carbons. In addition, life as it has developed in Qatar is also now dependent on these same hydro-carbons for the manufacture of water, the generation of electricity and to pay for the imports of consumer and capital goods without which socio-economic expectations could not be satisfied.

In this situation it is now critically necessary that a new, firmer and more integrated approach to the planning of industrial development be adopted. Planning by the State even in what is a free-enterprise society must be appropriate for the scale of the industrial challenges and opportunities that lie ahead in an uncertain and changing world. Qatar has the potential to become an industrialized country by the turn of the century provided systematic planning and the promotion of viable industrial projects are achieved.

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- External Trade (with Customs Department) (annual)
- Industrial Survey (annual)
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- Employment Survey in Private Sector (periodic)

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Department of Customs (annual)
Department of Electricity (annual)
Department of Industrial Licencing and Control (annual)
Department of Ports (annual)
Department of Posts (annual)
Department of Traffic (periodic)
Department of Water (annual)
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Ministry of Commerce & Transport
Ministry of Economics & Commerce - including Economic Survey of Qatar (annual)
Ministry of Education (annual)
Ministry of Energy and Industry
Ministry of Finance & Petroleum
Ministry of Industry & Agriculture
Ministry of Information
Ministry of Interior
Ministry of Labour & Social Affairs

QAFCO (annual reports)
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QIB (quarterly & annual)
QMA (quarterly & annual)
QNB (quarterly & annual)

APPENDIX I

PROSPECTS FOR NON-RESOURCE BASED INDUSTRIAL INVESTMENTS: GOIC REGION

1. Vehicle Trailers
2. Infant Foods
3. Electric Motors
4. Electric Transformers
5. Electric Fans (Ceiling, Pedestal)
6. Electric Fittings
7. Power Poles (Lighting, Distribution)
8. Switchgears
9. Travel Goods
10. Feldspar
11. Diesel Engines
12. Edible Oils
13. Medical Textile Goods
14. Carbon and Graphite Electrodes
15. PVC Tiles
16. Soda Ash (Heavy, Light)
17. Solar Panels
18. Machine Tools
19. Welding Machines
20. Welding Electrodes
21. Outerwear Garments and Knitwear
22. Wallpaper
23. Wooden Furniture
24. Dairy and Poultry Equipment
25. Disposable Lighters
26. Tools and Dies
27. Synthetic Protein
28. Synthetic Rubber (SBR) (Tyres and Tubes)
29. Bakers Yeast
30. TV Aerials
31. Vehicle Components

32. Water Meters
33. Tank Lorries
34. Telephone Sets
35. Float Glass
36. Asbestos Pipes
37. Aluminium Cans
38. Aluminium Foils and Products
39. Toys and Games
40. Detergents
41. Toiletries
42. Drugs and Medicines
43. Paints and Adhesives
44. Automotive Batteries
45. Fibreglass (GRP)
46. Polymers of Synthetic Fibre
47. Tableware
48. Steel Rods, Bars, Rolls, Strips, Wires
49. Vaccum Cleaners
50. Shoes

Source : GOIC 1984

APPENDIX 2

RELEVANT INDUSTRIAL LEGISLATION 1980-1990

I. LAW NO.11, 1980

Law No. 11 of the year 1980 stipulates the formation of Industrial Development Committee and the incentives for promotion of small medium scale industries.

Article 2

The capital of any establishment should not be less than 250,000 and number of permanent workers should not be less than 10.

Article 3

Local value added should not be less than 40%.

Article 4

Industrial Development Committee will comprise of:

- Under Secretary of Agriculture and Industry
- Director General of Industrial Development Technical Centre
- Representative of Emiri Office
- Representative of Ministry of Industry and Agriculture
- Representative of Ministry of Finance and Petroleum
- Representative of Ministry of Economy and Commerce
- Representative of Ministry of Legal Affairs
- Representative of Ministry of Electricity and Water
- Representative of Ministry of Municipality
- Representative of Ministry of Interior
- Representative of Industrial Development Technical Centre
- Representative of Qatar Chamber of Commerce.

Article 5

The Committee will be responsible for:

1.0 Study all regulations and assumptions referring to regulation of protection, encouragement and development of local industry.

2.0 Recommendations of general policy which will be given to industrial projects according to the requirement of economic plan, local consumption and export.

3.0 Any other responsibilities according to law.

Article 20

Small industries may be given a loan provided each capital investment is not more than QRs. 20 Million.

Article 21

Ministry of Finance and Petroleum will calculate the amount of finance required per year for loans and deposit the amount in one of the national bank in a separate account.

Article 22

Based on the recommendation of the committee of loans the Ministry of Finance and Petroleum can give loans to small industries whose owners are 100% Qataris according to easy conditions with a grace period suitable to each.

Article 23

The amount of loan will not be more than 40% of total capital investment with a 3% interest and can be paid through 7 years from the date of granting loan and may give a grace period of first 2 years and the repayment over 5 years with a six monthly installment including interest.

Article 25

The loans committee of small industries will comprise of:

- Representative of Emiri Office (Chairman)
- Representative of Industry and Agriculture
- Representative of Finance and Petroleum
- Representative of Industrial Development Technical Centre
- Representative of Qatar Chamber of Commerce
- Representative of Central Audit Bureau as Observer.

The committee will study the application for loan and condition of grace period.

Article 26

Each establishment should have a record of imported material out of customs and this material must be used in the production itself.

Article 27

Inspection of the establishment can enter the factory, labs, stores etc. and see the records and informations and can analyse the raw materials and products to be sure that the factory fulfilled all the laws of Qatar and according to the license and industrial register, safety rules and standards.

II. LAW NO.3, 1985

Law No.3, 1985 stipulates the following main items:

Article 1

Non Qatari persons whether natural or juristic may not engage in industry or agriculture by establishing or utilizing the small/medium sized projects specified in Article 2 of this Law.

Article 2

The projects specified are:

- Industrial or agricultural enterprise, the capital of which is less than three quarters of a million QR and with permanent employhees less than ten in number.
- Alimentary industries and industries of dairy and beverage products.
- Leather industry and products.
- Furniture industry and products.
- Paper industry and printing.
- Bricks industry and cement products.
- Light metal industries such as outfittings, grouping and provision of scrap.
- Casting of jewellery and gold forging.

Article 3

Non-Qatari individuals engaged in the projects referred to Articles 1 and 2 above are required to liquidate their capital within a maximum period of four years from the effective date of this Law. Non-Qatari partners in existing companies in the same categories are required to liquidate their share within the same period of time.

Article 4

Non-Qataris may engage in the following business:

Simple crafts such as tailoring, hair cutting, blacksmith business, plumbing, upholstery or normal repair works and other similar crafts.

Article 5

This Article stipulates that non-Qatari persons may engage in ventures in industry or agriculture provided that Qatari capital is not less than 51% of total capital.

Article 6

Article 6 exempts certain categories of industries which are open to foreign nationals.

1. Industrial or agricultural projects, investment capital of which is not less than one quarter of a million Qatar Riyal, and whose number of permanent workers is not less than ten.

2. Projects which require specialised foreign management, which the foreign party stipulates participation therein as against carrying out management functions.

3. Heavy and medium industries which require high technical expertise.

4. Production projects of fodder, cereals, vegetables, fruits and sugar, excluding alimentary products.

5. Air-conditioned greenhouses' products.

6. Production projects of meat, fish, eggs and milk, excluding dairy products.

It may be a decision from Minister of Economy and Commerce, following consultation with Minister of Industry and Agriculture, to add other products, or delete certain products formerly mentioned, as deemed necessary in the public interest.

Article 7

Article 7 stipulates that unless the costs of raw materials of local origin, local labours and other local production cost in the manufacturing process are not less than the total production cost the project shall not be considered industrial i.e. the value added must be atleast 40%.

Other provisions of the Law relate to the procedure for enforcing this Law in practice.

III. LAW NO. 25, 1990

The provisions of Law No.11, 1980 and Law No.3, 1985 were essentially to stimulate the participation of Qatari capital in industrial and commercial activities which are so far dominated by expatriate non-Qatari personnel. However, these Laws were not popular with foreign investors and required amendment in 1990.

Recognizing the possibility that Law No.3 of 1985 and Law No. 1 of 1981 may have negative impact on foreign participation, Law No.25 of 1990 deals with this aspect as follows:

Article 3

By way of exemption from the provisions of the first and second articles of this Law, non-Qatari persons, natural or juristic, may, by a decree, invest their moneys for economic development purpose or to facilitate the performance of a public service or to achieve public utility, whether relating to industry, agriculture, minerals/mining, motive power, tourism or contracting works and may also be permitted to import those materials required for such projects which cannot be supplied locally.

Article 19

Non-Qataris may not be permitted to participate in joint stock companies; nevertheless, by way of exemption, certain partners in joint stock companies may be non-Qatari, in accordance with the two cases stipulated in Article (88) of the Commercial Companies Law and provisions stated therein.

Article 20

Article 20 stipulates the unitary nature of Gulf States in respect of economic activity.

Citizens of the States of the Cooperation Council of the Gulf Arab States shall be treated as equal to Qatari citizens, without differentiation or discrimination, in the field of practicing freely in economic activity, in compliance with the Laws issued or shall be issued in this respect, in implementation of the Unified Economic Agreement between the States of the Cooperation Council of the Gulf Arab States.

APPENDIX 3

LICENCING & REGISTRATION FORMS FOR NEW INDUSTRIES

MINISTRY OF ENERGY AND INDUSTRY

Department of Industrial Licensing and Control

LICENSING APPLICATION FOR THE ESTABLISHMENT/AMENDMENT
OF AN INDUSTRIAL PROJECT
ACCORDING TO THE PROVISIONS OF LAW NO. (11) 1980
ON INDUSTRIAL ORGANIZATION

FORM NO. ILC(1)

EXPLANATIONS

1. According to the provisions of the law of industrial organization industrial establishments should comply with the following conditions:

   A - Conversion of raw materials to fully or semi manufactured products or; conversion of semi-manufactured products to fully-manufactured commodities or; extraction, mixture, assembly, formation, packing or coating of materials, shall be the basic purpose of the activity of the establishment.

   B - Investment capital shall not amount less than QR 250,000 and permanent workmanship employed shall not amount less than 10 workers.

2. Establishing any industrial project, amending its capital or industrial activity or; altering its capacity, size or location is not allowed unless a license as such has been obtained from the Minister of Energy and Industry.

3. Applications for licensing are to be submitted to the Industrial Development Committee, Ministry of Energy and Industry on an official form especially designed for the purpose.

4. Application forms can be obtained upon request from the Department of Industrial Licensing and Control, Ministry of Energy and Industry.

5. The following documents may be attached with the application:

   A - A feasibility study prepared by the applicant.

   B - Documents and data supporting the application and any other documents or data, as deemed appropriate.

6. The Department of Industrial Licensing and Control shall provide the applicant with a receipt showing the application's number and date of register in the application's entry book.

This receipt will not be given to the applicant unless proven competent to all the required conditions.

7. The Industrial Development Committee will study licensing applications to decide the required recommendations and then submit these recommendation to H.H. The Minister of Energy & Industry.

8. The Minister of Energy & Industry will issue a decree - subject to the recommendation of IDC - awarding or rejecting the licensing.

9. Licensing may be repealed - subject to an IDC recommendation - by a decree from the Minister of Energy and Industry in the following cases:

   A - If the industrial establishment, for unreasonable excuse, has failed to proceed with the construction, operation, production or amendment works within the period stipulated in the licensing decree.

   B - Default in compliance with the conditions of the licensing decree.

   C - Purposeful presentation of incorrect information resulting in acquisition of advantages, exemptions and facilities according to the provisions of this law.

   D - If the existing industrial establishment has declined to comply with this law following promulgation.

   The concerned shall preserve his right to appeal to the Council of Ministers within thirty days of his acknowledgement of the repeal.

10. The Department of Industrial Licensing and Control shall observe the following measures:

   A - That the application for licensing has been prepared according to the provisions of Law No. (11) 1980 on Industrial organization and executive regulations.

B - Additional paper signed by the applicant may be used if the items in this form could not contain all the required data and information.

C - Data in the licensing form must be typed when completed.

D - Completion time of procedures necessary for the award of the industrial licensing depends on the applicant's compliance with the above instructions and other identification documents.

To

H.H. The Minister of Energy and Industry
Head of Industrial Development Committee
Doha

I hereby submit to your highness this application for the establishment/amendment of an industrial project according the provisions of Law No. (11) 1980 and admit that the data included herein and attachments as well as reliable and correct.

Thank you,

Signature of Project Owner

Number of Attachments : ( )

STATE OF QATAR
Ministry of Energy & Industry
Dept. of Industrial Licensing & Control

FORM NO. ILC (1)

Licensing Application for the Establishment/Amendment of
An Industrial Project

According to the provision of Law No. (11) 1980 and its
Executive Regulations

Name of Project Owner	....
Nationality	....
Date and Place of Birth	....
Address	....
Telephone No.	....
FAX No.	....
Type of Industry	....
Principal product	....
Proposed title of project	....
Legal status of project	....
Location of Project	....
Others	....

Paid-up Capital, Partners' Names and Shares

Partner's Name	Nationality	Address	Partner's Share in Paid-up Capital			
			In Cash	In - Kind	Total	Percent
Grand Total						

SECTION 1

Techno-Economic Data

1. Proposed products, maximum production capacity according to the current measuring units for each of the various products, expected sale prices compared with the current prices of similar imported goods and the total value of annual production in Qatari Riyals.

Product	Annual Production Capacity		Unit Sale Price		Gross annual income Forecasts	Proposed Markets
	Units	Quantity	Local Products	Imported products		

2. Detailed process description, list of machinery and equipment necessary for project execution (attach specifications or catalogues).

(1) In case of amending an existing establishment indicate new proposed prdouction capacity.

Total estimated Capital of the Project including :

		QR.
1st:	Fixed Capital	
A -	Price or capital value of buildings (if leased, total lease for 10 years)	....
B -	Value of equipment and installations including cost of transport and installation.	....
C -	Value of vehicles and means of transport	....
D -	Patents and production rights	....
E -	Cost of establishment and furniture	....
	Total	....
2nd:	Working Capital	
A -	Price of raw materials for 3 months	....
B -	Price of spare parts, supplies and energy for 3 months	....
C -	Employees' and labourers' salaries and wages for 3 months	....
D -	General expenses for three months	....
	Total	....

Total estimated capital
(Fixed Capital + Working Capital) (QR. ....)

4. Paid-up Capital :

4/1 Components of capital paid-up by the project owner, companies or contributors.

A - Local component (QR)

B - Foreign component (if any) (QR)

Total (QR)

4/2 Equity Ownership

Mark (✓) where applicable.

Private	Public	Mixed			Other Ownership
		Public	Private	Foreign	

5. Project sources of Finance

6. Production costs for one year:

1st : Operating Costs: QRs

Raw materials	________
Salaries and wages	________
Power and fuel	________
Maintenance and spare parts	________
	============
Grand total	============

2nd : Administration and general costs:

Salaries and wages	________
Commissions	________
Overhead	________
	=============
Grand total	=============

3rd : Sales costs:

Salaries and wages	________
Commissions	________
Overhead	________
	=============
Grand total	=============

4th : Depreciation:

Buildings by 5% annually	________
Machienry & Installation costs by 10% annually	________
Vehicles by 25% annually	________
Establishing costs by 20% annually	________
	=============
Grand total	=============

Total Costs (QRs ________)

7. Project Profitability

Expected annual sales = Annual production X Expected unit price

= X = QRs.

Expected Profits = Value of sales - Total Costs

= - = QRs.

8. Pay Back Period = $\dfrac{\text{Total estimated investment capital}}{\text{Expected annual profit}}$

= .... = Years

9. Techno-economic indicators :

A. Annual profit forecasts as % of total paid-up capital .... %

B. Annual profit forecasts as % of total investment capital .... %

C. Break-even point as % of design capacity .... %

D. Local marketing as % of gross production .... %

E. Number of operating shifts .... shifts

F. Labour productivity .... QRs

(per)

10. Project Annual Requirements of Fuel, Power and Water:

- Fuel types :
- Power load Ampre/Kilowatt
- Estimated water consumption Cu^3/Gallon

11. Annual Requirements of Raw Materials, quantities and origin (local or foreign) and estimated value.

Sl. No.	Raw Material	Unit	Quantity	Value in QRs.	Origin
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

12. Industrial Wastes and Methods of disposal :

SECTION 2

1. Manpower (Permanent employees):

Category of Workers	Local recruits			External recruits		Total
	Qataris	Arabs	Foreigners	Arab	Foreigners	
1. Owners						
2. Employees, technicians and executives						
3. Labourers						
Total						

2. Number of daily work hours

3 Number of annual work days

4. Technical know-how, means of acquision and annual cost.

5. Proposed time schedule for project execution:

   A. Time necessary for project initiation after licensing

   B. Time needed for project completion

   C. Time needed to start production after project completion

   D. Time needed to reach designed capacity after operation.

6. Other data, documents or attachments seen useful by the applicant.

SECTION 3

Amendment/Expansion of an Exisiting Industrial Establishment

List the following data about the present situation of the establishment:

1. Total of present investment capital
2. Number of annual workdays
3. Number of daily work-hours
4. Personnel:

Categories	Local recruits			External recruits		Total
	Qatari	Arabs	Foreigners	Arabs	Foreigners	
1. Owners						
2. Employees, technicians and executives						
3. Labourers						
Grand Total						

5. Type of Industry: Classification :
6. Number and date of previous licensing decree :
7. Number and date of Industrial Register :

8. Items produced at the present time, capacity and actual production of the establishment.

Sl. No.	Name of product	Annual production		Actual production for the last three years		
		Unit	Quantity	19	19	19
1						
2						
3						
4						
5						
6						
7						

9. Major production equipment available in the establishment at the present time.

<u>Type</u> <u>Number</u>

Data to be filled by ILC Department

Name of Applicant :

Relation with the establishment :

Application's number of registration:

Classification of the Industry :

Received by

on ..../...../19....

APPENDIX 4

Source : Annual Industrial Surveys, CSO, Qatar

Qatar Manufacturing Industries by ISIC Code, Number Employed & Establishments*

ISIC		1984		1985		1986		1987		1988		1990		1991	
Code	Industry	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.
3	All Manufactures	16230	1203	15897	1202	16852	1879	16522	1864	16256	1850	17163	1855	18253	1875
31	Food,Drink, Tobacco	1563	103	1441	104	1760	175	1869	174	1865	172	1982	179	2107	183
3111	Meat Products	165	1	137	1	200	2	287	2	242	1	242	1	245	1
3112	Dairy Products	294	4	300	4	297	5	275	5	296	5	312	5	298	5
3116	Milled Grain Prod.	117	1	115	1	101	1	101	1	105	1	112	1	129	1
3117	Bakery Products	595	88	576	88	856	158	851	157	870	156	922	161	946	163
3119	Choc & Sugar Confct	29	4	25	4	NC	NC	NC	NC	NC	NC	NC	NC	N.C	N.C
3121	Other Food Prods.	43	2	47	3	47	5	41	5	46	5	56	6	70	7
3134	Soft Drinks etc.	320	3	241	3	259	4	314	4	306	4	338	5	419	6
32	Textiles etc. Clothing	1865	536	1808	536	3541	1054	3542	1053	3541	1053	4284	1052	5057	1070
3212	Textiles excl Clothing	NC	NC	NC	NC	47	11	46	11	36	11	40	12	39	11
3220	Clothing excl F/wear	1865	536	1808	536	3457	1040	3450	1039	3460	1039	4155	1037	4967	1056
3231	Prepar. of Leather	NC	NC	NC	NC	33	2	NC	NC	NC	NC	86	2	46	2
3233	Leather Goods	NC	NC	NC	NC	4	1	4	1	3	1	3	1	5	1
33	Wood & Products	1827	239	1839	239	1970	243	1915	242	1963	240	2046	240	1862	233
3311	Sawn & Milled Wood	1147	139	1149	139	1302	165	1693	174	1717	172	1800	174	1429	167
3320	Furniture	581	74	690	100	668	78	222	68	246	68	246	66	433	66

· D X CONTD

ISIC		1984		1985		1986		1987		1988		1990		1991	
Code	Industry	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.
34	Paper Print & Publi.	1126	18	1198	18	884	19	1023	19	1014	18	1076	20	1138	21
3411	Paper & Card & Prods	37	1			17	1	18	1	43	1	66	3	76	4
3420	Print. & Publ. etc.	1189	17	1198	18	867	18	1005	18	971	17	1010	17	1062	17
35	Chemicals & Prods. incl Rubber & Plastic	2800	22	2907	21	3034	35	3107	32	2765	29	2696	30	2892	34
3511	Basic Chemicals	843	5	789	5	1255	5	1257	5	702	4	726	5	685	5
3512	Fertilizers, Pesticides	911	1	979	1	698	1	698	1	772	1	756	1	807	1
3521	Paints & Assoc.Prods	0	0	0	0	32	1	32	1	32	1	72	2	76	2
3523	Soap, Cleaning Agents, Toiletries	54	1	51	1	48	1	50	1	68	1	98	1	143	1
3530	Oil Refining Prods.	499	1	567	1	564	2	558	1	594	1	619	1	599	1
3540	Misc.Petroleum Prods	151	4	150	4	65	6	127	5	225	4	88	4	151	4
3559	Unclassed Rubber Products	25	2	55	1	25	1	25	1	27	1	30	1	34	1
3560	Unclassed Plastic Products	317	8	316	8	347	18	360	17	345	16	307	15	397	19
36	Non-Metallic Mineral Prods excl Oil Prods	4144	116	4037	117	2483	132	2373	132	2294	130	2263	128	2120	128
3620	Glass & Products	0	0	0	0	0	0	0	0	0	0	23	1	14	1
3692	Cement,Plaster Prods	505	1	477	1	653	7	609	5	628	5	578	4	599	5
3699	Other	3609	115	3600	116	1830	125	1764	127	1666	125	1662	123	1507	122

APPENDIX 4 (CONTD)

ISIC		1984		1985		1986		1987		1988		1990		1991	
Code	Industry	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.
37	Basic Metals	1223	2	1172	1	1166	1	1106	1	1060	1	1974	1	1097	2
3710	Iron & Steel	1223	2	1172	1	1166	1	1106	1	1060	1	1074	1	1097	2
38	Fabricated Metal Prods & Machines	1508	152	1359	151	1931	205	1507	198	1669	194	1643	192	1871	190
3811	Cutlery, Hand Tools & Hardware	303	46	304	46	587	68	567	65	592	62	540	60	548	60
3812	Furniture & Fixtures Mainly Metal	38	2	NC	NC	51	2	48	1	78	2	86	3	107	3
3813	Structural Prods.	982	100	1021	102	538	81	395	79	408	77	460	78	567	81
3819	Fabricated Prods. Not Classed	20	1	20	1	442	47	471	48	498	47	395	47	336	42
3821	Mach.Maint & Repair incl. Turbines	NC	NC	NC	NC	284	1	NC	NC	NC	NC	NC	NC	NC	NC
3823 3824	Manuf. & Repair Mach. excl. Metal & Wood Working	7	1	NC	NC	18	2	18	2	85	3	154	1	297	1
3829	Mach. & Eqpt. excl. Electrical Unclassed	6	1	13	2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3841	Ships & Ship Repair	152	1	NC	NC	11	4	8	3	8	3	8	3	16	3
39	Other Manufactures	104	15	96	15	83	15	80	13	85	13	99	13	109	14
3901	Jewellery & Related Products	51	14	51	14	18	13	16	11	16	11	17	11	28	12
3909	Other Manufactures	53	1	45	1	65	2	64	2	69	2	82	2	81	2

* Figures for 1989 were not available

APPENDIX 5

Source: Dept. of Industrial Licencing & Control

Qatar - Manufacturing Establishments - Registered & Licenced at end of 1991

P.E. (Persons Engaged) = 10+. Minimum Authorized Capital 250,000 QR

Industrial Activity		Total No.	Registration & Production Start Before 1980				Registration & Production Start After 1980				Licenced 1980 & After			
ISIC Code	Description	31/12 1991	No. of Establishment	Persons Engaged	Invest. Capital mm QR.	% Foreign	No. of Establishment	Persons Engaged	Invest. Capital mm QR.	% Foreign	No. of Establishment	Persons Engaged	Invest. Capital mm QR	P=Prodn. C=Under Constn.
31	**F.D.T.**	47	16	559	152.6	x	16	786	288.1	x	15	432	116.2	x
3111	Meat Products	3	-	-	-	-	2	211	121.3	55	1	13	3.4	C
3112	Dairy Products	5	2	140	26.9	-	3	185	88.9	-	-	-	-	-
3116	Grain Products	2	1	138	33.7	-	-	-	-	-	1	12	0.9	C
3117	Bakery incl. Biscuits	17	9	158	24.8	9	5	127	27.5	-	3	187	72.4	C
3119	Cocoa, Chocolate & Sugar Prods, Sweets	3	1	10	0.4	49	1	15	8.8	-	1	32	3.6	C
3121	Not Elsewhere Classed	11	-	-	-	-	3	68	22.7	Neg.	8	128	24.5	P 1,C 7
3134	Drinks incl. Carbon Water	6	3	13	66.8	-	2	80	18.9	-	1	60	11.4	
32	**Textiles & Leather**	30	-	-	-	-	13	3072	52.6	x	17	2034	542.7	x
3212	Textile Goods excl. Clothes	5	-	-	-	-	-	-	-	-	5	30	500.9	P 1
3220	Clothing excl. F/Wear	24	-	-	-	-	12	2988	47.2	Neg.	12	2004	41.8	P 2

Industrial Activity		Total No.	Registration & Production Start Before 1980				Registration & Production Start After 1980				Licenced 1980 & After			
ISIC Code	Description	31/12 1991	No. of Estab-lishment	Persons Engaged	Invest. Capital mm QR.	% For-eign	No. of Estab-lishment	Persons Engaged	Invest. Capital mm QR.	% For-eign	No. of Establi-shment	Persons Engaged	Invest. Capital mm QR	P=Prodn. C=Under Constn.
3231	Preparation of Leather	1	-	-	-	-	1	84	5.4	-	-	-	--	-
3320	Wood & Products Furniture & Fittings	34	19	618	69.5	9	10	226	17.0	-	5	103	3.7	P 4
34	**Paper & Products, Printing & Publish.**	15	10	753	94.7	-	5	152	19.4	-	8	211	31.8	-
3411	Paper & Card Prods.	4	-	-	-	-	4	115	11.3	-	8	211	31.8	P 2
3420	Printing, Publishing	11	10	753	94.7	-	1	37	8.1	-	-	-	-	-
35	**Chemical & Petro-chem, Petrol, & Plastic Products**	57	10	1744	1455.3	8	17	989	2607.4	16	28	853	179.6	P 6
3511	Basic Industrial Chemicals excl. Fertilizers	7	3	53	19.1	-	3	687	2563.3	16	1	51	5.6	C
3512	Fertilizers & Pesticides	1	1	785		25	-	-	-	-	-	-	-	-
3521	Paints, Lacquers etc.	3	-	-	-	-	2	40	6.1	23	1	14	1.7	C
3523	Cleaning Agents & Toiletries	4	-	-	-	-	1	78	15.5	-	3	64	12.9	P 1
3530	Oil Refinery Prods.	3	1	605	910.0	-	-	-	-	-	2	51	7.5	P 1
3540	Misc. Oil & Gas Prods.	6	1	82	10.4	-	3	59	8.3	-	2	35	8.0	C

APPENDIX 5 (CONTD)

Industrial Activity		Total No.	Registration & Production Start Before 1980				Registration & Production Start After 1980				Licenced 1980 & After			
ISIC Code	Description	31/12 1991	No. of Estab-lishment	Persons Engaged	Invest. Capital mm QR	% For-eign	No. of Estab-lishment	Persons Engaged	Invest. Capital mm QR	% For-eign	No. of Establi-shment	Persons Engaged	Invest. Capital mm QR	P=Prodn. C=Under Constn.
3560	Plastic Products N.C.	31	4	219	17.6	-	8	125	14.2	-	19	638	143.9	P 4
36	**Non-Metallic Mineral Prods ex. Hydrocarb.**	70	29	1455	238.4		18	565	100.7	-	23	579	140.1	P 14
3620	Glass & Products	2	-	-	-	-	-	-	-	-	2	29	4.6	P 1
3692	Cement, Plaster etc.	63	27	965	221.9	Neg.	17	514	97.6	-	19	488	88.1	P 13
3699	Not Elsewhere Classed	5	2	490	16.5	-	1	51	3.1	-	2	62	47.4	C
37	**QASCO**	1	1	1065	1200.0	30								
Basic Metals	Qatar Sponge Iron	1									1	119	1205.5 49% Forgn.	C
	Qatar Zinc. Co.	1									1		25% Forgn.	C
	Ferrosilicon Co.	1									1	90	35.3 25% Forgn.	C
38	**Fabricated Metal**	52	19	358	35.7		17	622	162.8	Neg.	16	262	33.4	P 4
3811	Cutlery, Tools & General Hardware	2	-	-	-	-	2	37	3.2	-	-	-	-	
3812	Furniture & Fittings	4	1	13	1.0	49	1	32	1.9	-	2	20	2.3	P 1

Industrial Activity		Total No.	Registration & Production Start Before 1980				Registration & Production Start After 1980				Licenced 1980 & After			
ISIC Code	Description	31/12 1991	No. of Estab-lishment	Persons Engaged	Invest. Capital mm QR.	% For-eign	No. of Estab-lishment	Persons Engaged	Invest. Capital mm QR.	% For-eign	No. of Establi-shment	Persons Engaged	Invest. Capital mm QR	P=Prodn. C=Under Constn.
3813	Structural Products	3	1	18	1.0	30	1	122	100.0	-	1	11	3.0	C
3819	Fabricated Prods excl. Machinery & Eqpt.	31	13	271	29.8	4	7	125	11.4	-	11	205	24.0	P 3
3821	Machinery Maint. & Repair incl. Turbine	1	-	-	-	-	1	162	3.0	-	-	-	-	C
3824	Machinery & Repair of Machinery ex. 3823	7	4	56	3.9	10	3	50	5.2	17	-	-	-	C
3829	Machinery & Equip. excl. Electrical. NEC	4	-	-	-	-	2	94	29.0	-	2	36	4.1	C
39	**N.E.C.**	1	1	29	2.3	49	-	-	-	-	-	-	-	-

APPENDIX 5 - ADDENDUM

The data shown in Appendices 4 and 5 have involved personal research and investigation by the candidate to differing degrees. Appendix 4 contains information collated by the Central Statistical Office in its annual Industrial Survey. The original data include information from several different sources as mentioned in Chapter 6.4.2.1, including all the Departments and Ministries listed in Section C of Bibliography and References and, additionally, the Municipality of Doha which is responsible for Salwa Industrial Area. In some cases the classification of an activity or enterprise as industrial as distinct from commercial or service sector is difficult. For example small scale establishments classified under ISIC Code 3117 - Bakery Products may consist of small shops selling bread, cakes, confectionery etc. a large part of which products may have been made on the premises.

Under ISIC Code 3220 an establishment defined as making clothing may be either a small family tailoring business making clothes to individual orders or a factory with a structure of owner and/or management, and wage-paid employees. Under ISIC Code 38 the distinction between an enterprise predominantly concerned with manufacturing metal goods or machinery as contrasted with predominantly engaged in repairing equipment for example, vehicle repairs, is always difficult to make, especially where small establishments are concerned. The same difficulty was noted by Al-Kubaisi (1984), especially with regard to the period before 1980 and the Salwa Industrial Area.

The CSO attempts so far as is possible to analyse the information it receives from other Departments and Ministries but has to rely mainly on the classification made by these agencies. The Public Works Department, for example has large-scale engineering workshops (as noted in Chapter 6.3.10) which can be classified under ISIC Codes 3821, 3823 or 3824 and it is by no means certain that the same code is applied in every year. The candidate has found it impossible to personally research every establishment every year, but a series of sample visits were paid to over 90 establishments classed as industrial but not qualifying under Appendix 5 requirements, over a period between 1986 and 1990. All that can be said is that (a) the turnover and other changes in ownership etc. of such establishments is relatively high but that (b) on the basis of what information could be obtained on a voluntary basis is that the general trend over the years is as described in Chapter 6.4.2.1 - 6.4.2.3.

Appendix 5 data on the other hand is the responsibility of the single Department of Industrial Licensing and Control. The criteria which now have to be satisfied by an enterprise before it can be recognized as true industrial establishment are given in Appendix 3 - Licensing and Registration Forms for New Industries. This procedure was first established in a less rigorous form in 1982 and later considerably tightened up in the late 1980s, mainly as the result of the candidate's research investigations.

In the first place the application for licensing has to supply a range of detailed information, secondly this is then checked by a Department Inspector. Plant construction follows licensing but production should not start until registration which is not given until site visits etc. result in the approval by the Department. The candidate has regularly made sample visits to a range of establishments of different sizes, from QASCO to fabricated metal industries (Code 3812) employing 15-20 employees. While some changes have been made in classification e.g. ISIC Code 3829 is no longer used, the candidate is confident that all the establishments shown in Appendix 5 are true manufacturing units and that the trends indicated are true representations. The financial investment information obtainable meets legal requirements but in detail the position may be slightly flexible in individual cases over time. Great care is necessary in the analysis of investment data (and see Introduction II.1.2).